

**MODEL INFORMATION SYSTEM FOR
EDUCATIONAL ADMINISTRATORS IN
PAKISTAN**

**A THESIS SUBMITTED TO THE UNIVERSITY OF THE PUNJAB
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY IN LIBRARY
AND INFORMATION SCIENCE**

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CERTIFICATE

This is to certify that the research work described in this thesis is the original work of the author and has been carried out under my direct supervision. I have personally gone through all the data/results/materials reported in the manuscript and certify their correctness/authenticity. I further certify that the material included in this thesis have not been used in part or full in a manuscript already submitted or in the process of submission in partial/complete fulfillment of the award of any degree from any other institution. I also certify that the thesis has been prepared under my supervision according to the prescribed format and I endorse its evaluation for the award of Ph.D. degree through the official procedures of the university.

(Prof. Dr. Khalid Mahmood)

DEDICATION

This work is dedicated to the greatest Reformer of Humanity Prophet Muhammad (Peace Be Upon Him), Who showed us the right path and gave the women, a respectable place in the society. May Allah Almighty help us to know what is our actual role as the builders of Nation (Aameen).

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In the name of Allah Almighty Most Gracious, Most Merciful

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MODEL INFORMATION SYSTEM FOR EDUCATIONAL ADMINISTRATORS IN PAKISTAN

By

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ABSTRACT

The ultimate objective of this research is to develop a draft model for educational administrators in Pakistan. To achieve this objective a mixed methods research design was used and the study was completed in different phases. In the first phase, literature search was carried out by using standard sources and tools for the better understanding of theoretical and technical aspects of the study. Major areas covered in the literature review include: *a)* a discussion of the information overload in this information age and its burden on information searcher and user. Furthermore, how an Information System (IS) can help the information searcher/user. The discussion goes forward and discusses the case of educational administrators as information searchers and users; *b)* the design considerations of an educational information system along with available examples of information systems of the world are part of the review. A review of related studies is also given; *c)* the information needs, seeking behavior and work tasks etc of educational administrators are also presented; and *d)* the last section presents an overview of Pakistani perspective i.e., educational administration, information system and networks in education, etc. A review of related studies is also presented in this section.

This thorough literature search and review led to the second phase of the study i.e. the survey instruments development. In this phase the quantitative data were collected with the help of survey instruments. For finding the information needs and seeking behavior through questionnaire survey, a selected group of experts from the public sector institutes, who, in their discharge of day to day administrative work, have to depend upon the information system in education, were identified with the

help of reviewed literature and discussion with experts. Thus the educational administrators i.e., Registrars/Deans/Heads of Departments in universities and principals of schools and colleges (public sector) were identified as the target population and were selected through multistage cluster sampling. The respondents were from the Punjab province and Islamabad Capital Territory (ICT). In total, 297 (99%) responses were received and analyzed quantitatively. Interviews of three different categories of experts (i.e., educational administrators, Information and library professionals, and Information system experts) were also conducted for the in-depth understanding of respondents' point of view and phenomena under study. The purposively selected sample of interviewees was working in well known institutes (public and private sectors) of Punjab province and ICT and had better understanding of the area under study. Fifty five interview responses were qualitatively analyzed. In the third phase, an initial draft of a centralized information system entitled '*Pakistan National Information System for Educational Administrators-PAK-NISEA*' accessible through integrated web-based environment was proposed on the basis of findings of the study. The initial draft was sent to the purposively selected experts of Library & Information Science, Information System and Education within the country and abroad. In the final phase, the initial draft model was revised and finalized for presentation in the light of responses by 28 experts.

The development of the information system is proposed in phases by using the Spiral Model. Services and access mechanism are tried to be made more user-centered with the help of Knowledge Environment Model. Major components of the model include: primary users; geographic acquisition and distribution coverage and type of information acquired; media classification; information acquisition; information selection; information processing; information storage; products and services; and management structure and funding.

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Chapter 1

BACKGROUND OF THE STUDY

In the current age of science and technology, the role of education has come to be acknowledged as a vital factor for human development. The developed world achieved extraordinary socio-economic and technological developments because of the realization of this fact. A free flow of information to educational administrators and policy makers via sound information system is an essential requirement for achieving educational goals and objectives. Information systems exist in most of the developed countries that connect the education enterprises within and between different countries.

An information system is simply an organized procedure for collecting, processing, storing, and retrieving information to satisfy a variety of needs (Prytherch, 2005). An educational information system is the basis of management, planning and evaluation of an education system. During the education management process, the information system should inform the different actors and partners on the state of the sector, its internal and external efficiency, its pedagogical and institutional operation, its performance, shortcomings and needs. Since, the needs for information are diverse and becoming more and more complex, a sound information system should be as complete as possible. It should cover all the needs and areas for information and not only aim to collect, store data and process information but should also help in the formulation of education policies, their management and their evaluation (UNESCO, 2003).

However, most educational information systems in developing countries are faced with a lack of an integrated information infrastructure for providing accurate, valid and useful information when it is needed for educational planning, monitoring and further decision making. In case of Pakistan, although information is known to be very vital for effective educational administration and management, development of educational information system has been considered as an afterthought. There is urgent need of better research for the development of robust and user centered educational information system in Pakistan (Human Development Foundation, 2004).

1.1 Statement of the Problem

It is a fact that an efficient educational information system for the exploitation of national and international information is a prerequisite for the development of a country. Educational administrators require various types of information and data for efficiently carrying out their official assignments. They can only do this in a context, which allows them to access, use, validate and communicate required information.

However, the problem is that in Pakistan no such information system exists to facilitate the educational administrators and decision makers. Currently, Pakistan has one institution that conducts research on educational issues; National Educational Management Information System (NEMIS) working under Academy of Educational Planning and Management conducts research on basic education only. However, its abilities are hampered by inadequate funds, non-institutionalized basis for collecting, processing and analyzing data, non-availability of technical support staff and little

influence in policy making (Human Development Foundation, 2004). Without a reliable flow of valuable data, the impact of NEMIS with respect to any building and informing of institutions would be insignificant. Nevertheless, in the light of NEMIS's original objectives, a basic weakness in the project has been insufficient attention and effort given by the government and project management to establish NEMIS as an integral part of the existing government structure. The respective roles of NEMIS at the national and provincial levels are not clarified. There is lack of operational relationships between the national level and the provincial level, though the minimum forms of cooperation are necessary to assure statistics for national planning needs (Thomas & Khan, 1993). As a result, there is a gap in the provision of required, authentic and reliable information/data to the educational administrators working at tehsil/district/divisional level. In the absence of such information, they have to fill the gaps by approximation and they feel the need of having an efficient information system (Hashmi, 1984). Therefore, a management information system, badly needed by the Education Department of Pakistan, should be devised and established. Data on all educational institutions, teachers and facilities should be collected and computerized and programs should be designed to agglomerate and recall specific information needed by the administrators (UNESCO, n.d.).

In this perspective, the problem addressed in this study will lead the researcher to identify the information needs and seeking behavior of educational administrators in Pakistan and then proposing a draft model for enabling them to make well informed decisions.

1.2. Assumptions

This study is based on few assumptions which are as follows:

1. Educational administrators in Pakistan have problem in locating and finding the information that they need for effectively carrying out their administrative tasks.
2. The tasks are completed with little relevant information and approximation.
3. The information does exist either in the form of routinely collected data or in libraries. However, there is a need for integrating the disparate sources into an integrated information system accessible to all the educational administrators in Pakistan from macro level to the micro level.
4. It is assumed that the Government of Pakistan would be the major force for developing an effective, efficient and user centered information system for educational administrators in Pakistan.

1.3. Research Questions

The basic purpose of this study is to find out the information needs and seeking behavior of educational administrators in Pakistan and to propose a draft model for them.

Following research questions will support and direct the study:

RQ-1. *What is the role of information system in the promotion of education within a country?*

RQ-1a. What are the design considerations of a user centered information system in education?

RQ-1b. What is the existing system of education and its administration in Pakistan?

RQ-1c. What is the existing information system/network of education in Pakistan?

RQ-2. *What are the information needs and seeking behavior of potential users of educational information system?*

RQ-2a. Which studies are available on information needs and/or seeking behavior of educational administrators in Pakistan?

RQ-2b. Which tasks are performed by the educational administrators?

RQ-2c. Which sources are used by the educational administrators in Pakistan for seeking needed information?

RQ-2d. Is there any statistical relationship between the information source preferences and the administrative experience?

RQ-2e. What are the information needs of educational administrators?

RQ-2f. To what extent the needed information is available to them?

RQ-2g. Is there any statistical difference between the needed and available information to educational administrators in Pakistan?

RQ-2h. What are the problems being faced by the educational administrators?

RQ-3. *How a draft model can be evolved on the basis of reviewed literature, and views of potential users and service providers, determined through a questionnaire survey and personal interviews?*

RQ-3a. What are the major findings of reviewed literature?

RQ-3b. What are the major findings of questionnaire survey of potential users i.e., educational administrators?

RQ-3c. What are the major findings of interviews of educational administrators and service providers i.e., librarians/information professionals and IS/IT experts?

RQ-3d. To what extent these findings support the evolving of a user friendly information system for educational administrators in Pakistan?

RQ-3e. Which agency can function as focal point both for the national educational information system of Pakistan and as a coordinator with international educational information systems?

RQ-3f. What should be the functions of a model information system for educational administrators?

RQ-3g. Which information services, products and programs can be proposed for the information system users?

RQ-3h. How the draft model can be improved in the light of experts' recommendations?

1.4. Objectives

Parallel to the stated problem the basic objective of this research is to answer the research questions. The answers to these questions will lead to the draft model of information system for educational administrators in Pakistan. Following are the specific objectives of the study:

1. To review in brief the literature highlighting the different aspects of educational information system in national and international perspective;

2. To review the existing educational system and information network of education in Pakistan;
3. To determine the information needs and seeking behavior of educational administrators in Pakistan and related problems;
4. To evolve a draft model on the basis of views of potential users (educational administrators) and service providers (librarians and IS/IT experts), ascertained through a questionnaire survey and personal interviews;
5. To identify an agency that may function as focal point both for the national educational information system of Pakistan and as a coordinator with international educational information systems;
6. To identify the functions of a model information system for educational administrators;
7. To propose the information services, products and programs for the information system users;
8. To seek the opinions of experts about the draft model for its improvement.

1.5. Theoretical Framework

The theoretical framework for this study is to determine the information needs and seeking behavior of educational administrators in Pakistan and propose a draft model of information system which can assist them in making well informed plans and decisions for the education enterprise of the country. Verma (1996) in his work provided a framework for designing a national information system in education. The major elements of his framework are as follows: a) Know the Background; b) Users and Their

Needs; c) Types of Users; d) Types of Information Needs; e) Coverage; f) Centralized or Decentralized; g) Services; h) Organizational Considerations; i) Manpower Requirement; and j) Qualitative Considerations.

Know the Background: Research question (1) and its sub questions will look for the role of information system in the promotion of education within a country. It would also guide the review of educational administration system and related information system/networks in Pakistan.

Users and Their Needs; Types of Users; Types of Information Needs; Coverage: The Research question (2) and its sub questions will address the administrative tasks for which the information need arises and the type of information sources needed and the state of their availability; sub question (2c) will also lead to find out the information seeking behavior of the administrators. Furthermore it will also guide the review of research on information needs and seeking behavior of educational administrators in Pakistan. Further statistical tests (i.e. Paired Sample T test) will be used to see if there is any statistical difference between the needed and available information to educational administrators in Pakistan. Any relationship between the use of different information sources (formal and informal) and the administrative experience will also be sought out with the help of Chi-square test. The general model of information needs and seeking behavior by Wilson (1997) will be used with few modifications as a guide for determining the information needs and seeking behavior of educational administrators in Pakistan.

Centralized or Decentralized; Services; Organizational Considerations; Manpower Requirement and Qualitative Considerations: The next element of the framework is to consider the centralization or decentralization of the proposed information system. Research question (3) will not only explore this issue but would also determine the central agency which can play the role of a focal agency. It would also identify the functions of the proposed information system. Thus the Research question (3) with its sub questions will address all the aspects of evolving an initial draft model. It will also guide to seek experts' opinion about the proposed draft model. The changes will be made in the model in the light of recommendations by the experts.

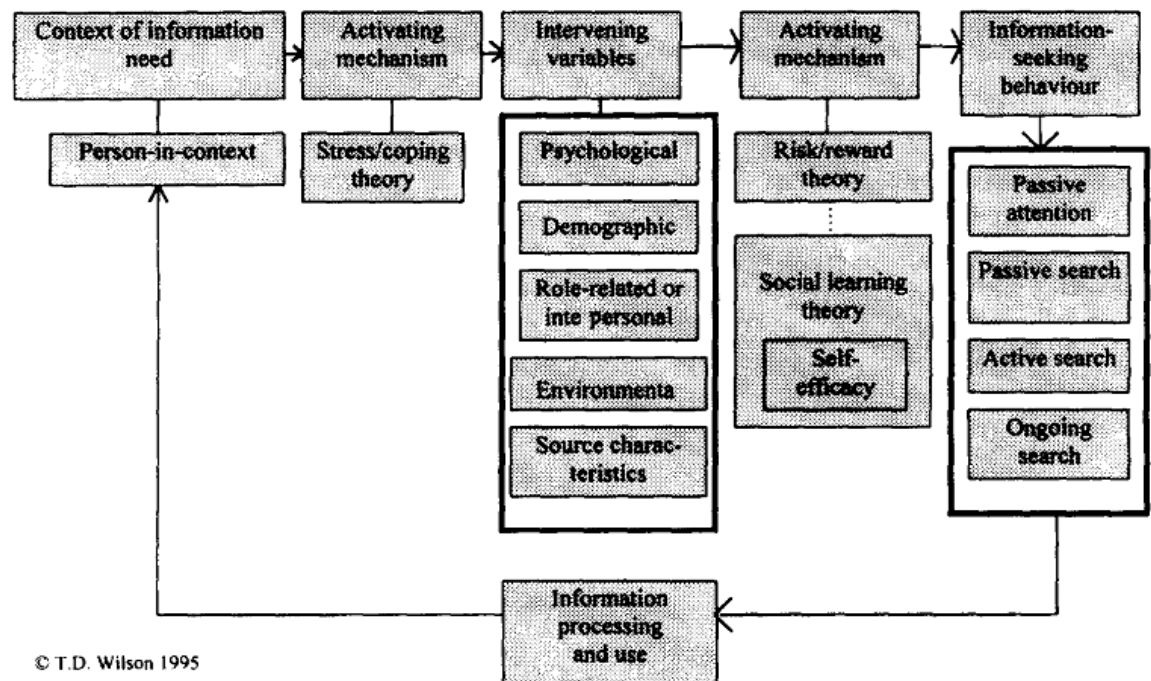


Figure 1.1: A Revised General Model of Information Behavior by Wilson (1997)

Wilson (1997) presented a general model of “information behavior”, which includes a number of stages that begin with the context of the information need. The

second stage is the activating mechanism i.e., the motive or reason for seeking information. The third stage is of intervening variables that may act as barriers to information seeking and/or processing, such as the personal variables and the characteristics of the source. Information seeking behavior is the active and/or passive search for information. Information processing and use is the next stage which acts as a mechanism of feedback for the information searcher/user and may give rise to more information needs (See Figure 1.1). Based on Wilson's model of "information behavior" the theoretical framework of this study identifies the *information searcher* (i.e., educational administrators) as the Independent variable, whose *work environment and tasks* (moderate variable) give rise to the *information need* (dependent variable) and motivate him for *seeking information* (dependent variable). The researchers have identified that information needed by educational administrators may be related to routine tasks, planning, and budgeting, etc (S. M. de-Alwis & Higgins, 2001; Lucey, 1995). The third dependent variable is the *availability of information* which may be affected by the intervening variables (i.e., non-availability of needed information, invalid information, etc.) and cause dissatisfaction of the searcher/user. Durrance (1989) stresses that most of the research studies have focused on which systems and services are used rather than on how information systems can be designed to meet the needs of users. In this perspective, the study attempts to utilize the findings of the study and proposes a draft model of information system (i.e. PAK-NISEA) which can satisfy educational administrators' information needs. Many researchers believe that the *design of the information system* should be informed by the users' information needs, seeking behavior and other preferences. Moreover already available information sources should also be pooled in the

information system (Robson, 1997; Schroeder and Dozier; 1975; Verma, 1996). In this information era, the services of the system can be more effective, if based on *Knowledge Environment Model*, which looks at the full range client needs and resource requirements and asks how co-operation and network can improve services to meet these needs and requirements (Gorman & Cullen, 2000). Moreover its development with iterative design approach (i.e., Spiral Model) can reduce the risk factor and involves the development of information systems (prototypes) based on the input of the users. Such systems can also be tested using real data (Moahi, 2000; TechTarget, 2009). The use and processing of information given by the information system will work as the feedback mechanism and may give rise to the further need for information; however, this study does not attempt to assess the use and processing of the information provided by the information system. Figure-1.2 presents the detailed overview of variables and their relationship with each other.

1.5.1. Theoretical Proposition

The theoretical proposition underlying this study is that an effective and user friendly educational information system plays a vital role in the national development. Such an information system can be proposed in the light of its potential users' 1) personal characteristics (i.e., designation, experience of job and work tasks etc.), which affect their 2) information seeking behavior and 3) information needs and their satisfaction with the availability of needed information. Their preferences for the needed information should reflect in the design, delivery and other aspects of information services and products provided by the information system. Different factors, such as the information systems' managing agency, its internal management structure, its functions and mechanism of

information acquisition, organization, storage, access and delivery, should be considered in the design and development of an educational information system. All these factors will affect the performance of the information system and its users' satisfaction with it.

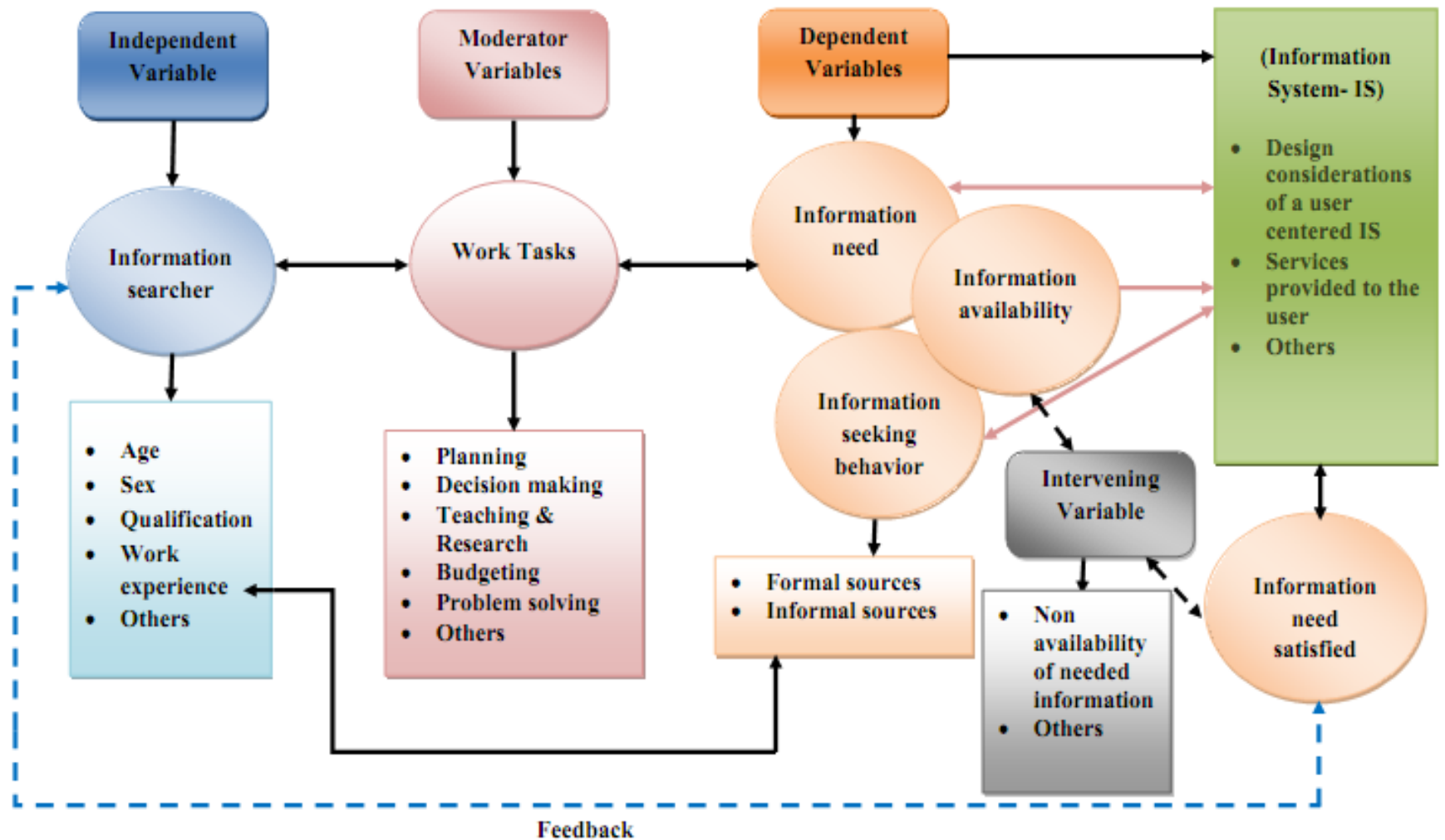


Figure 1.2: Detailed Overview of Variables and Their Relationships

1.7. Delimitations and Limitations of the Study

Following are the limitations and delimitations of the study:

1. The questionnaire survey and interviews are delimited to the Punjab province and Islamabad Capital Territory (ICT) of Pakistan. Only public sector institutes are included in the questionnaire survey (the justification of this sample is provided in Chapter-3).
2. This research only proposes a draft model of information system for educational administrators, it does not aim to test and validate the proposed draft model. The comments of the experts about the proposed draft aim at assessing the suitability of the model and improving the draft in the light of their recommendations.
3. This work does not aim at focusing the information needs and seeking behavior and related discussions in depth, however, the main focus is to determine the basic needs and information seeking behavior and other preferences of the educational administrators. This basic understanding can be helpful for proposing a draft model of information system for the educational administrators.
4. The relevant literature/studies which provided theoretical foundation for this research are dated.
5. The literature on some developing and developed countries of the world is limited to its availability in Lahore, and Bahawalpur libraries and online resources accessible through Internet and HEC Digital Library.
6. The survey was conducted through mail/e-mail, personal visits, research assistants and subsequent reminders. Response pattern was not good from

remote and far flung areas. However in Bahawalpur, Lahore, Islamabad and Multan due to personal persuasion the survey response was good.

1.8. Definitions of the Terms

Activating Mechanism: Reasons and the motivation that drives the educational administrators to actively seek information.

Centralized Processing: Processing performed in one computer or in a cluster of coupled computers in a single location. Access to the computer is via "dumb terminals," which send only input and receive output or "smart terminals," which add screen formatting. All data processing is performed in the central computer (TechEncyclopedia, 2007). In this study the concept is used for processing the information (i.e. indexing, abstracting, assigning metadata etc) at a central place, while the information will come from different nodal points to the center through web-based environment.

Educational Administrators: set educational standards and goals and establish the policies and procedures to achieve them. They also supervise managers, support staff, teachers, counselors, librarians, coaches, and other employees and develop academic programs, monitor students' educational progress, train and motivate teachers and other staff, manage career counseling and other student services, administer recordkeeping, prepare budgets, and perform many other duties. They also handle relations with parents, prospective and current students, employers, and the community. In an organization such as a small school, one administrator may handle all these functions. In universities, colleges or large school systems, responsibilities are divided among many administrators, each with a specific function (US, Bureau of Labor Statistics, 2008).

In this study the educational administrators are the principals/vice principals of schools and colleges, heads of departments, deans, registrars, vice chancellors in universities, District Education Officers (DEOs), Education Chiefs in Federal Ministry etc. working in public sector institutes of Pakistan.

Information Need: is a subjective, relative concept only in the mind of the experiencing individual. It has been defined as the "recognition of the existence of uncertainty" (Krikelas, 1983, p.6).

Information Seeking: has been understood as a process in which the actor's understanding of his or her tasks or problems, information needs, relevance criteria, and the available information space evolve (Javelin & Ingwersen, 2004).

Information Society: The prominent features of the information society include Internet access to enable e-government, e-health, and e-learning, electronic commerce citizen empowerment (Prytherch, 2005, p.353).

Information System: Information Systems, as an academic discipline, is a rich multidisciplinary domain. The scope of information systems is not oriented to the technology per se but to the impact of its use; some authors consider that the domain begins where *Computer Science* ends. Attempts to place rigid boundaries on IS have been argued to reduce the discipline's richness and value but whenever definition is used, the domain clearly has a major focus on the organizational and social context surrounding the use of information technology (David & Fitzgerald, 2003, p. 306).

On the other hand, an *information system* is a set of interacting artifacts and human activities that performs one or more functions involving the handling of data and information, including data collection, creation, editing, processing and storage; and information selection, filtering, aggregation, presentation and use (Clarke, 1995). According to Prytherch (2005), information system is an organized procedure for

collecting, processing, storing, and retrieving information to satisfy a variety of needs. The term information system in this study is used as a means of managing information.

Intervening Variables: It refers to the problems faced by the educational administrators in finding and using the needed information. The problems could be in the form of non-existence/non-availability of the information or in the sense that available information is not valid. According to Wilson (1997), these variables could be personal or they may be related to organizational environment and even to problems with the sources and channels themselves.

Model: The purpose of this research is to develop a draft model of National Information System for Educational Administrators in Pakistan. Model development is considered an effective research method. A model is an abstraction, a mental framework for analysis of a system. It involves simplified representations of real-world phenomena. It assists investigators and scientists in relating more accurately to reality; it also aids them to describe, predict, test or understand complex systems or events. Thus, models often provide a framework for the conduct of research and might consist of actual objects or abstract forms, such as sketches, mathematical formulas, or diagrams (Busha & Harter, 1980; Powell & Connaway, 2004, p. 60).

National Information System: A national system that systematically exploits information providers and resources in a coordinated way, for the benefit of users (Feather & Sturges (Eds.), 2003). In this study the concept is used for an agency that may function as an Ideal point both for the national information network and as a coordinator with International Agencies in the field of education.

Network: A network is a form of arrangement or an administrative structure that links a group, individuals or organizations who have agreed to work together for

any purpose such as in the acquisition programs, technical processing and resource sharing etc. Information networking generally entails the sharing of resources so that the information needs of both actual and the potential users of information- from the local to national level are met. This helps in meeting the information needs of all network participants. The concept of network and networking is applicable within an information system and amongst various information systems (Verma, 1996). In this study the concept has been used to include the networking in the system.

PAK-NISEA: Name suggested by the researcher for the proposed model and stands for “Pakistan National Information System for Educational Administrators”.

Prototype: The first model of something that is completely new (Dictionary of Information and Library Management, 2006).

Work Tasks: these are work related activities that individual (i.e., educational administrator) has to carry out; for example, planning would be a typical task.

1.9. Organization of the Study

The study is organized in seven chapters including appendices and references:

Chapter One: includes an introduction that describes the background of the study, theoretical framework and proposition, a statement of the problem, objectives of the study, justification and likely benefits of the study, major and supporting research questions, major variable, delimitations and limitations, definitions of the terms and organization of the study.

Chapter Two: consists of a review of related literature. It explains various aspects of Information Systems (IS), its role in education and methodologies adopted for its development, educational information systems and related research studies etc. All these topics are discussed in local and international scenarios.

Chapter Three: shows the detailed design of the study. Methods of research are described along with procedures for literature search, sampling, instrument development for survey and interviews of experts, collection and analysis of data, and design of the draft model.

Chapter Four: presents the quantitative analyses and interpretation of the data collected through questionnaire survey.

Chapter Five: presents the qualitative analyses and interpretation of the data collected through personal interviews.

Chapter Six: presents the major findings of the study, the initial draft model of a *National Information System for Educational Administrators in Pakistan* based on these findings, a report of experts' comments and recommendations about the proposed draft and the final draft of the Model. The initial draft model is attached as Appendix-O.

Chapter Seven: presents a summary of the study, draws conclusions, and makes recommendations.

The appendices contain the data collection instruments, lists of sample, cover letters, etc. A reference list of information sources cited in the study is provided at the end.

Chapter 2

REVIEW OF THE RELATED LITERATURE

The basic objective of this study is to propose a draft model of national information system for educational administrators in Pakistan after identify their information needs, information seeking behavior and other preferences. This chapter reviews the relevant literature to provide an understanding of different aspects of the study. This understanding facilitates the accomplishment of the objectives of the study. This chapter presents an account of published and unpublished literature (books, journal articles, reports, conference/workshop proceedings, theses and dissertations) covering different aspects of the study. It should be noted that due to the limited amount of Pakistani literature on different aspects of the study, most of the literature reviewed here is from developed countries of the World (particularly North America). Moreover, the relevant literature/studies which provided theoretical foundation for this research are dated. Following research questions were addressed in this chapter:

RQ-1. *What is the role of information system in the promotion of education within a country?*

RQ-1a. What are the design considerations of a user centered information system in education?

RQ-1b. What is the existing system of education and its administration in Pakistan?

RQ-1c. What is the existing information system/network of education in Pakistan?

RQ-2. *What are the information needs and seeking behavior of potential users of educational information system?*

RQ-2a. Which studies are available on information needs and/or seeking behavior of educational administrators in Pakistan?

RQ-2b. Which tasks are performed by the educational administrators?

RQ-2h. What are the problems being faced by the educational administrators?

The literature review consists of four major parts:

1. A discussion of the information overload in this information age and its burden on information searcher and user. Furthermore, how an Information System (IS) can help the information searcher/user. The discussion goes forward and discusses the case of educational administrators as information searchers and users.
2. The Design considerations of an educational information system along with available examples of information systems of the world are part of the review. A review of related studies is also given.
3. The information needs, seeking behavior and work tasks etc of educational administrators are also presented.
4. The last section presents an overview of Pakistani perspective i.e., educational administration, information system and networks in education, etc. A review of related studies is also presented in this section.

2.1. Information Age, Information Overload and its Burden on the Information Searcher/User

The human society is undergoing a transformation due to the rapid development and diffusion of Information Technology in all walks of life. Information has become a very crucial element in the progress of human society, which we get with the help of radio, telephone, television, computers, newspapers, magazines, reports, patents, standards, and microforms etc. In every walk of life information plays imperative role whether taking any decision or implementing some policies ‘public or private’ as this affects the society (Ashraf, 2004; Kawatra, 2000; Kumar, 2004). The digital revolution has changed the nature of information and this is true as the concept of information creation, delivery and presentation, user’s needs and expectations have changed. A rise is viewed in this context as ability to collect augmented data as well as enabling researchers to share the bulk of raw research data (Ross & Sennyey, 2008). Information Technology (IT) is the basis of modern society because it is used to support information processing tasks as an enabler of innovation and a saver of time and space. In such a context, it has become one of the most important resources in the working environment and, as a result, more organizations are investing heavily in IT. Acquiring, collecting, transferring and disseminating information is the major concern of IT (Weerasinghe, 2004). Furthermore new applications of information and communication technologies (ICTs) like business software, e-mail, e-commerce and organizational information systems are emerging with new techniques (Ayresa & Williams, 2004). Today there are staggering amounts of information shared digitally and stored in the worldwide databases of government departments, law enforcers, financial institutions, multinational organizations, health

providers, phone operators, airline service providers, to name but a few. Information technology is drawing effective means for assembling, systematizing and circulating required information to people on a large scale through communication networks (Ashraf, 2004; Elahi, 2009). The digital revolution in Information & Communication Technologies (ICTs) has created the platform for a free flow of information, ideas and knowledge across the globe. This revolution has made a profound impression on the way the world functions and has transformed it to an evolving information society (Shafique & Mahmood, 2008).

2.2. Helping the Information Searcher/User with the Information System (IS)

In this information era and information society, man is overburdened due to the information overload. The authenticity and reliability of information is another issue disturbing the researchers and information searchers and users. The free flow of information has created a new life where we are now in danger of becoming dependent on this method of access to information. Therefore we see an information overload from the access to so much information, almost instantaneously, without knowing the validity of the content and the risk of misinformation (Flew, 2008; Yang, Chen, & Honga, 2003). The general causes of information overload include:

- A rapidly increasing rate of new information being produced
- An increase in the available channels of incoming information (e.g. telephone, e-mail, instant messaging, rss)
- The ease of duplication and transmission of data across the Internet
- Large amounts of historical information to dig through
- Contradictions and inaccuracies in available information

- A lack of a method for comparing and processing different kinds of information
- A low signal-to-noise ratio
- The pieces of information are unrelated or do not have any overall structure to reveal their relationships (Lohr, 2007).

In this perspective, many organizations from national campaigning bodies to local tenants groups from time to time identify a need to set up an information service to meet the requirements of the following: *a)* their own staff or membership; *b)* the general public as a whole or belonging to a defined geographical area; *c)* sections of the public with particular needs, such as disabled or elderly people; *d)* workers and public associated with a particular purpose (Panigrahi, 2000). Gaslikova (1999) has critically analyzed that on one hand, we speak about the information revolution and development of information society emphasizing an almost miraculous role in transforming societies, organizations and workplaces. On the other hand, every day individuals and whole organizations try to dispatch with the great information stream continuously incoming. People talk about information overload and wonder that there are no essential growths of productivity in organizations, which invest in information technologies very much. Decision makers call for many reports but they have no time to read them; an expensive analysis of a problem is undertaken but its findings are not used; one compiles necessary information not before but after decision making, and so on. Information may simplify problem solving and work towards achieving an effective decision but for that it has to be exact, reliable, relevant, actual, and accessible for the appropriate individual in appropriate time and in a suitable form. Only then these lights could correct the existent process. This conclusion by

Gaslikova refers to an effective, efficient and user centered information system, which is the need of hour. As information system is an organized procedure for collecting, processing, storing, and retrieving information to satisfy a variety of needs (Prytherch, 2005), so in current scenario, the need and demand for information system is increasing day by day. Buckland (1991) has described different types of information systems such as: a) communication, in which information is conveyed, intentionally and more or less directly to the receiver as in a conversation, a letter, or a lecture; b) retrieval based information services, wherein collected and stored information-as-thing is sought and retrieved by the user, represent another sort of information-receiving situation; c) observation: information can also be received by other means such as observing an event, conducting an experiment or contemplating any evidence that has not been communicated or retrieved.

2.3. National Information Systems and Networks

A national information system can be defined as a system that systematically exploits information providers and resources in a coordinated way, for the benefit of users (Feather & Sturges, 2003, p. 444). The concept of network and networking is applicable within an information system and amongst various information systems. Information networking generally entails the sharing of resources so that the information needs of both actual and the potential users of information- from the local to national level are met. This helps in meeting the information needs of all network participants (Verma, 1996). Tedesco (1995) maintains that existing studies highlight the need to distinguish at least two basic dimensions. The technological dimension, which includes the physical infrastructures that support a network and ensure communication and information flows; and the social dimension, which includes both

the system of relations between individuals tied or linked by some common interest such as system or institution and culture, that non-explicitly regulates contacts between members of the network. These two dimensions point to the different barriers that need to be overcome for any network to function.

Boundaries, that once separated the types of networks used to deliver voice, data, and video services, are increasingly blurred (Brown, Irvin, Prabhakar, & Katzen, n.d.). In a digital world, these services can be combined and offered over the same transmission system. Multiple networks composed of different transmission media, such as fiber optic cable, coaxial cable, satellites, radio, and copper wire, will carry a broad range of telecommunications and information services and information technology applications into homes, businesses, educational institutions, and hospitals. These networks will form the basis of evolving national and global information infrastructures, which in turn will create a seamless web uniting the world in the emergent information age. Global accessibility and use of information is very critical in the globalization of markets, resources, and economics (US, Information Infrastructure Task Force, 1993).

2.3.1. UNESCO's Efforts: NATIS

Information is one of the nation's most critical economic resources for not only service industries but also for manufacturing, economic as well as national security. In an era of global markets and global competition, the technologies to create, manipulate, manage and use information are of strategic importance for the developed world. Keeping this reality in view, the intergovernmental Conference on the planning of National Documentation, Library and Archives Infrastructure in 1974 adopted unanimously recommendations supporting the concept and objectives of

National Information Systems (NATIS), encompassing all services involved in the provision of information for all sectors of the community and for all categories of users (UNESCO, 1977). Provision of the following facilities was expected from the NATIS plan: a) guides to information; b) sufficient staff to help users to obtain the information they need; c) arrangements to provide rapid access to the documents or copies of the documents required. The ability of the library system to provide quickly a copy of a needed document which is not available locally can help to create the idea in the user's mind that there is an information system which exists to help him (UNESCO, 1976). NATIS relates to all the agencies, resources, processes and activities involved in the transfer of information in the nation (National Library of Australia, 1980).

2.4. Role of Education in Information Society and Need of Educational Information System at National Level

The concept of 'Education' is changing from the formal and pre-defined curriculum in the industrial society; today education is redefined as life-long learning in the information society. Life-long learning certainly reflects a new comprehension of the need for education in society. The "redefinition" seems to be the conceptual answer to the increasingly complex needs and possibilities for development and learning in the information society (Danish Technological Institute, 2003). World Education Forum (2000) reaffirms education as the key to sustainable development, peace and stability within and among countries; and thus an indispensable means for effective participation in the societies and economies of the twenty-first century, which are affected by rapid globalization.

A solid education, good general knowledge and ICT skills acquired throughout life create the basis for using information society services. Educational institutions, workplaces, libraries and civic organizations play a key role in providing opportunities for people to learn information society skills. ICT is extensively used in support of teaching, learning and research. Good knowledge and skills help people to make use of information networks and their contents appropriately. Information society entails access to the specialized high-tech knowledge of ICT professionals (Finland, Ministry of Education, 2004).

2.5. Information Systems/Networks for Connecting the Education

Enterprise

One change experienced in education settings is the implementation of information system. The concept can be used in a very broad sense referring to the information system of an organization or of a country. Within an organization, it encompasses all formal and informal activities (i.e. manual, computer supported, and/or verbal) directed at collecting, distributing, and processing all kinds of data within an organization (Visscher, 1996). Whereas national information systems of education, as they evolve and affect ever more people, have to consider the processes of information. Various groups of people participate in the educational process i.e. teachers, students, administrators, research workers, parents, the public at large and each group, indeed each individual in his or her work, requires certain information. Problems arise when such information is not available or when (more rarely) there is too much information. The accuracy, recency and completeness of the information and its accessibility may fall short of what the user needs (UNESCO, 1978b).

Klein and Gwaltney (1991) have stressed that by learning from past experience and research, an emphasis should be kept on creating a system rather than on discrete activities for disseminating the education knowledge base. They have also emphasized that shared definitions, criteria, and procedures for selecting, evaluating, and disseminating education treasures should be developed. Moreover, federal authority and funding should be obtained to plan, build, and manage a national education network. Similarly, Bomar, Heidbreder, and Nemeyer (1975) have brought out that because of the key role of the states in setting educational goals, policies, standards and their funding power, communication networks designed to improve the performance of the education systems should be planned and operated on a statewide basis.

Keeping the challenges posed by the information age in view, UNESCO developed the Education Management Information System (EMIS) to help the countries in systematically organizing information related to the management of educational development. Preferably proposed to work within the Ministry of Education (MoE), EMIS is responsible for the promotion and use of information for policy planning and implementation, decision making, monitoring and evaluation of an education system. The basic goal and objectives of UNESCO for introducing this project is: a) to promote the educational development through informed decision making practices by increasing demand for information use; b) to collect, organize and report accurate, relevant and timely data for planning and decision making purposes; and c) to promote the use of information for educational development. The diagram in Figure 2.1 shows the relationship and the flow of information that should exist between the producers and users of information and top decision-making bodies

and schools. Through the conceptual framework EMIS intends to convey to the reader, the following points, at the very least:

- Central EMIS is located within the MoE (the inner circle) and gives out information services to all users around it.
- Directives, guidelines, and demands for information and other administrative information are sent to schools via the administrative channel.
- Through this same channel, reports, demands for support, and other necessary information flow from school up to the top decision-making bodies.
- The *top arrows* show the information that comes from higher body, higher than the MoE (perhaps the Council of Ministries, for example) and the responses.

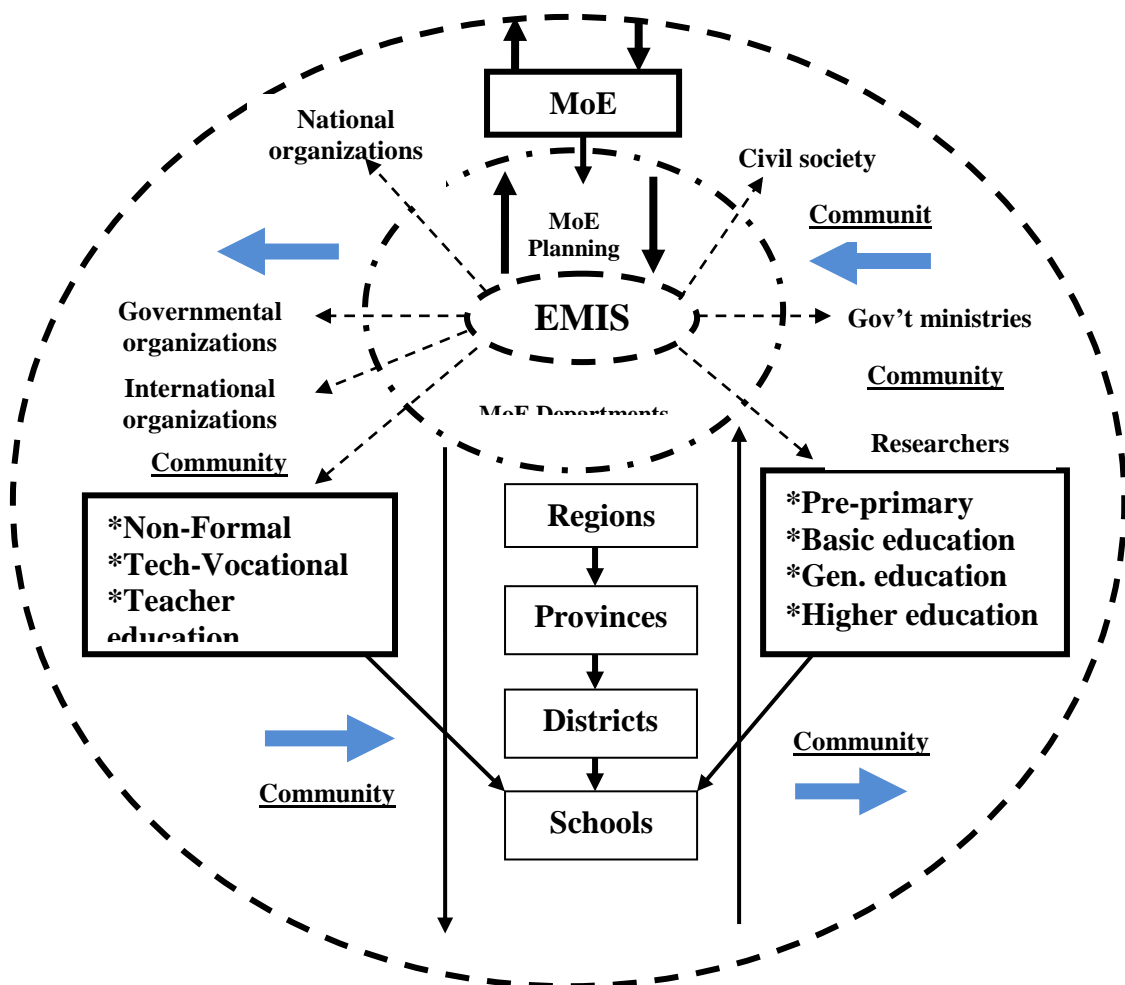


Figure 2.1: EMIS: Producer – Users Conceptual Relation

- The *three bold rectangles* at lower end of the figure indicate major sources of information that need greater attention.
- At each point of the administrative channel - region, province, district, school, they not only receive and pass information accordingly but information is also processed, analyzed and used. This is vital to increasing the awareness and appreciation of information and leads to the capture of quality information.
- In all directions there are *arrows pointing inwards and outwards*. These signify information exchange and feedback information at all levels. Accordingly, users at different stages have to have access to information, and feedback has to be collected, processed, and incorporated for future enhancement (NESIS/UNESCO, 2003).

2.6. Design Considerations of a National Information System in Education

The rapidly changing character of the science and technology of information systems, services, and centers, and the volume of diverse kinds and forms of information have created a deluge of literature on the subject area as well as extremely competitive and innovative market place for information industry. The entire area of information system is therefore one of adventure; investigation; alteration; and most importantly, responsiveness to the need of creating systems which provide needed, useful, relevant, and timely information services and products to their users (POSMIS, 2000; Vilentuck, 1975; Ward, 1995). 'Information system is an organized procedure for collecting, processing, storing, and retrieving information to satisfy a variety of needs' (Prytherch, 2005). The main components of information system are computer hardware and software, databases, telecommunications systems,

human resources, and procedures (Information system, 2009). Good information systems in education usually have the following basic characteristics:

- Data are collected at the most elemental level possible.
- Data are included on students, teachers, principals, and other staff.
- Data are stored in relational databases that facilitate sorting in ways that may be unanticipated.
- Key elements are collected frequently, providing nearly real-time availability.
- Certain standard analyses are programmed into the system.
- Findings are reported to parents and the community using friendly access, such as Web sites.
- Systems ensure the privacy and security of individual records.
- Systems are automated to alert educational institute officials if data are reported outside of acceptable range.
- To the extent possible, data are observable, reliable, and valid.
- Inferred data are as stable, reliable, and valid as possible.
- Systems allow maximum integration with existing equipment and software applications to lower cost (Shepperson, 2008).

As there are different categories of users, similarly information systems can also be categorized differently according to their objectives and users' needs. There could be information systems designed to serve a group of users engaged in a specific kind of activity or mission; such information systems are often called information support systems or mission oriented information systems. The information system can also be categorized as discipline oriented system. These two kinds of information systems can be managed from one and the same center. Education is a blend of the two types. However, a national information system in education can be designated as a mission oriented information system (Bovee, 1993; Verma, 1996).

In modern practice, many information systems are in fact based upon networks and the two terms are used interchangeably (UNESCO-UNISIST II, 1979). In fact, a network is a group of people or computers linked together so that information can be passed around, while an information system is used for the provision of information and designed according to user needs (Dictionary of Information and Library Management, 2006). An information system may make use of one or more networks, along with information storage devices and human interface devices (Verma, 1996). The use of the term 'network' has been extended in recent years to a very broad range of structures and types of organization. Existing studies highlight the need to distinguish at least two basic dimensions. The technological dimension, which includes the physical infrastructures that support a network and ensure communication and information flows; and the social dimension, which includes both the system of relations between persons tied or linked by some common interest, such as system or institution and culture, that non-explicitly controls contacts between members of the network (Tedesco, 1995).

In different eras of network development different models were introduced depending on the sophistication of ICT. These can be divided in three main stages as presented by Gorman and Cullen (2000) in their paper entitled "Asian library partnerships: Applying the knowledge model for library networks". A comparison of all three network models proposed in different stages is presented in Table 2.1. These stages include:

- Initial Stage = Networked Library Model
- Intermediate Stage = Co-operative Library Model
- Developed/Advanced Stage = Knowledge Environment Model

Table 2.1. *Functions and Stages in the Network Models and Features of Knowledge**Environment Model (Gorman & Cullen, 2000)*

Functions	Initial Stage (Networked Library Model)	Intermediate Stage (Co-operative Library Model)	Advanced Stage (Knowledge Environment Model)
Resource acquisition	Printed documents CD-ROMs Some dial-up connection	More offline e-resources Access by networked Workstations	Full remote access to resources Dedicated Internet links Most materials in e-format
Resource description	Manual cataloguing Some shared systems (OCLC)	Catalogues supplemented by resource lists of networked materials Structured bookmark lists	Integrated resources discovery system Metadata used comprehensively
Resource discovery	OPAC on PC Bibliographic data describe mainly printed resources	Local e- and networked resources included in OPAC	Full network access to all internal and external e-resources Integrated resource discovery system
User access	On-site Limited delivery	Remote catalogue access E-mail delivery	Full on-site and remote access On-site access not necessary
User support	Library staff give face-to-face service	Users can access system offering some help E-guide to library E-mail queries	Human support + full computer-assisted support for information discovery and access process

In fact, networking is a rapidly advancing concept to information services.

According to Bomar, Heidbreder and Nemeyer (1975), Dhiman and Rani (2007), and Prytherch (2005), a network is an interconnection of things, systems, or organizations.

In a network, data are transferred or transmitted through different media or channels.

An ideal network displays four characteristics:

1. **Formal Organization:** Many units sharing a common information purpose recognize the value of group affiliation and enter into a compact.
2. **Communications:** The network includes circuits that rapidly interconnect dispersed points.

3. ***Bi-directional Operations:*** Information may move in either direction, and provision is made for each network participant to send as well as receive.
4. ***A Directory and Switching Capability:*** A directory look-up system enables a participant to identify the unit most able to satisfy a particular request. A switching center then routes message to the unit over the optimum communications path (Becker & Olsen, n.d.).

There are three main features of networks: transmission media, network architectures and protocol standards, and network topologies.

Transmission media may comprises one or more of the following physical transmission media: 1) Twisted copper wires or cable; 2) Coaxial cables; 3) Fiber optics; 4) Microwaves; and 5) Communications satellites; 6) Standard electrical mains wiring.

Network architectures & protocols standards consist of a systematic definition of: 1) the topology of the way in which units are distributed through the network; 2) the control and flow of information through the network; and 3) the protocols and standards for data encoding and transmission.

Network topology is the way in which the communication links connect the equipment. Four common network configurations applied in both the computer and telecommunications fields as well as the library area include: 1) star network; 2) hierarchical network; 3) distributed network; and 4) ring network (Dhiman & Rani, 2007; Rowley, 1998). In fact most library and information networks do not conform strictly to one type of configuration and usually consist of a combination of configurations and can be labeled as composite network (i.e. the Illinois Library and Information Network- ILINET) (Rouse & Rouse, 1980; Verma, 1996).

“A national information system is basically a network of existing information resources together with new services for identified gaps, so coordinated as to reinforce and enhance the activities of the individual units and thus enable specific categories of users to receive the information relevant to their needs and abilities” (Atherton, 1977). An education information system is the basis of management, planning and evaluation of an education system. During the education management process, the information system should inform the different actors and partners on the state of the sector, its internal and external efficiency, its pedagogical and institutional operation, its performance, shortcomings and needs. Since, the needs for information are diverse and becoming more and more complex, a sound information system should be as complete as possible. It should cover all the needs and areas for information and not only aim to collect, store data and process information but should also help in the formulation of education policies, their management and their evaluation (UNESCO, 2003).

Many researchers such as Rowley (1996), Schroeder and Dozier (1975), Verma (1996), NESIS/UNESCO (2003), B. Vickery and A. Vickery (1987), and Weisman (1972) have provided guidelines which can be considered while designing an information system. Schroeder and Dozier, as early as 1975, reviewed and analyzed 13 existing Information Systems (IS) and have identified their important components, which should be considered while designing an Information System particularly at national level. The document provides a comprehensive guideline for new Information System developers and has outlined the following implications for the new information system developers:

1. The designers of the system need to study the potential users of such a system to determine what types of information material they need.
2. The designers must study the producers of information to determine specifically what types of information are produced; for whom; for use under what circumstances, and in what time period; with whom; and in what media format.
3. The designers need to study the technology and science of information transfer, not merely in terms of existing systems and how they satisfy user needs for information, but rather in terms of how users would, given that they know needed information exists, like to receive that which is now available and be kept up-to-date on what becomes available in the future.
4. Any information system makes sense only in the context of the purpose for which it was developed and used. The design of information systems has to take into account a number of factors. Indeed, the reason many information systems fail is because social issues (users and their work environment) are not taken into account at design and implementation stages (Lorenzi and Riley, 1994).

Rowley (1996) has proposed the following main phases for information system design and development:

Phase 1: Definition of Objectives: this phase includes the following activities:

- preparation of terms of reference
- initial needs analysis as a study proposal
- feasibility study
- evaluation of options and analysis of existing systems.

Phase 2: Definition of Systems Requirements. At this phase, detailed specifications of the systems requirements are prepared.

Phase 3: Design. This stage involves the following activities:

- creation of a logical and physical systems model, and
- choice and ordering of hardware and software configuration.

Phase 4: Implementation. The activities performed here are:

- planning and preparation
- education and training
- database creation
- system installation, and
- switch-over.

Phase 5: Evaluation. There could be several activities, such as,

- initial evaluation
- ongoing monitoring
- maintenance, and
- evolution.

Similarly, Verma (1996) has provided guidelines which can be considered while designing a national information system in education. These guidelines can be listed as follows: a) Know the Background; b) Users and Their Needs; c) Types of Users; d) Types of Information Needs; e) Coverage; f) Centralized or Decentralized; g) Services; h) Organizational Considerations; i) Manpower Requirement; and j) Qualitative Considerations.

2.6.1. Approaches to Information System Design

There are basically three classical approaches to Information system development i.e., the planning approach, the participation approach and the iterative design. The difference in these is the degree to which users are involved from the design to the implementation stages of the system.

The Planning Approach: the planning approach is based on managements' involvement in the design of the information system. The purpose of managements' inclusion is to enable them to keep an eye on the organizational objectives and ensure the achievement of these objectives through the development of an information system.

The Participation Approach: the participation approach stresses the need to involve users as active participants in the whole process. Their role depends both on the users' own knowledge and the ability of system designers to communicate with users in an effective manner.

The Iterative Design (the Spiral Model): iterative design involves the development of information systems (prototypes) based on the input of the users. The prototype is then presented to the users who make their suggestions for improvement or removal of features. Changes are thus made to the system until the users feel it is doing what they want. The merits of this approach are that users are able to see more clearly what they want a system to do and what is possible. Such systems can also be tested using real data (Moahi, 2000, TechTarget, 2009).

Any information system makes sense only in the context of the purpose for which it was developed and used. The design of information systems has to take into account a number of factors. Indeed, the reason many information systems fail is because social issues (users and their work environment) are not taken into account at design and implementation stages (Lorenzi and Riley, 1994).

Review of the above guidelines reveals that a system designed with the user in mind will provide end-users with timely, accessible, relevant, comprehensible and useful information they need. Different aspects of an Information System, important

to be considered i.e. centralization or decentralization, services, organizational units and evaluation of an IS are discussed below:

2.6.2. Centralization or Decentralization

At the designing phase, it should be decided by the designer whether the proposed system will be centralized or decentralized. According to Verma (1996), a network is not an inflexible alliance, but is a system of linkages for information exchange and sharing, and members can undertake other activities in search of their respective objectives. A designer has to develop an organizational structure and identify nodes and network relationships. Schroeder and Dozier (1975) have stressed that a new information system should be developed but rather a centralized system which would pull together activities, people, facilities, products and services from existing information systems and which would add its own products and services when necessary. ‘The main advantages of centralized systems are that they provide centralized control using established technology and human resources’ (Kroenke & Hatch, 1994). Duplication of effort, resources and expertise is also reduced, saving cost and time (Robson, 1997). For example, ERIC is a national information system designed and supported by the US Department of Education for providing access to the results of programs, research and development efforts, and related information. The central headquarter coordinates the efforts of a network of ERIC clearinghouses. ERIC uses a central processing facility that merges all the inputs of the clearinghouses into the ERIC database, redistributes the ERIC database to other organizations to provide to their users, and manages the ERIC Thesaurus (ERIC, 2003).

2.6.3. Services: The Important Feature of an IS

Services are the focal product of all type of information systems and networks. These services should be user centered not system centered. Keeping this reality in view, Gorman and Cullen (2000) have stressed that the products and services of a modern Network/IS should be based on the 'Knowledge Environment Model', which is less system focused and more clients focused. According to them, other models tend to ask how co-operation can improve this or that specific function in isolation from other functions. The Knowledge Environment Model looks at the full range client needs and resource requirements and asks how co-operation and network can improve services to meet these needs and requirements. It identifies that there is diversity in user expectations, and also diversity in user skills. Given this diversity, the Knowledge Environment Model seeks to offer both a sophisticated technological environment and also a more traditional set of services. Malviya and Kumar (2007) have emphasized that Knowledge Environment Model approach of network development is based on the argument that development and evolution are keys to robust and contextually responsive partnership. According to Owen and Wiercx (1996), 'the Knowledge Environment Model treats the library/network as a public information area which allows for a variety of information-related activities for different user groups. The network therefore needs to function internally, providing interlinked access to all local resources (a trait of the Networked Library Model); it also functions externally, providing total access to the worldwide information infrastructure through a network-wide resource discovery system and to the Web. It serves as an access point to community and government information services locally,

nationally, internationally, and all functions are available to users in any part of the network on an equal basis’.

2.6.4. Organizational Units of an Information System

Verma (1996) has emphasized that in the field of education, potential network members are easily identifiable. At the national level are the libraries of various departments of the Ministry of Education which implement education programs. At the state/provincial level, the education cells or branches lodged in the regional offices of the Ministry of Education. At the lower level, potential members include schools, colleges and universities etc. Verma has identified libraries, documentation centers, clearing houses, referral centers, information centers, information analysis centers, and data centers as the key organizational units of a national information system in education. These organizational units are discussed briefly as under:

- 1. *Libraries*** are now associated with the largely passive functions of a depository for documents, organized and maintained for reference and study, with the emphasis on the collection and circulation of documents (Verma, 1996).
- 2. *Documentation Centre*** ‘is a place where publications are received, processed, preserved, summarized, abstracted and indexed; where bulletins relating to such material are prepared for distribution to those interested; where research is undertaken, bibliographies prepared, and copies or translations made’ (Prytherch, 2005).
- 3. *Clearing House*** ‘is an organization that collects and maintains records of research, development, and other activities being planned, currently in progress, or completed; it provides documents derived from these activities, and referral services to other sources for information relating to these activities’ (Prytherch,

2005). For instance, ERIC maintains sixteen subject-specific clearinghouses that collect, abstract, and index education materials for the ERIC database; respond to requests for information in their subject-specific areas; and produce special publications on current research, programs, and practices. Eleven adjunct clearinghouses that are affiliated with one of the 16 subject-specific clearinghouses, but are more specialized and funded by non-ERIC resources (ERIC, 2003).

4. ***Referral Centre*** generally performs the task of referring enquiries to sources of information, in addition to the performance of other functions i.e. collecting information about data and information resources within a special subject or mission, preparing comprehensive inventories of the kinds of data/information/services available from various sources; preparing detailed subject index to facilitate access; and guiding users to appropriate sources of information (Verma, 1996). INSPIRE (Information Sharing Partners in Resources for Education) is a UK national referral and access scheme working to link across 875 higher education, 4,610 public and three national libraries, interweaving the existing network of successful access partnerships into a single pathway. The ambition is to provide managed reciprocal access and referral to other libraries with relevant collections (INSPIRE, 2009).

5. ***Information Center*** is usually ‘an office, or a section of a bibliographical centre, research bureau or documentation centre, which gives information on a subject with which the organization providing the facilities of the centre is concerned. Staffing varies, but may include any or all of the following: research officers, librarians, bibliographers or trained information officers. It may include the

functions of a Special library' (Prytherch, 2005). Information Analysis Centers are the most efficient systems for transferring to a user timely, authoritative, evaluated information in a convenient form (Verma, 1996). For example, AMMTIAC (The Advanced Materials, Manufacturing, and Testing Information Analysis Center) is responsible for acquiring, archiving, analyzing, synthesizing, and disseminating scientific and technical information related to advanced materials, manufacturing, and testing (AMMTIAC, 2009).

6. **Data Center** is an organization handling raw or partially processed data or results, including census-type data on population and commodities as well as data on pure science and the social sciences (Verma, 1996). Such as EDINA, is a JISC-funded national data centre based at Edinburgh University Data Library, which provides online access to a range of specialist bibliographic and geo-spatial services (e.g. Digimap) (EDINA, 2009).

2.6.5. The Evaluation of an Information System

The performance evaluation of the information system is important to determine the effectiveness of the system from users' end. Seok (2008) believes that the effective educational information system can be built when the three criteria of accessibility, adaptability, and clarity are implemented into the design of the educational information system. Included, should also be: (a) built in flexibility and (b) universal design for the architecture, using the user centered psychological principles. Verma (1996) stresses that in the social process of information transfer the ultimate evaluation must be from the viewpoint of the potential recipients: have they received the information needed, wanted, demanded and are the costs of this

information provision personally or socially acceptable? There is also the question of evaluation from the view point of the sources of information, who are concerned to know whether they have got their message across, to whom and with what effect. Verma has highlighted different aspects for information system evaluation i.e. quality of services from recipient viewpoint, relevance of information provided to the user and its assessment, system efficiency in terms of cost effectiveness, coverage of acquisition search, performance of the retrieval system from store measured through recall and precision formula.

The evaluation efforts and their need are by no mean new. In the past, Chandler and DeLutis (1977) have presented an evaluation technique to provide designers with an evaluation procedure, which 1) seeks to establish a causal relationship between user goal attainments and system resource expenditures, while allowing for the collection of hitherto hard to obtain evaluation information; 2) measures the impact of individual user classes on internal system performance; and 3) identifies those information system activities which should be modified to improve system performance related to those goals. All of this is achieved by maintaining resource utilization statistics on a user class basis. It is thought that such an evaluation framework is capable of eliminating many of the numerous non-satisfactory designs by directing the designer to the most advantageous ones. This evaluation, continuous monitoring and modification approach is incorporated in iterative system development models such as the Spiral Model. Following are the basic steps of a Spiral Model:

- The new system requirements are definite in as much detail as possible. This generally involves interviewing a number of users representing all the external or internal users and other aspects of the existing system.
- A prelude design is formed for the new system.
- A first prototype of the new system is constructed from the preliminary design. Prototype is the first model of something that is completely new and is usually a scaled-down system, and represents an approximation of the characteristics of the final product.
- A second prototype is evolved by a fourfold procedure: (1) evaluating the first prototype in terms of its strengths, weaknesses, and risks; (2) defining the requirements of the second prototype; (3) planning and designing the second prototype; (4) constructing and testing the second prototype.
- At the customer's option, the entire project can be aborted if the risk is deemed too great. Risk factors might involve development cost overruns, operating-cost miscalculation, or any other factor that could, in the customer's judgment, result in a less-than-satisfactory final product.
- The existing prototype is evaluated in the same manner as was the preceding prototype, and, if necessary, another prototype is developed from it according to the fourfold procedure outlined above.
- The preceding steps are iterated until the customer is satisfied that the refined prototype represents the final product desired.
- The final system is constructed, based on the refined prototype.
- The final system is thoroughly evaluated and tested. Routine maintenance is carried out on a continuing basis to prevent large-scale failures and to

minimize downtime (Developing an information system, 2009; Pressman, 1992). The various stages of Spiral Model are shown pictorially in Figure 2.2.

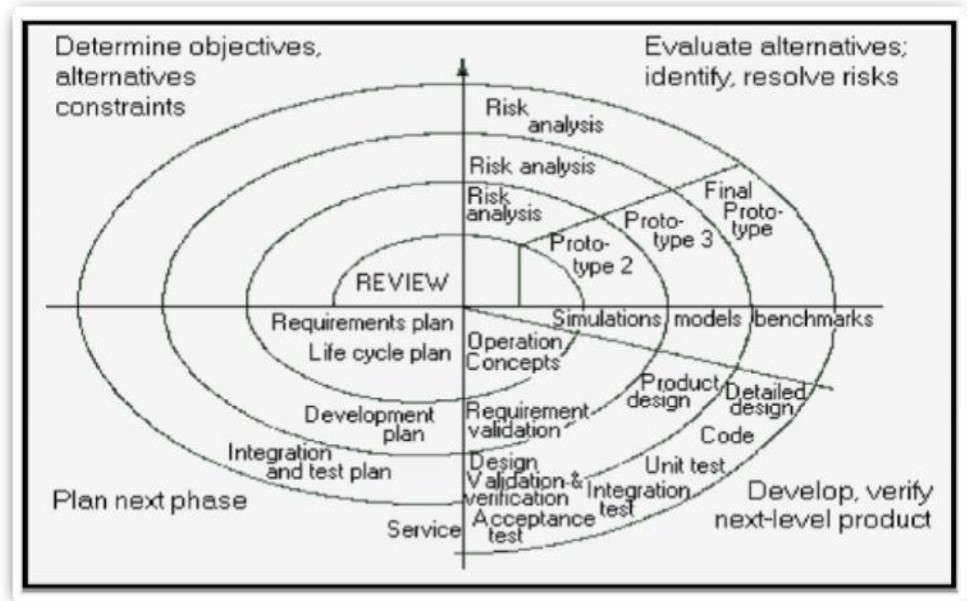


Figure 2.2. The Spiral Model (Developing an information system, 2009)

2.7. The Examples of Different Information Systems/Networks in Education Existing Within Different Countries of the World

Effective and efficient decision making is critically dependent on and driven by the ability to create and disseminate educational research contents. Administrators and decision makers can only do this in a context which allows them to access, use, validate and communicate research information. Many information systems exist in not only the developed countries but in developing countries as well to connect the education enterprise. Coming section presents a review of different information systems/networks in education existing in and between different countries to facilitate not only the research and other activities related to education but to assist their administrators/managers in their administrative pursuits and decision making. The review of these Information Systems (ISs) provided the researcher with an insight

about different aspects of IS in education, i.e. their structure, access pattern, services, scope of the system and its users etc.

2.7.1. Eurydice: The Information Network on Education in Europe

Eurydice is an institutional network for gathering, monitoring, processing and circulating reliable and readily comparable information on education systems and policies throughout Europe. Eurydice is committed, first and foremost, to offer policy-makers and all those involved in the provision of education with information and studies geared to their needs. Any issue related to educational policies (structures, reforms and trends) or to subjects associated with Community cooperation in education is liable to be considered by Eurydice. First launched by the European Community in 1980, the Eurydice network consists of a European Unit (EU) set up by the European Commission in Brussels and National Units established by education ministries in all countries taking part in Socrates, the EU education action program (i.e., Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom). In most countries, National units are situated within the education ministry. In a few, however, they are located in library resource centers, or bodies for administration and research. All levels of education considered as a whole, or in appropriate cases, individually, may be the subject of analysis. The potential focus extends from pre-primary to higher education and also naturally includes teacher training. Eurydice makes available to its users Eurybase, a highly detailed database, the only one of its kind on all education systems covered by the network (Eurydice, 2007).

2.7.2. UCISA: Universities and Colleges Information Systems Association

On 1st April 1993, the Universities and Colleges Information Systems Association, UCISA came into being. UCISA represents almost all the major UK universities and higher education colleges and has a growing membership among further education colleges, other educational institutions and commercial organizations interested in information systems and technology in UK education, providing a network of contacts and a powerful lobbying voice. UCISA exists to promote excellence in the application of information systems and services in support of teaching, learning, research and administration in higher and further education. Its aims are to identify best practice and to spread its use through the organization of conferences, seminars and workshops; the promotion and support of collaboration between institutions; the publication, including electronic publication of material; the promotion of development and research; and to inform and support policy making processes within institutions and nationally on the cost effective application of information systems and services (UCICA, 2005).

2.7.3. ERIC: Education Resources Information Center

ERIC - the Education Resources Information Center - is an online digital library of education research and information. ERIC is sponsored by the U.S. Department of Education, Institute of Education Sciences (IES). The ERIC collection includes annotated bibliographic records (citations, abstracts, and other pertinent data) for more than 1.2 million items indexed since 1966, including: journal articles, books, research syntheses, conference papers, technical reports, policy papers, and other education-related materials. ERIC users include education researchers, teachers, librarians, administrators, education policymakers, instructors and students in teacher-

preparation programs, parents, the media and business communities, and the general public. The user community conducts more than six million searches each month through the ERIC Web site and commercial and non-commercial sites. Computer Sciences Corporation (CSC) operates the ERIC Project under contract to the U.S. Department of Education. The ERIC contract supports development and management of the digital collection, Web site, and associated technologies, as well as to outreach ERIC users. IES has authorized the work of two expert advisory panels to foster ERIC's ongoing development: the ERIC Steering Committee and Content Experts (ERIC, 2008).

2.7.4. MREN- Metropolitan Research & Education Network

The Metropolitan Research and Education Network (MREN) is one of the world's most advanced high-performance broadband networks. Although MREN's primary focus is on providing advanced digital communications for leading-edge research and educational applications, it also addresses more general networking requirements. MREN is based on the premise that, in the future, the core foundation and enabling technology for most research and education activities will be high-performance, broadband digital networks (MREN, 2005).

2.7.5. JANET: the UK's Education and Research Network

JANET is the network dedicated to the needs of education and research in the UK. It connects the UK's education and research organizations to each other, as well as to the rest of the world through links to the global Internet. In addition, JANET includes a separate network that is available to the community for experimental activities in network development. The JANET network connects UK universities, FE Colleges, Research Councils, Specialist Colleges and Adult and Community Learning

providers. Over 18 million end-users are currently served by the JANET network (JANET, n. d.).

2.7.6. CANARIE: Network of Canada

In 1998, CANARIE deployed CANet 3, the world's first national optical Internet research and education network. CANet 3 was among the most advanced in the world when it was built, and its design has since been replicated by many network operators, both in the research and education as well as commercial domains. CANet 4, as did its predecessor CANet 3, interconnects the provincial research networks, and which further interconnects universities, research centers, government research laboratories, schools, and other eligible sites, both with each other and with international peer networks (CANARIE, 2002).

2.7.7. DANTE: Delivery of Advanced Network Technology to Europe

DANTE was established in 1993 in Cambridge, UK. It is a limited liability company and a “Not for Profit” organization. DANTE's purpose is to plan, build and operate pan-European research networks. It was set up, and is owned by a group of National Research and Education Networks (NRENs). Since its establishment, DANTE has played a pivotal role in four consecutive generations of pan-European research network: EuropaNET, TEN-34, TEN-155 and now GÉANT. The European NRENs (National Research and Education Networks) need an efficient and cost-effective vehicle to co-ordinate pan-European research networking on their behalf, and to ensure that project results are delivered on time, within budget and with high levels of reliability. DANTE was created by 11 of Europe's NRENs to do this (DANTE, n.d.).

2.7.8. AARNet: Australia's Academic and Research Network

Australia's Academic and Research Network (AARNet) is operated by AARNet Pty Ltd (APL), a not-for-profit company limited by shares. The shareholders are 38 Australian Universities and the CSIRO. AARNet provides high-capacity leading-edge Internet services for the tertiary education and research sector communities and their research partners. AARNet serves over one million end users who access the network through local area networks at member institutions. AARNet has been effective in making representations to government on policy, legislation, strategy and programs to improve the telecommunications facilities and services available not only to the education and research sector but also to the whole Australian community (AARNet, n.d).

2.7.9. INASP: International Network for the Availability of Scientific Publications

INASP enables a sustainable network of stakeholders that owns and drives access, use, dissemination and communication of research information. Collaborating with a wide network of partners in sister organizations, development agencies and publishers, INASP has implemented programs in more than 40 countries world wide (including Pakistan). INASP activities are grouped in five activity areas, all of which are complementary to its central mission of enabling access to information. *Advising:* Advising strategy, policy and funding groups on current issues in research information and communication; *Innovating:* Innovating to enable development and sharing of new systems, information and knowledge in research information and communication; *Networking:* Networking within and between stakeholder groups to build sustainable, practical and strategic partnerships; *Training:* Training stakeholders in practical and strategic elements of research communication through cascaded

learning events; *Facilitating*: Facilitating interactions within and between stakeholder groups, building South–South and South–North connections, is a critical process. INASP supports such networks to exchange experience, skills and best practice (INASP, 2006).

2.7.10. APAN: Asia-Pacific Advanced Network

APAN (Asia-Pacific Advanced Network) is a non-profit international consortium established in 1997. APAN provides an advanced networking environment for the research and education community in the Asia-Pacific region, and promotes global collaboration. Its objectives are: (a) to coordinate and promote network technology developments and advances in network-based applications and services; (b) to coordinate the development of an advanced networking environment for research and education communities in the Asia-Pacific region; and (c) to encourage and promote global cooperation to help achieve the above (APAN, 2008).

2.7.11. SingAREN: Singapore Advanced Research and Education Network

Singapore Advanced Research and Education Network (SingAREN) started as a national project funded by the government in 1997 to take on the challenge of ensuring that Singapore research and education (R&E) community is connected to the international R&E community. Being the national research and education network (REN), it has maintained closed working relationship with global Next Generation Internet (NGI) community such as Internet2 and APAN (Asia Pacific Advanced Network). SingAREN has high bandwidth and direct network connectivity to a number of RENs: TEIN2, Abilene, ASCC and NICT (SingAREN, 2007).

2.7.12. CERNET: China Education and Research Network

The CERNET is the first nationwide education and research computer network in China, directly managed by the Chinese Ministry of Education and funded by the Chinese Government. CERNET has a four-layer hierarchy i.e. the nation-wide backbone, regional networks, provincial networks and campus networks. CERNET National Center is located in Tsinghua University, which is responsible for operation and management of CERNET backbone nationwide. The ten regional network centers and main nodes are distributed in Tsinghua University, which are responsible for operation, management, planning and construction of CERNET regional backbones. CERNET provincial nodes are distributed among 38 universities in 36 cities around the country but Taiwan (CERNET, 2000).

2.7.13. NEIS: National Education Information System (Korea)

NEIS is a system that connects government agencies and administrations with elementary and secondary schools through the Internet, compiles a database for Municipal and Provincial Offices of Education, and electronically processes school administrative tasks including accounting, personnel management, and school affair duties. The system aims at making education administrative duties more efficient and transparent. This system allowed the sharing of educational data across other government agencies in an efficient manner while providing accurate information (Korea Education & Research Information Service, 2003).

2.7.14. EMIS: Education Management Information System (South Africa)

National Education Management Information System (EMIS) of South Africa covers schools, colleges, Higher Education, Adult Basic Education and Training (ABET), Early Childhood Development (ECD), Education for Learners with Special

Education Needs (ELSEN) centers and Further Education and Training (FET) institutions. The National Department of Education is responsible for: a) ensuring that education data and information (on learners, staff, institutions, facilities and resources) relevant to education planning is collected, analyzed, and reported using the EMIS; b) providing technical assistance and advice to provincial education departments and education institutions for monitoring and evaluating education system performance; c) coordinating training and development activities, and research on education information systems in collaboration with other partners in the education community; d) sourcing funding support for the expansion and development of EMIS from international and local agencies; e) facilitating the development of indicators for monitoring and evaluating the performance of the education system. EMIS units (Provincial and national) regularly provide services to other components in education as well as to ministries, departments and government agencies at national, provincial and local level; legislative and constituent bodies; regulatory bodies; civil society organizations; local and international agencies; learners; educators; and community groups including school and college governing bodies; business and the private sector; unions; and other partners in the education community (EMIS, 2006).

2.7.15. DISE: District Information System for Education (India)

In India, District Information System for Education (DISE) makes educational data available from the school to the national level by establishing computer centers at the district, state and the national level for revitalization of educational statistics in decision making. DISE tries to make available the right type of information to decision makers at the right time (DISE, 2002).

2.7.16. ERNET: Education and Research Network (India)

Education and Research Network (ERNET) of India has over the years become a trendsetter in the field of networking. It is a large network that provides various facilities to the research and education community. ERNET, India in partnership with University Grants Commission is setting up UGC-Info net. Main features of UGC-Infonet include: a) Scalable Architecture to grow from universities to affiliated colleges; b) Nation-wide Terrestrial Backbone using Fiber Optic links; c) Integrated Satellite WAN supporting broadband and SCPC V SAT technology; d) Comprehensive Network Management Systems; and e) Linkage with Academic and Research Networks all over the world (ERNET, 2008).

2.8. Major Findings of Reviewed Information Systems

The review of information systems and networks working in different countries of the world reveal following features of these systems:

Central Agency: Almost all the reviewed information systems of different countries of the world are working under Ministry of Education or Department of Education.

Objectives: Most of the reviewed ISs are working with the following objectives:

- To fulfill the information needs of policy-makers and other stakeholders of education enterprise. To guide them in planning and consider other issues related to educational policies (i.e., structures, reforms and trends).
- To make educational administrative duties more efficient and transparent.
- To integrate all levels of education (i.e., schools, colleges, universities etc.) in the information system, although few were specifically for colleges and universities or only for schools.

- To publish educational statistics and other qualitative material and to promote its use in decision making. To identify best practices and to spread its use through the organization of conferences, seminars and workshops
- To develop national and international liaison among educational institutes and other stakeholders of education.
- To collect, analyze, organize and disseminate the valid educational data and information (on learners, staff, institutions, facilities and resources.
- To consider other sources of financial support i.e. foreign grants.

Type of Collection Acquired, Processed and Stored: The resources acquired, processed and stored by most of information systems include: annotated bibliographic records (citations, abstracts, and other pertinent data), journal articles, books, research syntheses, conference papers, technical reports, policy papers, etc. Maintaining an online database of education related data (both quantitative and qualitative).

Outsourcing: Few systems though are fully supported by the concerned government but are designed, implemented and being operated by the private organizations such as ERIC.

Connection with the International Peer Networks: Most of the educational information systems were connected with international peer networks through Internet.

Nodal Points: Representative centers/institutes are identified by most of the information systems which are working as network nodes/nodal points at national and regional level and inter-connected with each other through Internet.

Layers of Hierarchy: Most information systems have a four-layer hierarchy i.e. the nation-wide backbone, regional networks, provincial networks and campus networks.

2.9. Information Systems and Networks: A Review of Related Research Studies

Effective and efficient decision making is critically dependent on and driven by the ability to create and disseminate educational research contents. Administrators and decision makers can only do this in a context which allows them to access, use, validate and communicate research information. Keeping the importance of educational information system in view, the Association for Educational Data Systems (AEDS) organized an Annual Convention, at Phoenix in 1976. In the said convocation, two abstracts and seventeen papers on educational information systems were presented. Of which one article describing the evolution of information systems provided an overview of educational data systems. Seven articles concerned the implementation and use of information systems by educational administrators: five of these articles focused on public schools and school districts, and two articles focused on higher education. A computer model for simulating faculty flow and salary schedules in higher education was also presented. Two papers described uses of minicomputers, one for student record keeping and one for predicting resource requirements. One for student record to on-line computer systems was presented in one paper, and seven papers described the use of the computer in salary schedule evaluation, program budgeting and accounting, pupil information, studies of school attendance and attendance boundaries, and test scoring and reporting (Association for Educational Data Systems, 1976).

Furthermore, different research studies were conducted to create the awareness for developing information system to facilitate the decision makers and/or connecting the research and education enterprise at national and international level. For example,

“An exploratory study regarding the attitudes toward the development of an international information system” (Ala, 1983); “Client reaction to an educational information service (California)” (Files, 1982), “A model information system for decision making on special education programs in Illinois” (Everett, 1984); “Resistance to implementation of computer-based information systems in the administration of higher education: relevant organizational and personal factors” (Farrell, 1984); and “Computer-based decision support systems in higher education: The support, development, and impact of MIS” (Russell, 1981).

Since 1980's, almost every developed country in the world has set up state-level education and research computer network, which have been interconnected one after another to constitute the cross-border academic network. In recent years, in order to maintain their position as economic powers and technical leaders, many developed countries have launched their "Information Highway" initiatives, and are implementing them vigorously. Such efforts have significantly boosted development of education and research in these countries (CERNET, 2000). Few developing countries have also realized the importance of such information system and networks. In India, for example, many efforts were made for proposing the information systems in different disciplines not only in recent years but as early as 1980s; such as, “Design and development of Indian National Information System for Ayurveda” by George (2001). In this study the design, structure and functions of a National Information System for Ayurveda are proposed. Similarly, Sivaraman (2001) proposed “Industrial and Technological Information centers for small scale sector”. Sivaraman proposed a system entitled “Industrial and Technological Information System- IT IS” exclusively for small scale entrepreneurs in the state to overcome the existing problems in free

flow of information from well established information centers like SENDOC, INSDOC, CSIR, etc. in the country. Other similar studies include, “Conceptual framework for an Indian National Agricultural Information System (INAGRIS)” by Subbaiah (1985) and “Design and development of national information system for marine fisheries in India” by Johnson (1986).

The work by Verma (1989) is particularly relevant to this study. His work entitled “*A comparative study of the national information system in education in UK and USA with a view to developing a model for India*” provided a clear direction for current research. He proposed a draft model of National Information System in education for India. He identified an agency that may function as an Ideal point both for the national educational information network and as a coordinator with International Agencies in the field of education. His research is based on questionnaire survey, through which he not only identified the information needs and seeking pattern of the target users’ of the proposed educational information system but he also sought out their opinion about the different aspects of the proposed system. After developing the draft model, he also got it reviewed by the selected experts.

2.10. User as a Focal Point in an Information System

In the middle of the 20th century, some of the optimistic predictions of the impact of technology on business efficiency and productivity were being confounded. Researchers, with a background in the behavioral sciences (Sociology, Psychology, Anthropology) suggested that what was needed was a fit between the technical subsystem and the social subsystem which together made up an organization. The

technical subsystem comprises the devices, tools and techniques needed to transform inputs into outputs in a way, which enhances the economic performance of the organization. The social system comprises the employees (at all levels) and the knowledge, skills, attitudes, values and needs they bring to the work environment as well as the reward system and authority structures that exist in the organization. These socio-technical ideas began to be used in the IT/IS field in the 1960s (York University, 2008). Similarly, Gaslikova (1999) has emphasized that designers submit new software or improved versions of used products realizing their own notions about the most effective and convenient methods of working, but very often they do not agree with notions and habits of potential users. As a result, there is a conflict between users' expectations and the capabilities of an offered system. Explorations of human information behavior in the process of problem solving in context and utilization of their findings in designing information computer systems could iron out this conflict and assist to create systems suited to user needs to the best advantage.

In nutshell, user is the focal point of all information systems because the sole objective of the system is to transfer information from the source to the user. After gleaning the views of different experts, Chowdhury (2004) has mentioned different groups of users of an information system. These groups are distinguishable according to the kind of activity in which they are engaged and can be concluded as follows: a) researchers, in the focused discipline; b) practitioners and technicians engaged in developmental and/or operational activities in the various areas of the concerned field; and c) managers, planners, students, teachers and decision makers.

Guinchat and Menou (1983) have defined the users' categories in terms of two criteria, such as: *Objective criteria* which categorizes the users' group according to

the socio-professional category, specialist field, nature of the activity for which information is sought, and reason for using the information system; and *Social and psychological criteria* which categorizes the users according to their attitudes and values in regard to information in general and their relation with information units in particular, the reasons behind their particular information-seeking, and their professional and social behavior.

As there are different categories of users, similarly information systems can also be categorized differently according to their objectives and users' needs. There could be information systems designed to serve a group of users engaged in a specific kind of activity or mission; such information systems are often called Information Support Systems or Mission Oriented Information Systems. According to Chowdhury (2004) users of such systems could be students, academics, researchers, planners, policy makers, administrators and so on. The common thread is that all of them are engaged in a specific area of study/activity, or are joined to accomplish a particular mission. They could be part of any organization/institution. For example, in government information system, users may broadly be categorized in accordance with the nature or area of activity, like education, trade, commerce and so on. Neelameghan (1992) has identified the following activities involved in the promotion and management of enterprises for which users may need information. These include: a) formulating objectives of the enterprise; b) formulating strategies and policies to meet specific objectives; c) preparing long range plans; d) reporting to the stock holders about the results of the enterprise's operations; e) informing employees about the status and performance of the enterprise; f) providing bases and back ground so that decisions can be made about specific matters; g) building the background for

outside contacts; h) taking decision about taxes; i) keeping abreast of current operations in the business concerned; j) exercising control over day to day operations; and k) improving personnel management and public relations.

2.11. Need of User Studies for Designing User-centered Educational Information Systems

Our society is undergoing profound and rapid changes digital revolution. These changes are evident in the economic, social, cultural and political aspects of our society. This revolution has made a profound impression on the way the world functions and has transformed it to an evolving information society. The concept of 'Education' is also changing from the formal and pre-defined curriculum in the industrial society; today education is redefined as life-long learning in the information society. Life-long learning certainly reflects a new comprehension of the need for education in society. The "redefinition" seems to be the conceptual answer to the increasingly complex needs and possibilities for development and learning in the information society (Danish Technological Institute, 2003). World Education Forum (2000) reaffirms education as the key to sustainable development, peace and stability within and among countries; and thus an indispensable means for effective participation in the societies and economies of the information era. As discussed earlier, in the changing scenario, information has become a commodity. It plays a significant role in the professional and personal lives of the people. Thus in this context, the education, information and finding out the information needs and seeking behavior of educational information system users are the important variables of research in current global and information centered society. But the question is, "who are the educational information system users"? Within the education enterprise many

groups of users can be identified. For example, educational planners and administrators; b) teachers at school and higher education level; c) teacher educators; d) researchers; and e) librarians/documentalists; etc. (Verma, 1996, p.311). However, the role of educational administrators is very important in an education enterprise. Their role can be more effective, if they are well informed about their domain of work.

2.11.1. Information Needs, Seeking Behavior and other Preferences of Educational Administrators (EAs)

2.11.1.1. Background

Organizations, more than ever, are concerned about the successful planning and design of computer-based information systems. The concern begins with the correct determination of the critical information needs of top management and other members, and extends to the methods and techniques that will transform these information needs into information systems (Auster & Choo, 1996). Information plays a significant role in the professional and personal lives of the people. They have to use information to work properly in their fields. Some issues such as; a) what constitutes a need for information?; b) what do people think and do at that particular time?; c) how do they feel and how do their feelings affect their research?; d) what problems do they face while seeking information?; and e) do some groups possess certain characteristics of seeking information in common provoked the need for studying the human information needs and seeking behavior. These issues support information system designers to establish their systems and services according to the information needs of the users. Marchionini (1995) has narrated that information seeking is a natural and necessary mechanism of human existence. According to the author,

information seeking behavior is the purposive seeking for information as a result of a need to satisfy some goal. Chowdhury (2004) has mentioned that information seeking behavior of users depends on a number of factors. He has elaborated some common points which affect the information seeking behavior of the users: a) the professional and educational level of the user; b) the skill of user to get to information sources; and c) the time which a user has to see information systems. Several researchers concentrated on the issues of users' information behavior with respect to their different information needs. These studies provoked the need of information models to get a clearer view of their different needs and problems. These models can be classified into two major types i.e., 'human information behavior models' and 'user centered information search models'.

Wilson (1999) ascertains that within both information seeking research and information searching research, alternative models address similar issues in related ways and that the models are complementary rather than conflicting. Extensive studies on users and their information needs have been conducted over the last three decades and various methods have been employed in these studies such as: a) Surveys-questionnaires, interviews, case studies, etc.; b) Critical incident examination-observation of events, review of diaries, etc.; and c) Qualitative methods- study of internal process. However, the method most commonly used is the survey conducted through one or more data collection tools like the questionnaire, interview, and observation, etc. (Chowdhary, 2004).

Wilson (1997) believes that to study and understand information behavior, it is important to get an overall understanding of the context within which the information need arises. Many researchers emphasize that there is a relationship between

information behavior and task performance (Byström, 1999; Järvelin, & Wilson, 2003; Vakkari, 2001). Chowdhury (2004) has mentioned that information seeking behavior of users depends on a number of factors. He has elaborated some common points which affect the information seeking behavior of the users: a) the professional and educational level of the user; b) the skill of user to get to information sources; and c) the time which a user has to see information systems.

Wilson (1997) provided a general model of information seeking behavior, which forms the conceptual model of this study on information needs and seeking behavior of educational administrators in Pakistan. Wilson's general model of "information behavior" includes a number of stages that begin with the context of the information need. The second stage is the activating mechanism i.e., the motive or reason for seeking information. The third stage is of intervening variables that may act as barriers to information seeking and/or processing, such as the personal variables and the characteristics of the source. Information seeking behavior is the active and/or passive search for information. Information processing and use is the next stage which acts as a mechanism of feedback for the information searcher/user and may give rise to more information needs (See Figure 1.1 in chapter-1).

2.11.1.2. The Context and Work Tasks

Wilson (1997) maintains that the information need of an individual should be understood in his/her context. The context may be the individual's work environment, the roles and the tasks that the individual has to carry out. Many researchers emphasize that there is a relationship between information behavior and task performance (Byström, 1999; Järvelin, & Wilson, 2003; Leckie, et al., 1996; Vakkari, 2001). According to Katzer and Fletcher (1992), administrators'/ managers'

information behavior reflects a relationship with their work settings and information environment that highlights a need to understand problem situations as an ancestor to understand how they seek and use information.

Leckie, et al. (1996), for example, based their model on the assumption that information seeking is related to the performance of a particular role and its associated tasks. As part of the communication and information seeking process, professional groups, such as engineers and lawyers, adopt, enact, and expect various roles. The Figure 2.2 shows that particular roles and their related tasks result in information needs, which are, in turn, affected by factors, such as sources available, intended use of sources, individual characteristics of the user, and environment surrounding the user.

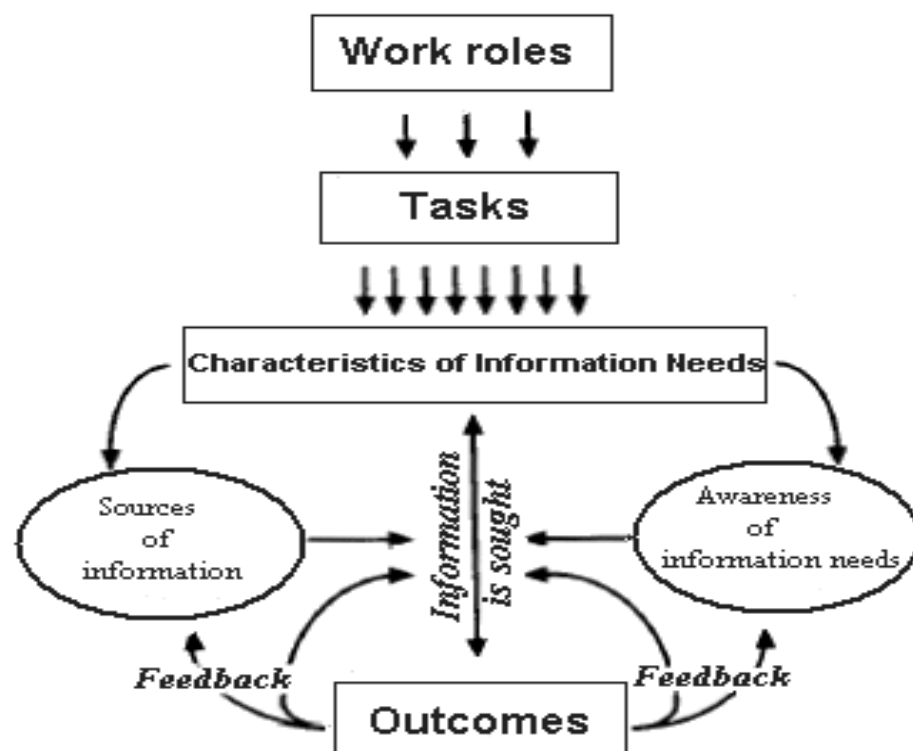


Figure 2.3: Leckie's Model

In order for tasks to be completed certain information needs must be met. According to Bystrom and Jarvelin (1995), a number of studies that relate tasks to information needs have been carried out. These studies have considered the relationship between the complexity of tasks and the resultant information seeking behavior. However it is noted that these studies were focused to look more at whole jobs or projects than on individual tasks and had used questionnaires to be completed after the completion of task and not during the task performance. The study by Bystrom and Jarvelin (1995) was an attempt to redress the paucity of studies on the effects of task complexity at the task level on information behavior. According to Bystrom and Jarvelin, simple tasks are routine information-processing tasks, where the inputs, processes and outcomes can be a priori determined, whereas difficult or complex tasks are new and genuine decision tasks, where they cannot be priori determined.

Many researchers have discussed that information needs of educational administrators are different according to the level at which information users are operating (national or sub-national) and the type of decision they take (planning and strategy, management and supervision, operational, recipients of programs etc), macro level (policy, planning, strategy development), intermediate level (management and control), and micro level (operations and recipients of programs). Educational policy makers and planners need information for an accurate analysis of the current situation and past trends to: a) define and quantify possible future developments; b) set development objectives; and c) define policies to be pursued to achieve these objectives. Program managers require information for planning, monitoring and evaluation of activities, resource allocation, and management of human resources.

The project/course manager requires more detailed information on inputs, process and outputs of programs, detailed budgetary information, impact of the programs etc. Educators would also require information on educational and pedagogical issues. Their work is open-ended because they have to tackle with a wide range of issues, but also in the sense that many of the problems have no apparent closure in the short-term, their resolution having to unfold over time (Auster & Choo, 1996; Lucey, 1995; UNESCO, 2006).

2.11.1.3. Information Needs and Activating Mechanism

Information needs by themselves do not lead to information seeking behavior. There is usually something that motivates an individual to seek the needed information (Wilson, 1997). According to Wilson (1994), the knowledge gap theories by Belkin and Dervin may be used to describe the activating/motivating factor that compels individuals to actually go out and seek information. An educational administrator may need information to back a decision or a course of action that was undertaken. Intervening variable to information seeking can vary from inertia on the part of the individual to organizational barriers to the free flow and use of information. Information needs can be categorized and individuals may experience a need for new information, need to clarify information held and the need to confirm information held. This categorization may be important in establishing the motivation for information seeking on the part of the individual. According to Leckie et al. (1996), information need is not constant and can be influenced by a number of variables. These include personal variables such as age, experience, education, geographic location, etc.; the context within which the information need arises, the

frequency, importance and the complexity of the tasks are also important factors. All of these factors can influence the formulation of information need.

The educational administrators usually need information for performing the routine tasks, planning, and budgeting, etc (S. M. de-Alwis & Higgins, 2001; Lucey, 1995). Types of information considered important include business news followed by political, social, and supplier trends, regulatory information, use of information technology, demographic trends and new management methods. Sources given a very high preference rating are personal contact for competitor trends and the use of government publications for obtaining regulatory information. (Alwis & Higgins, 2001; Auster & Choo, 1994; Grosser, 1991;-Katzner & Fletcher, 1992). According to the research findings reported by McCracken and Gillespie (n.d.), local educational administrators generally perceived little need for information for use in problem resolution. Most decision making was in the absence of an information search. Respondents desired experienced people as their major information source and the major criteria for utilization of print materials were the familiarity or degree of experience of the administrators with the materials, and the quality of contents.

At a planning forum, few thoughtful policymakers and educational administrators stressed on the need of research on issues related to the inputs and outcomes of education, the structure and process of education, the core of teaching and learning, and the broader context in which education operates. They believed that in order to be effective, research on governance, finance, policymaking, and management must address the issues and questions that decision makers really care about (US, Department of Education, n.d.).

2.11.1.4. Intervening Variables

According to Wilson (1997), whatever the situation in which a person perceives a need for information, engaging in information seeking behavior is not necessary consequence. There may be a number of reasons for this, including personal characteristics, social/interpersonal variables and environmental variables. An identification of these variables is possible and is desired so that they may be taken into consideration in the design and provision of information services. The possible intervening variables could be the characteristics of the source itself, such as information contained in a source may be out dated; it may not be quite in the form that the user requires it, and it is therefore important to find out the appropriate format in which it will be useful. Similarly, an individual's educational level may not be adequate for understanding statistical data (Leckie et al, 1996).

Non availability of needed information is another intervening variable, which may affect the efficiency of educational administrators. The needed information could be related to the inputs and outcomes of education, the structure and process of education, the core of teaching and learning, and the broader context in which education operates (US, Department of Education, n.d.). According to McCracken and Gillespie (n.d.), the research findings often fail to reach key decision makers either in the proper form or in time to assist in decision making. Also little is known about major problems for which educational administrators need information, methods of seeking information used by these decision makers, information normally used, or the criteria employed in selecting information.

2.11.1.5. Information Seeking Behavior

Information seeking behavior is manifested in the sources and channels that users utilize in the process of carrying out and completing their tasks. Wilson (1997) has identified modes of information seeking other than the one where the user actively carries out information seeking. The modes include passive search, passive attention and on-going research. Of specific interest for this research is the identification of information seeking and acquisition behaviors adopted by educational administrators. Leckie, et al (1996) have pointed out the factors affecting information seeking. According to them, professionals use a variety of information sources, which can be characterized by the types of channels – formal and informal; internal or external; oral or written; and personal.

G. de-Alwis, Majid and Chaudhry (2006) have found in a descriptive study that there has been a transformation in managers' information seeking behavior over the decades. Based on an extensive literature review, the authors analyzed the factors which have influenced managers' choice of source preferences. Their review not only reveals four key dimensions used to study source preferences, i.e. contextual, situational, personal/socio-cultural, and informational but also identifies common factors under each. The factors given main weight in the literature are accessibility, quality, and richness of the information, as well as individual and institutional characteristics (See Table 2.2).

Table 2.2. *Overview of Dimensions and Factors Influencing Information Source Preferences* (G. de-Alwis, Majid & Chaudhry, 2006)

a. Contextual (work related) <ul style="list-style-type: none"> • Work roles • Position in hierarchy (power) • Nature of task and task environment (complexity/uncertainty/ambiguity/time available for task) • Role/task relationship • How situation is perceived • Pursuing multiple work-related objectives • Pressure to produce results • Potential audience • Information environment (individual) • Level of discretion to pick information source • Geographical distances • Access to technology 	b. Situational (organizational/environmental) <ul style="list-style-type: none"> • Company goals and mission • Size of company • Organizational structure (centralized/decentralized) • Company performance • Corporate culture • Motivation/incentive to search for sources • Customer orientation of company • Technology available • Information environment (corporate) • Corporate communication flows • Commitment to professional development • Nature of the industry (perceived importance/ complexity/rate of change and uncertainty) • Environment factors (complexity/uncertainty) • Competition
c. Personal/socio-cultural <ul style="list-style-type: none"> • Cognitive styles • Age • Gender • Educational/professional qualification • Work experience • Years with company (current knowledge state) • Personal goals • Personal information seeking/ processing styles/preferences • Level of user sophistication/information literacy • Habitual preferences for information sources • IT skills • Membership of professional organizations • Membership of other organizations • Relationships/networking/ individual communication behavior • Social influences 	d. Informational <ul style="list-style-type: none"> • Acceptable quantity • Accessibility of sources (social/economic costs, physical proximity, time taken, effort, convenience) • Availability • Choice of sources • Costs • Document type • Easy to use • Awareness, familiarity, experience and prior success with source • Format (full-text/abstract) • Information richness (clarity, response speed, offer multiple information cues and channels simultaneously, interactive, personal focus, filtered, adaptable, summarized, integrated, actionable and specific; factual and relevant; variety of language for ease of understanding) • Position advocated in the information • Quality of sources (accuracy, authoritativeness, comprehensiveness, credibility, currency, reliability (individual/institutional), validity) • Quantity available • Response speed of source • Specificity of need (unique/specialized information) • Technology (speed of loading) • Trusted

Choo (n.d.) has found that chief executives prefer sources that they perceive to be reliable, high quality and that provide relevant information. Among the wide range of sources that they use, internal and personal sources appear to be more important than external and impersonal sources. Few chief executives personally use the

company library and online database services. S. M. de-Alwis and Higgins (2001) have reported the results of a study, which indicate that the types of information considered very important for decision making included competitor trends followed by regional economic trends. Types of information considered important included business news followed by political, social, and supplier trends, regulatory information, use of Information Technology, demographic trends and new management methods. Sources given a very high preference rating were personal contact for competitor trends and the use of government publications for obtaining regulatory information. Respondents also preferred the use of government publications for local economic information and the use of newspapers for political trends and business news. However, the company library was perceived as a storage facility rather than a dynamic information resource. Local libraries were also used for regional and international economic information. Radio and television were used to obtain regional and local economic information, but were rated low in accessibility. Very high preference was given to personal contacts as a source of information. Many researchers believe that administrators' source preferences have not changed over the years and they primarily rely on people they trust and other informal social networks (Auster & Choo, 1994; S. M. de-Alwis & Higgins, 2001; Grosser, 1991). Wilson (1997) believes that the use and impact of other information sources on information seeking behavior should also be explored, such as mass media and use of computer mediated technologies etc.

These new forms of media have affected the information seeking behavior of the educational administrators. For example, George and Huber (1990) believe that the use of computer-assisted communication technologies enable top administrators to

obtain local information quickly and accurately, and reduce ignorance and help them to make decisions that they, otherwise, may have been unwilling to make. The opportunity to obtain contextual clarification with electronic mail and other computer-assisted communication technologies would amplify this tendency. Conversely, electronic bulletin boards enable lower and middle-level managers to stay better informed about the organization's overall situation and about the nature of the organization's current problems, policies, and priorities and, consequently, permit decisions made by these managers to be more globally optimal, rather than more parochial and suboptimal. Further, computer-assisted communication technologies allow lower-level units to clarify information in a timelier manner.

2.11.1.6. Information Use

According to Wilson (1997), studies into how information is used have been ignored, yet these studies can help forecast information needs and the design of a user centered information system. Durrance (1989) stresses that most of the research studies have focused on which systems and services are used rather than on how information systems can be designed to meet the needs of users. However, an attempt is made by Ellis (1989) to understand the information seeking behavior of users and then linking it to how an information system can be designed for them.

Guan, Nunez and Welsh (2002) have identified three of the ways in which information is used strategically by both internal and external stakeholders in universities. The ways are as under:

1. By administrators and policy makers and faculties to: a) assist in resource management and strategic planning; b) assist in the recruitment and retention of students.

2. By external oversight agencies to: a) assess the performance of the institutions; b) assess programs offered on a variety of indicators.
3. By students requiring subject specific information on: a) lecture notes, tutorial and case study briefs; b) examination timetables; and c) results of assessments.

2.12. National Information System for Educational Administrators: The Pakistani Perspective

The basic objective of this study is to propose a draft model of information system for educational administrators in Pakistan; to fulfill this objective detailed overview is needed about the educational system, its administration, infrastructure of information within the education enterprise, state of the research on information needs and seeking behavior of educational administrators and educational information systems/network. This sections not only provides the needed overview but it highlights the gap, which exist in the provision of needed information to the administrators who are the sole planners and decision makers of the education enterprise.

2.12.1. The State of Educational Administration and its Information Networks in Pakistan

Pakistan (officially the Islamic Republic of Pakistan) is a country in South Asia. It is bound to the west by Iran, to the north by Afghanistan, to the northeast by China, to the east and southeast by India, and to the south by the Arabian Sea. It has an area (excluding the Pakistani-held part of Jammu and Kashmir) of 796,095 square kilometers. Pakistan was brought into being at the time of the Partition of British India in 1947 in order to create a separate homeland for the Muslims of Sub-Continent. In terms of the structure of its economy, Pakistan resembles the middle-income countries of East and Southeast Asia more than the poor nations of the Indian

Sub-Continent (Shafique & Mahmood, 2008). Economic performance compares favorably with that of many other developing countries; the GNP has increased at an average rate of more than five percent (5%) a year since independence. Agriculture is the backbone of the country's economy. It employs 48 percent of the labor force and accounts for 60 percent of export earnings (Husain, 2005). The GDP composition by sector in 2006 was 22 percent from agriculture, 26 percent from industry and 52 percent from services (US, Central Intelligence Agency, 2007).

IndoPak is perhaps one of the few countries which established a sound statistical system centuries ago. In the case of education statistics, *'Educational Development in IndoPak'* dates back to 1870. Due to political disparity, at independence, Pakistan had a poorly educated population and few schools or universities. Although the education system has expanded greatly since then, debate continues about the curriculum, and, except in a few elite institutions, quality remained a crucial concern of educators for the last many years. The education system in Pakistan, like British Columbia, is more or less central where a lot of progress can be predicted if the leadership is highly efficient and fully aware of its responsibilities (Burdey, 2003). Adult literacy is low, but improving. In 1992 more than 36 percent of adults over fifteen were literate, compared with 21 percent in 1970. School enrollment also increased, from 19 percent of those aged six to twenty-three in 1980 to 24 percent in 1990. However, by 1992 the population over twenty-five had a mean of only 1.9 years of schooling. This fact explains the minimal criteria for being considered literate: having the ability to both read and write (with understanding) a short, simple statement on everyday life. Relatively limited resources have been allocated to education, although there has been improvement in recent decades. In 1960 public

expenditure on education was only 1.1 percent of the gross national product (GNP); by 1990 the figure had risen to 3.4 percent (Blood, 1994). The total public spending on education (by federal, provincial and district government) came to 2.21% of GDP during the year 2005-06 (Pakistan, Ministry of Education, 2009).

2.12.2. Education System in Pakistan: A Review

Pakistan follows centralized system of education and there is statutory requirement for all schools and colleges to follow a national curriculum. Education is organized into five levels: primary (grades one through five); middle (grades six through eight); high (grades nine and ten, culminating in matriculation); intermediate (grades eleven and twelve, leading to an F.A. (arts)/F.S. (science) Degree and university programs leading to undergraduate and advanced degrees. Preparatory classes (*kachi*, or nursery) were formally incorporated into the system in 1988 with the Seventh Five-Year Plan. In 1991 there were 87,545 primary schools, 189,200 primary school teachers, and 7,768,000 students enrolled at the primary level, with a student-to-teacher ratio of forty-one to one. Just over one-third of all children of primary school age were enrolled in a school in 1989. There were 11,978 secondary schools, 154,802 secondary school teachers, and 2,995,000 students enrolled at the secondary level, with a student-to- teacher ratio of nineteen to one (Blood, 1994; AEPAM, 2009). In nutshell, the system has adopted three-tier mode (8+4+4) with distinct stages. The details of each stage are given as under:

2.12.3. Formal Education

2.12.3.1. Elementary Education

The elementary education comprises two distinct stages- Primary and Middle.

2.12.3.1.1. Primary Stage:- The primary stage (Grades: I-V) extends over five years (age 5+ to 10+). Net primary enrolment rate is 66% in 2005. The medium of instruction in most of the schools is Urdu- the national language. There are English-medium schools as well. However, the curriculum for primary classes is almost the same throughout the country. The major focus of this stage is on basic mathematical and literacy skills, appreciation of traditions and values, and socialization. Promotion to next class depends on the result of the school examination. Schooling is being made compulsory through appropriate legislation (Pakistan, Federal Bureau of Statistics, 2005; World Bank Group-IEG, 2007).

2.12.3.1.2. Middle Stage:- The Middle stage (Grades: VI-VIII) is of three years duration and is offered in schools either having primary or secondary classes. The curriculum is common for males and females as well as for urban and rural dwellers. The focus of this stage is to strengthen foundations of first and second languages, mathematics and science and developing understanding of family, community, environment, health and nutrition. Provincial Education Departments as well as schools conduct terminal examination at this stage. Middle level enrolment rate was 47.5% in 2005 (Pakistan, Federal Bureau of Statistics, 2005; Shami & Hussain, 2005).

2.12.3.2. Secondary Education

Secondary Education comprises of two stages- Secondary and Higher Secondary.

2.12.3.2.1. Secondary Stage:- The secondary education is of two years duration comprising Grades: IX-X. It covers 13-15 years cohort of children. There is a Secondary Schools Certificate (SSC) examination at the end of the tenth class and is

conducted by the Boards of Intermediate and Secondary Education through out the country. The medium of instruction in most of schools is Urdu, except in English medium schools. Streaming of children starts at this stage. Students opt for a group of their choice such as Science, Humanities, and Technical. Urdu, English, Pakistan Studies, Islamic Studies and Mathematics are compulsory subjects. A group of three elective subjects determines the specified stream.

2.12.3.2.2. Higher Secondary Stage:- The higher secondary education (Grades XI-XII) is imparted at both Intermediate Colleges and Higher Secondary Schools. The students follow two years program of study at higher secondary level, which leads to the Higher Secondary School Certificate (HSSC) and is a pre-requisite for entrance to university or an institution of higher education. The medium of instruction in science subjects is mostly English. The Boards of Intermediate and Secondary Education conduct the examinations for higher secondary school certificate. Division of students takes place at various levels of school education. After the middle stage, students can follow either academic courses in secondary schools or a trade course at vocational institutions. After secondary school stage students can enter Intermediate Colleges or Higher Secondary Schools for pre-university courses or can join polytechnics to take up three-years diploma course in a particular branch of technology or trade. After Higher Secondary School Certificate (HSSC) one can either join general universities or professional institutions such as agricultural, engineering and medical (Shami & Hussain, 2005). Table 2.3 shows the duration of education and age on entry in elementary, secondary and tertiary level education.

Table 2.3. *Duration of Education and Age on Entry by Level/Stage*

Level/Stage	Class	Duration	Age on entry
Elementary:			
Primary	I-V	5 years	5 years
Middle	VI-VIII	3 years	10 years
Secondary:			
Secondary	IX-X	2 years	13 years
Higher Secondary	XI-XII	2 years	15 years
Tertiary:			
Undergraduate	XIII-XIV	2 years	17 years
Postgraduate	XV-XVI	2 years	19 years

2.12.3.3. Teacher Education

After obtaining Secondary School Certificate (SSC) a student can join College of Education for Elementary Teachers for Primary Teaching Certificate (PTC), which is of one-year duration and enables him/her to teach at primary level. After HSSC one can also opt for one-year program leading to Certificate of Teaching (CT), which enables teachers to teach at middle school level. Now both the programs (PTC & CT) are being replaced by Diploma in Education that is of three years duration after SSC. Bachelor of Education (B.Ed.) is a one-year program after B.A./B.Sc. being offered by Colleges of Education and its successful completion enables him/her to be a secondary school teacher. An alternate three years degree course in science education leads to the Bachelor of Science Education (B.S. Ed). The Master of Arts in Education (M.A.) program is of two years after the first degree and Master of Education (M.Ed.) program is of one year after B.Ed (Shami & Hussain, 2005). Teacher-training workshops are overseen by the respective provincial education ministries in order to improve teaching skills.

However, incentives are severely lacking, and, perhaps because of the shortage of financial support to education, few teachers participate (Blood, 1994).

2.12.3.4. Vocational and Technical Education

The duration of vocational and technical educational programs ranges from three months to three years. Similarly entry qualifications also vary according to the program. Different trades are offered in these institutions. Technical and vocational education is being reorganized through the establishment of provincial bodies.

2.12.3.5. Deeni Madaris

Parallel to formal school system there are Deeni Madaris imparting religious education based on the Quran, the Hadith (Sayings of the Prophet Muhammad-Peace be upon him), Islamic jurisprudence, logic, etc. Attempts are under way to integrate religious educational system with the formal school system. Most of these institutions offer Shahadat ul Almiya and Ghausia courses. The highest degree of “Shahadat-ul-Almiya” is being recognized as equivalent to M.A. in Arabic/Islamic studies (Shami & Hussain, 2005).

2.12.3.6. Tertiary/Higher Education

Higher education is the top most level of the three-tier education system of Pakistan. All higher education programs are conducted by the universities and institutions of higher learning, designated by the government (M. Z. Akhtar, 2002). Policy views the higher education as a source of great potential for the socio-economic and cultural development of the country and for the beliefs that through quality higher education the nation can be transformed into a developed nation within the life time of a single generation. For that purpose of higher education system needs to be changed into a dynamic system to adjust to the changing time and invigorate

itself through renewal of efforts from time to time (A. Iqbal, 2004). Recognizing the significance of human resources the Government of Pakistan has reorganized the higher education in the country. Higher Education Commission (HEC) has been set up to meet the challenges and devising policies (Shami & Hussain, 2005).

2.12.3.6.1. Colleges:- Students precede to a College or University for Bachelor of Arts (BA) or Science (BSc) or Commerce/Business Administration (BCom/BBA) degree courses. There are two types of Bachelor courses in Pakistan namely Pass or Honors. Pass constitutes two years of study whereas Honors are of three or four years and students normally get specialized in a chosen field of study (Shami & Hussain, 2005). The real challenge for the Pakistani college is transforming itself into a dynamic, vibrant and innovative place of high quality learning. This will require great material and faculty resources, autonomy and conversion to a four-year undergraduate program. Colleges at the district level have traditionally played a critical role in our education system, particularly in preparing young graduates for professional degrees — mainly in medicine and engineering (Rais, 2008).

2.12.3.6.2. Universities:- Universities in Pakistan offer undergraduate, graduate and postgraduate programs of studies in general and professional education. A bachelor degree is a requirement for admission to postgraduate courses in the general universities. Two years Master Degree programs in arts and science (M.A./M.Sc.) are offered by universities and affiliated institutions. The universities also offer M.Phil and Ph.D. programs. The minimum duration of Master of Philosophy (M. Phil) is of two years. The Doctor of Philosophy (Ph.D) degree is offered by research as well as by course work cum research. The degrees of Doctor of Literature (D. Lit.), Doctor of Science (D.Sc.) and Doctor of Law are also awarded by

some universities. Pakistani universities churn out almost 1.2 million skilled graduates annually (Shami & Hussain, 2005).

2.12.3.6.3. Major Public Sector Universities in Pakistan:- There are 71 major public sector universities in Pakistan, organized by sub-national entities (It includes only those universities which are recognized by the Higher Education Commission of Pakistan) (See Table 2.4). Within the Islamabad Capital Territory (ICT) there are 14 universities, while in Azad Kashmir, there is only one public sector university i.e. University of Azad Jammu and Kashmir, Muzaffarabad. In Baluchistan, there are six universities, 14 universities in North-West Frontier Province, in Northern Area there is only one university i.e. Karakorum International University, Gilgit. Contrarily in Punjab, there are 21 universities and in Sindh, there are 14 public sector universities (HEC, 2009).

Table 2.4. *Public Sector Universities Within each Province of Pakistan*

R.	Provinces	Public Sector Universities	Percentage
1.	Punjab	21	29.57
2.	Islamabad Capital Territory (ICT)	14	19.71
3.	North-West Frontier Province	14	19.71
4.	Sindh	14	19.71
5.	Baluchistan	6	8.45
6.	Azad Kashmir	1	1.4
7.	Northern Area	1	1.4
Total		71	100

2.12.4. Non-formal Education

To cater the needs of those who cannot rejoin formal education and to promote education in the country, Pakistan has established Allama Iqbal Open University. It offers courses through distance learning system that includes four months special need based short courses to degree programs even leading to Ph.D. degrees in various subjects (Shami & Hussain, 2005). Similarly Virtual University of Pakistan is another option for distance learning in Pakistan. The Virtual University, Pakistan's first university completely based on modern Information and Communication Technologies (ICTs), using free-to-air satellite television broadcasts and the Internet. It allows students to follow its rigorous programs regardless of their physical locations (Virtual University, 2008). Both for training teachers, as well as for direct instruction of students, one can imagine that distance-learning through specially developed videos and multi-media learning materials could be extremely powerful tools (A. Khan, 2008).

2.12.5. Current Educational Statistics

According to the current statistics (acquired from the Census 2005), out of 2, 27,791 institutions for which the information was collected, 167,446 (73.5 percent) institutions were in rural areas and 60,345 (26.5 percent) were in urban areas. Punjab, the most populated province of Pakistan has the largest number of institutions i.e. 110,459 (48.5%). Then Sindh has 51,006 institutions, NWFP has 37,761, Baluchistan 10,986, Islamabad Capital Territory (ICT) has 1,189, FATA has 5,145, FANA has 3,977, while AJK has 7,268 institutions. Table 2.5 shows the number of rural and urban institutions within each province/region (Pakistan, Federal Bureau of Statistics, 2005).

Table 2.5. *Number of Institutions by Location*

Area	Total	Rural	Urban
Pakistan	227,791	167,446 (73.5%)	60,345 (26.5%)
Punjab	110,459	77,054 (69.8%)	33,405 (30.2%)
Sindh	51,006	34,056 (66.8%)	16,950 (33.2%)
NWFP	37,761	31,849 (84.3%)	5,912 (15.7%)
Baluchistan	10,986	9,093 (82.8%)	1,893 (17.2%)
ICT	1,189	618 (52.0%)	571 (48.0%)
FATA	5,145	5,145 (100.0%)	-
FANA	3,977	3,535 (88.9%)	442 (11.1%)
AJK	7,268	6,096 (83.9%)	1,172 (16.1%)

2.12.5.1. Institutions by Level and Sector

The data reveal that Public Sector is major education provider with 151,744 institutions nearly two fold of Private Institution. In Pakistan, the public sector institutions were 66.6 percent and in private sector these were 33.4 percent observing the situation in the provinces/regions, it is found that in all provinces/regions public sector institutions were more as compared to private sector except ICT and FANA. It is to be noted that private sector institutions are growing rapidly, i.e., from 36,096 institutions in 1999-2000 as compared to 81,103 educational institutions in 2005 showing thereby an annual average increase of 25 percent (Pakistan, Federal Bureau of Statistics, 2005).

2.12.5.2. Institution by Level and Location

Table 2.6 reveals that out of 227,791 institutions 1081 (0.5 percent) were pre-primary schools; 14,123 (6.2 percent) were mosque schools.

Table 2.6. *Number of Educational Institutions by Level and Location*

Level of Institutions	Total	Rural	Urban
Total	227,791	167,446 (73.5%)	60,345 (26.5%)
Pre-Primary	1,081	589 (54.5%)	492 (45.5%)
Mosque School	14,123	12,995 (92.0%)	1,128 (8.0%)
Primary	122,349	103,863 (84.9%)	18,486 (15.1%)
Middle	38,449	23,986 (62.4%)	14,463 (37.6%)
Secondary	25,090	11,971 (47.7%)	13,119 (52.3%)
British System	281	29 (10.3%)	252 (89.7%)
Inter and Degree College	1,882	470 (25.0%)	1,412 (75.0%)
General Universities	49	13 (26.5%)	36 (73.5%)
Technical /Professional	1,324	129 (9.7%)	1,195 (90.3%)
Vocational/Poly Technique	3,059	802 (26.2%)	2,257 (73.8%)
NFBE	4,831	3,726 (77.1%)	1,105 (22.9%)
Deeni Madaris	12,153	6,658 (54.8%)	5,495 (45.2%)
Others	3,120	2,215 (71.0%)	905 (29.0%)

Likewise, 122,349 (53.7 percent) were primary schools; 38, 449 (16.9 percent) were middle and 25,090 (11.0 percent) were secondary schools and 12,153 (5.3 percent) were Deeni Madaris and rest 14,546 (6.4%) were other institutions including British System of education, Inter and Degree Colleges, General Universities, Technical Professional, Vocational and Poly Techniques, NFBE and other institutes (Pakistan, Federal Bureau of Statistics, 2005).

2.13. Structure of Educational Administration in Pakistan

Politically, Pakistan is a federation of four provinces i.e. Punjab, Sindh, Northwest Frontier Province, and Baluchistan. Administratively, the provinces are comprised of districts, which are divided into small subdivisions (tehsils). These are

further divided into union councils. Coming section presents an overview of the structure of educational administration in Pakistan.

According to the constitution, education in Pakistan is a provincial concern. Provinces are, as a matter of principle, independent in policy formulation and management of education within their administrative boundaries. The Federal Government is assigned with the responsibility for policy, planning, and promotion of educational facilities in the federating units. This responsibility is in addition to the overall policymaking, coordination and advisory authority; otherwise, education is the provincial subject. In practice however, major education policies are formulated at federal level and they are passed on to the Provincial Education Departments for implementation. The Federal Ministry of Education administers the educational institutions located in the federal capital territory. Universities located in various provinces are administered by the provincial governments, but are exclusively funded by the federal government through the Higher Education Commission (HEC) (A. Khan, 2008). The Federal Ministry of Education is headed by the Minister of Education. The most senior civil servant in the Ministry is the Education Secretary assisted by Joint Secretary and Joint Educational Advisors of each wing. Each wing in the Federal Ministry of Education is headed by Joint Educational Advisor. The Provincial Departments of Education are counterparts of the Federal Ministry of Education. In provinces, Ministers for Education are in charge of the provincial Ministries of Education. Within the province the Minister for Education is responsible for policy matters concerning the Department. He conducts the business of the Department in the Provincial Assembly, submits cases to the Chief Minister for seeking his approval on important decisions. The Minister keeps the provincial

Governor informed about important developments in the field of education. The civil servant in charge of the department is the Provincial Education Secretary (Pakistan, Ministry of Education, 2009; Punjab Education Department, 2008) (See Figures 2.4, 2.5 & 2.6). The provinces are further divided into districts for the purpose of administration. The head of the Education Department in a district is Executive District Officer (EDO). Literacy Department functions separately in case of Punjab and Sindh only and it is headed by Executive District Officer (EDO) literacy. In the Provinces of NWFP and Baluchistan, literacy is the part of Education Department. The hierarchy then runs down to the District Education Officer, Sub-district Education Officer, Supervisors or Assistant Sub-district Education Officers. In certain cases, a different ministry may oversee specialized programs. Teacher-training workshops are overseen by the respective provincial Education Ministries in order to improve teaching skills. Academic and technical education institutions are the responsibility of the Federal Ministry of Education, which coordinates instruction through the intermediate level. Above that level, a designated university in each province is responsible for coordination of instruction and examinations (Blood, 1994; A. Khan, 2008).

2.13.1. At Federal Level (Ministry of Education)

Govt. of Pakistan

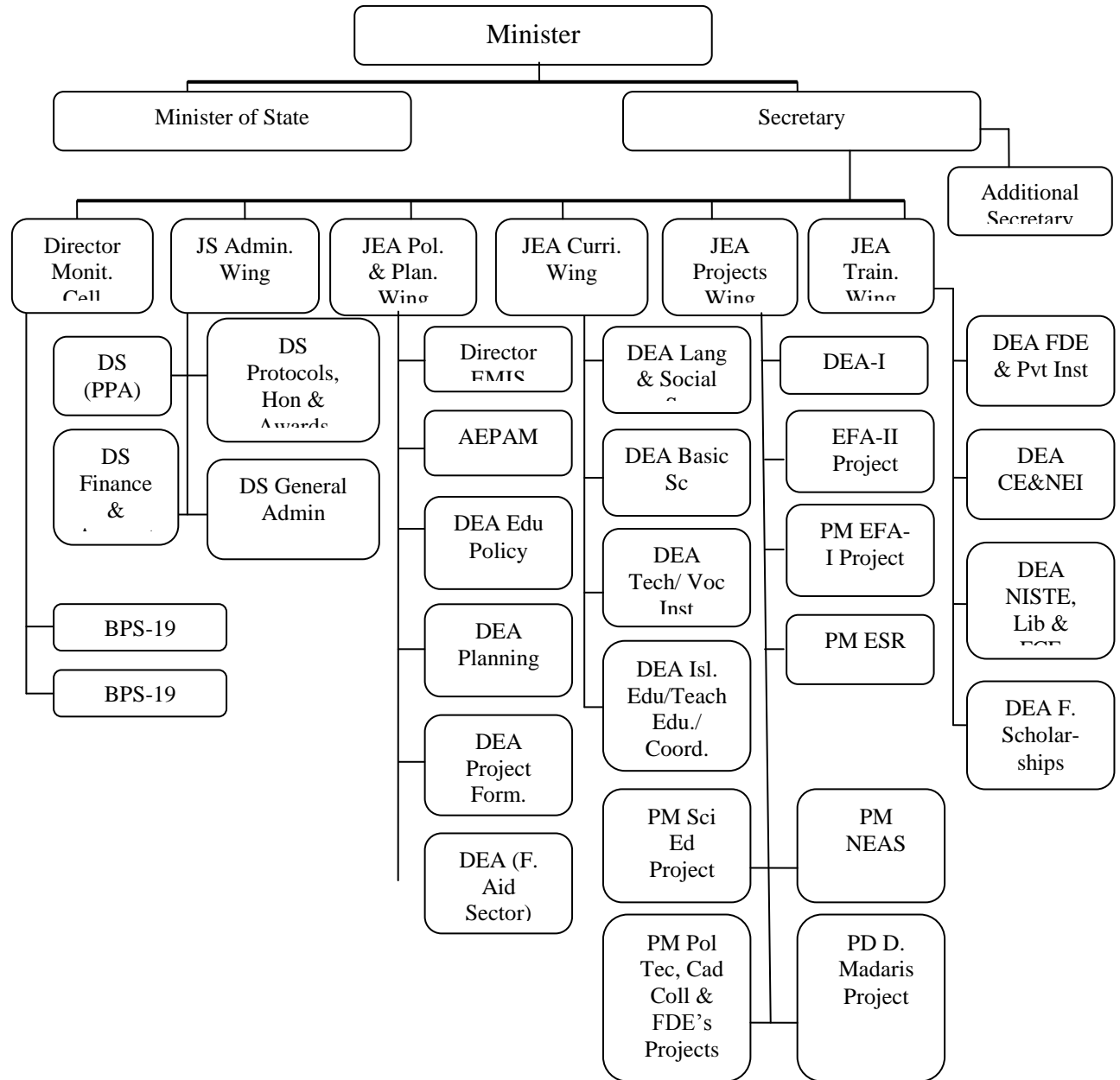


Figure 2.4. Organogram of Ministry of Education (Pakistan, Ministry of Education, 2009)

2.13.2. At Provincial Level

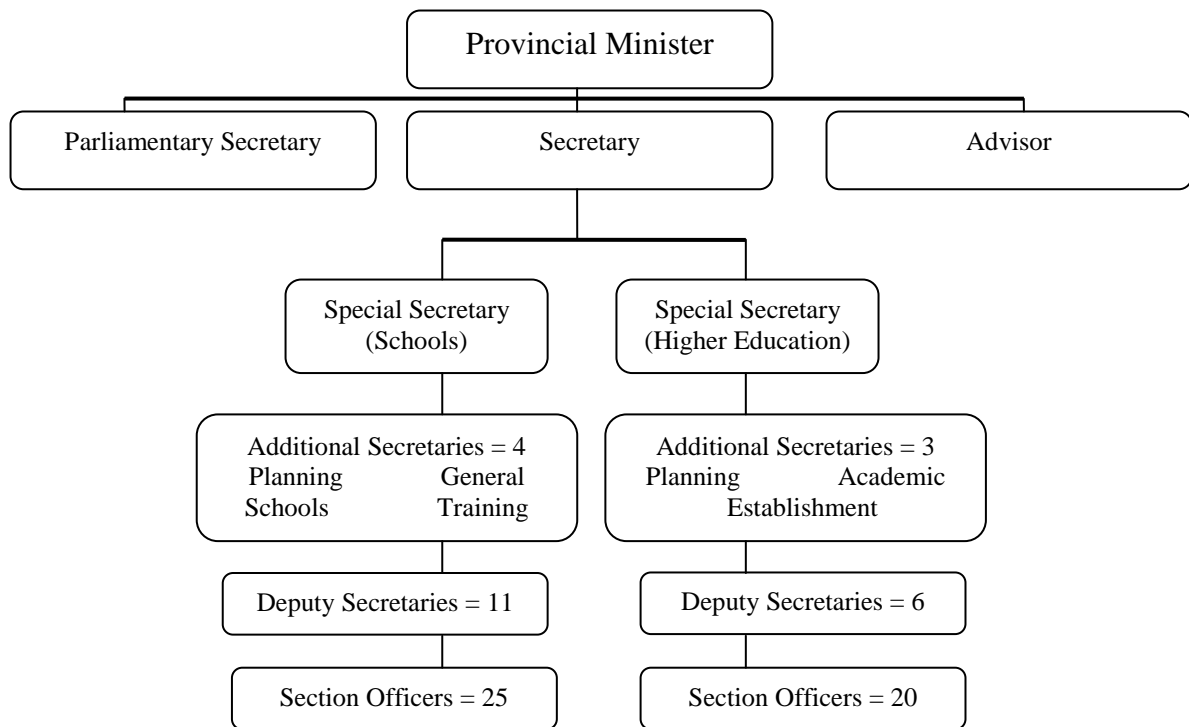


Figure 2.5. Organogram of Education Department

2.13.3. At District Level

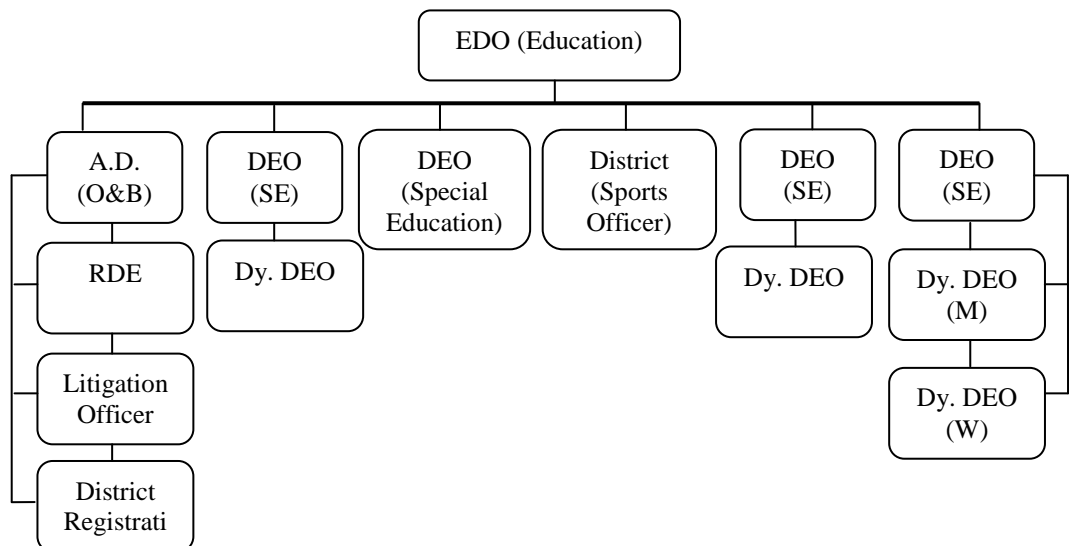


Figure 2.6. Organogram of District Education Setup

From 1947 to 1955 educational management was the responsibility of local bodies in Pakistan. The creation of one unit in West Pakistan made education a

provincial subject. In 1971 separation of the East Pakistan and continuous political upheavals and military takeovers aggravated the situation that from 1947 to date. Education policies have failed to achieve the target of mass literacy (Burdey, 2003). The elementary education system in Pakistan is fragmented into state controlled, municipal, and private education. The first is over-controlled under the hierarchical structure, without any system of accountability or democratic control and is subject to political intervention. In urban areas, elementary education is totally left to the municipalities. Owing to their multi-purpose nature, lack of clarity in the local government laws, and absence of central discipline and administrative control, the real interest of education could never be guaranteed among the municipalities. The political and administrative élite are fulfilling their educational needs from private sector, which is expanding speedily under the auspices of the government. Practically, State and Municipal education is left only to the poor people, who have no say in society (Chaudhry, 1999). Sohail (2005) has found that educational administration system in all the provinces of Pakistan is decentralized. Despite this fact, there are certain parameters, which differentiate the educational administration system of the provinces from one another. According to Shami and Hussain (2005), Pakistan being alive to the need of decentralization has initiated political and administrative devolution under its reforms agenda. The Local Government Ordinance has been promulgated to pave way for devolution plan in the country. The reform addresses shift to decentralization of political power, decision-making authority, and administrative responsibilities to the grass root levels - village, union council, tehsil and district. The main aim of devolution is to maximize the local participation in the decision- making process to improve the services' delivery to all segments of the

society. Chaudhry (1999) has also emphasized that the establishment of the “education authorities” at division, district or the local level can ensure the involvement of the related interests in planning, administration and maintenance of the educational institutions.

Major institutions responsible for the different educational administrative activities in Pakistan are described as under:

2.13.4. Ministry of Education, Pakistan

Ministry of Education, Pakistan performs the following functions: a) development and coordination of national policies, plans and programs in education, development of curricula; b) international aspect of development and planning of education; c) copyright; d) external examination and equivalence of degrees and diplomas; e) development of instructional technology; promotion and coordination of educational research; f) national language and other languages used for official purposes including medium of instruction; g) national education institutions and organizations and grant-in-aid to them, excluding administrative control of law colleges, National Educational Council; h) education in the Capital of the Federation, Federally Administered Areas and AJ&K; i) financial assistance to educationists and men of letters and their bereaved families; j) Pride of Performance Award in academic fields; k) National libraries; l) National Service Corps; military training for students; m) Boy Scouts and Girl Guides; youth activities and movements; n) welfare of Pakistani students abroad and foreign students in Pakistan; o) relationship with UNESCO and participation in its activities; liaison with other international agencies and organizations in educational programs; p) international exchange of students and teachers; q) foreign studies and training, international assistance in the field of

education; r) promotion of special studies designed to identify problems of national integrity and measures best calculated to protect the mainsprings of ideological inspiration and develop national cohesion; s) administrative control of the Federal Colleges of Arts and Design; t) administrative control of Islamic Research Institute; u) selection of scholars against Pakistan Chairs abroad by the Special Selection Board constituted in the Education Division; v) integrate plans, proposals and programs proposed or prepared or adopted by Higher Education Commission in higher education sector (Pakistan, Ministry of Education, 2002).

2.13.5. Higher Education Commission (HEC)

The Higher Education Commission has been set up by the Government of Pakistan to facilitate the development of indigenous universities to be world-class centers of education, research and development. Founded by “Presidential Ordinance No. LIII” in September 2002, the Commission has been entrusted with a broad mandate to evaluate, improve and promote the higher education and research sector in Pakistan. The reform agenda has been supported through the granting of a large array of powers to the Commission to fulfill its mandate, and record increases in financial resources by the Government to support this process (HEC, 2008).

2.13.6. Federal Directorate of Education (FDE)

Federal Directorate of Education (FDE), Islamabad was established as an Attached Department of Ministry of Education in 1967 for providing educational facilities at various levels in ICT (Islamabad Capital Territory). FDE's reforms and measures to improve quality of education through: a) in-service teachers' training; b) uni-system of education; c) introduction of IT education at various levels; d) English teachers for primary classes; e) Institution of Parent Teacher Association (PTA); f)

promulgation of education code; and g) free text books (Pakistan, Federal Directorate of Education, 2008).

2.13.7. Boards of Intermediate and Secondary Education

In Pakistan, the Boards of Intermediate and Secondary Education are responsible to organize, regulate, develop and control Intermediate Education and Secondary Education (Punjab Boards of Intermediate and Secondary, 1976). For example secondary school in Pakistan begins from grade nine (9) and lasts for four years. Upon completion of grade 10, students are expected to take a standardized test administered by a regional 'Board of Intermediate and Secondary Education'. Upon successful completion of this examination, students then enter a college and complete grades 11 and 12. Upon completion of grade 12, they again take a standardized test which is also administered by the regional boards (AEPAM, 2009; GPO for the Library of Congress, 2006).

2.13.8. Pakistan Academy of Educational Planning and Management

In Pakistan, Academy of Educational Planning and Management (AEPAM) was established in March 1982, under Resolution to provide assistance to Ministry of Education in planning, implementing, monitoring and policy formulation. It aims to facilitate development and promotion of education through cooperative policy, planning, innovation, capacity building, quality assurance, watch of implementation, establishment and up-gradation of information system and data bank. Charter of AEPAM is to: a) monitor and evaluate the education sector projects and programs being implemented throughout the country; b) collate data collected through provincial EMIS, and develop database of critical indicators; c) maintain linkages with Provincial and District educational institutions; d) organize training programs for

capacity building of education managers; e) impart training at the pattern of NIPA to all educational officers eligible for promotion to senior positions on regular basis; f) organize training programs in computer/IT for head teachers, teachers, computer personnel and education managers; g) establish and house “Think Tank” for assisting the Ministry of Education in the formulation of education policies. The Academy, being the prime institute in the field of EPM and has been collaborated with international agencies: JICA, UNESCO, IIEP, IBE, WB, ADB, UNICEF, UNDP, HIID (Harvard) for carrying out various training programs as well as research projects (AEPAM, 2003).

2.14. Information and Communication Infrastructure in Pakistan

The world economy has already moved from low value basic industries (i.e. manufacturing and agriculture) to a fast-paced high-value information based economy. Pakistan is also pressurized by these factors to capture the emerging opportunities prevailing in the information society. Keeping these realities in view, the Government of Pakistan today is not only promoting e-culture at local and national level but also trying to meet most of the essential requirements that foreign businesses and investors are looking for. Macroeconomic stability, deep-rooted structural reforms, high standards of economic governance, outward looking orientation, liberalized trade and investment regime, easy access to policy makers, low production costs, a sophisticated financial sector and its location as a regional hub make it a highly attractive country for global business and investment. These factors, along with the lessons learnt from its historical experience, the development of new capitalistic features (based on census reports and definitions of occupations) and the imperatives of globalization, have led to the conversion of Pakistan’s agricultural

society to an information society. Many indicators show that an information society is emerging in this country at a very fast pace. These indicators include fast growing telecommunication facilities, free flow of information through electronic media, and the use of computers and the Internet in public life (Shafique & Mahmood, 2008). Pakistan is divided into four administrative regions. The Internet facility is available in 2389 cities and towns, of which 1433 are in the Punjab Province, 561 in the North West Frontier Province (NWFP), 244 in the Sindh Province, while 151 are in the Baluchistan Province (Pakistan, Federal Bureau of Statistics, 2008).

Though in early 2006 the Internet penetration remained low, the numbers have since been growing. By now broadband access is available in all the major cities. According to the available statistics, as of March 2008, there were 17, 500,000 Internet users (10.4% penetration, per ITU) in Pakistan and 128,700 broadband subscribers (per ITU) (Internet Coaching Library, 2008). Internet service is becoming an integral part of life in Pakistan particularly in urban areas where large portion of the businesses are using it for different purposes. Most of the domestic Air Lines including PIA and Air Blue have started e-ticketing through internet to provide better and efficient services to its customers. According to the estimates of ISPAK (Association of Pakistani ISPs), currently there are about 3.5 million internet subscribers all across in Pakistan whereas total users crossed 17 million marks (Pakistan Telecommunication Authority, 2008).

It is evident from the above reviewed literature that a sound ICT infrastructure exists in Pakistan. By utilizing this infrastructure, various information systems are available in different disciplines. For example, health sector is benefiting from Health Management Information System (HMIS), though there is a need for strengthening of

the whole system with better coordination among various vertical health information systems, which can practically contribute to better decision-makings (Ali & Horikoshi, 2002). Similarly, Pakistan Society of Geographic Information System (PSGIS) is a wider network of foreign qualified GIS experts in Pakistan and abroad, which provides services in the following sectors: GIS Consulting; Analysis/Advice; Land Information System (LIS); Demographic Database; E-Governance; Environmental Management; Water Quality Monitoring; GIS Training/Seminars/Workshops and other services on clients need (PSGIS, 2006).

2.15. Infrastructure of Current Information System in Education

National information infrastructure not only covers the technological aspects i.e. telecommunication networks but the individuals and institutions as well, which are the backbone of any information infrastructure. Coming section presents an over view of different stakeholders of Pakistan's information infrastructure within the education enterprise.

2.15.1. Different Stakeholders of Information Infrastructure Within Education

Enterprise

2.15.1.1. Libraries and Information Centers

Role of libraries and information centers cannot be denied in this information era. IFLA urges national, regional, and local governments, as well as international organizations, to invest in library and information services as vital elements of their information society strategies. The claim is that, in so doing, an informed and literate citizenry will not only be more stable, but more productive and thus able to participate more effectively in the democratic process and also be helpful members of their respective local communities (Horton, 2005). In a bid to foster the role of libraries as

key players in building people-centered, inclusive and development-oriented knowledge societies, UNESCO and the IFLA have decided to establish a strategic alliance as part of their contribution to implement the decisions of the WSIS (UNESCO, 2006b).

The situation of libraries and information centers in Pakistan is not very encouraging. At the time of independence, Pakistan inherited only two libraries of significance. These were the Punjab University Library, Lahore and the Punjab Public Library, Lahore (Punjab University Library, 1947). Presently, Pakistan librarianship is in a state of stagnation. There does not exist a national library in true sense. School and college libraries have not developed because of defects in the educational system, which do not encourage the use of books in the educational process at any level. University libraries are better in terms of their structure and resources, though their services are very limited. On the other hand special libraries are far better than all other categories of libraries. Public libraries do not exist in their true sense due to the lack of proper legislation and widespread illiteracy in the country (Haider, 2002). Khurshid (1990) reported that till 1990 there were 6,034 libraries in the country, holding 13,354,500 volumes. The most satisfying development has been in university libraries. In the city of Punjab, are found the largest of the nation's public libraries and the largest university library. Although a young country, Pakistan shares the 5,000-year history of the Indo-Pakistan sub-continent. Bibliothecally as well, Pakistan has had a rich heritage. Some of today's leading libraries were founded in the nineteenth century: Karachi Metropolitan City Library (1851), King Edward Medical College Library, Lahore (1860), Government College Library, Lahore (1864), Punjab Public Library, Lahore (1864), Punjab University Library (founded

1882, opened 1906), the Civil Secretariat Library, Lahore (1885), and the Dayal Singh Trust Library, Lahore (1908/1910).

According to Haider (2002) and Mahmood (2005), education, in general, has always been neglected in Pakistan. The government barely spends \$3 per capita on activities important for human care. The institutions providing education are heavily under-financed as compared to institutions in neighboring countries. Haider (2008, February 9) has discussed that up grading the quality of education is the first and most obvious requirement to bring about development in the educational sector. The most conventional ideas as to how this quality should be achieved include enrichment of curricula, better faculty, maintenance of a balanced teacher-student ratio, and establishment of well-equipped laboratories. Surprisingly, however, the need to have better libraries and information centers is seldom mentioned, which clearly reflects the decline evident in our teaching methods and the manner in which our students study. Coming section reviews the status of school, academic, special, and national library and archival facilities in Pakistan.

2.15.1.1.1. School Libraries:- School libraries have been grossly neglected, and this is a major problem to be dealt with by government and the library profession. School library services in Pakistan are almost non-existent. Only a limited number of secondary schools in the public sector maintain a proper library. A cupboard or two, usually locked up and having been placed in school's office or some class room, constitutes the library of many secondary schools. Books are outdated and irrelevant. The head master/principal appoints a member of the teaching staff to the position of teacher-librarian, but he/she has no official time to organize and run the library. Some of the schools even do not have the teacher librarian. In most cases, books of the

library are not even being seen by the majority of students, not to mention borrowing them (Fatima, 1984; Haider, 1969; Haider, 2002; Khawaja, 1979; Khurshid, 1990; Sabzwari, 1982). Haider (2008) has emphasized that existing school libraries will have to survive in dual culture, that is, both print and digital cultures. In order to upgrade the existing school libraries with digital media, the first generation of school librarians need to focus all their energies on maintaining a balance between computers, media and the print culture.

2.15.1.1.2. College Libraries:- The college libraries also present a gloomy picture. The resources of college libraries are neither adequate nor up-to-date. Their collections consist largely of gifts from organizations and individuals, and hence are of miscellaneous character. Annual additions are limited. The services provided are just lending of the few text books for a limited period. Mostly libraries are run by a single librarian and the access to the material is closed. Almost all the libraries are faced with the shortage of accommodation (Haider, 1996).

2.15.1.1.3. University Libraries:- A review of the literature related to university libraries of Pakistan reveals that situation of university libraries is not worth mentioning too. Due to the failure of our universities to promote research, libraries play an insignificant role in the academic progress of our universities (Haider, 2008, February 9; N. Qureshi, 1982). Mirza (2007) conducted a survey of six public sector university libraries from federal area of Pakistan and found that 83% university libraries were not satisfied with their available e-resources and services. Lack of faculty's interest in the use of e-resources, lack of training opportunities for LIS professionals and lack of e-resources were three major obstacles in the promotion and proper utilization of available e-resources. Warraich (2007) found in a study that

the resources of HEC Digital Library are under used by the universities. She recommended that HEC must strive aggressively to market these databases and improve its training programs. HEC needs to develop a feedback mechanism with the assistance of Library and Information Science professionals to improve its usage, as they better know the information needs of their potential users. Ramzan (2007) has analyzed that in Pakistan majority of the institutes/universities are not utilizing their budgets for research and as a result Pakistan shares only 0.1% of the total world research output and 19,312 persons share one research paper. According to him one of the reasons is that the resources, infrastructure and environment in libraries are not conducive to support the research activities. Shafique, Rehman and Mahmood (2008) surveyed 10 public sector university libraries of Punjab and found that their users are less satisfied with their services.

2.15.1.1.4. *Special Libraries:-* Special libraries are better than other categories of libraries in terms of resources and services. These libraries are mostly found in research establishments, training institutes, banks, government departments, business firms and large industrial organizations (Khurshid, 1990). According to Haider (1996), although special libraries are enjoying the better status in Pakistan, but they are also providing the traditional services to their user community. The most popular services provided by some libraries are publication of current acquisition lists, and bibliography compilation on request. Very few libraries also provide SDI, translations, literature searching and editorial assistance.

2.15.1.2. *National Library of Pakistan*

The concept of a national library is fairly understood, even though national libraries differ in size and scope from country to country. Speaking broadly, National

Library is the library which has the prime duty of collecting and preserving the written production of the country. It serves not only as the top most information center but a coordinating force for all libraries as well. The National Library of Pakistan (NLP) exchanges Government documents with USA; Pakistan National Bibliography with other national libraries of the world; serves as depository for Asian Development Bank publications; and provides information and photocopy services. The NLP is a member of the International Federation of Library Associations (IFLA). The foremost objective of the NLP is to acquire library materials generally, and in particular, to acquire a comprehensive collection of library materials, both current and retrospective relating to Pakistan and its people and in accordance with national requirements and to receive and maintain the national published heritage deposited under the provisions of copyright Law (National Library of Pakistan, 2002).

2.15.1.3. National Archives of Pakistan

The National Archives of Pakistan (NAP) now housed at Islamabad has acquired and preserved considerable amount of archival material. It has established full-fledged sections for private collections, newspapers and periodicals, repair and preservation, reprography and publications. The functions of NAP are: a) to increase knowledge by providing information to Ministries/Divisions and their attached departments; b) provision of research facilities to general public; c) preservation and conservation of archival material; d) providing advisory services to the organizations/individuals in preserving their record; e) providing material in the form of microfilms and photo-stats to research organizations/research scholars on payment; f) acquisition and preservation of private collection of eminent personalities; g) review of records; h) preparation of accession and descriptive lists; i) mounting of

exhibitions; and j) imparting training in preservation and records management (National Archives of Pakistan, 2007).

2.15.1.4. Library and Information Networks

Libraries in Pakistan are starved of materials, particularly foreign journals. Such scarcity of resources can be overcome by networking and resource sharing. Khalid (2000) has emphasized that co-operation and networking in library and information systems provide a wider access to collections, improve public and technical services and enhance operations by sharing resources, reducing duplication and offering more cost-effective services. These systems are frequently applied in developed countries. These countries are getting maximum benefits from these systems, for example, expanding their services, providing better user satisfaction and solving their problems. These systems are less used in LIS of developing countries. Similarly, Shah and Ainuddin (2005) have stressed that decentralized services could never be as effective as a centralized one, since the former would reach a far smaller number of clients, and would involve a duplication of effort and expenditure. However, a central focus is still required and there is a need to organize and strengthen the network and develop the norms and standards for cooperation and provide mechanism consultation among the partners.

The importance of networking had long been recognized in Pakistan and many library and information networks were developed in the large cities, though many of them did not prove to be successful. Jaswal (2005) has critically reviewed the performance and causes of failure of different information networks in Pakistan i.e., LABELNET- Lahore Business and Economics Libraries Networks (1990-1996), The Development Information Network for South Asia-DEVINSA (1985-1999) and The

National Documentation Centre Library and Information Network-NADLIN (1986-1993). The author has analyzed that all of these examples were semi-automated offline networks. All three used computers to develop the tools like union catalogs or the information sharing databases, but the actual information was on paper and sharing was done through paper-dependent activities of ILL and document delivery. Distance played a vital role in the success or failure of these initiatives. Despite being very well planned, enthusiastic and sincere, these ambitious initiatives are now either dead or diminished. Coming section presents a brief review of library and information networks existing in Pakistan.

2.15.1.4.1. Pakistan Scientific and Technological Information Centre

(PASTIC):- Pakistan Scientific and Technological Information Centre (PASTIC) is the premier organization for dissemination of scientific and technological information to the scientists, researchers, engineers, entrepreneurs, industry and citizens of Pakistan. Established as early as 1957, and expanded in 1974, Pakistan Scientific and Technological Information Centre (PASTIC) is now functioning as a unit of the Pakistan Science Foundation, an autonomous organization under the Ministry of Science & Technology. The PASTIC National Centre (Headquarter) is located at Islamabad and has five sub-centers located at Karachi, Lahore, Faisalabad, Peshawar and Quetta. PASTIC is currently offering wide ranging facilities such as supply of scientific documents, Current Awareness Service (CAS), publication of abstracting & indexing journals, Information Transfer Service (ITS), patent information, environmental information, bibliographic service, data processing on computers, production of union catalogues and directories, National Science Reference Library, reprographic services ranging from mimeographing, photocopying and microfilming

to printing and linkage with international information networks. PASTIC has recently completed a Development Project i.e. "Establishment of National Science and Technology Database/Information Network" and presently it is working on a project titled "Science Awareness through TV Channels". PASTIC is part of International Information Network & is the national focal agency for WHO/ CEHANET, UNEP/ INFOTERRA, UNESCO/ ASTINFO & SAARC Information Centre. Through its Technology and Trade Information Promotion System (TIPS), PASTIC provides support and information to business enterprises of TIPS Network countries. PASTIC has also established an 'Entrepreneurship Development Centre' with special focus on Intellectual Property Services (PASTIC, 2008).

2.15.1.4.2. PopLibNet: Population Libraries Network of Pakistan:-

Population Libraries Network (PopLibNet) is a network of population libraries in Pakistan. The service has been started as a result of the efforts by Population Council, Pakistan Office to facilitate information sharing between Pakistani libraries. PopLibNet is a part of the project '*Taking Forward the Leadership and Capacity Building Agenda in Pakistan*', which is being supported by the Packard Foundation. PopLibNet not only provides access to information resources available at the Pakistan Institute of Development Economics, Health Service Academy and the Population Council in Pakistan but also provides many other services. For example, browsing of online library; access to news items related to population in Pakistan; newsletter by the Population Council; information about new publications and events such as conferences, seminars and capacity development activities; free Library Management Software; and g) user response by allowing them to upload information about publications, news and events (Population Council Pakistan, 2008).

2.15.1.4.3. Pakistan Library Network:- Pakistan Library Network is a research initiative of *Planwel Academic and Research Network* to build electronic access network of all the regional libraries for the promotion of research and development; as per the mission statement of PLANWEL for '*Building Technology Based Communities and Bringing Technology to the People*'. It is an effort to ensure that all underprivileged communities in the region have equal access to information.

Here is a list of libraries of Pakistan indexed in the network:

- Allama Iqbal Open University Library, Islamabad
- Allam I. I. Kazi Library University of Sindh
- All Pakistan Educational Conference Library, Karachi
- Archaeological Library , Taxila
- Archival Museum , Peshawar
- Atomic Energy Minerals Center Library, Lahore
- Azad Kashmir Assembly Library, Muzaffarabad
- Babar Ali Library, Aitchison College, Lahore
- Bait-ul-Hikma (Hamdard University, Karachi)
- Bahauddin Zakriya University Library, Multan
- Baluchistan Provincial Assembly Library, Quetta
- Baluchistan University Library, Quetta
- British Council Library , Islamabad, Karachi, Lahore, Peshawar
- Central Library Bahawalpur
- Central Secretariat Library Islamabad
- Dr. Mahmud Hussain Library, University of Karachi
- Dr. Baqir's Library, Lahore
- Dyal Singh Trust Library , Lahore
- Ewing Memorial Library , Lahore
- Faisal Shaheed Library University of Engineering and Technology, Lahore
- Gomal University Library , Dera Ismail Khan
- Government College Lahore , Lahore

- Government College Peshawar Library, Peshawar
- Institute of Sindhology, Jamshoro
- International Islamic University, Central Library, Islamabad
- Islamia College Lahore Library, Lahore
- Islamia College Peshawar Library, Peshawar
- Islamia University Library, Bahawalpur
- Islamic Research Institute Library
- Islamic Documentation and Information Center , Karachi
- Khalikdina Hall Library Association , Karachi
- Lahore University of Management Sciences (LUMS) Library, Lahore
- Liaquat Hall Library , Karachi
- Liaquat Memorial Library Karachi
- Mehran University of Eng. & Technology Library, Jamshoro
- Ministry of Agriculture and works Library, Islamabad
- National Archives of Pakistan , Islamabad
- National Assembly Library , Islamabad
- National Bank of Pakistan Head office Library, Karachi
- National Library of Pakistan , Islamabad
- NED University of Engineering and Technology Library, Karachi
- NWFP Agriculture University Library, Peshawar
- NWFP University of Engineering and Technology Library, Peshawar
- NWFP Provincial Assembly Library, Peshawar
- Pakistan Administrative Staff College Library, Lahore
- Pakistan Forest Institute Library, Peshawar
- Pakistan Institute of International Affairs Library, Karachi
- Pakistan National Center Library and culture Center , Hyderabad
- Pakistan Scientific and Technological Information Center , Islamabad
- Punjab Provincial Assembly Library, Lahore
- Punjab Public Library, Lahore
- Punjab University Library, Lahore
- Peshawar University Library, Peshawar

- Quaid-e-Azam Library , Lahore
- Quaid-e-Azam University Library, Islamabad
- Scientific Information Center, Karachi
- Shaban Library , Peshawar
- Shamsul Ulema Daudpota Sindh Government Library , Hyderabad
- Sindh Provincial Assembly Library, Karachi
- Sir Syed University of Engineering and Technology Library, Karachi
- State Bank of Pakistan Library, Karachi
- UNESCO Regional Office Library, Islamabad
- University of Agriculture Faisalabad Library, Faisalabad
- University of Azad Jammu and Kashmir Library, Muzaffarabad (Planwel, 2001).

2.15.1.4.4. Library Websites Accessible Through WWW:- Here is a list of libraries in Pakistan, which are accessible through World Wide Web (WWW):

- Aga Khan University Karachi, Pakistan
- Akhter Hameed Khan Resource Center Islamabad, Pakistan
- Bahauddin Zakariya University Multan, Pakistan
- COMSATS Institute of Information Technology Islamabad, Pakistan
- Goethe Insitute of Karachi Karachi, Pakistan
- Government College University Lahore, Pakistan
- Hamdard University Karachi, Pakistan
- Institute for Development Sudies and Practices Quetta, Pakistan
- Institute of Sindhology Jamshoro, Pakistan
- International Islamic University Islamabad, Pakistan
- Islamic Research Institute Islamabad, Pakistan
- Lahore School of Economics Lahore, Pakistan
- Lahore University of Management Sciences Lahore, Pakistan
- Liaquat Memorial Library Karachi, Pakistan
- NGO Resource Centre Karachi, Pakistan
- Pakistan Library Network Karachi, Pakistan
- Punjab University Lahore, Pakistan

- Quaid-e-Azam University Islamabad, Pakistan
- Shaheed Zulfikar Ali Bhutto Institute of Science and Technology Islamabad, Pakistan
- University of Central Punjab Lahore, Pakistan
- University of Peshawar, Pakistan
- University of Veterinary and Animal Sciences Lahore, Pakistan.

2.15.1.5. Information Systems in Education

Until a few years ago, with the exception of NWFP, there was no computerized data available in the country's education system. In the rest of Pakistan, manual facilities existed, which appeared outdated, obsolete, time consuming and also unreliable data and consequently resulting in defective planning. A definite need was, therefore, felt to improve the data collection mechanism, its reliability, relevance and also prompt availability thus bringing it at par with NWFP where a pilot EMIS project was established (1980-83) by Management Unit for Study and Training (MUST) in Peshawar. It computerized educational data and raised an EMIS for school department. Later, not only the activities of MUST were expanded to cover about 75% of all the schools in the province and also at colleges following the MUST model, NEMIS Project was implemented during 1991-93 (Amin, 1994).

2.15.1.5.1. National Educational Management Information System (NEMIS):- National Education Management Information System (NEMIS) has been functioning in the AEPAM since 1993. The main functions of the NEMIS include collection, processing, storage, retrieval, analysis and dissemination of educational data. According to the recent National Education Policy- 1998-2010, the broader responsibility of the NEMIS in education sector is as follows:

1. Existing EMIS at Federal (FedEMIS) and Provincial levels will be strengthened to make them responsive to the need of Monitoring and Evaluation System (EMIS).
2. Academy of Educational Planning and Management (AEPAM) shall be strengthened and tuned up to meet the emerging demands of EMIS and its obligations at national and provincial levels.
3. Data collected through Provincial EMISs and collated by National Education Management Information System (NEMIS) shall be recognized as one source for planning, management, monitoring, and evaluation purposes to avoid disparities and confusion.
4. Database of critical indicators on qualitative aspects of educational growth will be developed and maintained by AEPAM for developing sustainable indicators of progress, based on more reliable and valid data to facilitate planning, implementation and follow-up.
5. Geographical Information System (GIS) developed by NWFP and Balochistan shall be popularized and introduced for strengthening spatial planning and EMIS in other provinces.
6. To complete educational statistics of all educational institutions in the country, legislation shall be passed to require all private institutions to supply school data to their respective EMIS centers.
7. A School Census Day shall be fixed for collecting data from all over the country. Awareness campaigns shall be launched for educational monitoring data and the role of schools and community (AEPAM, 2003).

2.15.1.5.2. HEC- IT Infrastructure Upgrade:- Higher Education Commission (HEC) has built the IT Infrastructure, which provides the IT facilities viz. video

conferencing, interactive lecturing, Internet, Email, files sharing, etc. to the employees of HEC and to the users of universities/institutes. Over the past four (04) years, advanced technology and enhanced version of software have emerged and their requirement is penetrating in HEC routine business. Currently critical applications are running/hosted on HEC's servers, e.g. Pakistan Research Repository, MIT Open Courseware, HEC SharePoint Portal/Website etc. Moreover, HEC has acquired an ERP solution, a Multi-Point Control Unit (Centralized) for all universities having video conferencing facilities, video streaming services, and network management software for PERN2 connected universities (HEC, 2008).

2.15.1.5.3. PERN- Pakistan Education and Research Network:- Pakistan Education and Research Network (PERN) is part of the overall vision and objectives of IT Action Plan that was launched by HEC. The project is financed by the Government of Pakistan in cooperation with PTCL (Pakistan Telecommunication Company Limited) Research and Development funds. The network is designed, operated, and maintained by NTC (National Telecommunication Corporation). It is aimed to be an integral part of the overall education system of the country and is designed to interlink all public/private sector chartered universities/degree awarding institutes registered with Higher Education Commission, Government of Pakistan. In its first phase the project interconnected 56 public/private sector chartered universities/institutes. Rest of the 59 HEC recognized universities in Pakistan were planned to be connected in the PERN2 -II project phase (PERN, 2004). PERN2 is not only limited to just providing connectivity, but to meet the entire needs of the educational and research institutions by hosting and providing relevant services and information to the users. PERN2 is an integrated platform for network research and

middleware development for the development of network technologies and applications such as performance measurement, IPv6, multicast, MPLS, VoIP, e-learning, and multimedia, as well as for the support of Grids such as EcoGrid, Medical Grid and e-learning Grid etc. (design of the PERN2 is presented in Figures 2.7 & 2.8).

PERN Architecture

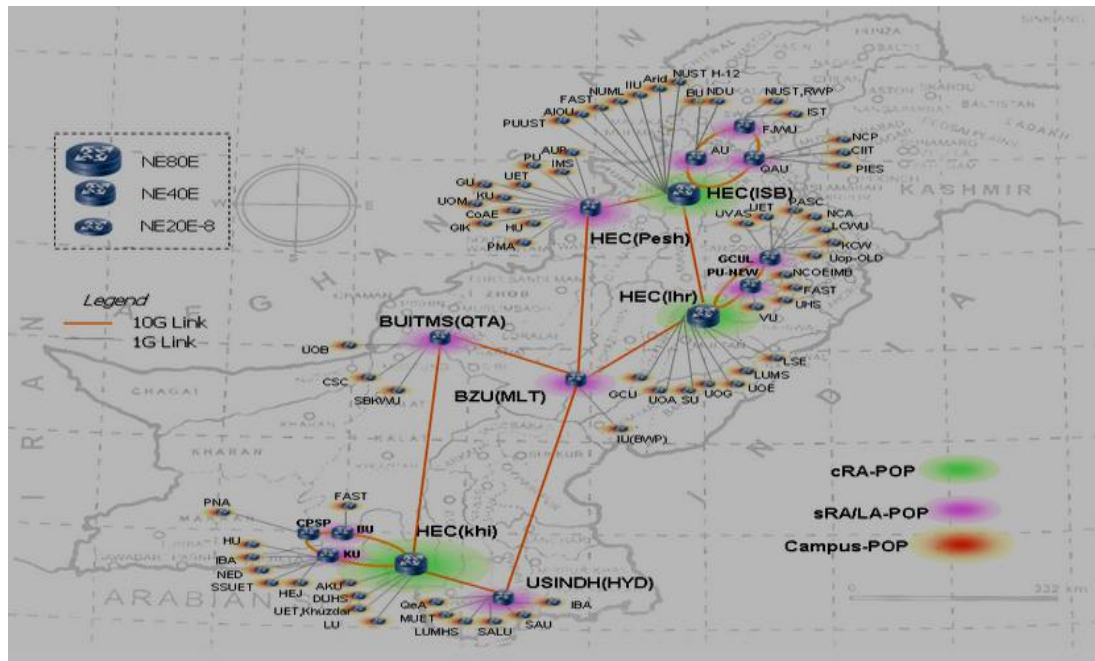
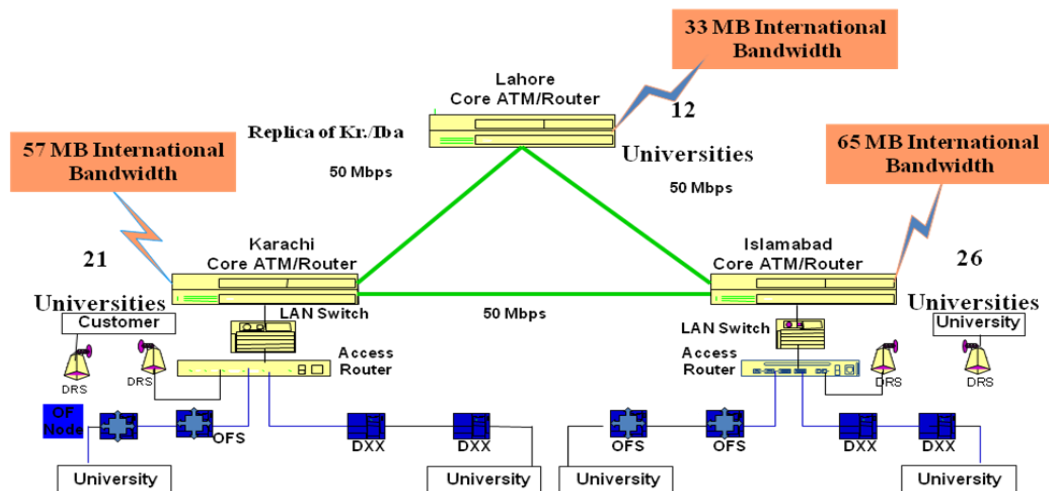


Figure 2.7 & 2.8: PERN2: Architecture & Design

PERN2 offers its users a variety of new services including IPv6, Multicast, and Light Path. Due to the need of guaranteeing service level quality to users, PERN2 also introduced a powerful management system. The goals of PERN2 network design are: a) Hybrid technology: IP (routing) over optical Light Path (dark fiber, SDH, or Wavelength); b) Dual networks: production and research networks; c) Hierarchical topology: 3 tiers (cores, POPs, and end nodes); d) Multiple services; and e) Highly reliable, stable and flexible network (PERN2, 2009).

2.15.1.5.4. iEARN-PK: International Education and Resource Network-Pakistan:- iEARN- The International Education and Resource Network is a non-profit global telecommunications community of over 35,000 primary and secondary schools and youth organizations in over 125 countries, making it the largest online K-12 network in the world. iEARN-PK is an approved iEARN Centre and a member of the iEARN International. In Pakistan, it is committed to provide K-12 educators, students and schools with an invaluable structure to engage in online curriculum based telecommunications projects. iEARN-PK supports and provides resources and professional development to its members for effective implementation of K-12, school based ICT initiatives and a wide range of educational programs and learning opportunities (International Education and Resource Network, 2002).

2.15.1.5.5. GÉANT Network Connects Pakistan to 100 Million researchers in Europe and Asia:- Scientists and researchers in Pakistan can now connect with their colleagues across the globe via new high speed computer network link, made possible by GÉANT, the advanced Pan-European backbone network, and TEIN, the Asian equivalent to GÉANT. GÉANT was launched in 2000 by the European Commission and the Member States as a jointly funded initiative to upgrade Europe's

research and education networking infrastructure. The Trans-Eurasia Information Network (TEIN) and the US National Science Foundation (NSF) today agreed to link with the Pakistan Education Research Network (PERN). TEIN and GÉANT together serve close to 100 million researchers in Europe and Asia enabling ground-breaking research collaboration in fields such as climate change, radio astronomy and biotechnology (GÉANT, 2008).

2.15.1.5.6. Initiatives by the Government for Strengthening and Capacity

Building at IT Institutes and Universities:- The Electronic Government Directorate has also planned many programs for the promotion and use of Internet for education and has decided to start capacity building programs at the IT institutes and universities and computer literacy programs for all university graduates. To promote the ICT in academic institutes following initiatives will be taken by the government:

- a) Free leased line Internet access to the public sector universities would be provided,
- and b) a wide-band Intranet, 'Pakistan Educational Intranet (PEI)', connecting all educational institutions (public and private), would be established with a centralized data warehouse containing teaching and research material in order that resources may be shared (through video-conferencing and distance learning).

Capacity will be strengthened at selected institutions for offering quality Post-graduate Diploma, Bachelors, Masters' and PhD education in areas including Computer Science, Computer Engineering, and Management Information Systems. This program would aim at re-training 2,000 under-employed graduates. IT labs will be established at major public and private sector universities, colleges, government training institutes and schools. New technologies, skills training and short courses will

be offered at selected educational institutions (Pakistan, Electronic Government Directorate, 2008).

2.15.2. Roles and Responsibilities of Educational Administrators at Institutional Level

In Pakistan, the head of an institution (from primary to higher secondary) shall be responsible for its proper administration and management of institution and boarding house/hostel attached to it. He/she shall also maintain discipline among the staff and students, organize and supervise instruction, regularly participate in the teaching work, arrange for games and other co-curricular activities, ensure that all registers are regularly and accurately maintained, keep a proper account of all money entrusted to him/her, and see that the same is utilized in accordance with the prescribed rules, and generally promote the physical, intellectual, religious, social and moral welfare of the students under his/her charge (Punjab Education Code, n.d.).

In universities, following are the officers/administrators with distinct responsibilities: the chancellor, the pro-chancellor, the vice-chancellor, the deans, the director, the principals of the constituent colleges, the chairmen of the teaching departments, the registrar, the treasurer, the controller of examinations, and the chief librarian. The governor of the province holds the position of the chancellor and acts as the principal officer of the universities in the province. The Minister of Education (provincial) acts as pro-chancellor and performs such duties, and functions and exercises such powers as may be assigned and delegated to him by the chancellor. The vice-chancellor is the principal executive and academic officer of the university and is responsible for the promotion of teaching, research, publication, administration and the general efficiency and order of the university. He/she has all powers necessary for this purpose including

administrative control over all officers, teachers and other employees of the university. Registrar is a whole time officer of a university and is the custodian of the common seal and academic records; and maintains a register of the registered graduates in a prescribed manner (Islamia University of Bahawalpur, n.d.).

2.15.3. Other Issues Related to Educational Administration

2.15.3.1. Bureaucratic Setup and Inconsistent Policies

Pakistan's checkered history of investment and planning in education began immediately after independence in 1947 with the consideration of such immediate projects (as) the provision of Senior All-India Polytechnics on the lines of Massachusetts Institute of Technology. More than half a century later, that "consideration" still has no hope of being implemented. After the National Commission on Education 1959, came Education Policies of 1970, 1972, 1979, 1992 and 1998. Each one of these reports had its own bag of unrealistic (and ultimately unrealized) targets. However they all shared the belief that by the fiat of a minister, the stroke of a pen, without sound planning and investment, education sector would take care of itself (Boston Group, 2002).

2.15.3.2. Training of Educational Administrators and Their Participation in Educational Planning Process

Very few efforts were made by the Government for educational administrators' training and development in the current age of information technology. A. Khan (2008) believes that educational goals can be fundamentally re-oriented away from indoctrination towards the creation of critical, creative, and informed minds, the intelligent use of technology may well be the only way out of Pakistan's educational morass.

UNESCO (1983) reported the findings of two projects and recommended in the report that the province (Punjab) should embark on an intensive staff development program in the form of short in-service courses for educational administrators, managers and supervisors. (It would be desirable for one or more of the universities to provide for the training of future educational administrators). It was further concluded in the report that Pakistan's provinces are receiving technical assistance and external resources to further the development of education. However, some of these inputs have been less effective than they could have been because of poor internal coordination and monitoring. In some cases, equipment is ordered long before the necessary arrangements have been planned for its installation and maintenance. Equipment is often not used because no one has been trained to use it. An effective national body should be established to oversee and ensure the efficient use of external inputs, so as to coordinate, control, and subsequently evaluate, their application. An overall unit should be established to promote sharing of information, materials and personnel, so that the maximum benefit from available sources and external aid can be attained (UNESCO, 1983). Similarly, National Secretariat of Pakistan Coalition for Education (PCE) organized a seminar on the theme “Policies and Practices of Education in Pakistan”, in which educational administrators from public and private schools stressed on the need of their training and active participation in educational planning process, which is a neglected link in Pakistan (Pakistan Coalition for Education, 2006).

2.15.3.3. Availability of Data About Educational Outputs and Outcomes

Another problem faced by the policy makers and planners is the non availability of accurate data about educational outputs and outcomes. According to the

World Bank Group-IEG (2007), trends in output indicators (enrollment rates) are available, but outcome trends (learning achievement and employment) are not. Gross enrollment rates have been somewhat stagnant in recent years, being 75 percent, 71 percent, and 72 percent in 1995-96, 1998-99 and 2001-02, respectively. These figures are based on household surveys, and some observers are puzzled by the data, given that the ambitious SAP projects were expected to have some impact around this period. Also puzzling is that fact that two major household surveys do not agree for some measures. The Pakistan Social and Economic Survey gives 84.3 percent for the GRE in 2000-1 while the Pakistan Integrated Household Survey gives 72 percent in 2001-02. However, the two surveys are closer for net enrollment rates (NERs), with the Pakistan Social and Economic Survey giving 48.6 percent and the household survey giving 42 percent for the same years. The reasons for these differing measurements are not clear. In this scenario, Amin (1994) has pointed out that non availability of accurate data at the operational level has resulted in confusions at the lower strata. The situation is worse at the management control and strategic planning level. Absence of any decision-support at these levels have made decision making complex and enigmatic. This has resulted in defective planning and mis-management of the whole education system. As a consequence, country could not utilize its resources properly. Due to lack of proper data flow, the system suffered from major problems such as ‘under funding’ and “under spending”.

2.15.3.4. Problems Faced by Educational Administrators

Educational administrators at institutional level especially in school sector face many problems in their day-to-day official responsibilities. For example, UNESCO (2002) conducted a survey of school head teachers for finding their

perceptions and problems faced in their administrative pursuits. It was found that head teachers were most concerned about school-related factors. The two factors identified by Head teachers from three provinces, were absence of teaching resources and lack of parent-teacher communication. Head teachers from N.W.F.P. and Baluchistan also expressed concern over poor physical facilities in primary schools to the point of emphasizing the ‘acute shortage’ of physical facilities in rural primary schools. The head teachers from Punjab were rather concerned about ‘over-crowded classrooms.’ This may be indicative of larger enrolment in comparison to classroom areas rather than complete absence of classrooms. Head teachers from N.W.F.P. and Baluchistan also allude to the unsuitability of curricula, which they considered to be heavy and difficult. Forty percent male as well as female head teachers thought that difficulty level of textbooks was affecting teacher performance. Of all the provinces, head teachers from Sindh pointed out to ‘infrequent’ supervision as a factor contributing to low quality of teaching in primary schools.

2.16. National Information System for Educational Administrators in Pakistan: A

Review of Related Studies

It is evident from the above literature review that an information system is the basis of management, planning and evaluation of an education system. Coming section presents a critical review of studies conducted in the past on different aspects of the phenomena under study.

2.16.1. Research on Information Needs and Seeking Behavior of Educational

Administrators in Pakistan

Administrators or managers have always managed information by some method for effective decision making. According to Massie (1992), in the past, each

operational department (finance, marketing, production, and personnel) maintained separate information system to satisfy its particular needs. According to the author, the technology mediated information systems serve as an interface between the complicated computer hardware and the non-technical manager who needs the information contained in the computer.

Allen (1996) has discussed the need for user-centered approaches to information system development. A *user-centered approach* is one where ‘the needs of the users play a more influential role than data or technology’. Allen has provided a rich insight into how a user's 'knowledge structures' and 'abilities, styles and preferences' influence their information behavior and has emphasized that these factors must be incorporated into the system design process. According to Slamecka (1985), the industrialized world tends to think of technical information and databases and resources that improve or optimize problem-solving and decision making, and otherwise to improve productivity. In other words, these resources have decidedly economic implications (p. 181).

In the developing world, however, this is not quite the same. The role of information in decision making, administration and policy formulation or in national and educational development is not fully appreciated and it therefore plays a minor role in the general flow of communication. As it is evident from the above reviewed literature that many user groups are studied by the researchers in the developed world but the situation in Pakistan is not hopeful. In Pakistan, a number of studies on reading habits of different professional groups have been conducted by different individuals, associations and institutions which somewhat point out their information needs. However, the studies on information needs and information-seeking behavior

are not many in number. According to Anwar (2007), very little interest has been shown for information needs' research in Pakistan by both the academics and the practitioners.

Coming section presents a review of the different research studies conducted in Pakistan. Most of the studies were carried out at University of the Punjab. Bashir (1975) investigated the information needs of veterinary surgeons working in the district veterinary hospitals of the Punjab. Findings of the study exposed that respondents had no access to their specific material and they were unable to keep themselves up to date in their profession. Nighat (1975) studied the information needs of scientists working in the Oils, Fats and Waxes Division of the PCSIR Laboratories at Lahore using personal interview technique. The findings of the study indicated that participants used both formal and informal sources of information and they used to scan scientific literature especially current journals. Afza (1975) carried out her research to know the information needs of scientists in Pakistan. The research results showed that the most frequently used sources were journals. The scientists also used to maintain card file index for their personal use and they read scientific literature. Parvez (1975) investigated the information needs of dental surgeons working in the Dental College and Hospitals of Lahore. The findings of the study revealed that 68% respondents needed information for keeping themselves up to date, 48% required information to learn about medicines and related techniques. Gureja (1975) studied the information needs of newspaper editors. The study showed that majority of the respondents used reference tools specially dictionaries. For meeting their information needs, government reports were used by 67% respondents. News paper files were consulted by 53%, hand books by 40%, while gazetteers and directories were used by

37% respondents. Butt (1975) in his study investigated the information needs of Pakistan Television news producers located in Karachi, Lahore, Peshawar, Quetta and Rawalpindi. He exposed that a large majority of the respondents (95%) were using radio, press releases, official notifications, newspapers, foreign journals and professional books as sources of information. The study also revealed that respondents lacked the help of qualified librarians. Parveen (1976) studied the information needs of teachers and research staff working in the social sciences department of University of the Punjab, Lahore. The study showed that teachers required information mostly for teaching purposes and they used both formal and informal sources. Other sources of fulfilling the needs were abstracts, books, reviews, conferences, proceedings and library catalogues. Bokhari (1976) conducted research to find out the information needs of the engineers of heavy mechanical complex Taxila. The study revealed that participants were consulting both formal and informal sources to meet their information needs. Majority of them attended workshops to get current knowledge in their field. Siddique (1976) studied the information needs of chemists. The findings exposed that current periodicals were frequently used by the respondents. Abstracts were used by them for research work. Only 51% respondents were satisfied with the library services.

Jonathan (1975) studied the information needs of the senior population planning officers of the Punjab. The study found that the basic information needs of the respondents were of the literature required in connection with their training and supervisory duties and the publicity material needed to publicize their programs; publications produced by their department were considered very important and 70% percent of the respondents considered their department as the main source for meeting

their information needs. They stressed on the need of an agency that could be responsible to collect, consolidate, reproduce, and disseminate population planning information systematically and to inform the producers of such information about the consumer needs. Fazlul-Haq (1976) conducted a study to know the information needs of teachers. According to the results, the teachers were consulting text books for the preparation of class lectures. The main sources of obtaining new ideas were current journals, latest books, news magazines, research reports and conference proceedings. Chaudhary (1977) studied the information needs of science teachers. The study showed that 94% science teachers were using textbooks and 43% current journals. To keep themselves up to date, they usually used to consult journals. Anjum (1978) probed the information needs of the humanities faculty members of the University of the Punjab, Lahore by using a questionnaire which was supplemented by selected interviews. Major findings of the study pointed out that humanist scholars were less interested in informal sources of information. A study of the information needs of the teachers of the religious schools of Lahore was also conducted by Aseer (1982).

Beside these old studies, in the recent years, few more studies were conducted. For example, Nazli (2001) studied the information seeking behavior of user community at the Central Library of the Islamia University of Bahawalpur. Shahzad (2007) conducted his research to find out the information seeking behavior of faculty members at GCU, Lahore. It was found that teachers were using a variety of sources in order to meet their information needs for example library resources especially reference resources, HEC electronic journals, online databases such as Oxford University Press and Internet search engines. Besides these formal sources, respondents were also using the informal sources, such as conversation with experts

for fulfilling their information needs. Bhatti (2008) studied the information needs and seeking behavior of students at the Islamia University of Bahawalpur. The study found that a vast majority of students relied on books for satisfying their academic and research needs adequately. Journals, encyclopedias and yearbooks were also used by them. Internet was considered as a source for acquiring up-to-date information by 50% of the respondents. T. M. Qureshi, J. Iqbal, and M. B. Khan (2008) undertook a study to determine the information needs and information seeking behavior of university students. The study also identified impact of different factors involved in the general pattern of information gathering system by the students. Data were collected from 1000 respondents randomly selected from nine famous universities of Pakistan through questionnaires. Correlation and regression tools were used for analysis. The study identified that awareness of resources, surrounding environment, student participation, educational & cultural background, ability to use tools, self-evaluation, and intuition are having positive impact on students' information needs and seeking behavior.

Tahira (2008) studied information needs and seeking behavior of science & technology teachers at University of the Punjab for her M. Phil research. The findings reveal that respondents' information needs and seeking behavior were associated with their professional obligations. Direct access to e-resources had moderately affected their choice of information sources and information seeking behavior. The study explored that digital-access infrastructure had been established, but various factors such as lack of competencies of library staff, less motivation of providing services to respondents, inadequate automation of library operations and less use of sophisticated technologies impeded the adequate use of available resources and services. Lack of

formal orientation, awareness and understanding regarding the searching and use of subscribed sources by respondents and library professionals were seemed major barriers. Relatively HEC subscribed databases were under-utilized. Ansari (2007) carried out her PhD research to find out the information needs and seeking behavior of media practitioners in Pakistan. Ansari found that the reports of various organizations, government departments, NGOs and assignment committees, etc., were used and sought most often. Most of the respondents required selective information rather than exhaustive type. Feature writers, producers of research oriented programs and policy executors were found in the need of exhaustive information. Library and Internet were mostly used by all the groups of practitioners. Information seeking behavior of the practitioners involved in research-based programs was found to be very distinct than others.

In the field of education, very few studies were conducted to assess the needs of educationists either for staff development or for analyzing their training needs. For example, M. N. Khan (2005) conducted a study for designing a model for staff development in higher education in Pakistan. The main objectives of the study were to: (i) evaluate the existing situation of staff development in higher education in Pakistan; (ii) investigate the measures adopted by the Government to improve staff development in higher education; (iii) identify the areas in which development is needed by the teaching staff of the universities; and (iv) design a model for staff development in higher education in Pakistan. The population of the study consisted of all the teaching staff working in public and private universities and degree awarding institutions. Gul (2005) has assessed the needs of educational administrators at college level in Punjab for designed a training model for the professional development of

educational administrators/principals. The study consisted of the following stages (a) assessment of training needs and problems of educational administrators; (b) designing a training model on the basis of findings and literature; and (c) validation of training model by Delphi Technique.

This researcher recently supervised two MLIS research theses. These two studies aimed at finding the information needs and seeking behavior of college and school teachers and administrators within the city of Bahawalpur. For example, S. A. Khan (2008) conducted a survey to find out the information needs and seeking behavior of college teachers and administrators at the city of Bahawalpur. The study reveals that the college teachers and administrators mostly sought information for lecture preparation, improvement of their personal competencies and current awareness. They mostly used to converse with co-workers or experts at their institutions and frequently acquired information resources from their institutional libraries. They also used their personal collection or institutional libraries when they had urgent need of some information. Books and monographs were mostly used for seeking information. They frequently used to discuss face-to-face with their colleagues and friends as an informal source of information. The purpose of their library visit was to borrow and return books and to read journals and newspapers. They did not find different parts of research journals directly useful for their information needs. They preferred English language for reading material, while print was the most preferred format. Major obstacle which they faced while seeking information was lack of computer hardware and software. Majority of them used atmospheric communication technologies (Radio/TV), telephonic communication and Internet search engines for information seeking. Google was the most used search

engine by them. Institutional libraries were fulfilling their information needs to some extent and they suggested that college libraries should be equipped with computers, CDs, Internet, and latest research journals. Moreover, workshops and seminars should also be arranged for them. Similarly, Z. Iqbal (2008) conducted the same study to find out the information needs of secondary school teachers and administrators at the same city. Findings of the study reveal that majority of the respondents used to converse with co-workers or other experts at their institute to seek needed information. They used to search their personal collection in case of urgent need of information and acquired required information sources from colleagues or through purchase. Books and monographs were among the most used formal information sources. Similarly face to face discussion with colleagues was mostly used by the respondents as an informal source of information. They found training, educational articles and professional news directly useful for their information needs. ICT had completely changed the information seeking habits of the respondents and surprisingly electronic format was among the most preferred format. TV and Radio were among the most used Information and Communication Technologies. Google and search.com were among the most used information search engines. School libraries were fulfilling respondents' information needs to some extent. Both the studies highlighted the problem of scattered information and non-availability of a uniform source/system of educational information. Findings and recommendations of these studies can be a useful source in developing the more effective information system and services for the college and school teachers & administrators not only at the City of Bahawalpur but in other parts of Pakistan as well.

2.16.2. Research on Information Systems and Networks

Like the research on information needs and seeking behavior of educational administrators, there is a wide gap in research on information system for educational administrators as well. The researcher has made maximum effort to review the available research studies conducted in Pakistan, either in the form of research articles, or Masters and PhD thesis on any aspect of the study underway.

In the education sector only one attempt was made (as master's thesis) by Hashmi (1984) to propose the modules of an education information system. Hashmi focused on the development of management information system for the education department of schools within Multan Division. L. H. Khan (1993) found during his PhD research entitled "*Effects of infomaps on decision-effectiveness in education management information systems*" that educational policy makers do not make adequate use of quantitative information in the decision making process. The failure of the decision makers to use data may be attributed to a limited mode of presentation. Literature suggests that mode of information presentation has a significant effect on decisions. The main question of this research was to assess if the effectiveness of information presentation through Infomaps, a computer assisted Geographic Information Systems (GIS), was more effective than the traditional mode of presentation in table findings. Infomaps not only increased the level of accuracy and satisfaction of the users but also saved a considerable amount of time when used to answer questions in the planning exercise.

On the other hand few efforts were made for proposing library network models or designs at doctorate level research. For example, M. F. Khan (1991) found that university libraries were inadequate in terms of materials and collections. Their

technical processing work was slow and out-dated. They suffered from shortage of funds, lack of manpower in quantity and quality, absence of coordinated planning and lack of government attention and social urgency. To overcome these problems Khan proposed a plan to be executed under the aegis of University Grants Commission (Now known as Higher Education Commission). The goals of the plan were as follows: a) to strengthen the library resources including storage and preservation of materials, b) to provide a good quality bibliographic accessibility to library resources, c) to stimulate, promote, and coordinate education, research and communication programs for library staff and participating members, d) to ensure sufficient funds from UGC/HEC. To achieve these goals, establishment of following centers was suggested: a) cooperative acquisition center, b) joint processing center, joint preservation cell, joint publication cell, bibliographic center, inter library loan center and center for promotion of higher and continuing education of in-service personnel. Khalid (1997) conducted his study entitled “Co-operation and networking in library and information systems of advanced countries: a framework for countries with less developed systems”. Khalid argued that co-operation and networking in library and information systems provide a wider access to collections; improve public and technical services; and enhance operations by sharing resources, reducing duplication and offering more cost-effective services. These systems are frequently applied in developed countries. These countries are getting maximum benefits from these systems, for example, expanding their services, providing better user satisfaction and solving their problems. These systems are less used in developing countries. Keeping this gap in view, Khalid proposed a model for the initiation of cooperation and networking in countries with less developed systems.

According to Sharif (2006) in the provincial metropolis (Lahore), there is considerable scope to start concrete Resource Sharing (RS) projects because of the large number of libraries. Different types of libraries can develop different kinds of mutual RS projects. Libraries of academic institutions in the public sector (universities/colleges) can develop collaborative programs to share their print and online resources. They can further be divided into two levels i.e. college and university level. Similarly institutions in the private sector can devise their own RS programs. They can formulate policies after consulting their peer institutions.

2.16.3. Identification of Gaps and Need of the Hour

Policymakers and education leaders- including governors, state legislators, chief state school officers, school board members, local superintendents, principals and teacher leaders- are key consumers of research information. They make complex, far-reaching decisions about how to spend billions of public money. They establish the conditions and requirements that govern public education for millions of children across districts or states. They have primary responsibility for implementing education laws and charting a course for their education agencies. They must struggle with features of the legislative process that frequently work against systemic policies and long-term planning. They must balance a host of political and community pressures while trying to keep the focus on quality teaching and learning. To carry out these duties, policymakers and education leaders need high-quality, objective research information, written in language they can understand and delivered in time to inform their decisions (US, Department of Education, n.d.).

This conclusion refers to a user friendly, effective and efficient information system for educational administrators, which can assist them in planning and decision

making. The need of such an information system is by no mean new even in developing world. As early as 1989, Verma proposed a model information system in education in his PhD research entitled “A comparative study of the national information system in education in UK and USA with a view to developing a model for India”. The study presented a comparison of the national information system of education in UK and USA with a view to develop a model for India. It also identified an agency that might function as an Ideal point both for the national educational information network and as a coordinator with International Agencies in the field of education. Moreover, the study examines the ineffectiveness and deficiencies in the Indian Educational Information System vis-à-vis that of U.K. and U.S.A.

The need of such an information system is also identified by the research community of Pakistan, though they are few in numbers. Fatima (2000) has pointed out the absence of a national forum in Pakistan, an agency-public or private- that effectively knits together the various associations and professional groups concerned with preserving its intellectual heritage. She has mentioned this as the principal obstacle in creating a national system in the country. In this scenario, she has recommended the development of a national information system in education and research. According to Human Development Foundation (2004), there is a need for better research. Currently, Pakistan has one institution that conducts research on educational issues, the Academy of Educational Planning and Management (AEPAM), which conducts research on basic education only. However, its abilities are hampered by inadequate funds, non-institutionalized basis for collecting, processing and analyzing data, non-availability of technical support staff and little influence in policy making.

Thomas and A. D. Khan (1993) have critically analyzed the performance of the NEMIS (National Educational Management Information System) of Pakistan and concluded that without a reliable flow of valuable data, the impact of NEMIS with respect to any building and informing of institutions would be insignificant. Nevertheless, in the light of NEMIS's original objectives, a basic weakness in the project has been insufficient attention and effort given by government and project management to establish NEMIS as an integral part of the existing government structure. It was stressed that the respective roles of NEMIS at the national and provincial levels must be clarified. Provincial authorities have substantial autonomy in deciding on their statistical needs for planning purposes. The cooperation of the provinces is essential in order to assure timely, comprehensive and reliable data at a sustainable cost. Attention should be given to operational relationships between the national level and the provincial level and to minimum forms of cooperation necessary to assure statistics for national planning needs. Hashmi (1984) has also identified the gap in the provision of required, authentic and reliable information/data to the educational administrators working at tehsil, district and divisional level. He further mentioned that in the absence of such information, they have to fill the gaps by approximation and they feel the dire need of having an efficient management information system. After critically analyzing the situation of Pakistan, UNESCO (1983) has stressed that a management information system, badly needed by the Education Department, should be devised and established. Data on all educational institutions, teachers and facilities should be collected and computerized and programs should be designed to agglomerate and recall specific information needed by administrators.

2.17. Findings of the Chapter

Pakistan, administratively comprised of four provinces, follows centralized system of education and there is statutory requirement for all schools and colleges to follow a national curriculum. The system has adopted three-tier mode (8+4+4) with distinct stages. Education is organized into five levels: primary (grades one through five); middle (grades six through eight); high (grades nine and ten, culminating in matriculation); intermediate (grades eleven and twelve, leading to an F.A. diploma in arts or F.Sc. science; and university programs leading to undergraduate and advanced degrees.

The Federal Government is assigned with the responsibility for policy, planning, and promotion of educational facilities in the federating units. In practice however, major education policies are formulated at federal level and they are passed on to the Provincial Education Departments for implementation. The Federal Ministry of Education administers the educational institutions located in the federal capital territory. Academic and technical education institutions are also the responsibility of the federal Ministry of Education, which coordinates instructions through the intermediate level. Above that level, a designated university in each province is responsible for coordination of instruction and examinations. Universities located in various provinces are administered by the provincial governments, but are exclusively funded by the federal government through the Higher Education Commission (HEC). Educational administration system in all the provinces of Pakistan is decentralized. Despite this fact, there are certain parameters, which differentiate the educational administration system of the provinces from one another.

Reviewed literature reveals that Pakistan has a reasonable Information and Communication Infrastructure. Many networks and information systems are working in their specific domains. Government is also taking interest in advanced ICT initiatives for the promotion of research and education culture in Pakistan. It is also evident that existing information systems designed to facilitate the educational administrators are not robust and well planned, as a result unable to facilitate the educational administrators in realistic planning and decision making. It can be seen that many resources and information networks are available but those are not well integrated to form a nationwide information system for educational administrators and other users. As a result, the educational administrators either have to rely on informal sources of information or approximation. Most of the problems within the education enterprise exist due to the poor planning and unrealistic decision making by the educational administrators. This problem is also realized by the educational administrators and they often complain for the non-availability of an effective and efficient information system. An information system is the basis of educational planning and management process. During this process, the information system should inform its users on the state of the sector, its internal and external efficiency, its pedagogical and institutional operations, its performance, deficiencies and needs. As the needs for information are varied and becoming increasingly complex, a solid information system should be as complete as possible. It should cover all the needs and areas for information and not only aim to collect, store data and process information but should also help in the formulation of educational policies, their management and their evaluation. An effective information system can be designed by analyzing the information needs of its users. On the other hand, the reviewed

literature reveals that so far no comprehensive study was conducted to find out the information needs of educational administrators at school, college and university level in Pakistan for model information system development. Review of the above literature highlights a gap and need in assessing the information needs and seeking behavior of educational administrators for designing an effective and user centered/friendly information system in education at national level. This can be stated as the basic reason besides others that existing educational management information system(s) such as NEMIS, working under Academy of Educational Planning and Management (AEPAM) has not proved itself to be user centered. It is also noted that no comprehensive and well integrated information system is available in Pakistan covering all tiers of education- schools, colleges and universities- for facilitating the educational administrators especially at macro level. Such a system can provide a holistic and complete overview of education enterprise for realistic planning and resource allocation.

Chapter 3

DESIGN OF THE STUDY

This chapter explains the research methods used to achieve the objectives of the study and the procedures used for literature review, selection of sample for questionnaire survey and personal interviews. It also explains the construction of the instruments used for data collection, procedure of the data collection and analysis of data, initial draft model development, its assessment and revision.

3.1. Research Methods

The ultimate objective of this research is to develop a model for educational administrators in Pakistan. Model development is considered an effective research method. It assists investigators and scientists in relating more accurately to reality; it also aids them to describe, predict, test or understand complex systems or events. Thus, models often provide a framework for the conduct of research and might consist of actual objects or abstract forms, such as sketches, mathematical formulas, or diagrams. A model is a representation or abstraction of an actual object or situation. It shows the interrelationships (direct or indirect) and interrelationship of an action and reaction in terms of a cause and effect. Since a model is an abstraction of reality, it may appear less complex than reality itself. The model, to be completed, must be representative of those aspects of reality that is being investigated (Adeyemi, 1975; Busha & Harter, 1980; Powell & Connaway, 2004).

For designing a model some data were required for situation analysis and determining future needs of the proposed information system users. The mixed methods approach was used for data collection. The study was conducted in four phases. In phase one, literature search was conducted for the better understanding of

technical aspects of the phenomena under study and for developing the theoretical framework. This splendid literature search led to the second phase of the study i.e. the survey instruments development and data collection. In this phase the qualitative and quantitative data were collected with the help of survey instruments. The data were then quantitatively and qualitatively analyzed to reach at conclusions. In the third phase, an initial draft model of “Pakistan National Information System for Educational Administrators (PAK-NISEA)” was proposed on the basis of findings of the study. In the final phase the draft model was sent for seeking opinion of Library & Information Science, Information System and Education experts within the country and abroad. In the light of experts’ opinions, the draft model was finalized for presentation in the dissertation. All the steps of the study are presented in the Figure 3.1. Table 3.1 presents an overview of research method and data analysis plan by each research question.

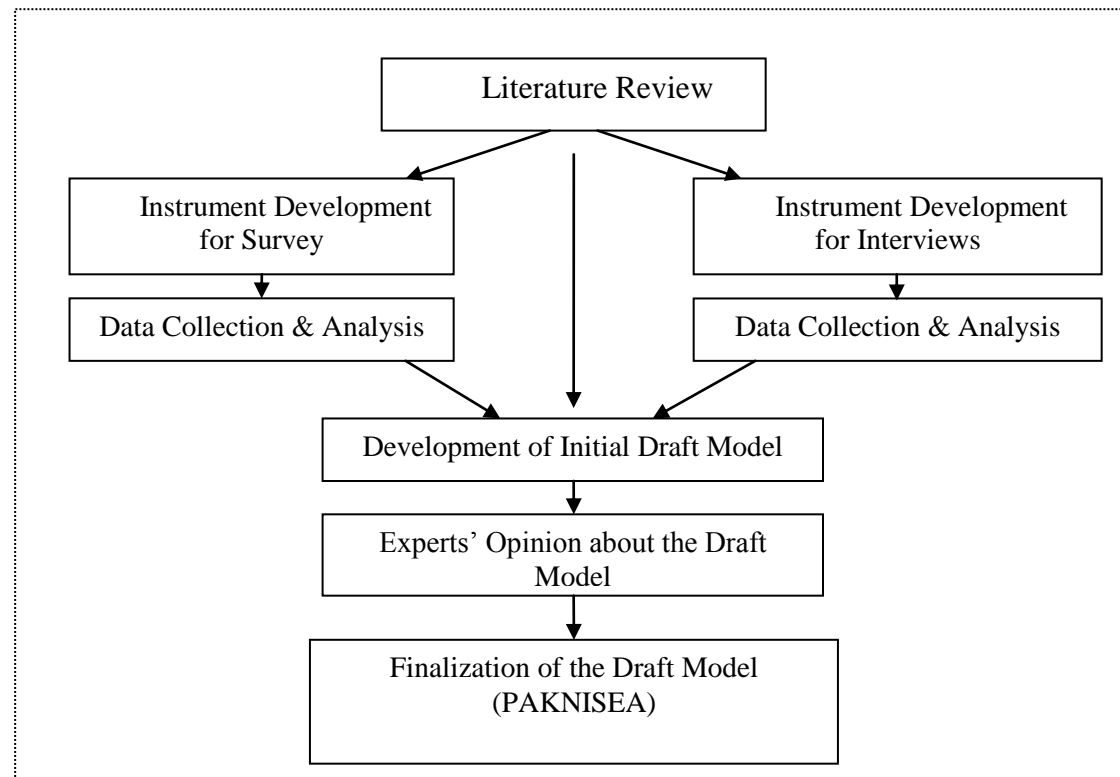


Figure 3.1. Flow Chart of the Research Methodology

Table 3.1. *Research Method and Data Analysis Plan by each Research Question*

Research Questions	Plan
<p>RQ-1. What is the role of information system in the promotion of education within a country?</p> <p>RQ-1a. What are the design considerations of a user centered information system in education?</p> <p>RQ-1b. What is the existing system of education and its administration in Pakistan?</p> <p>RQ-1c. What is the existing information system/network of education in Pakistan?</p>	<p><i>Literature review</i></p>
<p>RQ-2. What are the information needs and seeking behavior of potential users of educational information system?</p> <p>RQ-2a. Which studies are available on information needs and/or seeking behavior of educational administrators in Pakistan?</p> <p>RQ-2b. Which tasks are performed by the educational administrators?</p> <p>RQ-2c. Which sources are used by the educational administrators in Pakistan for seeking needed information?</p> <p>RQ-2d. Is there any statistical relationship between the information source preferences and the administrative experience?</p> <p>RQ-2e. What are the information needs of educational administrators?</p> <p>RQ-2f. To what extent the needed information is available to them?</p> <p>RQ-2g. Is there any statistical difference between the needed and available information to educational administrators in Pakistan?</p> <p>RQ-2h. What are the problems being faced by the educational administrators?</p>	<ol style="list-style-type: none"> <i>Literature review</i> <i>Mixed method (Questionnaire survey and Interview)</i> <p><i>Sampling:</i></p> <ul style="list-style-type: none"> <i>(multi stage cluster sampling for questionnaire survey)</i> <i>(purposive sampling for personal interviews)</i> <p><i>Data Analysis:</i></p> <ul style="list-style-type: none"> <i>Quantitative analysis with SPSS (version-15.0)</i> <i>Use of Descriptive and Inferential Statics</i> <i>Use of Chi-Square test for analysis of RQ-2d.</i> <i>Use of Paired sample T test for analysis of RQ-2g.</i> <i>Qualitative analysis with Spradley's analytical model of ethnographic analysis.</i>

Research Questions	Plan
<p>RQ-3. <i>How a draft model can be evolved on the basis of reviewed literature, and views of potential users and service providers, determined through a questionnaire survey and personal interviews?</i></p> <p>RQ-3a. What are the major findings of reviewed literature?</p> <p>RQ-3b. What are the major findings of questionnaire survey of potential users i.e., educational administrators?</p> <p>RQ-3c. What are the major findings of interviews of educational administrators and service providers i.e., librarians/information professionals and IS/IT experts?</p> <p>RQ-3d. To what extent these findings support the evolving of a user friendly information system for educational administrators in Pakistan?</p> <p>RQ-3e. Which agency can function as focal point both for the national educational information system of Pakistan and as a coordinator with international educational information systems?</p> <p>RQ-3f. What should be the functions of a model information system for educational administrators?</p> <p>RQ-3g. Which information services, products and programs can be proposed for the information system users?</p>	<p><i>Tabular view of findings of the study (i.e., reviewed literature, questionnaire survey and personal interviews along with conclusions).</i></p> <p><i>Evolving the initial draft model of PAK-NISEA on basis of findings of the Study.</i></p> <p><i>Determining the focal agency, organizational structure, developing relationship among different components of the system, identifying its functions in the light of objectives and proposing different services and products.</i></p>
<p>RQ-3h. How the draft model can be improved in the light of experts' recommendations?</p>	<p><i>Initial Draft Model Assessment by the national and international experts</i></p> <p><i>Purposive Sampling</i></p> <p><i>Qualitative analysis of Reviewers' comments</i></p> <p><i>Revision of the draft in the light of experts' suggestions</i></p>

3.2. Data Collection and Analysis for Draft Model Development

This section explains the procedure used for literature search, instrument development, data collection, and analysis and draft model development for the study.

3.2.1. Literature Review

To understand the different theoretical and practical aspects of the study, a thorough search of the relevant literature was conducted. For this purpose, different aspects of information system such as: an information system; national information system; its basic characteristics and objectives, membership and components etc., were reviewed in detail. Literature related to educational system of Pakistan; information systems especially in education at International (some developed and developing countries of the world were selected for this purpose) and national level; user studies conducted for finding the information needs and seeking behavior of intended users especially educational administrators; role of such studies in the development of effective information systems were collected and reviewed thoroughly. For literature search standard sources were used e.g., Library Literature, theses, online resources i.e., *EBSCO Host, ScienceDirect, Emeraldinsight, LISTA etc.*, World Wide Web search engines and portals, such as *Google, Yahoo, Alta Vista, Dog pile etc.* The researcher personally visited different libraries of Lahore, Bahawalpur and Islamabad for literature search. A list of references and bibliography consulted during the literature search is given at the end.

3.2.2. Mixed Methods

Mixed methods research design was used for collecting data for draft model development. This design contributes quantitative and qualitative approaches by

including both quantitative and qualitative data in a single study. Many researchers believe that for proposing an educational information system country wide, this approach is most suitable to determine the needs and preferences of potential users. They stress on the use of interview method along with questionnaire method. They believe that at the design stage, the personal interviews can be of great help (Davis & Yen, 2000; Verma, 1989). According to Chauhdary (2004), the method most commonly used by the social science researchers to study the users of different information systems and/or proposing the information systems to satisfy their information needs is the survey conducted through one or more data collection tools like the questionnaire, interview, and observation, etc.

The purpose of mixed methods research is to build on the synergy and strength that exists between quantitative and qualitative research methods to understand a phenomenon more fully than is possible using either quantitative or qualitative methods alone. Quantitative studies are good at establishing the for example effects of particular phenomena, but qualitative studies help us to understand the reasons of that phenomena. Three types of mixed methods research designs are common:

The QUAL-quant Model: in it qualitative data are collected first and are more heavily weighted than quantitative data.

The QUAN-qual Model: in it quantitative data are collected first and are more heavily weighted than qualitative data.

The QUAN-QUAL Model: in this model, quantitative and qualitative data are equally weighted and are collected concurrently throughout the same study (Gay, L. R., Mills, G. E., & Airasian, P. (2009).

3.2.3. The QUAN-qual Model

The QUAN-qual Model of mixed methods was used for this study. Questionnaire Survey was used as the major tool for quantitative data collection, while semi-structure interviews were conducted to fill the gaps of quantitative data. In the first phase the researcher formulated the research questions with the help of reviewed literature, developed questionnaire for quantitative survey, collected quantitative data, analyzed and then interpreted the data. The qualitative data were collected through personal interviews to fill the gaps identified in the quantitative data. The quantitative data informed the researcher regarding the potential users' (educational administrators) information needs and source preferences and their opinion about the development of educational information system and services which should be offered by the proposed system. However, the survey results did not inform the researcher about the managerial aspects of the proposed model. This gap was filled by interviewing the key educational administrators, library and information professionals and IS/IT experts. The use of '*QUAN-qual Model*' led the researcher to present the quantitative data (chapter 4) before the qualitative data (chapter 5) in the dissertation. A detailed description of research methods employed is provided as under:

3.2.4 Survey

The researcher chose to collect the quantitative data with the help of questionnaire survey. Many researchers have declared it as the most suitable and widely used method of gathering scientific information. Often the purpose of a survey is simply to determine how people feel about a particular issue. Survey research involves collecting data to test hypotheses or to answer questions about people's opinions on some topic or issue. A

survey is an instrument to collect data that describes one or more characteristics of a specific population. Survey research requires the collection of standardized, quantifiable information from all members of a population or of a sample. To obtain comparable data from all participants, the researcher must ask them each the same questions (Gay, Mills, & Airasian, 2009; McBurney & White 2007).

3.2.4.1. Survey Population

Sample survey population framework was as follows:

1. Intermediate and micro level educational administrators working in public sector schools, colleges and universities (i.e. Registrar/deans/deptt. heads in universities and principals of schools and colleges).
2. The individuals who in their discharge of day to day administrative work, have to depend upon the information system in education.

The target population for the questionnaire survey was identified with the help of reviewed literature and discussion with experts. The respondents were from the Punjab province and Islamabad Capital Territory (ICT). The choice of the Punjab for the questionnaire survey and interviews is based on three main grounds: (1) The researcher is based in Punjab and logistic support for the PhD fieldwork was most conveniently available in this region; (2) Circumstances in Baluchistan and NWFP provinces were not in favor of field survey; (3) The population of the province was estimated to be 86,084,000 in 2005 and is home to over half of the population of Pakistan. About 50% educational institutes are situated within Punjab province and ICT (Of the 71 public sector universities of Pakistan, 35 are in Punjab and ICT. Of the 227,791 public and private educational institutes 111, 648 are in Punjab Province and ICT).

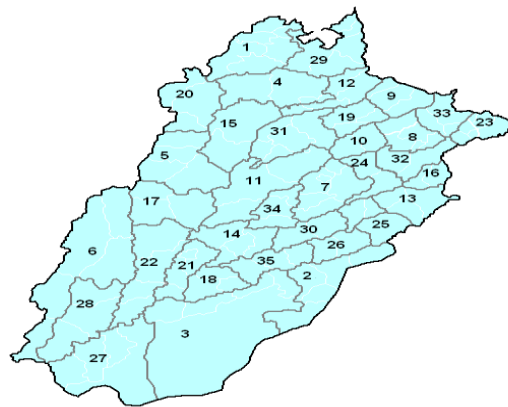
3.2.4.1.1. Punjab province and ICT (Islamabad Capital Territory):- The Districts of Pakistan form the third tier of government in Pakistan, ranking as subdivisions of the provinces of Pakistan. Prior to August 2000, the provinces contained administrative units called *divisions* which contained *districts* as the fourth level of government. Districts are further subdivided into tehsils which may contain villages or municipalities. In August 2000, the *divisions* were abolished as an administrative tier, and the provinces (except Punjab) are now directly divided into districts. In the **Punjab province**, divisions are restored since 2008 and now it consists of nine divisions and 35 districts. **Islamabad** is the capital of Pakistan, and is the tenth largest city in Pakistan. The Rawalpindi/Islamabad metropolitan area is the third largest in Pakistan with a population of over 4.5 million inhabitants, 1.5 million in Islamabad and three million in Rawalpindi (See Figure 3.2).

3.2.4.2. Sampling Procedure and Frame

Multistage cluster sampling was used for the survey. In *cluster sampling*, a researcher selects the sample in stages, first selecting groups of elements, or clusters (e.g., city blocks, census tracts, schools), and then selecting individual elements from each cluster (e.g., randomly or by systematic sampling and so on) (Herek, 2009). Cluster sampling can be carried out in stages, involving selection of clusters within clusters. This process is called *Multistage Cluster Sampling* (Gay, Mills, & Airasian, 2009). In a multistage cluster sampling, a combination of probability and non-probability sampling may be used (Powell & Connaway, 2004). For the sampling purpose the Punjab province and ICT were divided into clusters and sub clusters and each **district** was designated as a primary cluster. It was tried to get response from each primary cluster (i.e. **District**). Then each primary cluster (district) was divided into sub clusters (i.e. **Tehsils**). Sub clusters

were randomly selected. Elements (i.e. schools and colleges) were selected according to a defined criterion** (See Figure 3.4).

Table 3.2 presents responses acquired from districts of Punjab and ICT (See Appendix-P). To get the reasonable response, 300 responses (in total) were targeted from the three groups of *Elements* i.e. schools, colleges and universities. On the other hand, all the public sector universities were selected within Punjab province and ICT (See Table 3.3. in Appendix-P).



Note: 35 Districts of Punjab, Pakistan are as follows: 1. Attock 2. Bahawalnagar 3. Bahawalpur 4. Bhakkar 5. Chakwal 6. Dera Ghazi Khan 7. Faisalabad 8. Gujranwala 9. Gujrat 10. Hafizabad 11. Jhang 12. Jhelum 13. Kasur 14. Khanewal 15. Khushab 16. Lahore 17. Layyah 18. Lodhran 19. Mandi Bahauddin 20. Mianwali 21. Multan 22. Muzaffargarh 23. Narowal 24. Nankana Sahib 25. Okara 26. Pakpattan 27. Rahim Yar Khan 28. Rajanpur 29. Rawalpindi 30. Sahiwal 31. Sargodha 32. Sheikhupura 33. Sialkot 34. Toba Tek Singh 35. Vehari.

Figure 3.2. Districts of Punjab Province

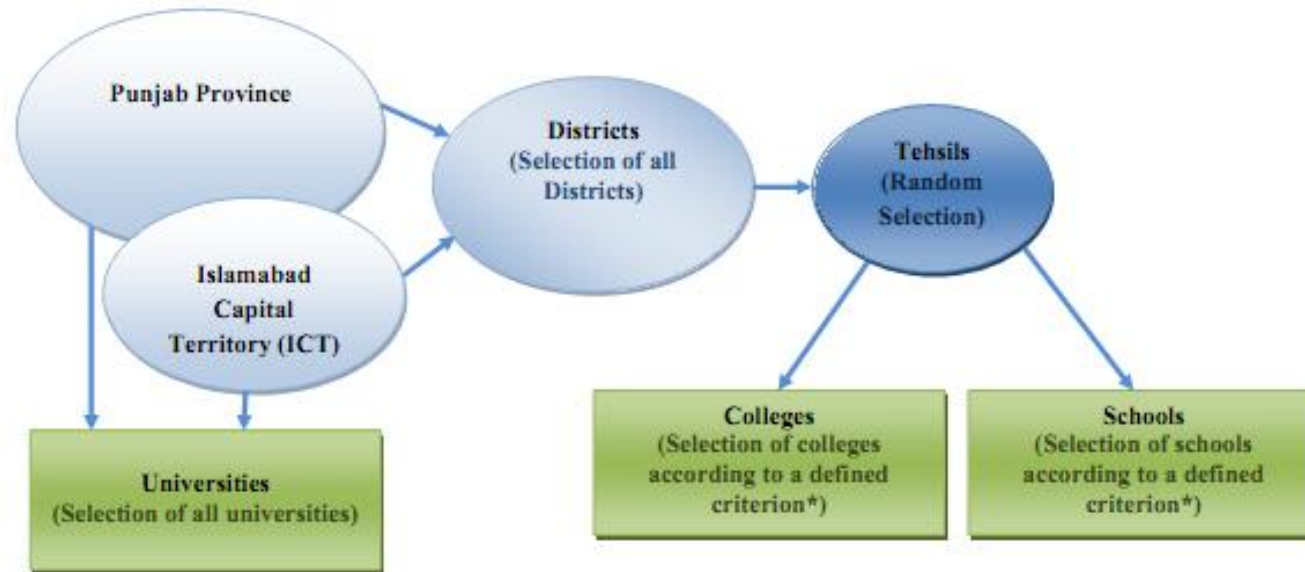
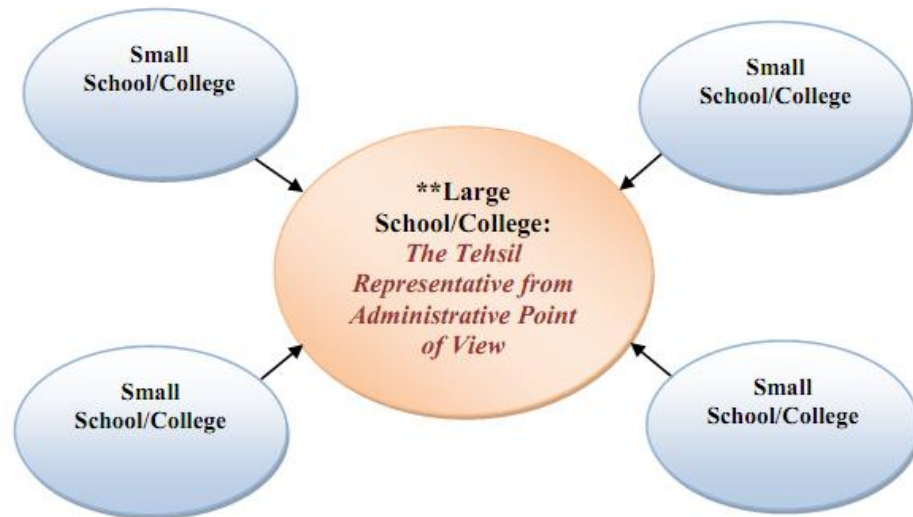


Figure 3.3. Multistage Cluster Sampling Employed for Questionnaire Survey



*Figure 3.4: The Selection of **Tehsil Representative Schools and Colleges as Elements for Questionnaire Survey*

Multistage cluster sampling technique with a combination of probability and non-probability sampling was employed (see Figure 3.3) on the basis of following grounds:

- a) **The elements (schools and colleges) were selected for the survey on the assumption that these schools and colleges have to play the role of nodal points in their respective districts and tehsils. So the schools and colleges were selected with the help of EDOs and DEOs (the list of EDOs and DEOs consulted is attached as Appendix-N) with a non probability sampling technique. The schools and colleges selected for the survey were already working as tehsil representatives or focal points at tehsil level from administrative point of view.
- b) The targeted population are busy people and difficult to consult in large number without any personal reference.

- c) To reduce the sampling bias, all the districts of Punjab province were selected for the study and tehsils were further selected randomly (See Table 3.2. in Appendix-P).

3.2.4.3. Instrument Development

A questionnaire was prepared with the help of communication with related experts and literature review. Both open ended and close ended questions were included.

3.2.4.3.1. Pilot Study:- A pilot study was conducted to assess the reliability of the instruments developed for the study. Questionnaires were distributed among 10 university, 10 college and 10 school administrators within the Bahawalpur district. In total 23 responses were received. Necessary changes were made in the instruments in the light of feedback before using them as the final instruments for the survey.

3.2.4.3.2. Major Questions:- Following are the major questions of the survey questionnaire:

1. Demographics of the Respondents i.e. Name of Institute, Gender, Age, Designation of the respondents, Highest academic qualification, Professional and administrative experience (in years) etc.
2. Administrative tasks Performed by the respondents i.e. Planning, Budgeting, Forecasting, Controlling etc.
3. The degree of need and availability of different type of information for administrative work. (Few aspects were not related to the school administrators and were excluded from their respective questionnaire).
4. Information seeking pattern for obtaining information for better decision making and planning.

5. Sources used (formal and Informal) for obtaining ideas for new developments
6. Preferred language and format for reading material.
7. Information and Communication Technologies (ICTs) used for seeking information.
8. Impact of ICTs on information seeking and gathering process.
9. Educational administrators' opinion about the development of PAK-NISEA, its objectives and services.
10. Suggestions by the Educational Administrators.

3.2.4.3.3. Scales Used:- Scales used for measurement include 4-point Ratio Scale and 5-point Likert Scale.

Ratio Scale is a measurement scale in which a certain distance along the scale means the same thing no matter where on the scale you are, and where "0" on the scale represents the absence of the thing being measured. Thus a "4" on such a scale implies twice as much of the thing being measured as a "2". The ratio scale was used to assess the degree of need and degree of availability of information to educational administrators. The researcher executed the reliability analysis on the 4-point ratio scale used to assess the degree of respondents' information needs. The Cronbach alpha is 0.905 which is above than 0.8, so the scale is reliable. Similarly, reliability analysis was executed on the 4-point ratio scale used to assess the degree of availability of needed information to the respondents. The Cronbach alpha is 0.931 which is above than 0.8, so the scale is reliable.

Likert Scale is one of the most commonly used summated scales. Likert type scales are often used with individual, non-summated scales as well (Powell & Connaway, 2004). Respondents' opinion about the PAK-NISEA development, its objectives and services was sought out against a 5-point Likert Scale. Reliability

analysis was executed on the Likert Scale used to get respondents' opinions about the objectives of the proposed PAK-NISEA. The Cronbach alpha is 0.870 which is above than 0.8, so the scale is reliable. Similarly, reliability analysis was executed on the Likert Scale used to get respondents' opinions about the services to be rendered by the PAK-NISEA. The Cronbach alpha is 0.871 which is above than 0.8, so the scale is reliable.

Three separate questionnaires for school, college, and university administrators (Appendix C) along with cover letter (Appendix B) were distributed through mail, email and personal visits. In few districts help of District Education Officers (DEOs) and research assistants was sought out for questionnaire distribution and collection. Professional colleagues working in college and university libraries helped in data collection from their respective institutes. The data collection process was completed in six months. Many follow up letters, emails, telephone calls and personal visits made the achievement of targeted response possible. Frequency distribution of obtained responses from school, college and university sector are presented in Table 3.4.

Table 3.4. *Frequency Distribution of Obtained Responses*

Institute	Targeted Response	Obtained Response	Percent
Universities	100	101	100
Colleges	100	99	99
Schools	100	97	97
Total	300	297	99

3.2.4.4. Analysis and Interpretation of Data

The quantitative data were analyzed with the help of SPSS version 15. Both descriptive (such as Mean, Mode, Median, Standard Deviation etc.) and inferential (such as Paired Sample T-test and Chi-square) statistics were used for data analysis. The descriptive statistics helped in summarizing the bulk of data and inferential statistics allowed the researcher to inference/conclude on the basis of the data. References from reviewed literature were also inserted where appropriate.

3.2.5. Interview

An interview is a purposeful interaction in which one person obtains information from another. Interviews are distinguished by their degree of formality and structure. Interviews may be formal and planned or informal and unplanned. Some interviews are structured, with a specified set of questions to be asked, whereas others are unstructured, with questions prompted by the flow of the interview. Semi-structured interviews combine both structured and unstructured approaches (Gay, L. R., Mills, G. E., & Airasian, P., 2009). Interviewing provides insight into how and why people believe, feel, interpret events and behave in the way they do (Gorman & Clayton, 2005).

In the first phase the researcher formulated the research questions, developed questionnaire for quantitative survey, collected quantitative data, analyzed and then interpreted the data. The qualitative data were collected through personal interviews to fill the gaps identified in the quantitative data. The quantitative data informed the researcher regarding the potential users' i.e. educational administrators' information needs and source preferences and their opinion about the development of educational information system and services which should be offered by the proposed system.

However, the survey results did not inform the researcher about the managerial aspects of the proposed model. This gap was filled by interviewing the key educational administrators, library and information professionals and IS/IT experts. The researcher did interviewing and even though semi-structured, any other new insights that were presented were taken up and followed through. Pilot study was also conducted to assess the reliability of the interview tools. Two information professionals, one educational administrator and one information system expert (from Bahawalpur city) were interviewed to check the reliability of the interview instruments.

3.2.5.1. Sampling Procedure and Frame

Sample for interviews was chosen through handpicked/purposive sampling. Interviews of three different categories of experts were conducted (list of interviewees is attached as Appendix-C). *Handpicked/Purposive Sampling* involves the selection of a sample with a particular purpose in mind. While looking for representativeness this might involve selecting cases that meet particular criteria; are considered typical; show wide variance; represent ‘expertise’; or cover a range of possibilities (O’Leary, 2004).

Sample interview population framework was as follows:

3. Educational administrators working on Macro, Intermediate and Micro levels of educational administration in Pakistan ((Appendix-D).
4. Information and library professionals working on executive positions of well known institutes (Appendix-E);
5. Information system/IT experts working on executive positions of well known institutes (Appendix-F).

6. The officials who work in well known institutes (public and private sectors) of Punjab province and ICT and have responsibility or interest/understanding about educational information system.

Following the framework of the sample population, a list of prospective interviewees was developed with the help of supervisor and three other experts from each category of interview population. Thus the selection of the sample for the interview was handpicked/purposive as well as based on the availability of the participants for interview. Some of the participants desired for the interview were not available due to their busy schedules (particularly working VCs). As a result only two retired VCs could be interviewed. The participants of the interviews were not necessarily the individuals who were the participants of the questionnaire survey. The actual targets were high up officials or administrators who were not possible to pursue in large number for the survey. Secondly, it was easier to interview them than requesting them to fill a questionnaire. In most cases, the high ups ask their assistants to fill up the questionnaires; in such cases the real response cannot be obtained. Keeping these limitations in view, it was tried to interview more high ups for getting their own point of view regarding their information needs, related problems and the mechanism of developing an educational information system for them at national level which could assist them in planning and decision making.

The interviewees were sent interview schedule through mail/email and personal visits (where possible). The researcher interviewed them in their offices or homes (in few cases) according to the schedule of meeting. Only two interviews were conducted on telephone due to interviewees' departure for emergency meeting on the scheduled day (they requested to interview them on some other day on telephone). Face-to-face individual interviews lasting for thirty to sixty minutes were necessary

for the interviewees' to explain the different aspects of prospective model of information system for educational administrators in Pakistan. Thus 55 interviews were audio recorded with the help of "Olympus Digital Wave Player". The researcher also took reflexive journals during the interviews. The transcripts with minute edition are attached as Appendix-H.

3.2.5.2. Analysis and Interpretation of Qualitative Data

Spradley's analytical model of ethnographic analysis was used for qualitative data analysis. Spradley's Model provides both methodological guidance and also facilitates the systematic examination of something to determine its parts, the relationship among parts and their relationship to the whole. It can be used for data drawn from observational field notes, reflexive journal notes, individual interview and focus group transcripts. Spradley's model for domain, taxonomic, componential and theme analysis provides a practical analytical map for systematically identifying patterns of behavior and conversational themes from data gathered during the investigative stages of research (Gorman & Clayton, 2005, p. 215). The data obtained through open ended questions, interviews and experts' review about the initial draft model were analyzed qualitatively by employing the ethnographic content analysis technique. Finally, the thematic analysis of the acquired patterns of the data helped in reaching at conclusions. The references from literature, quantitative data and telling quotes were also inserted to make the results more understandable and cohesive. These interviews and review of the related literature helped in the overall understanding and designing of the system.

3.3. Preparation of the Initial Draft Model

An initial draft model entitled “Pakistan National Information System for Educational Administrators: PAK-NISEA” was proposed with the help of findings from literature review, questionnaire survey and personal interviews.

3.4. Assessment and Revision of the Draft Model

The initial draft was sent to the experts of education, library and information science and information system. The selection of the experts was with the help of experts keeping in view the area of research/interest of the national and international professionals (List of experts who helped in selection of the experts is attached as Appendix-Q). A list of more than 50 experts was prepared and they were contacted through email, snail mail and/or personally. Subsequent reminders were also sent. Few experts refused from reviewing the draft model due to their busy schedule and few others did not reply at all. As a result, only 28 experts provided their feedback, which was qualitatively analyzed and reported in Chapter-6. The draft model was revised in the light of experts’ suggestions. The revised draft model is also reported in Chapter-6.

3.5. Summary, Conclusions and Recommendations

Finally the summary and conclusions were drawn from the study along with recommendations and reported in Chapter-7. The researcher also proposed topics for future research.

The References and bibliography provided at the end was prepared according to the style manual by American Psychological Association (APA- 5th edition).

Chapter 4

ANALYSIS AND INTERPRETATION OF QUANTITATIVE DATA

The aim of this study is to develop a draft model for educational administrators in Pakistan. To accomplish this aim, one of the objectives is to determine and understand their information needs and seeking behavior through questionnaire survey and personal interviews. This chapter and the next one achieved this objective. Based on the questionnaire survey data, the following research questions are addressed in this chapter:

RQ-2b. Which tasks are performed by the educational administrators?

RQ-2c. Which sources are used by the educational administrators in Pakistan for seeking needed information?

RQ-2d. Is there any statistical relationship between the information source preferences and the administrative experience?

RQ-2e. What are the information needs of educational administrators?

RQ-2f. To what extent the needed information is available to them?

RQ-2g. Is there any statistical difference between the needed and available information to educational administrators in Pakistan?

Two hundred and ninety seven questionnaires were analyzed with the help of SPSS- Version 15.0 and are reported here. The respondents of the study were intermediate and micro level educational administrators from Punjab province and Islamabad Capital Territory (ICT). The first part deals with demographic information about the respondents. The second part attempts to find out their information seeking behavior and other source preferences. The third part deals with finding their information needs along with the state of its availability to the administrators. Their suggestions sought through an open ended question are also presented at the end. An attempt is made to correlate the survey results with the reviewed literature.

4.1. Respondents' Demographics

The respondents were asked different questions related to their particulars i.e. gender, age, academic qualification, professional experience etc. The results show that of the 297 respondents, 196 (66%) were male and 101 (34%) were female. One hundred and one (34%) responses were received from the university sector, following 99 (33.3%) from college and 97 (32.7%) from school sectors. Thus the response rate from the university sector is slightly higher than the other two sectors of education. Respondents were asked to specify the administrative positions on which they were working. It was found that most of the respondents were working as principals (113, 38%) either in school or college sectors. The second category of high response was of chairs/heads of the departments in higher education institutes (82, 27.6%). Third category was again of school and college vice principals (65, 21.9%). Other categories include registrars, deputy/Asst. registrars (14, 4.7%), administrative officers (7, 2.3%), directors, asst. directors and deans (5, 1.8%). Frequency distribution of the responses is given in Table-4.1. It is also evident from Table-4.1 that most of the responded administrators were working at micro level, while the number of intermediate level administrators is very low. The reason of this low response is their non-availability for the survey due to their busy schedule. Therefore only few intermediate level administrators could be approached by the researcher for this survey. It is remarkable to note that administrators from school and college sector were more difficult to approach than university administrators and in some cases the contact to the school and college administrators was made with the help of concerned EDO of DEOs as many school and college administrators perceived that they could be in problem if they would fill the questionnaire.

Table 4.1. *Frequency distribution of designation of the respondents*

Level of Administration	Designation	Frequency	Percentage
<i>Administrators Working at Micro Level</i>	Principal	113	38.0
	Chairs/Heads of the Deptt.	82	27.6
	Vice Principals	65	21.9
<i>Administrators Working at Intermediate Level</i>	Registrars	14	4.7
	Deputy/Asst. Registrars		
	Deans	6	2.0
	Directors	5	1.7
	Asst. Directors	5	1.7
	Other categories	7	2.3
Total		297	100

Table 4.2. *Frequency distribution of age categories of the respondents*

Years	Frequency	Percentage
20-25	7	2.4
26-30	8	2.7
31-35	17	5.7
36-40	28	9.4
41-45	32	10.8
46-50	60	20.2
51-55	45	15.2
56-60	58	19.5
60 onwards	10	3.4
Missing	32	10.8
Total	297	100

The results show a variety of patterns of academic qualification especially in school and college sectors. According to the results, 72 (24.2%) respondents had qualification of Masters of Arts (MA), 42 (14.1%) MA-MEd, 29 (9.8%) Masters of Science (MSc), 28 (9.4%) Mphil, and 22 (7.4%) MA-BEd. Other small responses were of MSc-MEd (8, 2.7%), BEd (5, 1.7%), MSc-BEd (3, 1.0%), FCPS (2, 0.7%)

and BSc, MEd (1, 0.3), while 12 (4.0%) respondents did not mention their qualification. The highest academic qualification was PhD-Post doctorate (3, 1.0%) followed by PhD (70, 23.6%). Results show a variety of respondents' age varying between 20 to 60 years onwards. The highest response was from age group of 46-50 (60, 20.2%) and 56-60 (58, 19.5%). The frequency distribution of other age categories is given in Table-4.2.

Frequency distribution given in Table-4.3 shows that professional experience of the respondents varied from one to more than 40 years. Fifty (16.8%) respondents had 16-20 years of experience.

Table 4.3. *Professional and administrative experience of the respondents*

Years	Professional exp.	Administrative exp.
1-5	25(8.4%)	138(46.5%)
6-10	27(9.1%)	67(22.6%)
11-15	37(12.5%)	35(11.8%)
16-20	50(16.8%)	19(6.4%)
21-25	40(13.5%)	6(2%)
26-30	47(15.8%)	6(2%)
31-35	30(10.1%)	1(0.3%)
36-40	9(3%)	0
40 onwards	1(0.3%)	0
Missing	31(10.4%)	25(8.4%)
Total	297(100%)	297(100%)

The high responses lie between 11 to 35 years of professional experience. Like the professional experience, respondents' administrative experience also varied between 1 to 35 years. Most of the respondents had administrative experience of 1-5 years (138, 46.5%). The other highest response was of administrators having experience of 6-10 years (67, 22.6%).

4.2. Information Needs and Seeking Behavior of the Respondents

Table-4.4. *Frequency Distribution of Sources of Obtaining Information for Better Decision Making and Planning Used by the Respondents*

R	Sources	School Admin.	College Admin.	University Admin.	Total
1.	Through staff meetings	85 (87.6%)	89 (89.9%)	89 (88.1%)	263 (88.6%)
2.	Informal discussion with assistant staff	83 (85.6%)	75 (75.8%)	70 (69.3%)	228 (76.8%)
3.	From result output	76 (78.4%)	69 (69.7%)	47 (46.5%)	192 (64.6%)
4.	By discussing with students	63 (64.9%)	69 (69.7%)	50 (49.5%)	182 (61.3%)
5.	From trustable individuals	54 (55.7%)	69 (69.7%)	56 (55.4%)	179 (60.3%)
6.	Social networks	49 (50.5%)	57 (57.6%)	49 (48.5%)	155 (52.2%)
7.	By walking around (Grape wine)	43 (44.3%)	50 (50.5%)	41 (40.6%)	134 (45.1%)
8.	Internal documentary sources	36 (37.1%)	44 (44.4%)	45 (44.6%)	125 (42.1%)
9.	From communities of practice	41 (42.3%)	36 (36.4%)	28 (27.7%)	125 (42.1%)
10.	From Institutional ranking by HEC/Board exams output	57 (58.8%)	31 (31.3%)	36 (35.6%)	124 (41.8%)
11.	From library resources	39 (40.2%)	51 (51.5%)	34 (33.7%)	124 (41.8%)
12.	Through intelligence staff	51 (52.6%)	35 (35.4%)	33 (32.7%)	119 (40.1%)
13.	Through computerized information system	22 (22.7%)	32 (32.3%)	36 (35.6%)	90 (30.3%)
14.	By discussing with librarian	26 (26.8%)	34 (34.3%)	17 (16.8%)	77 (25.9%)
15.	From foreign educational information systems	17 (17.5%)	15 (15.2%)	35 (34.7%)	67 (22.6%)

4.2.1. Use of Different Information Sources by the Educational Administrators

The researcher assessed the frequency of usage of different formal and informal sources of information by the educational administrators (Simple frequency of sources used is given in Table 4.4). Respondents were asked to mention the sources which were being used by them for better decision making and planning. The sources are ranked in Table 4.4 according to their order of preference. According to the results, 263 (88.6%) respondents were using staff meetings as a source of information. This pattern is almost similar among school, college and university administrators. Informal discussion with assistant staff was used as a source by 228 (76.8%) respondents. Of them most of the respondents were from school sector (83, 85.6%). Feedback from result output was used by 192 (64.6%) respondents. Of them majority was from school sector (76, 78.4%) and university administrators were very few in

number (47, 46.5%). Similarly, discussion with students and trustable individuals, or interaction with other social networks was used as a source of information by 182 (61.3%), 179 (60.3%) and 155 (52.2%) respondents respectively. One hundred and thirty four (45.1%) respondents were getting feedback by walking around. Other sources used as feedback for better planning and decision making were internal documentary sources (125, 42.1%), communities of practice (125, 42.1%), institutional ranking by HEC/Board exams output (124, 41.8%), library resources (124, 41.8%), and intelligence staff (119, 40.1%). Very few administrators mentioned the use of computerized information system (90, 30.3%), discussion with librarian (77, 25.9%) or foreign educational information systems (67, 22.6%). The pattern of responses shows that the educational administrators mostly rely on informal sources and/or social networks than formal sources i.e. library resources and/or other information systems. Similarly, Choo (n.d) found that very few chief executives personally use the institutional library and online database services.

The use of these sources was further categorized as formal and informal sources. In the category of *formal sources of information*, following sources were listed: formal staff meetings, result output, internal documentary sources, institutional ranking given by authoritative institutes such as HEC or Examination Boards, library resources, and computerized and/or foreign educational information systems. On the other hand the *informal sources of information* included the following: informal discussion with assistant staff, discussion with students, trustable individuals, librarians, communities of practice, intelligence staff, other social networks, and by walking around. The researcher also tried to find out whether there is any relationship between the administrative experience and the use of different formal and informal information sources. To test it statistically, the administrative experience was divided into three categories, i.e., 1-10 years, 11-20 years and 21-30 years and/or onwards. As

both the variables i.e., administrative experience and use or non use of formal and informal information sources represent the nominal level of measurement, the use of Chi-Square test is therefore justified. Chi square, symbolized as χ^2 is a nonparametric test of significance appropriate when the data are in the form of frequency counts or percentages and proportions that can be converted to frequencies. It is used to compare frequencies occurring in different categories or groups. Simple frequency counts for the variable under consideration are often presented in contingency tables. Whereas a contingency table by itself presents basic descriptive data, a chi square analysis helps determine if any observed difference between the variables are meaningful and is computed by comparing the frequencies of each variable observed in a study to the expected frequencies. The chi square value increases as the difference between observed and expected frequencies increases; large chi square values indicate statistically significant differences (Gay, Mills, & Airasian, 2009). Executed through cross-tabulation in SPSS (v-15), the results of the test are also presented in Table-4. Regarding the use of two informal sources of information i.e., informal discussion with assistant staff ($\chi^2 = 6.215$, sig= .045*) and the discussion with students ($\chi^2 = 6.990$, sig= .030*), the results are significantly different (Table-4.5).

It shows that the use of these informal sources is significantly high among educational administrators although the use of even such sources decreases as the administrative experience increases. The decrease in usage of informal source may be due to the reason that more experienced educational administrators start using their tacit knowledge and personal experience rather than using other formal and informal sources. According to the above table, the use of other formal and informal sources is not different among all three categories of administrative experience.

Table 4.5. *Use of Different Information Sources According to Administrative Experiences*

Sources		1-10 years		11-20 years		21-30 years onward		Total		(Chi Square & Significance)
		No	Yes	No	Yes	No	Yes	No	Yes	
Formal sources	Through formal staff meetings	30	164	3	47	0	12	33	223	($\chi^2 = 5.034$, sig= .081)
	From result output	72	122	14	36	6	6	92	164	($\chi^2 = 2.516$, sig= .284)
	From institutional ranking by HEC/Board exams output	110	84	27	23	8	4	145	111	($\chi^2 = .633$, sig= .729)
	From library resources	103	91	34	16	9	3	146	110	($\chi^2 = 5.264$, sig= .072)
	Internal documentary sources	111	83	33	17	8	4	152	104	($\chi^2 = 1.549$, sig= .461)
	Through computerized information system	135	59	37	13	6	6	178	78	($\chi^2 = 2.632$, sig= .268)
	From foreign educational information systems	149	45	36	14	8	4	193	63	($\chi^2 = 1.011$, sig= .603)
Informal sources	Informal discussion with assistant staff	48	146	8	42	6	6	62	194	($\chi^2 = 6.215$, sig= .045*)
	By discussing with students	85	109	12	38	6	6	103	153	($\chi^2 = 6.990$, sig= .030*)
	From trustable individuals	81	113	22	28	6	6	109	147	($\chi^2 = .366$, sig= .833)
	Social networks	83	111	26	24	8	4	117	139	($\chi^2 = 3.590$, sig= .166)
	By walking around (Grape wine)	106	88	25	25	9	3	140	116	($\chi^2 = 2.442$, sig= .295)
	Through intelligence staff	115	79	27	23	8	4	150	106	($\chi^2 = .795$, sig= .672)
	From communities of practice	122	72	37	13	6	6	165	91	($\chi^2 = 3.291$, sig= .193)
	By discussing with librarian	140	54	42	8	8	4	190	66	($\chi^2 = 3.285$, sig= .193)

Note:- *significant difference (at the 0.05 alpha level)

It is evident from the table that almost all the formal sources (except formal staff meetings and result output) are less used by the educational administrators. On the other hand most of the informal sources (except discussion with librarian, communities of practice, intelligence staff and walking around) are most used by all three categories of educational administrators. Most of the responses related to the

information sources used by EAs go with findings of Auster and Choo (1994), Alwis and Higgins (2001), Grosser (1991), and Katzer and Fletcher (1992). They believed that administrators prefer sources that they perceive to be reliable, of high quality and that provide relevant information. They primarily rely on people they trust and other informal social networks.

4.2.2. Sources Used by the Educational Administrators for Obtaining Ideas for New Developments

The respondents were provided with a list of sources and were asked to mention whether these were used by them for obtaining ideas for new developments. Newspapers/magazines got the highest ranking and were used by the 238 (80.1%) respondents. Two hundred and twenty seven (76.4%) respondents were getting new ideas from conferences/seminars and this practice was higher among university administrators (88, 87.1%). Staff meetings (220, 74.1%) and students' feedback (208, 70%) were also used by most of the respondents. Similarly, TV/Radio programs were used as a source of new ideas by 195 (65.7%) respondents. Discussion with ex-seniors/retired & senior persons (188, 63.3%), sub ordinate staff (169, 56.9%) and peers outside the institute (167, 56.2%) were also important sources for generating new ideas. Again the findings highlight the importance of personal sources of information for the administrators.

Books/monographs, local journals, government publications, advertisements, circulars, research studies, other institutes' websites, foreign journals, private sector institutes, institutional bulletins, project proposals, dissertations/theses, visits to foreign countries, persuasive interviews and employ surveys were also among the sources used for getting new ideas. The results reveal that the use of research studies, other institutes' websites and bulletins, dissertations/thesis, and visits to foreign

countries was higher among university administrators than school and college administrators. Frequency distribution of the responses is given in Table-4.6.

Table-4.6. *Sources for Obtaining Ideas for New Developments Used by the School, College and University Administrators*

R	Sources	School Admin.	College Admin.	University Admin.	Total
1.	News papers/magazines	88 (90.7%)	78 (78.8%)	72 (71.3%)	238 (80.1%)
2.	By attending conferences	66 (68.0%)	73 (73.7%)	88 (87.1%)	227 (76.4%)
3.	Staff meetings	79 (81.4%)	75 (75.8%)	66 (65.3%)	220 (74.1%)
4.	Feedback from students	60 (61.9%)	75 (75.8%)	73 (72.3%)	208 (70.0%)
5.	TV/Radio programs	66 (68.0%)	65 (65.7%)	64 (63.4%)	195 (65.7%)
6.	By discussing with ex-seniors/ retired persons	60 (61.9%)	67 (67.7%)	61 (60.4%)	188 (63.3%)
7.	By discussing with sub-ordinate staff	71 (73.2%)	53 (53.5%)	45 (44.6%)	169 (56.9%)
8.	By discussing with peers outside the institute	40 (41.2%)	64 (64.6%)	63 (62.4%)	167 (56.2%)
9.	Books/monographs	40 (41.2%)	52 (52.5%)	62 (61.4%)	154 (51.9%)
10.	Local Journals	40 (41.2%)	53 (53.5%)	60 (59.4%)	153 (51.5%)
11.	Government publications	52 (53.6%)	57 (57.6%)	41 (40.6%)	150 (50.5%)
12.	Advertisements	44 (45.4%)	51 (51.5%)	43 (42.6%)	138 (46.5%)
13.	Circulars	48 (49.5%)	41 (41.4%)	44 (43.6%)	133 (44.8%)
14.	Research studies	31 (32.0%)	36 (36.4%)	62 (61.4%)	129 (43.4%)
15.	Other institutes' websites	23(23.7%)	39 (39.4%)	55 (54.5%)	117 (39.4%)
16.	Foreign Journals	18 (18.6%)	32 (32.3%)	67 (66.3%)	117 (39.4%)
17.	Private sector institutes	36 (37.1%)	39 (39.4%)	24 (23.8%)	99 (33.3%)
18.	Institutional bulletins	22 (22.7%)	34 (34.3%)	43 (42.6%)	99 (33.3%)
19.	Project proposals	32 (33.0%)	31 (31.3%)	32 (31.7%)	95 (32.0%)
20.	Dissertations/thesis	22 (22.7%)	25 (25.3%)	42 (41.6%)	89 (30.0%)
21.	Visits to foreign countries	14 (14.4%)	20 (20.2%)	42 (41.6%)	76 (25.6%)
22.	Persuasive interviews	22 (22.7%)	27 (27.3%)	17 (16.8%)	66 (22.2%)
23.	Employ surveys	20 (20.6%)	15 (15.2%)	17 (16.8%)	52 (17.5%)

High use of news papers, magazines and TV, Radio programs is notable as these are the passive sources for getting new ideas. This is may be due to the fact that administrators' work is open-ended because they have to tackle with a wide range of issues, but also in the sense that many of the problems have no apparent closure in the short-term, their resolution having to unfold over time (Auster & Choo, (Eds.), 1996).

4.2.3. Language Preferred by the Respondents for Reading Material

The respondents were asked to mention the language preferred by them for reading materials. The results reveal that most of the respondents preferred English (147, 49.5) or both English and Urdu (82, 27.6%).

Table-4.7. *Frequency Distribution of Languages Preferred by the Respondents for Reading Material*

R	Language	School Admin.	College Admin.	University Admin.	Total
1.	English	30 (30.9%)	46 (46.5%)	71 (70.3%)	147 (49.5%)
2.	Both English and Urdu	29 (29.9%)	32 (32.3%)	21 (20.8%)	82 (27.6%)
3.	Urdu	34 (35.1%)	20 (20.2%)	8 (7.9%)	62 (20.9%)
4.	Missing	4 (4.1%)	1 (1.0%)	1 (1.0%)	6 (2.0%)

Only 62 (20.9%) respondents mentioned Urdu as the only preferred language.

It is evident from the results that the English was the most preferred language by University administrators (71, 70.3%). Frequency distribution is given in Table-4.7. Other local/regional languages were also mentioned by few of the respondents i.e., Arabic (n=4), Seraiki (n=2) Punjabi (n=2), and Persian (n=1). The preference for English by most of the respondents could be due to the reason that it is the official language of Pakistan. The reason of preferring Urdu is obvious that it is the National language of Pakistan.

4.2.4. Format Preferred by the Respondents for Reading Material

The results show that Print format was the most preferred format by the respondents (Mean= 2.62), while they preferred electronic (Mean=2.26) and audio/visual (Mean= 2.16) formats as well. Microform was the least preferred format by the respondents (Mean= 1.31). Group wise analysis of the results reveals that besides print, electronic format was also most preferred among university administrators (Mean= 2.55). Descriptive statistics are presented in Table-4.8. The preference for electronic format is encouraging to note and strengthen the idea of

introducing electronic resources and services in the prospective draft model of the information system.

Table-4.8. *Format Preferred by Each Category of Respondents for Reading Material*

R	Format	School Admin.	College Admin.	University Admin.	Cumulative Mean
		Mean	Mean	Mean	
1.	Print	2.55	2.68	2.62	2.62
2.	Electronic	1.96	2.23	2.55	2.26
3.	Audio / Visual	2.22	2.25	2.02	2.16
4.	Microform	1.33	1.37	1.24	1.31

Note: Most Preferred= 3, Preferred= 2, Less Preferred= 1

4.3. Information and Communication Technologies (ICTs) Used by the Respondents for Seeking Information

The respondents were asked to mention the Information and Communication Technologies (ICTs) being used by them for seeking information. The results show that telephone was among the most used technology by the respondents (237, 79.8%). The other most used technology was the Internet (174, 58.6%). The use of Internet was highest among university administrators (88, 87.1%) and lowest among school administrators (32, 33%). Atmospheric communication technologies (i.e. Radio/TV) were on the third place in ranking (163, 54.9%) and its use was higher among school administrators (66, 68%) than college and university administrators. Use of electronic mail (E-mail) technology was also good (129, 43.4%) especially among university administrators (76, 75.2%). The use of online chatting (35, 11.8%) and teleconferencing (20, 6.7%) was very low. Only one respondent mentioned the use of fax in response of any other technologies. Frequency distribution of acquired responses is given in Table 4.9.

Table 4.9. *Information and Communication Technologies (ICTs) Used by the Respondents for Seeking Information*

R	ICT	School Admin.	College Admin.	University Admin.	Total
1.	Telephone	82 (84.5%)	80 (80.8%)	75 (74.3%)	237 (79.8%)
2.	Internet (i.e. search engines, websites etc.)	32 (33.0%)	54 (54.5%)	88 (87.1%)	174 (58.6%)
3.	Atmospheric communication(Radio/T.V)	66 (68.0%)	57 (57.6%)	40 (39.6%)	163 (54.9%)
4.	E-mail	17 (17.5%)	36 (36.4%)	76 (75.2%)	129 (43.4%)
5.	Online chatting	12 (12.4%)	9 (9.1%)	14 (13.9%)	35 (11.8%)
6.	Teleconferencing	2 (2.1%)	6 (6.1%)	12 (11.9%)	20 (6.7%)

4.3.2. Internet Usage by the Respondents for Administrative Work

The reviewed literature highlights that Pakistan has sophisticated ICT infrastructure. According to the available statistics, as of March 2008, there were 17,500,000 Internet users (10.4% penetration, per ITU) in Pakistan and 128,700 broadband subscribers (per ITU) (Internet Coaching Library, 2008). Keeping these facts in views, the respondents were asked to mention about their Internet usage for administrative work. It is encouraging to find out that the ratio of Internet users was higher and more than half of the respondents (155, 52.2%) were using Internet for their administrative responsibilities. These statistics are different from earlier statistics given in Table 4.9; it shows that above statistics related to the Internet use could be for general use not particularly for administrative tasks. Respondents were further asked to mention the most used/accessed websites for administrative purpose. A fair categorization of these websites shows that that most accessed websites were related to education (52, 17.5%). The second category was of different search engines (51, 17.2%) i.e. Google and/or AltaVista. Anyhow Google was the most used search engine. The third category was of email services (28, 9.2%) i.e. yahoo, gmail and

hotmail. Databases subscribed by the Higher Education Commission (HEC) were used by only 20 (6.7%) respondents. Other websites were also mentioned by them, such as recreational and news related websites. Frequency distribution of different categories of most used/accessed websites is given in Table 4.10.

Table 4.10. *Frequency Distribution of Websites Most Used/Accessed by the Respondents*

Response	Frequency	Percentage
Education related websites	52	17.5
Search Engines	51	17.2
Email Services	28	9.2
HEC databases	20	6.7
Others	15	5.1

4.3.2. Respondents' Opinion About the Impact of Information and Communication Technologies (ICTs) on Information Seeking and Gathering Process

The respondents were asked to mention the impact of ICTs on information seeking and gathering process. Most of the respondents mentioned that ICTs had made this process easier (254, 85.5%). Only 22 (7.4%) respondents mentioned it as more difficult and only two (0.7%) as much more difficult. Whereas 16 (5.4%) respondents mentioned it as about the same. Frequency distribution of acquired responses is given in Table 4.11.

Table 4.11. *Frequency Distribution of Respondents' Opinion About Impact of ICTs on Information Seeking and Gathering Process*

R	Impact of ICT	School Admin.	College Admin.	University Admin.	Total
1.	Easier	75 (77.3%)	91 (91.9%)	88 (87.1%)	254 (85.5%)
2.	More difficult	14 (14.4%)	2 (2.0%)	6 (5.9%)	22 (7.4%)
3.	Much more difficult	0	0	2 (2.0%)	2 (0.7%)
4.	About the same	5 (5.2%)	6 (6.1%)	5 (5.0%)	16 (5.4%)

The descriptive statistics presented in Table 4.12 show that all the respondents from school, college and university sectors believed that ICTs had made information seeking and gathering process easier (Mean values are 3.69, 3.80 and 3.75 respectively). Cumulative mean 3.75 also shows agreement with the positive effect of ICT on information seeking and gathering process.

Table 4.12. *Descriptive Statistics of Respondents' Opinion About Impact of ICTs on Information Seeking and Gathering Process*

R	Respondents	Mini	Max	Mean	Median	Mode	S. D.
1.	School Administrators	1	4	3.69	4.00	4	.734
2.	College Administrators	1	4	3.80	4.00	4	.728
3.	University Administrators	1	4	3.75	4.00	4	.727

Note: About the same= 1, Much more difficult=2, More difficult=3, Easier=4

4.4. Information Needs of Educational Administrators and the State of its

Availability

Administrators are a distinct group of information users, whose information needs and information seeking preferences are largely conditioned by the demands and context of their work (Auster & Choo, (Eds.), 1996). Keeping this reality in view, it was tried to find out the administrative responsibilities for which educational administrators usually need information. Coming section uncovers the different aspects of their information needs and seeking behavior.

4.4.1. Different Administrative Tasks Performed by the School, College and

University Administrators

Respondents were provided with a comprehensive list of administrative tasks and were asked to mention the tasks they feel were related to their administrative responsibilities and for which they usually need information. Frequency distribution of cumulative and sector wise responses is presented in Table-4.13. The results show that most of the respondents were engaged with four categories of tasks, i.e. planning,

decision making, devising and implementing rules & procedures and teaching & research. It was found that most of the respondents who needed information for teachers'/staff's training were from school sector (74, 76.3%) followed by college sector (73, 73.7%). This need was very low among university sector administrators.

Table 4.13. *Frequency Distribution of Different Administrative Tasks for Which Information is Needed by the School, College and University Administrators*

R	Administrative Tasks	School Admin.	College Admin.	University Admin.	Total
1.	Planning	82 (84.5%)	88 (88.9%)	91 (90.1%)	261 (87.9%)
2.	Decision making	67 (69.1%)	66 (66.7%)	85 (84.2%)	218 (73.4%)
3.	Rules & procedures	76 (78.4%)	66 (66.7%)	75 (74.3%)	217 (73.1%)
4.	Teaching & Research	69 (71.1%)	69 (69.7%)	71 (70.3%)	209 (70.4%)
5.	Budgeting	78 (80.4%)	75 (75.8%)	52 (51.5%)	205 (69.0%)
6.	Problem solving	70 (72.2%)	69 (69.7%)	59 (58.4%)	198 (66.7%)
7.	Handling students' affairs	66 (68%)	73 (73.7%)	58 (57.4%)	197 (66.3%)
8.	Teachers/staff training	74 (76.3%)	73 (73.7%)	47 (46.5%)	194 (65.3%)
9.	Team work	65 (67%)	68 (68.7%)	61 (60.4%)	194 (65.3%)
10.	Staff development	67 (69.1%)	66 (66.7%)	60 (59.4%)	193 (65.0%)
11.	Official correspondence	56 (57.7%)	66 (66.7%)	68 (67.3%)	190 (64.0%)
12.	Government policies	76 (78.4%)	61 (61.6%)	52 (51.5%)	189 (63.6%)
13.	Day to day official activities	66 (68%)	54 (54.5%)	64 (63.4%)	184 (62.0%)
14.	Time management	65 (67%)	63 (63.6%)	55 (54.5%)	183 (61.6%)
15.	Curriculum development	64 (66%)	57 (57.6%)	60 (59.4%)	181 (60.9%)
16.	Monitoring	66 (68%)	65 (65.7%)	48 (47.5%)	179 (60.3%)
17.	Current affairs	64 (66%)	61 (61.6%)	47 (46.5%)	172 (57.9%)
18.	Controlling	66 (68%)	60 (60.6%)	37 (36.6%)	163 (54.9%)
19.	For seeking government grants	68 (70.1%)	47 (47.5%)	45 (44.6%)	160 (53.9%)
20.	Personal professional development	55 (56.7%)	58 (58.6%)	47 (46.5%)	160 (53.9%)
21.	Leadership roles	65 (67%)	47 (47.5%)	44 (43.6%)	156 (52.5%)
22.	Personnel evaluation	58 (59.8%)	48 (48.5%)	46 (45.5%)	152 (51.2%)
23.	Emerging new scenarios	51 (52.6%)	48 (48.5%)	43 (42.6%)	142 (47.8%)
24.	Fund raising	60 (61.9%)	50 (50.5%)	32 (31.7%)	142 (47.8%)
25.	Reducing uncertainty	54 (55.7%)	41 (41.4%)	42 (41.6%)	137 (46.1%)
26.	Building trust & goodwill	54 (55.7%)	50 (50.5%)	31 (30.7%)	135 (45.5%)
27.	Crisis management	53 (54.6%)	46 (46.5%)	29 (28.7%)	128 (43.1%)
28.	Forecasting	44 (45.4%)	42 (42.4%)	41 (40.6%)	127 (42.8%)
29.	Showing personal concern	46 (47.4%)	41 (41.4%)	27 (26.7%)	114 (38.4%)
30.	Growth of corporate culture	51 (52.6%)	35 (35.4%)	20 (19.8%)	106 (35.7%)
31.	To choose between alternatives	48 (49.5%)	27 (27.3%)	28 (27.7%)	103 (34.7%)
32.	Political Scenarios	42 (43.3%)	31 (31.3%)	26 (25.7%)	99 (33.3%)
33.	Marketing strategies	39 (40.2%)	26 (26.3%)	24 (23.8%)	89 (30.0%)

In Pakistan, universities are autonomous bodies and are independent in most of their decision making. This fact is reflected by the above results; university administrators mostly need information for the tasks which are related to planning and decision making rather than for routine matters. On the other hand school sector is far behind

in independent decision making, facilities and access to information, so their information needs for routine matters is higher than both the sectors. College sector falls between both the sectors in terms of facilities and access to information. Anyhow their need for information about handling the students' affairs is higher than other two sectors, which might be due to the teenagers who newly enter in the college sector.

4.4.2. Degree of Need and Availability of Different Type of Information for

Administrative Work

Respondents were asked to mention the degree of need and availability of different type of information for their administrative work. The ratio scale was used to assess the degree of need and degree of availability of information to educational administrators. The researcher executed the reliability analysis on the 4-point ratio scale used to assess the degree of respondents' information needs. The Cronbach alpha is 0.905 which is above than 0.8, so the scale is reliable. Similarly, reliability analysis was executed on the 4-point ratio scale used to assess the degree of availability of needed information to the respondents. The Cronbach alpha is 0.931 which is also above than 0.8, so the scale is reliable. Coming section presents the acquired responses according to their need and availability to the school, college and university administrators.

4.4.2.1. Degree of Need and Availability of Different Type of Information to School Administrators

According to the results, information related to education policy, leave, financial, pension and purchase rules, government grants, education codes/calendars of their own institutes, and staff development was most needed by the school administrators. Such information was to some extent available to school administrators. On the other hand information related to curriculum of Punjab/Federal Boards, student activities, personnel evaluation methods, Government of Punjab

employment rules, current data about educational developments, current trends in education, national comparison reports of different teaching programs & teaching methods, IT solutions for administrative work, personnel working behavior, market value of their school alumni, different options and alternatives related to administrative work, community perception about their school, evaluated and aggregated data about education, demographic data related to education, i.e., No. of schools, teachers, students etc., human relations, Government of Pakistan employment rules, competitors' strengths & weaknesses, employment rules of other provincial governments of Pakistan and rules of other private schools were to some extent needed by school administrators. The analysis of degree of availability of this information shows that information related to curriculum of Punjab Board, student activities, Government of Punjab and Pakistan employment rules, and human relations is available to some extent. Whereas, information related to other aspects is least available to school sector administrators. Only information related to politics at institutional and national level is least needed and available to school administrators. Descriptive statistics of degree of information need and its availability to school administrators are presented in Tables-4.14 to 4.16 (*Note:-* Table 4.14 to Table 4.26 and Figures 4.1 to 4.3 are attached as Appendix-M).

Figure-4.1 (See Appendix-M) graphically presents the difference between degree of need and degree of availability of different educational administration related information to school administrators. To see the significant difference between the means of degree of need and degree of availability of information to school, college and university sector administrators, further statistical procedure i.e., Paired Samples T-Test is used.

Paired Sample T-test is used to compare means on the same or related subject over time or in differing circumstances. The observed data are from the same subject

or from a matched subject and are drawn from a population with a normal distribution. Subjects are often tested in a before-after situation, or subjects are paired such as with twins, or with subject as alike as possible. The paired t-test is actually a test that the differences between the two observations is 0. So, if D represents the difference between observations, the hypotheses are:

$H_0: D = 0$ (the difference between the two observations is 0)

$H_a: D \neq 0$ (the difference is not 0)

The test statistic is t with $n-1$ degrees of freedom. If the p-value associated with t is low (< 0.05) or (< 0.01), there is evidence to reject the null hypothesis. Thus, the researcher would have evidence that there is a difference in means across the paired observations (TexaSoft, 2007). This test is used to compare the degree of need and degree of availability of information to each group of respondents.

The paired sample correlations point out that there is significant correlation between the degree of need and degree of availability, the use of Paired Samples T-Test is therefore, justified.

The Paired Samples T. Test indicates that there is significant difference between the means of degree of need and degree of availability of information to school sector administrators. All the pairs show significant difference (sig= .000). Thus it can be concluded that information need about different aspects (reported above) is much higher than its availability to school sector administrators in Punjab and ICT. ‘Paired Samples T-Test’ statistics are presented in Table 4.17 (See Appendix-M).

4.4.2.2. Degree of Need and Availability of Different Type of Information to College Administrators

Analysis of data related to college sector administrators reveals that they mostly needed information about current trends in education, purchase rules,

education policy, staff development, leave, pension, and financial rules, current data about educational developments, personnel evaluation methods, student activities, and human relations. The status of availability of this information is not very encouraging for the college sector administrators as well. Information related to current trends in education and current data about educational developments was least available to them. Whilst information related to purchase rules, education policy, staff development, leave, pension, and financial rules, personnel evaluation methods, student activities, and human relations was available to some extent to them.

Information related to government grants, personnel working behavior, Government of Punjab employment rules, different Options and alternatives related to administrative work, market value of their college alumni, national comparison reports of different teaching programs & teaching methods, education codes/calendar of their own college, research output of their college & faculty members, IT solutions for administrative work, evaluated and aggregated data about education, ranking criteria of colleges, competitors' strengths & weaknesses, demographic data related to education, i.e., No. of colleges, teachers, students etc., community perception about their college, Government of Pakistan employment rules, curriculum of other boards and universities, research output of other colleges & faculty members, politics at institutional and national level, rules of other boards and universities, employment rules of other provincial governments of Pakistan and education codes of other colleges were to some extent needed by the college administrators. Information related to government grants, personnel working behavior, Government of Punjab employment rules, education codes/calendar of their own college, and research output of their own college and faculty members was to some extent available to them. On the other hand information about different options and alternatives related to administrative work, market value of their college alumni, national comparison

reports of different teaching programs & methods, IT solutions for administrative work, evaluated and aggregated data about education, ranking criteria of colleges, competitors' strengths & weaknesses, demographic data related to education, i.e., No. of colleges, teachers, students etc., community perception about their college, Government of Pakistan employment rules, curriculum of other boards and universities, research output of other colleges & faculty members, politics at institutional and national level, rules of other boards and universities, employment rules of other provincial governments of Pakistan and education codes of other colleges was least available to them. Descriptive statistics of degree of information need and its availability to college administrators are presented in Tables-4.18 to 4.20 (See Appendix-M). Figure-4.2 (See Appendix-M) graphically presents the difference between degree of need and degree of availability of different educational administration related information to college administrators. To see the significant difference between the means of degree of need and degree of availability of information to college sector administrators, further statistical procedure i.e., Paired Samples T-Test is used. The paired sample correlations point out that there is significant correlation between the degree of need and degree of availability, the use of Paired Samples T-Test is therefore, justified.

The Paired Samples T. Test indicates that there is significant difference between the means of degree of need and degree of availability of information to college sector administrators. All the pairs show significant difference (sig= .000) (except 'politics at institutional and national level', sig= .003). Thus it can be concluded that information need about different aspects (reported above) is much higher than its availability to college sector administrators in Punjab and ICT. 'Paired Samples T-Test' statistics are presented in Table 4.21 (See Appendix-M).

4.4.2.3. Degree of Need and Availability of Different Type of Information to University Administrators

Information about competitors' strengths & weaknesses, education policy, research output of their university/faculty members, current data about educational developments, staff development, and government grants were most needed by university administrators. Information about competitors' strengths & weaknesses and Current data about educational developments was least available to them (Mean values are 2.28, 2.48 respectively), while information related to education policy, research output of their university/faculty members, staff development and government grants was to some extent available to them. On the other hand, to some extent they needed information about current trends in education, student activities, education codes/calendar of their own university, demographic data related to education, i.e., No. of universities, teachers, students etc., national comparison reports of different teaching programs & teaching methods, curriculum of other universities, personnel evaluation methods, ranking criteria of universities, market value of their university alumni, different options and alternatives related to administrative work, IT solutions for administrative work, leave rules, human relations, research output of other universities/faculty members, evaluated and aggregated data about education, community perception about their university, financial rules, personnel working behavior, purchase rules, rules of other universities, pension rules, Government of Pakistan employment rules, education codes of other universities, and Government of Punjab employment rules. The analysis of degree of availability shows that information about current trends in education, student activities, education codes/calendar of their own university, curriculum of other universities, ranking criteria of universities, leave rules, human relations, financial, purchase and pension rules, rules of other universities, Government of Pakistan and Punjab employment

rules was to some extent available to university administrators. Contrarily demographic data related to education, national comparison reports of different teaching programs & teaching methods, personnel evaluation methods, market value of their university alumni, different Options and alternatives related to administrative work, IT solutions for administrative work, research output of other universities/faculty members, evaluated and aggregated data about education, community perception about their university, personnel working behavior and education codes of other universities were least available to them. Information about politics at university and national level and employment rules of other provincial governments of Pakistan were least needed and least available to university administrators. Descriptive statistics of degree of information need and its availability to university administrators are presented in Tables-4.22 to 4.24 (See Appendix-M).

Figure-4.3 (See Appendix-M) graphically presents the difference between degree of need and degree of availability of different educational administration related information to university administrators. To see the significant difference between the means of degree of need and degree of availability of information to university sector administrators, further statistical procedure i.e., Paired Samples T-Test is used. The paired sample correlations point out that there is significant correlation between the degree of need and degree of availability, the use of Paired Samples T-Test is therefore, justified.

The Paired Samples T. Test indicates that there is significant difference between the means of degree of need and degree of availability of information to university sector administrators. There is no significant difference between the means of degree of need and degree of availability of 'Govt. of Punjab employment rules', sig= .138; and 'Politics at institutional and national level', sig= 1.000. All other pairs show significant difference at .000, except 'Govt. of Pakistan employment rules', sig=

.036; and Education codes/calendar of their own university, sig= .049. Thus it can be concluded that information need about almost all the aspects (except Govt. of Punjab employment rules and politics at institutional and national level) is much higher than its availability to university sector administrators in Punjab and ICT. 'Paired Samples T-Test' statistics are presented in Table 4.25 (See Annexure).

Table 4.26 (See Appendix-M) presents a comprehensive overview of degree of information needs and its availability to school, college and university administrators. Sector wise comparison of information needs and seeking behavior of all three groups (with Paired Samples T-Test) do not show major difference in their information needs and its availability, though university sector at some points seemed better in the availability of needed information. This fact also correlates with the fact mentioned in the reviewed literature that in Pakistan another problem faced by the policy makers and planners is the non availability of accurate data about educational outputs and outcomes. According to the World Bank Group-IEG (2007), trends in output indicators (enrollment rates) are available, but outcome trends (learning achievement and employment) are not.

4.5. Respondents' Opinion About the Development of a National Information System for Satisfying Their Information Needs

It is a fact that an educational information system is the basis of management, planning and evaluation of an education system. During the education management process, the information system can inform the different stakeholders on the state of the sector, its internal and external efficiency, its pedagogical and institutional operations, its performance, shortcomings and needs. In this perspective, the respondents were asked about the development of a national information system for satisfying their information needs. The name denoted to the prospective information

system is “*Pakistan National Information System for Educational Administrators (PAK-NISEA)*”. The results show that most of the respondents (98%) were strongly agreed (204, 68.7%) or agreed (87, 29.3%) with the idea of developing PAK-NISEA. Only one respondent showed disagreement with this idea and four (1.3%) did not express any opinion. The frequency of strongly agree was very high among college administrators (81, 81.8%) than school and university administrators and none of them disagreed with this idea. It indicates that most of the educational administrators from all three sectors were aware of the importance of developing a national information system for them. Frequency distribution of their responses is given in Table 4.27.

Table 4.27. *Frequency Distribution of Respondents’ Opinion About the Development of PAK-NISEA*

R	Opinion About PAK-NISEA	School Admin.	College Admin.	University Admin.	Total
1.	Strongly Agree	56 (57.7%)	81 (81.8%)	67 (66.3%)	204 (68.7%)
2.	Agree	37 (38.1%)	18 (18.2%)	32 (31.7%)	87 (29.3%)
3.	Don’t Know	2 (2.0%)	0	2 (2.0%)	4 (1.3%)
4.	Disagree	1 (1.0%)	0	0	1 (.3%)
5.	Strongly Disagree	0	0	0	0
6.	Missing	1 (1.0%)	0	0	1 (.3%)

Mean values (4.54, 4.82 and 4.68) presented in Table 4.28 show that all the respondents from school, college and university sector were strongly agree with the idea of developing PAK-NISEA.

Table 4.28. *Descriptive Statistics of Respondents' Opinion About the Development of PAK-NISEA*

R	Respondents	Mini	Max	Mean	Median	Mode	S.D.
1.	School Administrators	2	5	4.54	5.00	5	.597
2.	College Administrators	4	5	4.82	5.00	5	.388
3.	University Administrators	3	5	4.64	5.00	5	.521

Note: Strongly Agree= 5, Agree= 4, Don't Know = 3, Disagree= 2, Strongly Disagree= 1

4.5.1. Respondents' Opinion About the Objectives of Pakistan National Information System for Educational Administrators (PAK-NISEA)

The respondents were further asked to give their opinions about the objectives of the prospective information system. It was found that most of the respondents strongly agreed that the objectives of the proposed PAK-NISEA should be to provide the information with easy access, to provide update and current information in the field of education, training of educational administrators and to ensure availability of valid, reliable and needed information (Mean values are 4.66, 4.61, 4.56 and 4.53 respectively). At the same time they agreed with these objectives: training of other staff members i.e., teachers/information providers/librarians etc., to have linkage within educational institutes of the country, to provide information according to the administrators' specific needs, to develop and maintain an online full text database of educational documents related to administrators' information needs, to generate and maintain adequate media of information and to have linkage within educational information systems of the world (Mean values are 4.47, 4.46, 4.45, 4.40, 4.33, and 4.24 respectively). Descriptive statistics are presented in Table 4.29. Table 4.30 shows the means of opinion given by each category of respondents. These results supplement the idea that most of the respondents were aware of the importance of

sound reliable, valid and efficient information system to assist them in their administrative endeavors.

Table 4.29. *Descriptive Statistics of Respondents' Opinion About the Objectives of PAK-NISEA*

R	Objectives	Mini	Max	Mean	Median	Mode	S. D.
1.	To provide the information with easy access	1	5	4.66	5.00	5	.605
2.	To provide update and current information in the field of education	1	5	4.61	5.00	5	.601
3.	Training of Educational Administrators	1	5	4.56	5.00	5	.645
4.	To ensure availability of valid, reliable and needed information	1	5	4.53	5.00	5	.631
5.	Training of other staff members i.e., Teachers/Information Providers/librarians etc.	1	5	4.47	5.00	5	.689
6.	To have linkage within educational institutes of the country	1	5	4.46	5.00	5	.636
7.	To provide information according to the administrators' specific needs	1	5	4.45	5.00	5	.687
8.	To develop and maintain an online full text database of educational documents related to administrators' information needs	1	5	4.40	4.50	5	.715
9.	To generate and maintain adequate media of information	1	5	4.33	4.00	5	.800
10.	To have linkage within educational information systems of the world.	1	5	4.24	4.00	5	.875

Note: Strongly Agree= 5, Agree= 4, Don't Know = 3, Disagree= 2, Strongly Disagree= 1

Table 4.30. *Means of Respondents' Opinion About the Objectives of PAK-NISEA*

R	Objectives	School Admin.	College Admin.	University Admin.
		Mean	Mean	Mean
1.	To provide the information with easy access	4.55	4.72	4.72
2.	To provide update and current information in the field of education	4.46	4.71	4.64
3.	Training of Educational Administrators	4.52	4.67	4.50
4.	To ensure availability of valid, reliable and needed information	4.33	4.63	4.63
5.	Training of other staff members i.e., Teachers/Information Providers/librarians etc.	4.40	4.53	4.50
6.	To have linkage within educational institutes of the country	4.33	4.43	4.62

Table 4.30 (continued)

7.	To provide information according to the administrators' specific needs	4.36	4.47	4.52
8.	To develop and maintain an online full text database of educational documents related to administrators' information needs	4.26	4.44	4.48
9.	To generate and maintain adequate media of information	4.03	4.42	4.51
10.	To have linkage within educational information systems of the world	3.92	4.20	4.59

Note: Strongly Agree= 5, Agree= 4, Don't Know = 3, Disagree= 2, Strongly Disagree= 1

4.5.2. Respondents' Opinion About the Services to be Rendered by the PAK-NISEA for Educational Administrators

Respondents were also asked to give their opinions about the prospective services which should be rendered for educational administrators by the proposed information system- PAK-NISEA. All the respondents agreed that following services should be provided by PAK-NISEA: Training workshops, information for their specific needs on request (SDI), Online Digital Library of educational resources, News Letter, statistical data about education, Electronic Document Delivery Services, access to full text information, translation, online catalog, bibliographic services, verbal information provided by a scholarly persons, computer mediated communication (List serve & Discussion group), reprography/photocopy service, Intranet & portals, Wikis for encouraging user participation, Chat Reference Service and Abstracts & Indexes (Mean values are 4.49, 4.43, 4.42, 4.37, 4.36, 4.35, 4.30, 4.25, 4.21, 4.19, 4.16, 4.15, 4.14, 4.11, 3.86, 3.80 and 3.63 respectively). Descriptive statistics are presented in Table 4.31. Table 4.32 shows the means of opinion given by each category of respondents.

The results indicate that most of the proposed services were based on the remote access/online medium; thus respondents' agreement for these services shows their acceptance for online services. These findings also give strength to the idea of

Knowledge Environment Model for library network services in Asian perspective proposed by Gorman and Cullen (2000).

Table 4.31. *Respondents' Opinion About the Services to be Rendered by the PAK-NISEA*

R	Services to be Rendered	Mini	Max	Mean	Median	Mode	S. D.
1.	Training workshops	2	5	4.49	5.00	5	.703
2.	Information for your specific needs on request (SDI)	1	5	4.43	5.00	5	.685
3.	Online Digital Library of Educational Resources	2	5	4.42	5.00	5	.659
4.	News Letter	1	5	4.37	4.00	4	.651
5.	Statistical Data about education	2	5	4.36	4.00	5	.673
6.	Electronic Document Delivery Services	1	5	4.35	4.00	5	.705
7.	Access to full text information	1	5	4.30	4.00	5	.835
8.	Translation	1	5	4.25	4.00	4	.783
9.	Online Catalog	2	5	4.21	4.00	4	.674
10.	Bibliographic Services	2	5	4.19	4.00	4	.753
11.	Verbal information provided by a scholarly person	1	5	4.16	4.00	4	.866
12.	Computer Mediated Communication (List serve & Discussion group)	1	5	4.15	4.00	4	.811
13.	Reprography/photocopy	1	5	4.14	4.00	4	.801
14.	Intranet & portals	1	5	4.11	4.00	4	.764
15.	Wikis for encouraging user participation	1	5	3.86	4.00	4	.826
16.	Chat Reference Service	1	5	3.80	4.00	4	.823
17.	Abstracts and Indexes	1	5	3.63	4.00	4	1.042

Note: Strongly Agree= 5, Agree= 4, Don't Know = 3, Disagree= 2, Strongly Disagree= 1

Table 4.32. *Means of Respondents' Opinion About the Services to be Rendered by the PAK-NISEA for Educational Administrators*

R	Services to be Rendered	School Admin.	College Admin.	University Admin.
		Mean	Mean	Mean
1.	Training workshops	4.54	4.54	4.41
2.	Information for your specific needs on request (SDI)	4.28	4.49	4.52
3.	Online Digital Library of Educational Resources	4.15	4.43	4.67
4.	News Letter	4.28	4.40	4.43
5.	Statistical Data about education	4.14	4.45	4.47
6.	Electronic Document Delivery Services	4.21	4.38	4.45
7.	Access to full text information	4.15	4.45	4.29
8.	Translation	4.18	4.41	4.16
9.	Online Catalog	4.04	4.24	4.33
10.	Bibliographic Services	4.01	4.20	4.35
11.	Verbal information provided by a scholarly person	4.04	4.25	4.19

Table 4.32 (continued)

12. Computer Mediated Communication (List serve & Discussion group)	4.04	4.07	4.35
13. Reprography/photocopy	4.02	4.29	4.11
14. Intranet & portals	3.90	4.12	4.30
15. Wikis for encouraging user participation	3.68	3.97	3.92
16. Chat Reference Service	3.72	3.91	3.77
17. Abstracts and Indexes	3.72	3.60	3.56

Note: Strongly Agree= 5, Agree= 4, Don't Know = 3, Disagree= 2, Strongly Disagree= 1

4.6. Suggestions Provided by the Respondents

The respondents were asked to provide with their valuable suggestions as well. Of them, 85 (28.6%) respondents provided with their suggestions (See Table 4.33.). A qualitative analysis of the acquired responses is given in the coming section.

Table 4.33. Frequency Distribution of Respondents who Provided Any Suggestions

Suggestions Provided:	Frequency	Percentage
Yes	85	28.6
No	212	71.4
Total	297	100

The respondents suggested that an efficient information system is strongly needed for sound planning and decision making, so PAK-NISEA should be developed in reality. They further pointed out that if proposed system will be developed in reality it would boost the education sector of Pakistan up (n= 17). They recommended that PAK-NISEA should provide ICT training not only to educational administrators but to the teachers as well (n= 16) and services proposed in the questionnaire should be offered in reality (n= 6). According to the respondents, the proposed system may facilitate the constructive work, so it should provide not only update information about rules, regulations, and methodologies for their implementation but it should also provide action oriented solutions to educational administrators. It should supply information on status of educational policy and appraisal of its implication throughout the educational year, change in education policy, curriculum, board and university

decisions, and specific website links regarding the up-coming training workshops and seminars (n= 6). Training of educational administrators was also strongly recommended (n= 5).

They pointed out that although Internet is a good source for such services, such an information system in Pakistan would need improved Internet services and skilled staff (n= 4). They suggested that before developing such a system, information systems of other countries i.e. India, China etc. should also be studied. Personal interviews should be conducted with VCs, principals and directors of educational institutes. PAK-NISEA should be developed by keeping our cultural, social and geographical needs in view (n= 3). They stressed that educational administrators' (at micro level) suggestions should be considered in educational policy making process (n= 3), and special attention is required in school and college sector particularly in rural and remote areas (n= 2), where quality IT facilities are required. Not only this but computer education policy for the colleges should also be revised according to the contemporary requirements (n= 2). Free access to full text information (both print and electronic) should be provided for improving administrative skills (n= 2).

They suggested that for the successful implementation of PAK-NISEA, awareness should be created about the system. National and International conferences should be arranged for its promotion and orientation (n= 2). As administrators need up-to-date and accurate knowledge at the correct time for making correct decisions (n= 1), so available data should be valid and reliable (n=1), and all the educational institutes should be interconnected with each other (n= 1). The system should be implemented and outcomes should be measured and process of continuous improvement must be started by design (n=1). One respondent recommended that brief analysis of the study should be communicated to the participants of the survey.

4.7. Findings of the Chapter

Analysis of the data reported in this chapter reveals that administrators need information for performing different administrative tasks. These tasks varied from long term planning to daily and routine tasks. The sources most used for seeking information were informal and social and they perceived those sources as more reliable before making decisions and/or developing new plans. Status of availability of needed information to all three sectors is not encouraging though university sector seems slightly better in this regard. Thus it can be concluded that educational administrators in all three major education sectors are underprivileged in the availability of needed information, which is badly affecting the planning and decision making process. This fact is also traced from the open ended suggestions by the respondents and reviewed literature.

Respondents perceived that ICT has made information seeking and gathering process easier and it was encouraging to note that more than half of the respondents were using Internet for their administrative work. English was the most preferred language for reading material and print was the most preferred format though electronic and A/V were also among the preferred formats. The idea of developing Pakistan National Information System for Educational Administrators (PAK-NISEA) was strongly supported by the respondents along with all the objectives and proposed services. Many respondents also recommended that such a system should be developed in reality and they anticipated that it would boost up the education sector in the country.

Chapter 5

QUALITATIVE DATA ANALYSIS AND RELATED DISCUSSION

The basic objective of this study is to develop a draft model of information system for educational administrators in Pakistan after finding out their information needs, information seeking behavior and other preferences. The quantitative data reported in chapter-4 was an attempt in this direction. Most of the research questions listed here were answered in chapter-4 with quantitative data; however, qualitative data reported here try to fill the gaps of quantitative data. Here, again an attempt is made to correlate the qualitative data with survey results and reviewed literature.

This chapter aims at answering the following research questions with in-depth qualitative data:

RQ-2b. Which tasks are performed by the educational administrators?

RQ-2c. Which sources are used by the educational administrators in Pakistan for seeking needed information?

RQ-2e. What are the information needs of educational administrators?

RQ-2f. To what extent the needed information is available to them?

RQ-2h. What are the problems being faced by the educational administrators?

RQ-3b. What are the major findings of interviews of educational administrators and service providers i.e., librarians/information professionals and IS/IT experts?

RQ-3c. To what extent these findings support the evolving of a user friendly information system for educational administrators in Pakistan?

RQ-3e. Which agency can function as focal point both for the national educational information system of Pakistan and as a coordinator with international educational information systems?

RQ-3f. What should be the functions of a model information system for educational administrators?

RQ-3g. Which information services, products and programs can be proposed for the information system users?

For addressing these research questions, in total 55 experts from education administration, library and information science and computer science were interviewed. Of the 55 interviewees, 31 were library and information science professionals, 14 were educational administrators and 10 were IT and Information System (IT/IS) experts. Interviewees were selected according to the criteria mentioned in chapter-3. Interview contents were analyzed with the help of ‘*Spradley’s analytical model of ethnographic analysis*’ technique. Interviews of all the three categories are analyzed and reported separately in this chapter. Frequency distributions of interviewees are presented in Table 5.1. and Figure 5.1.

Table 5.1. *Frequency Distribution of the Interviewees*

R	Interviewees	Frequency
1	Library and Information Professionals	31
2	Educational Administrators	14
3	IT and Information System Experts	10
Total		55

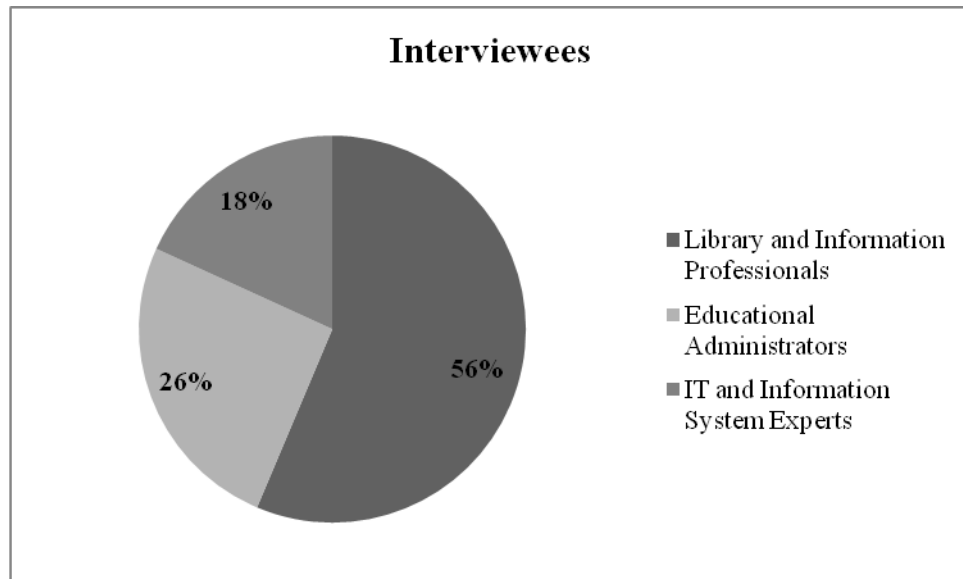


Figure 5.1. Percentage of Three Categories of Interview Respondents

Table 5.2. Frequency Distribution of Cities Where Interviewees Work or Reside

R	City	Frequency
1	Lahore	22
2	Islamabad	20
3	Bahawalpur	6
4	Multan	2
5	Gujrat	1
6	Kasur	1
7	Rawalpindi	1
8	Sargodha	1
9	Texila	1
Total		55

Most of the interviewees were from Lahore (n=22) and Islamabad (n=20). Other cities covered were Bahawalpur (n=6), Multan (n=2), Gujrat, Kasur, Rawalpindi, Sargodha, and Texila (n=1) (Table 5.2).

5.1. Interviews with Educational Administrators

Educational administrators selected for the interviews were from all three levels of administration i.e., macro, intermediate and micro levels. In total seven macro level administrators such as Senior Chief (Education) from Planning Commission Government of Pakistan (n= 2), Ex-Vice Chancellors (VCs) (n= 2), Ex-Director Generals (n= 2) and EDO (n= 1); four intermediate level administrators i.e., District Education Officers (DEOs) (n= 3) and Dean (n= 1); and three micro level administrators i.e., Principals (School & College) (n= 2) and Chairman (n= 1) could be available for personal interviews. Frequency distribution of educational administrators and their designations are given in Table 5.3.

Table 5.3. *Frequency Distribution of Educational Administrators and Their Designations*

Levels of Administration	Designation	Frequency
<i>Administrators Working at Macro Level</i>	Senior Chief (Education)- Planning Commission Government of Pakistan	2
	Ex-Vice Chancellor (VC)	2
	Ex-Director General	2
	EDO	1
<i>Administrators Working at Intermediate Level</i>	District Education Officer (DEO)	3
	Dean	1
<i>Administrators Working at Micro Level</i>	Principal (School & College)	2
	Chairman	1
Total		14

Questions asked were related to educational administrators' information needs, sources used for fulfilling their information needs, and performing different

administrative tasks, impact of ICT on their information seeking behavior, and problems faced in information seeking process. They were also asked to comment on the need of a National Information System for Educational Administrators in Pakistan and its services. Qualitative analysis of interview responses is as follows:

5.1.1. Roles and Responsibilities of Educational Administrators Define Their Information Needs

Most of the respondents mentioned that educational administrators' information needs depend on their roles and responsibilities (n=11). This fact is also pointed out by Auster & Choo (1996). They said that administrators are a distinct group of information users, whose information needs and information seeking preferences are largely conditioned by the demands and context of their work.

The interviewees mentioned that educational administrators (EAs) usually need information for planning (n=7), budgeting (n=7), decision making (n=4), personnel evaluation (n=1), daily correspondence (n=1) and overall management of educational resources (n=1). These findings also correlate with the results of quantitative data; in the previous chapter, following tasks got highest response: planning, decision making, Devising Rules & procedures, Budgeting and Problem solving. These tasks are also traced in the reviewed literature.

They further mentioned that the EAs mostly need information about faculty/staff's (n=8) and students' retentions, achievements and attitudes (n=8), available resources (n=6), government rules (n=6), political priorities/current affairs (n=5), financial rules (n=4), and opportunities/grants (n=3). They require qualitative literature on education i.e. research reports (n=3), curricula (n=3), statistical data (n=3), management techniques for time and crisis management (n=3), literacy rate (n=2), new trends in education (n=2), information about training programs (n=2),

means of communication with staff (n=1), pension rules (n=1), leave rules (n=1), current data about education (n=1), five years plans (n=1), ratio of institutions according to the population (n=1) and information about all stake holders (n=1). It was also stressed that they need reliable (n=1) and consolidated information (n=1) to fulfill their dynamic information needs (n=1). As an example, one administrator told:

“All kind of information will be needed which can help them in their planning and decision making. For example data on literacy rate, Gross and Net enrollment rate, drop out rate, human resources i.e. information about faculty at large, new trends in education in the country and across the globe, status about the available literature on education, curricula, students’ retentions, achievements and attitudes towards their studies” (Abdul Hameed).

The reviewed literature reveals the similar fact that information needs of educational administrators are different according to the level at which information users are operating (national or sub-national) and the type of decisions they take (planning and strategy, management and supervision, operational, recipients of programs etc), macro level (policy, planning, strategy development), intermediate level (management and control), and micro level (operations and recipients of programs). Educational policy makers and planners need information for an accurate analysis of the current situation and past trends to: a) define and quantify possible future developments; b) set development objectives; and c) define policies to be pursued to achieve these objectives. Program managers require information for planning, monitoring and evaluation of activities, resource allocation, and management of human resources. The project/course manager requires more detailed information on inputs, process and outputs of programs, detailed budgetary information, impact of the programs etc. Educators would also require information on educational and pedagogical issues (Auster & Choo, 1996; UNESCO, 2006).

5.1.2. Sources Used by the Educational Administrators to Obtain Information and Ideas for Planning, Decision Making and New Developments

Regarding the sources used for getting the needed information, the interviewees pointed out that educational administrators mostly use informal sources for seeking needed information (n=6) i.e. ask colleagues and peers (n=6), friends (n=5), assistant staff (n=5), use Internet (n=4) and internal documentary sources (n=3), ask senior experts (n=3) or visit the relevant place personally (n=3). They also get information through conferences (n=2), meetings (n=2), fieldwork (n=2), or use tacit knowledge (n=2). Sometimes they consult relevant government agencies (n=2). They fulfill their information needs through multiple ways (n=2) i.e. through telephone (n=2), media (n=1), computer databanks (n=1), use CCTV for real time data of employee activities (n=1). They also check policies (n=1), or ask students and parents (n=1). It was pointed out that formal sources are also used by the educational administrators (n=3) i.e., books, journals etc. (n=3), survey reports (n=2), proceedings (n=2) and library resources (n=1). Administrators also keep an eye on local and global scenarios (n=1).

The interview responses reveal that the educational Administrators use different sources to obtain information and ideas for planning, decision making and new developments. For example they use Internet/institutional websites (n=8), ask junior staff (n=6), and their seniors (n=5), use media (n=5) or rely on available literature and data (n=5). They also use other informal sources (n=4), i.e. ask friends (n=4), use insight developed through reading (n=3) and tacit knowledge/experience (n=3). They also get ideas by visiting other countries (n=3), sister/government organizations (n=3), from internal resources/circulars (n=3), through staff meetings

(n=3), interacting with people (n=2), and through deep thinking about the rapid changes (n=2).

They also get ideas through formal sources of information (n=2) but they do not use libraries for this purpose (n=2). It was also pointed out that generating new ideas requires very broad vision (n=1), concentration (n=1), personal observations (n=1), self effort (n=1), field visits (n=1), conferences (n=1), feedback from higher authorities (n=1), and analyzed field data (n=1). Most educational administrators do not generate new ideas (n=1). One EDO and DEO told that they use to get new ideas from:

“Field visits, feedback provided by the higher authorities and even by the assistant staff” (Abdul Rehman-EDO).

“They use newspapers, other institutes web sites, meeting minutes, conference proceedings, TV, Radio and Internet etc. for this purpose” (Ghulam Rasool-DEO).

The high preference for personal and informal sources of information was also traced from the reviewed literature and quantitative data (Chapter-4). According to Auster and Choo (1994), Alwis and Higgins (2001), Grosser (1991), and Katzer and Fletcher (1992), the EAs primarily rely on people they trust and other informal social networks.

5.1.3. Availability of Needed Information to the Educational Administrators

The interviewees pointed out that EAs' needed information is not easily available (n=5), if available then accessibility of the available information/data is a big issue (n=4). It takes too much time and effort in getting needed information (n=2). Easily available information is less reliable and is not organized properly (n=1). It was pointed out that few things are available in published form (n=1) but they do not use libraries (n=1) and no proper information system is available for them (n=1).

Educational officers' i.e. EDO or DEOs' information seeking process is a defined one (n=1). One university chairperson mentioned:

"For getting information they usually rely on their own resources, friends, peers, colleagues or contact with sister organizations. As I mentioned earlier they usually do not go to the formal information agencies i.e. libraries, archives or other such offices etc. Sometimes they contact government organizations for obtaining needed information" (Abdul Hameed).

Similarly one DG shared these comments:

"They mostly require demographic information, population information, legal rules, government grants, political scenarios etc. No their needed information is not easily available; if it is available then they are not aware about it. Mostly for their decision making they rely on their personal sources and experiences" (Habib Khan).

This fact also correlates with the fact mentioned in the reviewed literature that in Pakistan another problem faced by the policy makers and planners is the non availability of accurate data about educational outputs and outcomes (World Bank Group-IEG, 2007). Similarly, the quantitative data (Chapter-4) also found a gap in the availability of needed information to the EAs.

5.1.4. The Impact of ICT on Information Needs and Seeking Behavior of Educational Administrators

The respondents unanimously agreed that many educational administrators now use Internet (n=14) and ICT has made information seeking process easier (n=14). It was also pointed out that not all the people use Internet (n=6), although ICT skills can be enhanced through training (n=1). They were of the opinion that without ICT information management is difficult (n=1), so Internet should be available at least to administrators (n=1). Many department are connected through Internet (n=1), and government is now providing computers and labs to schools as well (n=1). Similarly many foreign agencies are giving funds for this purpose (n=1). One senior EA mentioned:

“Not all the people use Internet for administrative work, however now a great number of educational administrators has started its use. No doubt ICT has made information seeking and gathering process easier, efficient and cheaper. Availability of Internet at least to the administrators only should be assured for making information seeking process easier and efficient even for those who are sitting in remote and less developed areas. Thus they would become knowledge seekers because everyone has an inbuilt tendency and mechanism for seeking knowledge which should be activated through training” (Abdul Hameed).

The survey results (Chapter-4) also showed that more than half of the responded EAs (155, 52.2%) were using Internet for their administrative responsibilities. However, the general use of Internet among EAs was slightly higher (58.6%).

5.1.5. Problems Face by the Educational Administrators in Getting the Required Information

Many problems were indicated by the interviewees. For example, available information is not valid and reliable (n=7), relevant information is difficult to get (n=7), neither any information system is available (n=6), nor any trained staff (n=5). It was mentioned that they have to rely on available statistics (n=4) but personalization of information due to bureaucratic mindset is another barrier in getting the available information (n=4).

Due to the influence of information age, the information is overloaded and scattered (n=3) and administrators are not trained in its retrieval (n=3). Sometimes school/college principals and DEOs provide information to higher authorities on their own expenses (n=2) and no proper facility is provided to them (n=2). There is no coordination among all the stakeholders of educational data (n=2), and they lack condensed information (n=1). Trained IT staff do not stay on job for long (n=2), which is a threat to the sustainability of already developed information systems (n=1).

In such circumstances access to relevant information is difficult (n=1). One senior EA shared the following statement:

“Availability of valid and reliable information is a big problem for administrators. Sometimes they know that provided statistics are not accurate but they have no other choice. If an administrator is responsible then he would try to confirm him/her self from other sources as well. Otherwise no proper channel/system is available to facilitate them” (Inamul Haq).

Most of the problems indicated by the interviewees are also reported in the reviewed literature such as non-availability of data about educational outputs and outcomes; lack of training programs for educational administrators and poor information infrastructure (Horton, 2005; Pakistan Coalition for Education, 2006; World Bank Group-IEG, 2007).

5.1.6. Need of a National Information System for Educational Administrators in Pakistan

All the interviewed educational administrators agreed and stressed that a National Information System for Educational Administrators should be developed in Pakistan (n=14). They mentioned that all three tiers/levels of education i.e. schools, colleges and universities should be integrated with each other (n=5). They suggested that separate modules for each sector should be developed and then integrated with each other (n=2) and the system should be reliable and all encompassing (n=2). The use of available resources/networks (n=2) and government cooperation for its real development (n=2) was also emphasized.

They stressed that such systems are available in developed world and working successfully (n=2), so with proper planning (n=1), international standard systems can be developed in Pakistan as well (n=1), and it would make administrators' work easier (n=1). They recommended that tacit knowledge should also be preserved (n=1) and

research studies should also be provided (n=1) through this system. It was also pointed out that NEMIS is not an information system in real sense (n=1). The quotes of one Ex-VC and Chief of Education from Ministry of Planning (NPC) are given below:

“Yes it is strongly recommended and as you asked, off course all three levels i.e. school, college and university sector should be integrated through PAK-NISEA model. There are many information systems in the developed world which provide the information from the Montessori level up to the higher education level. I think we should have a national information system, which would have international perspective. This is a lame excuse that information system of international standards cannot be developed in Pakistan. I think such a system is the need of the hour if we have to survive in this global village” (Karamat Ali).

“Yes, definitely I strongly favor the development of PAK-NISEA. It would be a great help for boasting the education sector of Pakistan. When we will have reliable information system, the planning efforts will be more realistic and effective. Such a system should be available which will integrate all three tiers of education and will be accessible through a single interface. Separate systems are available but they are not coordinated with each other. So a system is needed which will coordinate already existing resources and information systems. Try to think on its different aspects and plan different steps for the sustainability of the system” (Talib Hussain).

The quantitative results (Chapter-4) also show that most of the respondents (98%) agreed with the idea that a national information system for educational administrators should be developed in Pakistan.

5.1.7. Services that Should be Offered Through the Proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)

The respondents recommended that Internet based services should be offered through this system (n=7). Similarly end-user training (n=7), online database (n=5), reliable and valid information (n=4) and condensed reports/summaries/abstracts/ (n=3) should be provided quickly (n=3). They stressed that services should be based on end users' need analysis (n=3). Services like tacit knowledge of seniors (n=2),

conferences and seminars (n=2), SDI, CAS (n=2) with full text contents (n=2), qualitative and quantitative data (n=1), manuals (n=1), hybrid data access (n=1) and Wikis for interactive communication (n=1) should be provided. They stressed that services should be of international standard (n=1) with proper facility to use these services (n=1). It was pointed out that information can also be provided on phone (n=1), though education sector do not have readymade solutions (n=1). Similarly, Auster and Choo (1996) mentioned that administrators' work is open-ended because they have to tackle with a wide range of issues, but also in the sense that many of the problems have no apparent closure in the short-term, their resolution having to unfold over time.

Executive District Officer (EDO) and District Education Officers (DEOs) mentioned that the idea of full remote access to e-resources through dedicated Internet links will work in Pakistan. They mentioned that now government is making serious efforts in this regard by providing computers and IT staff to every school and college. According to them, thousands of computer labs are being developed in each district (n=4). For example, three administrators mentioned:

“Yes, it will work. Now government has decided to provide at least 15 computers in secondary and higher secondary schools even in rural areas as well. A trained IT teacher or assistant would also be provided at each institute. So there would be no more issue of lack of ICT facilities and training etc. Administrators would have no other choice rather than using it” (Abdul Rehman Malik).

“Why not, off course, it will work. Now there are big grants for computer labs in secondary schools even in villages. Now each principal will definitely use it. I mean him/herself or with the help of computer staff” (Ghulam Rasool Akhtar).

“Regarding the possibility of use of e-resources in remote and rural areas, it is not a problem now. We have planned and even advertised in the news papers that each secondary and higher secondary school will be provided with 15 to 20 computers along with an IT teacher. So this idea is workable now in Pakistan” (Qazi Khalid Farooq).

This fact also supplements the facts and figures provided in the reviewed literature (Chapter-4) that a sophisticated ICT infrastructure now exists in Pakistan (Shafique & Mahmood, 2008) and Internet facility is available in 2389 cities and towns, of which 1433 are in the Punjab Province, 561 in the North West Frontier Province (now known as KPK), 244 in the Sindh Province, while 151 are in the Baluchistan Province (Pakistan, Federal Bureau of Statistics, 2008).

5.2. Interviews with Library and Information Professionals

Most of the information professionals selected for the interviews were chief librarians (n=14) in university libraries or library managers/sr. librarians/ deputy librarians (n=9) in different libraries. Four interviewees were Chairmen/HODs in LIS departments of different universities, two were working as Director Generals (DGs) and two were professor/assistant professors (Table 5.4).

Table 5.4. *Frequency Distribution of Information Professionals and Their Designations*

R	Library/Information Professionals	Frequency
1	Chief Librarians	14
2	Library managers/sr. librarians/ deputy librarians	9
3	Chairman/HOD	4
4	Director General (DG)	2
5	Professor/Asst. professor	2
Total		31

Library and information professionals were asked to highlight the different aspects of information needs of educational administrators and explain how their

information needs can be fulfilled. They were also asked about the different aspects related to the need and development of a national information system for educational administrators in Pakistan. Coming section presents the qualitative analysis of acquired responses.

5.2.1. Information Needs of Educational Administrators and Their Roles and Responsibilities

Library and information (LIS) professionals were asked to point out the information needs of educational administrators (i.e., school & college principals, heads of Departments, deans and registrars, EDOs etc.). Like the reviewed literature and interviewed educational administrators, the LIS professionals mentioned that EAs are a distinct group of information users, whose information needs and information seeking preferences are largely conditioned by the demands and context of their work (n= 10). Similarly, most of the tasks mentioned by the LIS professional were also traced in the reviewed literature, quantitative data and interviews with EAs. For example, LIS professionals opined that EAs need information for budgeting (n=7), planning (n=6), routine matters/daily correspondence (n=6), decision making (n=6), staff development (n=5), Human Resource Management (HRM) (n=5), controlling (n=3), teaching and research (n=3), forecasting (n=2), monitoring (n=2), personnel evaluation (n=2), quality control of education (n=1), scheduling of future plans (n=1), personal professional development (n=1), time and crisis management (n=1), new development programs/projects and other academic activities (n=1). For example two information professionals mentioned:

“Information needs of educational administrators depend on the type of job they are engaged with. Mostly they need information about available resources, institutional rules, regulations, and etc. They also need information for their routine correspondence, about their own roles and responsibilities, their duties downward and upward. In fact they need information for

performing their duties in a better way. Lack of information and/or ignorance of laws may cause great disaster” (Kanwal Ameen).

“Mostly to fulfill their information needs they rely on different resources. For example, sometimes they do come to the library and librarian but most of the time they consult the Internet and relevant staff to which the data is associated i.e., registrar office, treasurer office, examination office, Planning and development division etc. To facilitate the educational administrators, GCU have a System Analysis Office (SAO), Financial Aid Management System etc. But there is no integrated system to facilitate the educational administrators in a convenient way at national level” (Abdul Waheed).

5.2.2. Sources Used by the Educational Administrators for Fulfilling Their Information Needs

Interviewed LIS professionals opined that most of the educational administrators rely on internal documentary resources, rules, policies etc. (n=18). As no formal source exists for fulfilling their information needs, so they use informal methods/social networks (n=12). They mostly use Internet (n=6), newspapers/journals/magazines (n=5), media channels (n=3), ask their assistant staff (n=3), use related institutions’ websites or consult government institutes for needed information (n=2). They also use their tacit knowledge/experience for handling the administrative tasks (n=2).

They usually need information about government rules, regulations and policies (n=21), new trends in education (n=9), statistical and qualitative data related to education (n=9), status of available resources and financial grants (n=8), curricula of other universities (n=7), current affairs (n=5), information about faculty, alumni information and institutional ranking criteria (n=4), competitors’ information (n=3), rules, codes and calendars of other institutes and other information about competitors (n=3), and sponsors or priorities of higher authorities (n=2). They ask for education policies (n=2), standards (n=2), proceedings (n=2), reports etc. (n=2). They need resources which can help in other administrative tasks (n=2) i.e. master academic

records, space data, transportation data, and accreditation information (n=1). One information professional said:

“Unluckily there is no comprehensive source for fulfilling the information needs of educational administrators in Pakistan. Neither any comprehensive source nor any manual is available, which can guide to their needed information resources. Even in their personal offices the information is not properly organized and sometimes it becomes difficult to find out a simple letter because there is no mechanism for retrieval. Libraries are less used for this purpose. No formal method exists, so they use informal methods i.e. they mostly ask their peers, colleagues, and use social networks etc. There should be a formal method and source, which will provide easy access to the information and will satisfy the information needs of educational administrators. Even the tacit knowledge of the predecessors should also be managed for the successors. As you asked about the development of a National Information System, yes it should be developed and it is strongly recommended for easier access to the required information” (Khalid Mahmood).

Reviewed literature, quantitative data and interviews with EAs and LIS professionals reveal that EAs prefer sources that they perceive to be reliable, of high quality and that provide relevant information. Among the wide range of sources being used by them, internal and personal sources appear to be more important than external and impersonal sources. Many researchers believe that administrators’ source preferences have not changed over the years and they primarily rely on people they trust and other informal social networks (Auster & Choo, 1994; S. M. de-Alwis & Higgins, 2001; Grosser, 1991; Katzer & Fletcher, 1992).

5.2.3. Use of Libraries by the Educational Administrators

Library and information professionals mentioned that administrators’ information needs are not related to the library so they rarely visit the library (n= 21). Although library can provide great help in this regard either through its own resources or through Inter library loan or by referring to other libraries or information agencies (n=11). It was suggested that trained information professionals can play proactive role

(n=5) and resources of National Library of Pakistan and National Archives of Pakistan should be utilized for this purpose (n=3). It was also pointed out that only libraries cannot fulfill all the information needs of educational administrators and there is no liaison between information professionals and educational administrators (n=3); all type of information resources can be utilized for fulfilling educational administrators' information needs, so information professionals should change their attitude in this regard (n=3). For example one library chief pointed out:

“Mostly the education administrators use Internet or other sources for seeking their required information. They rarely come to the library. For administrative information needs they usually ask for Newspaper clippings, Government policy documents, information related to grants and scholarships and university/college ranking criteria etc.” (Ajmal Khan).

Choo (n.d) has identified the same trend and mentioned that very few chief executives personally use the institutional library and online database services.

5.2.4. Gaps in the Provision of Needed Information and Need of a National Information System

The gap in the availability of needed information to the EAs identified in the reviewed literature, quantitative data (Chapter-4) and interviews with EAs was also pointed out by most of the LIS professionals. They mentioned that unluckily neither any comprehensive source is available for fulfilling the information needs of educational administrators in Pakistan, nor any manual is available, which can guide to their needed information resources (n=30). Even in their personal offices the information is not properly organized and sometimes it becomes difficult to find out a simple letter because there is no mechanism for information retrieval (n=2).

All the respondents (n= 32) unanimously pointed out that there should be a formal method and source, which will provide easy access to the information and will satisfy the information needs of educational administrators. They stressed that a

national information system should be developed to facilitate the educational administrators.

They recommended that tacit knowledge should also be preserved in the proposed information system (n=3) and seminars and workshops should be arranged for creating awareness and training (n=3). User specific services should be designed and Information and Communication Technologies (ICTs) can help in information provision (n=3); for example, online reference services, links to related web sites, and indexes and catalog of available sources (n=2). It was also stressed that efforts should not be duplicated and needed information should be provided without wasting the time (n=2). The barriers in the provision of needed information is its non availability through commercial channels (n=1) and the reliability and validity of available information (n=1), so as a solution, the information should be gathered and standardized at national level (n=1). Another library chief said:

“Currently there is no liaison between information professionals and educational administrators. This liaison should be developed for properly fulfilling their information needs” (Muhammad Anwar).

5.2.5. Factors Needed to be Considered, While Designing Pakistan National

Information System for Educational Administrators (PAK-NISEA)

Information professionals highlighted different factors which they perceived should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA). For example, skilled manpower (n=23), financial resources (n=22), IT infrastructure & resources (n=19), proper planning of the project (n=13), need analysis of end users (n=12), training of personnel and end users (n=12), political instability and bureaucratic mindset (n=11), local environment and ground realities (n=8), issues related to information i.e. quality of contents, format etc. (n=7), utilization of existing resources (n=7), careful and systematic data

collection and processing (n=6), development of the project in phases (n=5), bandwidth and other access issues (n=5), user-friendly information provision environment (n=4), creation of awareness at local and national level (n=4), up-dating of information (n=3), executive body for the management of the system (n=3), private sector help for system development (n=3), exploration of foreign systems (n=3), development and integration of separate modules and access through single interface (n=3), physical resources (n=3), copy right and other legal issues (n=2), cooperation and coordination among all the stakeholders (n=2), multilingual system (n=1), overall management and maintenance of the system (n=1), and meeting the international standards (n=1). It was also suggested that proposed PAK-NISEA should be a combination of MIS (Management Information System) and digital repository of routine tasks, reports, research studies, tacit knowledge resources, demographic facts and figures about education etc. (n=1). The quote of one information professional is as follows:

“First of all their information needs should be assessed. Training should be given to information providers. How the information will be gathered, organized and accessed, whether the users will feel easy with new ICTs, contents for different categories of users and what will be the organizational structure of the proposed system” (Anwar Ejaz).

5.2.6. Status of the Existing Information Services/Information Systems

Respondents pointed out that resources are available but not in integrated form (n=10). Most of them were of the opinion that available sources and networks can be used for this purpose. For example, HEC resources, i.e. PERN, National Digital Library, ETDs etc. (n=19), education related resources of all types of libraries i.e. academic, public, federal and provincial assembly libraries (n=12), National and provincial archives (n=10), resources of Academy of Educational Planning and Management (AEPM) i.e. NEMIS (n=10), and Ministry of Education and Planning

Commission of Pakistan (n=10), resources available through Internet (n=5), institutional websites and portals (n=4), different Information system i.e. PASTIC, NADRA, E-government (n=4), research output of educational institutes (n=3), resources of UNESCO, World Bank and Asian Bank related to Pakistan (n=2) and resources collected by EDO offices (n=1). For example, one library director mentioned:

“No single platform is available in the field of education as it is available in some other fields i.e. Science and Technology field for example PASTIC, PMDC, Pakistan Engineering Council. HEC has made some efforts, which can be utilized. Cooperative efforts are needed in this regard” (Mian Ramzan).

5.2.7. Information Acquisition and Processing Mechanism for PAK-NISEA Model

Most of the respondents agreed that the PAK-NISEA Model should be based on “Centralized Processing Supported by Web based Environment” (n= 29). They argued that modern systems are built centrally; hence are easy to manage, update, and upgrade. Another benefit of central processing is that it can be accessed by various users at a time and information can be updated in real-time. Multiple users can input the data in the system easily. Centralized processing is most economical than the decentralized processing. At district level their nodal points/ coordinating offices can be developed for the collection/acquisition of statistical data and other related information sources however other functions can be performed at the center i.e. standardization of information should be done at the center by a team of experts. It will facilitate the availability of expert and skilled manpower at one place and it will be easy to manage them. Government officials should collect the data for this purpose from different schools, colleges, universities, HEC, related ministries, libraries, archives and other agencies (n=10). It was also suggested that the system should be developed in phases and end users should be involved in information gathering and processing as the banks are doing (n=2). Only two respondents opined that it should

be decentralized (n=2) but it may be switched towards centralization at later stage (n=1). One information professional suggested:

“Internal repository can be developed at each nodal point. I mean the district level nodal points will digitize their own data relevant to educational administrators and can be stored in the repository and such different district level repositories can be integrated with each other. Thus it would be centralized processing. Each university, college and school should start automating their routine tasks and managerial tasks thus it would be easier to collect them at a main stream” (Mirza Naseer).

5.2.8. Workability of Idea “Full Remote Access to E-resources (i.e., most materials in e-format) Through Dedicated Internet Links” in Pakistan

Most of the respondents perceived that the idea of full remote access to e-resources through dedicated Internet links will work in Pakistan (n=28), because there is rapid change in people’s behavior and it is already working in some other cases. People are now easily using the mobile phones and Internet even in remote areas. We can see many examples of remote access i.e. Raabta Ghar (Village Tele-centers), Kudo etc., DSL connections are now available at most of the places, Internet rates are becoming cheaper day by day and number of Internet users in Pakistan is increasing very rapidly. Now we can see that many Internet cafés are working even in rural/remote areas. Many studies of the recent years show that use of Internet and e-resources is increasing day by day in Pakistan. It means to introduce this idea in Pakistan is not far from reality. Although in the beginning it would be difficult to digitize all the resources but with the passage of time when we will have all resources in digital form, it will become easier to access them. Many equalizers are now available, which can be used for providing the remote access (n=17). So infrastructure is available only attitudes should be changed. Training and awareness campaign will be needed especially for the remote areas (n=12). Some of them mentioned that it will

take some time (n=3) and without proper IT infrastructure and electricity supply (n=3), it will not be possible in near future (n=2).

It was suggested to adopt the hybrid approach (electronic and print resources) in the beginning (n=3) or initially CD/DVD version of some (selected) information can be released simultaneously, thus the information could be used in any unusual condition (n=1). One respondent stressed that if higher authorities will be determined to implement it then it would not be impossible. The quote of one information professional was as follows:

“It would work although not very easy. I think people will not feel easy in the beginning but with proper training, orientation, and user friendly infrastructure it can work in Pakistan” (Mirza Waseem).

The need for proper training was also pointed out during the interviews of EAs. Similarly, reviewed literature also highlights this need. According to Pakistan Coalition for Education (2006), very few efforts were made by the government for educational administrators’ training and development in the current age of information technology. National Secretariat of Pakistan Coalition for Education (PCE) organized a seminar in which educational administrators from public and private schools stressed on the need of their training.

5.2.9. Services Needed to be Offered Through the Proposed PAK-NISEA

Respondents suggested different services for PAK-NISEA. For example, SDI, CAS (n=17), full text database (n=16), indexing and abstracting services (n=14), email alerts (n=11), information literacy programs (n=10), Document Delivery Service (DDS) (n=9), chat reference (n=8), multimedia and hybrid data (n=8), seminars and training workshops (n=7), user friendly interface and services (n=7), Wikis/blogs/RSS Feeds (n=5), maintaining users’ profiles (n=5), list serves (n=4), links to related online resources (n=4), e-services of international standard (n=4), new

arrivals' alert (n=3), Inter Library Loan (ILL) (n=3), Web 2.0 services (n=2), directory of educational administrators in Pakistan (n=2), OPAC (n=2), article alert (n=2), expert opinion (n=2), ETDs (n=1), search engines (n=1), FAQs (n=1), bibliographic services (n=1), customized reports (n=1), and user manuals (n=1). It was pointed out that both qualitative and quantitative data should be available (n=1) and tacit knowledge should also be preserved for the help of young administrators (n=1). One information professional suggested:

“Personal profiles of the end users should be developed esp. about their areas of interest etc. many services can be developed like List serves, SDI, CAS, online reference service. Scrolling links of relevant resources and history of most used links etc.” (Maqsood Shaheen).

It is evident from this analysis that all the services proposed by the information professionals are new, up to the date and user centered. This also highlights the change in the trend of information service provision in Pakistan. Like the quantitative data (Chapter-4), these findings further strengthen the idea of *Knowledge Environment Model* for library network services in Asian perspective proposed by Gorman and Cullen (2000).

5.2.10. Focal Agency and Proposed Structure of PAK-NISEA Model

All the library and information professionals suggested that Ministry of Education should be the parent organization of proposed PAK-NISEA (n=31). It was stressed that there should be an executive body/board (n=24) and all the stake holders should be member of the executive body (n=13). In their opinion Federal Government should monitor the system up to district level (n=11) but Provincial Governments should also be involved for proper monitoring at provincial and district level (n=11). Other institutes can also coordinate with the system i.e. HEC (n=8), Ministry of Information Technology, Planning Commission of Pakistan, Ministry of

Communication (n=4), AEPM (n=2), Provincial educational ministries, Provincial IT Boards, DPI & EDO offices, Directorate of Schools, and Education Boards (n=2). They suggested that available resources and institutes should be utilized rather than developing a complete new infrastructure (n=4). PASTIC and NADRA model should be followed (n=3) and private sector's help should be sought for its development (n=3). Development of institutional repository in each district was also recommended (n=1). For example, one female information professional said:

“Ministry of Education should be its parent body. There should a board or body which should handle it. Different people should be its members for example education planners, government policy makers, educational administrators from school, college and university sectors, IT and information dissemination experts etc. It should be controlled by the federal and provincial governments with clear division of roles and responsibilities” (Mamoona Kousar).

5.2.11. Finance for PAK-NISEA

The respondents were of the opinion that finance should be provided by the Federal Government only (n=26). Few of them opined that Provincial Governments should also contribute their share in the funds (n=17). They were also in favor of foreign funds (n=22) and fee based services (n=18). The suggestion of an LIS professor was as follows:

“Finance should be provided by both federal and provincial governments. Funds generation is not an easy task. For fund raising, fee-based services can also be provided but only to the private sector. Funds can also be generated through foreign grants. In this regard UNESCO can be a good source” (Fazil Khan).

5.3. Interviews with IT Professionals/Information System Experts

For in-depth understanding of technical aspects of the study, few IT and Information System (IT/IS) experts were also interviewed from different well known institutes (n=10).

Table 5.5. *Frequency Distribution of Information System/IT Experts and Their Designations*

R	Information System Experts	Frequency
1	Software Engineer	4
2	Chairman IT Deptt.	2
3	Director IT Deptt.	2
4	DG (PASTIC)	1
5	Lecturer	1
Total		10

Of the respondents four were working as soft engineers, two as chairmen of the university departments, two as Directors of IT directorate/cell of the universities, one as Director General (DG of PASTIC) and other as a university lecturer. Frequency distribution of respondents is presented in Table 5.5.

5.3.1. Need and Benefits of Pakistan National Information System for Educational Administrators (PAK-NISEA)

The need and importance of an information system is evident from reviewed literature, quantitative results and current interviews. Such a system allows managers/administrators at all levels in all functions to make timely and effective decisions for planning, directing, and controlling the activities for which they are responsible (Lucey, 1995). So, all the information system experts unanimously agreed that Pakistan National Information System for Educational Administrators (PAK-NISEA) should be developed (n=10), because it will facilitate the educational administrators (n=7) and no planning is possible without realistic data (n=6). It was stressed that we are lacking such a system (n=4) and it is a great proposal (n=3). They suggested that Ministry of Education should help in this regard (n=2). They stressed that the basic

objective of such a system should be to provide real time access (n=1) to valid and reliable data (n=1). One senior IT/IS shared the following statement:

“Obviously there is no question/debate regarding the establishment of an information system at national level for educational administrators. Definitely there should be a NIS not only in education but in other areas as well. There exist different information systems ranging from the Management Information Systems to Specialized Information Systems designed in a way to help the core management of those organizations. These systems not only help in decision making but minimize the efforts of the policy makers as well because the information retrieval is fast. Efforts can be minimized while using these Information Systems. So a proper national information system for educational administrators is must” (Aurangzeb).

5.3.2. Important Factors Needed to be Considered in Designing Pakistan National Information System for Educational Administrators (PAK-NISEA)

Like LIS professionals, IT/IS experts also point out many factors which should be considered while designing PAK-NISEA. Most of the factors mentioned are similar to those mentioned by the LIS professionals and the reviewed literature. The IT/IS experts highlighted the following factors: skilled manpower (n=8), IT infrastructure & resources (n=8), finance (n=7), training of personnel and end users (n=6) and access (n=4). Other factors were also pointed out like political instability and bureaucratic mindset (which may create hurdle in data sharing) (n=2), issues related to information i.e. quality of contents, information sharing standards, format etc. (n=2), physical resource mapping (n=2), assigning nodal points (n=1), proper segmentation (n=1), IT enabled and IT literate users (n=1), coordination among all the stakeholders (n=1), overall management and maintenance of the system (n=1), government support (n=1), development and integration of separate modules through single interface (n=1), and user friendly information provision environment and interface (n=1).

It was also pointed out that PAK-NISEA should be developed in phases and at first focus should be on basic needs (n=7). Needs of educational administrators should be analyzed (n=4). Objectives of the PAK-NISEA should be clear and accordingly it should be planned and evaluated (n=3). It was suggested that foreign information systems should be explored (n=1) and Geographical Information System (GIS) can be used for institutional mapping (n=1); Pakistan has reasonable IT infrastructure (n=1) only awareness should be created at local and national level (n=1). The suggestion of one IT/IS expert was as follows:

“Many factors should be considered i.e. trained manpower, finance, IT infrastructure throughout the country. I would like to suggest that Geographical Information System (GIS) should also be used for this purpose, as it is a practice in many developed countries. One simply would login in a GIS and by clicking on a specific location/area he/she would be able to find out number of schools, colleges, students, teachers ratio etc in that area. I would like to add the example of an Indian Information System entitled “Silicon Valley” developed for farmers and milk sellers. We also have reasonable IT infrastructure in the form of satellites, mobile phone networks etc. Similarly many efforts were made by the government of Pakistan as well to provide such facilities to the remote areas as well in the form of tele-centres (i.e. Raabta Ghar etc)” (Mushahid Anwar).

5.3.3. Integration of All Three Tiers/Levels of Education i.e., Schools, Colleges and Universities Through a Single Interface

The respondents were asked about the possibility of integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface. They mentioned that all three level of education can be integrated (n=8) but it is not an easy task (n=3), though such examples exist but those systems developed gradually (n=2). Few of them mentioned that it is possible with object oriented techniques (n=1), it would be like data warehousing schemes (n=1), and a centralized database can be developed with restricted access (n=1). Similarly, existing networks can also be integrated (n=1) and a hybrid model can also be developed (n=1).

They suggested that PAK-NISEA should be developed in phases (n=5). For this purpose few good examples of foreign information systems should be studied and then it should be proposed (n=2). Sound planning would be needed (n=1) and foreign expertise should be involved for developing the model (n=1). For example, one IS/IT expert said:

“Yes, the idea of integrating all three levels/tiers of education is feasible. It would work like a data warehousing scheme. It will be base on a hybrid model which will connect all the three different databases of schools, colleges and universities. The thing which should be considered is that it should be developed in phases. As the universities are less in numbers and have more sophisticated IT infrastructure, so it should start working from universities, then colleges and at the end the schools should also be integrated with it. Thus the order will be from easy to difficult” (Salman Shakeel).

The development of the new information system in phases is also stressed by the LIS professionals. The technique most used for this purpose is Spiral Model which is an iterative approach to system development and facilitates the development of an IS in four phases (TechTarget, 2009).

5.3.4. Utilization of Already Existing Information System and Networks in Different Sectors of Education

Respondents were asked to mention the possibility of utilization of already existing information systems and networks in different sectors of education. They mentioned that different existing information systems/networks can be utilized and integrated with proposed PAK-NISEA Model. For example, HEC networks and resources i.e. PERN, NDL (n=7), NEMIS (n=6), subsystems of individual universities (n=5), other examination boards (n=4), NADRA (n=1) and Geographic Information System (GIS) (n=1). It was stressed that existing resources should be used (n=3) but mostly existing systems are hybrid (n=1). One senior professional said:

“Yes in school sector such systems are available which gather information at district level, for example EDO offices collect such information. Similarly NEMIS, HEC, Ministry of Education (MoE) and Federal schools and college Directorate, provincial boards of education have information which can be useful for educational administrators. Although the information might be in hybrid form. This meaningful data should be converted into digital form and stored in the database” (Nazir A. Sangi).

5.3.5. Information Acquisition and Processing Mechanism for PAK-NISEA Model

The IT/IS experts were asked about either the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized. Like the LIS professionals, all of them unanimously pointed out that it should be centralized and with the availability of the hardware & specialized skills at one place there will be no redundancy of those particular hardware and information organization skills at different places (n=10). It is cheaper (n=1) and uniformity can be maintained in centralized processing (n=1). It was also pointed out that initially it can be decentralized too (n=2) or hybrid model can also be used which is neither centralized nor decentralized (n=1). The suggestion of an expert was as follows:

“I would recommend a centralized processing supported by Web based environment I mean with the availability of the hardware & specialized skills at one place there will be no redundancy of those particular hardware and information organization skills at different places. When we talk about web based environment, it minimizes the need of specific application software for each nodal point. No highly specialized IT expertise would be needed for processing the information in web based environment, just a terminal and a scanning device with a single operator would be sufficient for entering or digitizing the data from a nodal point. This data can be further processed (i.e. assigning metadata, indexing & abstracting etc.) in the central sever based at the central body. Data collection should be in parts. In the beginning data should be collected on simple and routine matters then gradually move towards your actual target” (Aurangzeb).

The idea of centralized processing is also supported by many researchers. According to Kroenke and Hatch (1994), and Schroeder and Dozier (1975), a new information system should be developed but rather a centralized system which would

pull together activities, people, facilities, products and services from existing information systems and which would add its own products and services when necessary. The main advantages of centralized systems are that they provide centralized control using established technology and human resources.

5.3.6. Applicability of the Idea “Full Remote Access to E-resources (i.e., Most Materials in E-format) Through Dedicated Internet Links” in Pakistani Perspective

Regarding the applicability of the idea “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” in Pakistani perspective, most of them agreed that the idea of full remote access will work in Pakistan (n=8). They stressed that training can help in this regard (n=7) and it will work gradually (n=3). Some of them opined that it is difficult to introduce in remote areas (n=3) and it depends on the availability of resources (n=2). It was also mentioned that alternatives and equalizers are available (n=2) and we are not very backward in IT (n=2). Government should take initiative in this regard (n=1), similarly user campaigns can also be helpful for convincing the end users (n=1). The IT expert pointed out:

“Yes, it will work but in rural areas it would be difficult without proper IT infrastructure. Although many alternatives are available for providing remote access esp. in the rural and far flung areas i.e. Wireless phone, Satellite, Mobile phones. There are few projects which are working in the rural areas but the key question is the access and speed of the Internet. In fact the selected people i.e. educational administrators are the key users so special facilities can be provided to this segment to connect them with the PAK-NISEA” (Aurangzeb).

Similar views were also shared by the EAs and LIS professionals and they stressed on the need of proper training of EAs for the successful execution of this idea in Pakistan.

5.3.7. Focal Agency and Proposed Organizational Structure for PAK-NISEA Model

All the respondents proposed that Ministry of Education should be its parent body (n=10) (Ministry of IT and Planning Commission can also cooperate in this regard (n=1)) and there should be an executive body/board/cell for PAK-NISEA (n=10). They suggested that all stake holders should be given representation in the body/board (n=8). It was stressed that Federal Government should take care of the project up to the district level (n=7) and EDO offices should be designated as district nodal points (n=2). Provincial Governments (n=1) and IT boards of provinces should also be involved in this project (n=1) and there should be a separate IT cell in the proposed PAK-NISEA. They recommended that some good examples of system structure i.e. NRSP should also be explored (n=1). One respondent suggested that PAK-NISEA should work under Prime Minister Secretariat (n=1) and decision making should be decentralized (n=1). One IS/IT expert said:

“Ministry of Education should be its parent body. There should be an executive body. IT Boards of all the provinces should also collaborate in the development and maintenance of this system. Up to the district/zonal level the system should be under control of federal government rather than involving the ministries of provinces” (Adil Imdad).

5.3.8. Finance for PAK-NISEA

Regarding the finance the respondents stressed that Federal Government (n=7) and Provincial Governments (n=2) should provide the funds for PAK-NISEA. Besides this funds can also be generated through foreign grants (n=6) and fee based services (n=5). Another IS/IT expert mentioned:

“Finance should be shared by both the federal and provincial governments. I mean 75% by federal and 25% by the provincial government. Foreign funding can also be sought from NGOs, UNESCO, US Aid, etc. Fee based services can also be provided to the private and foreign customers” (Syed Aun).

The role of Ministry of Education (MoE) as a focal agency for prospective PAK-NISEA is also highlighted by the interviewed EAs and LIS professionals. Most

of the reviewed foreign educational information systems (reported in Chapter-2) are also working under their respective education ministries or departments. The funds are also provided by the respective ministries or government.

5.4. Findings of the Chapter

A qualitative analysis of the interview responses reveals that educational administrators are a distinct group who are responsible for the overall management and administration of education in the country. Their information needs largely depend on the type of job and the level of decision making they are involved with. For their decision making and planning, they mostly use informal sources and/or their internal documentary sources. It was identified that there is a wide gap in the provision of needed information to them which in turn influences the planning and resource allocation. This gap has greatly affected the overall education of the country. All the respondents (n=55) were of the view that Pakistan National Information System for Educational Administrators (PAK-NISEA) should be developed. They also foresaw that the idea of providing full remote access to e-resources will work in Pakistan because now many Information and Communication Technologies (ICTs) are largely being used even in remote areas of Pakistan. Information System/IT experts and information professionals favored the centralized processing mechanism for PAK-NISEA. They suggested that the PAK-NISEA should be developed in phases by keeping the available resources and ground realities of Pakistan in view. Interviewees were of the view that Ministry of Education should be its parent body. Beside the federal and provincial governments' funds, fundraising through other sources i.e. foreign grants and fee based services was also proposed. It was stressed that the services of the proposed PAK-NISEA should be user centered and user friendly.

Chapter 6

NATIONAL INFORMATION SYSTEM FOR EDUCATIONAL ADMINISTRATORS IN PAKISTAN: A PROPOSED DRAFT OF THE MODEL

The information needs and seeking behavior of educational administrators in general and in Pakistan is discussed in previous chapters. Previous chapters also explored the different aspects of an educational information system which can fulfill the gaps in the provision of needed information to the educational administrators. To accomplish the main objective of the study, this chapter uses the findings from the previous chapters to evolve the initial draft of model information system for educational administrators in Pakistan. The initial draft was sent for assessment to the experts. A report of experts' opinion about the proposed draft model is also given in this chapter. The draft was revised in the light of experts' opinion. This chapter deals with the following research questions:

RQ-3. *How a draft model can be evolved on the basis of reviewed literature, and views of potential users and service providers, determined through a questionnaire survey and personal interviews?*

RQ-3a. What are the major findings of reviewed literature?

RQ-3b. What are the major findings of questionnaire survey of potential users i.e., educational administrators?

RQ-3c. What are the major findings of interviews of educational administrators and service providers i.e., librarians/information professionals and IT/IS experts?

RQ-3d. To what extent these findings support the evolving of a user friendly information system for educational administrators in Pakistan?

RQ-3e. Which agency can function as focal point both for the national educational information system of Pakistan and as a coordinator with international educational information systems?

RQ-3f. What should be the functions of a model information system for educational administrators?

RQ-3g. Which information services, products and programs can be proposed for the information system users?

RQ-3h. How the draft model can be improved in the light of experts' recommendations?

The purpose of this research is to develop a draft model of National Information System for Educational Administrators in Pakistan. For designing a preliminary draft model some data were required for situation analysis and determining future needs of the proposed information system users. The survey was conducted to assess the information needs and seeking behavior of micro and intermediate level administrators from schools, colleges and universities (i.e., school and college principals and vice principals; university deans, registrars, deputy registrars, chairs/heads of departments etc.). Public sector schools (secondary) and colleges within Punjab and Islamabad Capital Territory (ICT) were selected through *multistage cluster sampling*. On the other hand, all the Public sector universities of Punjab province and ICT (N=35) were covered for the survey. Three separate questionnaires were executed for this purpose, targeting 100 responses from each sector (in total 300). Interviews of three different categories of experts within Punjab and ICT were also conducted for in-depth understanding of the phenomena. These categories included educational administrators (i.e., Ex. Vice Chancellors, EDOs, DEOs, DGs of Education Boards & Academy of Educational Planning and

Management, Deputy Chiefs of Education in Planning Commission of Govt. of Pakistan etc.); library & information professionals; and information system experts. These interviews and review of the related literature helped in the overall understanding and designing of the system.

6.1. Major Findings of the Study

To achieve the objectives of the study, the data were collected through literature review, questionnaire survey and personal visits. Table 6.1 presents an overview of the major findings from all three modes of data collection. A brief discussion on major findings of the study is as follows:

Tasks Performed: the data collected through literature review, questionnaire survey and personal interviews reveal that educational administrators' information needs depends on their work environment and the work tasks/roles for which they are responsible. The major tasks performed by them are planning, budgeting, decision making and other daily administrative routines and correspondence. The literature reveals that the level of administration (macro, intermediate, and micro) also affects the information needs of the education administrators.

Information Seeking Behavior and Other Preferences: the data collected through all three modes reveal that the educational administrators prefer the informal and personal sources of information, however as the experience increases the use of even informal sources decreases. This is may be due to the reason that experienced educational administrators at a certain stage of their professional life start using their personal experience and intuition.

The preference for a source largely depends on the reliability and high quality of the source. They usually ask their seniors, peers, colleagues and/or other members of their social network. The internal documentary sources are also used, however the use of

many formal sources such as libraries resources, and online information systems was comparatively low.

Impact of ICT on Information Seeking Behavior: The use of different information and communication technologies among educational administrators has increased the efficiency of their work and has made the information seeking and searching process easier. The results show that in Pakistan the use of ICTs (particularly Internet) has increased among educational administrators and they also perceive that it has made their work easier.

Information Needs: The literature reveals that at the macro level the administrators need information for the overall policy making and planning. The intermediate level needs more detailed information on different aspects of the policy and plan to make those executable/implementable. On the other hand the micro level manager needs more detailed information at the operational level. The educational administrators in Pakistan usually need information related to financial, employment and other government rules, current data about education i.e., curricula, literacy rate, ratio of institutions according to the population etc. The administrators were more concerned about the validity and reliability of information.

Availability of Needed Information: According to the reviewed literature, survey and interview findings that there is a gap in the availability and/or provision of needed information to the educational administrators.

Problems: Many problems were identified in the literature and survey and interview findings such as the non availability of needed information. In many cases if the information is available then it is not reliable and/or incomplete. No information system exists in real sense which can assist the educational administrators. The less

informed administrators are preparing inconsistent policies, which as a result are negatively affecting the education enterprise of Pakistan.

Need of a National Information System for Educational Administrators:

Review of the related literature, survey and interview findings highlight the need of developing a national information system for educational administrators in Pakistan.

Objectives of the Proposed Information System: The basic objective of the information system should be to provide reliable and authentic information when, where and how it is needed. The information system should necessarily integrate complex relations between the different levels of decision making to fulfill its role efficiently. It should also enable the educational administrator to make well-informed and timely decisions which can lead to the educational reform in the country.

Services: It is evident from the all three types of data findings that the services should be user-centered rather than system-centered. The services proposed by the survey respondents and the interviewees strengthen the idea of Gorman & Cullen (2000), according to which more user-centered information services can be provided even in Asian countries by employing the *Knowledge Environment Model* approach of library networking.

Factors Needed to be Considered, While Designing a National Information System for Educational Administrators: the factors needed consideration of information system designers can be categorized in two broader divisions i.e., social factors (such as need analysis of end users, local environment and ground realities etc.) and technical factors (such as IT infrastructure and resources, data collection and processing, Bandwidth and other access issues etc.). Verma has provided a framework for consideration while developing/proposing an educational information system such as a) Know the Background; b) Users and Their Needs; c) Types of Users; d) Types

of Information Needs; e) Coverage; f) Centralized or Decentralized; g) Services; h) Organizational Considerations; i) Manpower Requirement; and j) Qualitative Considerations.

Focal Agency and Proposed Structure /Organization Units of an Information System: Ministry of Education (MoE) should be the focal agency for the development of PAKNISEA as it is the pattern of most of reviewed educational information systems and also recommended by the interviewees.

Workability of Idea “Full Remote Access to E-resources Through Dedicated Internet Links” in Pakistan: In the light of reviewed literature and interview findings it seems possible that the idea of full remote access to e-resources through dedicated Internet links is workable in Pakistan. Many such systems in other fields i.e. health are already working on these lines. The executive board consisting on all the stake holders was also proposed.

Information Acquisition and Processing Mechanism for NISEA Model: Almost all interview respondents stressed that the data/information collected by the system should be processed centrally. Literature also highlights many benefits of the centralized processing. All the designated nodal points (at provincial and district level) can acquire/collect the data and other information sources; the central headquarter can further process all the inputs sent by different nodal points. The ERIC’s model is a good example in this regard.

Finance for NISEA: The soul supporting agencies should be the federal and provincial governments, however the alternative sources of funds generation can also be considered such as foreign grants and fee based services.

Utilization of Already Existing Information System and Networks in Different Sectors of Education: The review of literature reveals that in Pakistan a

reasonable number of networks are available in the education sector. These networks/information systems can be utilized for the development of PAKNISEA, such as HEC networks and resources i.e. PERN, NDL, NEMIS, subsystems of individual universities, other examination boards, NADRA and Geographic Information System (GIS) etc.

Evaluation: The system should adopt the evaluation mechanism which will facilitate not only the continuous monitoring but evaluation as well. The Spiral Model will not only facilitate its continuous monitoring and evaluation but will help its development in phases.

Table 6.1. *Major Findings of the Study*

Research themes		Findings from Literature Review	Findings from Questionnaire Survey	Findings from Personal Interviews
Information Searchers and Users: Educational Administrators	Tasks Performed	<p>According to the reviewed literature, the educational administrators can be divided in three broader categories regarding their managerial responsibilities. These levels are as follows:</p> <p>Macro Level:- administrators at this level are responsible for strategic decisions concerning the planning of the whole of the education system. The category of decisions at this level concerns the general policy and attainable medium or long-term objectives.</p> <p>Intermediate Level:- this level comprises decision-makers who are in charge of management and control of the allocation of resources, for an efficient and equitable distribution. This level translates the general objectives into more technical, operational decisions.</p> <p>Micro Level:- corresponds to operational tasks, and to more daily activities, closer to the institution (i.e. school, college or university department). The decision here has local and immediate reach. Mostly educational administrators have to perform the following tasks:</p> <ul style="list-style-type: none"> • Resource management • Strategic planning 	<p>From 51% to 88% educational administrators working at intermediate and micro level in Punjab province and ICT were performing following tasks as educational administrators:</p> <ul style="list-style-type: none"> • Planning • Decision making • Rules & procedures • Teaching & Research • Budgeting • Problem solving • Handling students' affairs • Teachers/staff training • Team work • Staff development • Official correspondence • Government policies • Day to day official activities • Time management • Curriculum development • Monitoring • Current affairs • Controlling • For seeking government grants • Personal professional development • Leadership roles • Personnel evaluation 	<p>Educational administrators (n=14) working at macro, intermediate and micro level in Punjab province and ICT were performing following tasks as educational administrators:</p> <ul style="list-style-type: none"> • Planning • Budgeting • Decision making • Personnel evaluation • Daily correspondence • Overall management of educational resources.

Research themes		Findings from Literature Review	Findings from Questionnaire Survey	Findings from Personal Interviews
		<ul style="list-style-type: none"> • Recruitment and retention of students • Instructional leadership • Management of day-to-day activities • Setting educational standards and goals • Establishing the policies and procedures to achieve goals. • Supervising managers, support staff, teachers, counselors, librarians, coaches, and other employees. • Developing academic programs • Monitoring students' educational progress • Training and motivating teachers and other staff, • Managing career counseling and other student services • Administering recordkeeping • Preparing budgets • Performing many other duties • Handling relations with parents, prospective and current students, employers, and the community. 		
	Information seeking behavior and other Preferences	<p>Administrators prefer sources that they perceive to be reliable, high quality and that provide relevant information.</p> <ul style="list-style-type: none"> • Among the wide range of sources that they use, internal and personal sources appear to be more important than external and impersonal sources. • Few administrators personally use the institutional library and online database services. • Sources given a very high preference 	<p>From 42% to 88% respondents were mostly using informal sources of Information. It was also found that as the experience increases the use of informal sources decreases among educational administrators. Following informal and formal sources were being used by them:</p> <p>Informal Sources:</p> <ul style="list-style-type: none"> • Informal discussion with assistant staff • By discussing with students 	<p>Educational administrators mostly use informal sources for seeking needed information. Following informal and formal sources were being used by them:</p> <p>Informal Sources:</p> <ul style="list-style-type: none"> • Ask colleagues and peers, friends, and assistant staff • Use Internet and internal documentary sources • Ask senior experts • Visit the relevant place personally

Research themes		Findings from Literature Review	Findings from Questionnaire Survey	Findings from Personal Interviews
		<p>rating were:</p> <ul style="list-style-type: none"> • Personal contact for competitor trends • The use of government publications for obtaining regulatory information. • The use of government publications for local economic information • The use of newspapers for political trends and business news. • The company library was perceived as a storage facility rather than a dynamic information resource. • Local libraries were also used for regional and international economic information. • Radio and television were used to obtain regional and local economic information, but were rated low in accessibility. • Very high preference was given to personal contacts as a source of information. • Many researchers believe that administrators' source preferences have not changed over the years and they primarily rely on people they trust and other informal social networks. • Local educational administrators generally perceived little need for information for use in problem resolution. • Most decision making was in the absence of an information search. • They desired experienced people as 	<p>From trustable individuals</p> <p>Social networks</p> <p>By walking around (Grape wine)</p> <p>Through intelligence staff</p> <p>From communities of practice</p> <p>By discussing with librarian</p> <p>Formal sources:</p> <p>Through formal staff meetings</p> <p>From result output</p> <p>From institutional ranking by HEC/Board exams output</p> <p>From library resources</p> <p>Internal documentary sources</p> <p>Through computerized information system</p> <p>From foreign educational information systems</p> <p>Sources of Obtaining New Ideas</p> <p>From 50% to 80% educational administrators were using following sources for obtaining new ideas:</p> <ul style="list-style-type: none"> • News papers/magazines • By attending conferences • Staff meetings • Feedback from students • TV/Radio programs • By discussing with ex-seniors/retired persons • By discussing with sub-ordinate staff • By discussing with peers outside the institute • Books/monographs • Local Journals 	<ul style="list-style-type: none"> • Attend conferences and meetings • Fieldwork • Use tacit knowledge • Consult relevant government agencies • Fulfill their information needs through multiple ways i.e. through telephone, media, computer, and databanks • Use CCTV for real time data of employee activities • Check policies • Ask students and parents <p>Formal sources:</p> <ul style="list-style-type: none"> • Books • Journals • Survey reports • Proceedings • Library resources • Keep an eye on local and global scenarios (<p>Sources of Obtaining New Ideas</p> <ul style="list-style-type: none"> • Use Internet/institutional websites • Ask junior staff and their seniors • Use media • Rely on available literature and data. • Use other informal sources, i.e. ask friends • Use insight developed through reading • Tacit knowledge/experience • Get ideas by visiting other countries and sister/government organizations • From internal resources/circular • Through staff meetings • Interacting with people

Research themes		Findings from Literature Review	Findings from Questionnaire Survey	Findings from Personal Interviews
		<p>their major information source and the major criteria for utilization of print materials.</p> <ul style="list-style-type: none"> • They prefer the information sources depending on the familiarity or degree of experience with the materials, and the quality of contents. 	<ul style="list-style-type: none"> • Government publications <p>Most of the respondents mentioned English as a preferred language</p>	<ul style="list-style-type: none"> • Through deep thinking about the rapid changes • Also get ideas through formal sources of information but they do not use libraries for this purpose. • Generating new ideas requires very broad vision, concentration, personal observations, self effort, field visits, conferences, feedback from higher authorities, and analyzed field data.
	Impact of ICT on Information Seeking Behavior	<p>The new forms of media have affected the information seeking behavior of the educational administrators. Many researchers believe that the use of computer-assisted communication technologies enable top administrators to obtain local information quickly and accurately, and reduce ignorance and help them to make decisions that they, otherwise, may have been unwilling to make. The opportunity to obtain contextual clarification with electronic mail and other computer-assisted communication technologies would amplify this tendency. Conversely, electronic bulletin boards enable lower and middle-level managers to stay better informed about the organization's overall situation and about the</p>	<p>About 86% respondents perceived that ICTs had made information seeking and gather process easier. More than 52% educational administrators were using Internet for their administrative work. Following ICTs were used by the 43% to 80% educational administrators:</p> <ul style="list-style-type: none"> • Telephone • Internet (i.e. search engines, websites etc.) • Atmospheric communication (Radio/T.V) • E-mail 	<p>Many educational administrators now use Internet and ICT has made information seeking process easier. They were of the opinion:</p> <ul style="list-style-type: none"> • Without ICT information management is difficult, so Internet should be available at least to administrators. • Many departments are connected through Internet and government is now providing computers and labs to schools as well. • Similarly many foreign agencies are giving funds for this purpose.

Research themes		Findings from Literature Review	Findings from Questionnaire Survey	Findings from Personal Interviews
		nature of the organization's current problems, policies, and priorities and, consequently, permit decisions made by these managers to be more globally optimal, rather than more parochial and suboptimal. Further, computer-assisted communication technologies allow lower-level units to clarify information in a timelier manner.		
	Information needs	<p>Macro Level:- More aggregated information is required for setting the objectives on the national, regional or provincial level.</p> <p>Intermediate Level:- It requires more specific data to detect eventual malfunctions and to optimize the use of resources. The actual project/course manager requires more detailed information on inputs, process and outputs of programs, detailed budgetary information, and impact of the programs etc. Educators would also require information on educational and pedagogical issues</p> <p>Micro Level:- This level requires more detailed information. Thus, these three decision-making levels which sometimes overlap each other at the administrative levels require distinct information. They are however linked because decisions at the macro level would be relevant and efficient in as</p>	<p>Educational administrators mostly need information about:</p> <ul style="list-style-type: none"> • Education policy • Current data about educational developments • Staff development • Government Grants • Leave rules • Current trends in education • Research output of your institute/faculty members • Student activities • Financial rules • Purchase rules • Personnel evaluation methods • Education codes/calendar of your own institute • Pension rules • National comparison reports of different teaching programs & teaching methods • Different Options and alternatives 	<p>They mostly need information about:</p> <ul style="list-style-type: none"> • faculty/staff's and students' retentions, achievements and attitudes • Available resources • Government rules • Political priorities • Current affairs • Financial rules • Opportunities • Grants • Qualitative literature on education i.e. research reports • Curricula • Statistical data • Management techniques for time and crisis management • Literacy rate • New trends in education • Information about training programs • Means of communication with staff • Pension rules • Leave rules

Research themes		Findings from Literature Review	Findings from Questionnaire Survey	Findings from Personal Interviews
		<p>much as they are based on precise and reliable information gathered from the lower levels. The information system should necessarily integrate these complex relations between the different levels of decision making to fulfill its role efficiently.</p> <p>Educational administrators mostly need information related to:</p> <ul style="list-style-type: none"> • Governance • Finance • Policymaking • Management • Inputs and outcomes of education • The structure and process of education • The core of teaching and learning • The broader context in which education operates. <p>The types of information considered very important for decision making included:</p> <ul style="list-style-type: none"> • Competitor trends • Regional economic trends. • Business news • Political, social, and supplier trends • Regulatory information • Use of Information Technology • Demographic Trends • New management methods • Govt. rules • Educational policy 	<ul style="list-style-type: none"> • related to administrative work • Ranking criteria of higher education institutes • Market value of your alumni • IT solutions for administrative work • Human Relations • Personnel working behavior • Curriculum of other institutes/boards • Evaluated and aggregated data about education • Demographic data related to education • Government of Punjab employment rules • Community perception about their institute • Government of Pakistan employment rules • Research output of other higher education institutes/faculty members • Competitors' strengths & weaknesses • Rules of other universities/boards/private institutes • Education codes of other higher education institutes • Employment rules of other provincial governments of Pakistan 	<ul style="list-style-type: none"> • Current data about education • Five years plans • Ratio of institutions according to the population • Information about all stake holders • The information should be reliable and consolidated to fulfill their dynamic information needs.

Research themes		Findings from Literature Review	Findings from Questionnaire Survey	Findings from Personal Interviews
		<ul style="list-style-type: none"> Grants related information 		
	Availability of Needed Information	The literature reveals that there is gap in the provision of required, authentic and reliable information/data to the educational administrators working at tehsil, district and divisional level.	To see the significant difference among the needed information and its availability further inferential statistics were used; on the basis of these statistical results it can be concluded that information need about different aspects (reported above) is much higher than its availability to school and college sectors administrators in Punjab and ICT. However, in university sector the situation is same except few things (i.e. Govt. of Punjab employment rules and politics at institutional and national level).	<p>The interviewees pointed out:</p> <ul style="list-style-type: none"> Administrators' needed information is not easily available; if available then accessibility of the available information/data is a big issue. It takes too much time and effort in getting needed information. Easily available information is less reliable and is not organized properly. Few things are available in published form but they do not use libraries. No proper information system is available for them.
	Problems	<p>Many problems faced by the educational administrators in Pakistan are identified in the literature, such as:</p> <ul style="list-style-type: none"> Non-availability of data about educational outputs and outcomes Less informed administrators and their inconsistent policies Bad impact of inconsistent policies on education Lack of training programs for educational administrators Poor information infrastructure The situation of libraries and information centers in Pakistan is not very encouraging Dearth of research on information needs and seeking behavior of educational administrators in Pakistan 	<p>The survey respondents mentioned many problems and give suggestions for the improvement of the situation, such as:</p> <ul style="list-style-type: none"> The educational administrators' (at micro level) suggestions should be considered in educational policy making process Special attention is required in school and college sector particularly in rural and remote areas where quality IT facilities are required Computer education policy for the colleges should also be revised according to the contemporary requirements Free access to full text information 	<p>Many problems were indicated by the interviewees. For example,</p> <ul style="list-style-type: none"> Available information is not valid and reliable Relevant information is difficult to get Neither any information system is available nor any trained staff They have to rely on available statistics Personalization of information due to bureaucratic mindset is another barrier in getting the available information Due to the influence of information age, the information is overloaded and scattered and administrators are not trained in its retrieval Sometimes school/college principals and DEOs provide information to

Research themes		Findings from Literature Review	Findings from Questionnaire Survey	Findings from Personal Interviews
			<p>(both print and electronic) should be provided for improving administrative skills</p> <ul style="list-style-type: none"> • As administrators need up-to-date and accurate knowledge at the correct time for making correct decisions, so available data should be valid and reliable • All the educational institutes should be interconnected with each other. 	<p>higher authorities on their own expenses and no proper facility is provided to them</p> <ul style="list-style-type: none"> • There is no coordination among all the stakeholders of educational data • They lack condensed information • Trained IT staff do not stay on job for long, which is a threat to the sustainability of already developed information systems • In such circumstances access to relevant information is difficult.
	Need of a National Information System for Educational Administrators	<p>There is a gap in the provision of required, authentic and reliable information/data to the educational administrators working at tehsil/district/divisional level. In the absence of such information, they have to fill the gaps by approximation and they feel the need of having an efficient information system. Therefore, a management information system, badly needed by the Education Department of Pakistan, should be devised and established. Data on all educational institutions, teachers and facilities should be collected and computerized and programs should be designed to agglomerate and recall specific information needed by the administrators.</p>	<p>Most of the respondents (97%) agreed that a national information system for educational administrators should be developed.</p>	<p>All the interviewees (n=55) unanimously agreed on the development of a national information system for educational administrators in Pakistan.</p>

Research themes		Findings from Literature Review	Findings from Questionnaire Survey	Findings from Personal Interviews
	Objectives of the Proposed Information System	<p>Definition of Objectives is the first step for the design and development of an information system. UNESCO mentioned that the basic objects of an Educational Management Information System (EMIS) should be:</p> <p>a) to promote the educational development through informed decision making practices by increasing demand for information use; b) to collect, organize and report accurate, relevant and timely data for planning and decision making purposes; and c) to promote the use of information for educational development.</p> <p>However, the basic objectives of most of the reviewed ISs are as follows:</p> <ul style="list-style-type: none"> • To fulfill the information needs of policy-makers and other stakeholders of education enterprise. To guide them in planning and consider other issues related to educational policies (i.e., structures, reforms and trends). • To make educational administrative duties more efficient and transparent. • To integrate all levels of education (i.e., schools, colleges, universities etc.) in the information system, although few were specifically for colleges and universities or only for 	<p>Most of the respondents agreed with the following objectives of the prospective information system:</p> <ul style="list-style-type: none"> • To provide the information with easy access • To provide update and current information in the field of education • Training of Educational Administrators • To ensure availability of valid, reliable and needed information • Training of other staff members i.e., Teachers/Information Providers/librarians etc. • To have linkage within educational institutes of the country • To provide information according to the administrators' specific needs • To develop and maintain an online full text database of educational documents related to administrators' information needs • To generate and maintain adequate media of information <p>To have linkage within educational information systems of the world.</p>	<p>The interviewees mentioned that the basic objective of such a system should be to provide real time access to valid and reliable data and information.</p>

Research themes		Findings from Literature Review	Findings from Questionnaire Survey	Findings from Personal Interviews
		<p>schools.</p> <ul style="list-style-type: none"> • To publish educational statistics and other qualitative material and to promote its use in decision making. To identify best practices and to spread its use through the organization of conferences, seminars and workshops • To develop national and international liaison among educational institutes and other stakeholders of education. • To collect, analyze, organize and disseminate the valid educational data and information (on learners, staff, institutions, facilities and resources. • To consider other sources of financial support i.e. foreign grants. 		

Research themes		Findings from Literature Review	Findings from Questionnaire Survey	Findings from Personal Interviews
	Services	<p>Services are the focal product of all type of information systems and networks. These services should be user centered not system centered. The “Knowledge Environment Model” is less system focused, and more clients focused. The Knowledge Environment Model looks at the full range client needs and resource requirements and asks how co-operation and network can improve services to meet these needs and requirements. It recognizes that there is diversity in user expectations, and also diversity in user skills. Given this diversity, the Knowledge Environment Model seeks to offer both a sophisticated technological environment and also a more traditional set of services.</p>	<p>Most of the respondents agreed with the provision of following services:</p> <ul style="list-style-type: none"> • Training workshops • Information for user specific needs on request (SDI) • Online Digital Library of Educational Resources • News Letter • Statistical Data about education • Electronic Document Delivery Services • Access to full text information • Translation • Online Catalog • Bibliographic Services • Verbal information provided by a scholarly person • Computer Mediated Communication (List serve & Discussion group) • Reprography/photocopy • Intranet & portals • Wikis for encouraging user participation • Chat Reference Service • Abstracts and Indexes 	<p>Interviewees suggested different services for PAK-NISEA. For example:</p> <ul style="list-style-type: none"> • SDI and CAS • Full text database • Indexing and abstracting • Email and article alerts • Information literacy • Document Delivery Service • Chat reference • Multimedia and hybrid data • Seminars/training workshops • User friendly interface and services • Wikis/blogs/RSS/List serves • Maintaining users’ profiles • Links to related E-resources • E-services of international standard • New arrivals’ alert • Inter Library Loan (ILL) • Directory of educational administrators in Pakistan • OPAC, ETDs, search engines, FAQs and Experts’ opinion • Bibliographic services • Customized reports • User manuals • Availability of qualitative and quantitative data • Preservation of Tacit knowledge for the help of young administrators.

The managerial and other design aspects of the prospective information system were identified through literature review and personal interviews only. The major findings are given below:

Table 6.2. *Development of National Information System for Educational Administrators: Design Considerations*

Research Themes	Findings from Literature Review	Findings from Personal Interviews
<p>Factors Needed to be Considered, While Designing a National Information System for Educational Administrators</p>	<p>Any information system makes sense only in the context of the purpose for which it was developed and used. The design of information systems has to take into account a number of factors. Indeed, the reason many information systems fail is because social issues (users and their work environment) are not taken into account at design and implementation stages. Existing studies highlight the need to distinguish at least two basic dimensions. The technological dimension, which includes the physical infrastructures that support a network and ensure communication and information flows; and the social dimension, which includes both the system of relations between persons tied or linked by some common interest, such as system or institution and culture, that non-explicitly controls contacts between members of the network. These guidelines can be listed as follows: a) Know the Background; b) Users and Their Needs; c) Types of Users; d) Types of Information Needs; e) Coverage; f) Centralized or Decentralized; g) Services; h) Organizational Considerations; i) Manpower Requirement; and j) Qualitative Considerations.</p>	<p>The interviewees mentioned following factors for consideration while designing Pakistan National Information System for Educational Administrators (PAK-NISEA). For example:</p> <ul style="list-style-type: none"> • Skilled manpower • Financial resources • IT infrastructure & resources • Proper planning of the project • Need analysis of end users • Training of personnel and end users • Political instability and bureaucratic mindset • Local environment and ground realities • Issues related to information i.e. quality of contents, format etc. • Utilization of existing resources • Careful and systematic data collection and processing • Development of the project in phases • Bandwidth and other access issues • User-friendly information provision environment • Creation of awareness at local and national level • Up-dating of information • Executive body for the management of the system • Private sector help for system development • Exploration of foreign systems

		<ul style="list-style-type: none"> • Development and integration of separate modules and access through single interface • Physical resources • Copy right and other legal issues • Cooperation and coordination among all the stakeholders • Multilingual system • Overall management and maintenance of the system • Meeting the international standards • Proposed system should be a combination of MIS (Management Information System) and digital repository of routine tasks, reports, research studies, tacit knowledge resources, demographic facts and figures about education etc. • Quality of contents • Information sharing standards • Format • Physical resource mapping • Assigning nodal points • Proper segmentation • IT enabled and IT literate users
Focal Agency and Proposed Structure /Organization Units of an Information System	<p>Most of the international educational information systems are working under Ministry of Education. Similarly, UNESCO's project EMIS is proposed to work within the Ministry of Education (MoE). It is responsible for the promotion and use of information for policy planning and implementation, decision making, monitoring and evaluation of an education system.</p> <p>In the field of education, potential network members are easily identifiable. At the national level are the libraries of various departments of the Ministry of Education which implement education programs. At the state/provincial level, the education cells or branches lodged in the regional offices of the Ministry of Education. At the lower level, potential members include schools, colleges and universities etc.</p>	<p>Most of the interviewees mentioned that:</p> <ul style="list-style-type: none"> • The Ministry of Education should be the focal agency for the development of such a system (Ministry of IT and Planning Commission can also cooperate in this regard) • There should be an executive body/board/cell for PAK-NISEA and all the stake holders should be given representation in the body/board. • Federal Government should take care of the project up to the district level and EDO offices should be designated as district nodal points. • Provincial Governments and IT boards of provinces should also be involved in this project. • There should be a separate IT cell in the proposed

	Libraries, documentation centers, clearing houses, referral centers, information centers, information analysis centers, and data centers are also the key organizational units of a national information system in education.	<p>PAK-NISEA.</p> <ul style="list-style-type: none"> Other institutes can also coordinate with the system i.e. HEC, Ministry of Information Technology, Planning Commission of Pakistan, Ministry of Communication, AEPM, Provincial educational ministries, Provincial IT Boards, DPI & EDO offices, Directorate of Schools, and Education Boards. Available resources and institutes should be utilized rather than developing a complete new infrastructure. PASTIC and NADRA model should be followed and private sector's help should be sought for its development. Development of institutional repository in each district was also recommended.
Workability of Idea "Full Remote Access to E-resources Through Dedicated Internet Links" in Pakistan	It is evident from the reviewed literature that a sound ICT infrastructure exists in Pakistan. By utilizing this infrastructure, various information systems are available in different disciplines. For example, health sector is benefiting from Health Management Information System (HMIS), though there is a need for strengthening of the whole system with better coordination among various vertical health information systems, which can practically contribute to better decision-makings. Similarly, Pakistan Society of Geographic Information System (PSGIS) is a wider network of foreign qualified GIS experts in Pakistan and abroad, which provides services in the following sectors: GIS Consulting; Analysis/Advice; Land Information System (LIS); Demographic Database; E-Governance; Environmental Management; Water Quality Monitoring; GIS Training/Seminars/ Workshops and other services on clients need.	The idea of full remote access will work in Pakistan. They stressed that training can help in this regard and it will work gradually. Some of them opined that it is difficult to introduce in remote areas and it depends on the availability of resources. It was also mentioned that alternatives and equalizers are available and we are not very backward in IT. Government should take initiative in this regard, similarly user campaigns can also be helpful for convincing the end users
Information Acquisition and Processing Mechanism for NISEA Model	The literature reveals that a new information system should be developed but rather a centralized system which would pull together activities, people, facilities, products and services from existing information systems and which would add its own products and services when necessary. 'The main advantages of centralized systems are that they provide centralized control using established technology and	<p>The respondents were asked about either the PAK-NISEA model should be based on "Centralized Processing Supported by Web based Environment" or it should be decentralized.</p> <ul style="list-style-type: none"> All of them unanimously pointed out that it should be centralized and with the availability of the

	<p>human resources'. Duplication of effort, resources and expertise is also reduced, saving cost and time. For example, ERIC is a national information system designed and supported by the US Department of Education for providing access to the results of programs, research and development efforts, and related information. The central headquarter coordinates the efforts of a network of ERIC clearinghouses. ERIC uses a central processing facility that merges all the inputs of the clearinghouses into the ERIC database, redistributes the ERIC database to other organizations to provide to their users, and manages the ERIC Thesaurus.</p>	<p>hardware & specialized skills at one place there will be no redundancy of those particular hardware and information organization skills at different places. It is cheaper and uniformity can be maintained in centralized processing.</p> <ul style="list-style-type: none"> • At district level the nodal points/ coordinating offices can be developed for the collection/acquisition of statistical data and other related information sources however other functions can be performed at the center i.e. standardization of information should be done at the center by a team of experts. It will facilitate the availability of expert and skilled manpower at one place and it will be easy to manage them. • It was also pointed out that initially it can be decentralized too or hybrid model can also be used which is neither centralized nor decentralized.
Finance for PAKNISEA	<p>ERIC is a national information system designed and supported by the US Department of Education. The researchers have stressed on creating a system rather than on discrete activities for disseminating the education knowledge base. They have also emphasized that shared definitions, criteria, and procedures for selecting, evaluating, and disseminating education treasures should be developed. Moreover, federal authority and funding should be obtained to plan, build, and manage a national education information system/network.</p> <p>Many researchers have stressed that because of the key role of the states in setting educational goals, policies, standards and their funding power, communication networks designed to improve the performance of the education systems should be planned and operated on a statewide basis</p>	<p>The interviewees mentioned:</p> <ul style="list-style-type: none"> • Federal Government and Provincial Governments should provide the funds for PAK-NISEA. • Funds can also be generated through foreign grants and fee based services.

Utilization of Already Existing Information System and Networks in Different Sectors of Education	<p>In Pakistan many information systems and networks are available, which can be utilized in the design of a national information system. By utilizing the existing information systems and networks duplication of effort, resources and expertise is also reduced, saving cost and time. For example, ERIC is a national information system for providing access to the results of programs, research and development efforts, and related information. ERIC uses a central processing facility that merges all the inputs of the clearinghouses into the ERIC database, redistributes the ERIC database to other organizations to provide to their users.</p>	<p>The interviewees mentioned:</p> <ul style="list-style-type: none"> • Different existing information systems/networks can be utilized and integrated with proposed PAK-NISEA Model. For example, HEC networks and resources i.e. PERN, NDL, NEMIS, subsystems of individual universities, other examination boards, NADRA and Geographic Information System (GIS). • Existing resources should be used but mostly existing systems are hybrid.
Evaluation	<p>In the social process of information transfer the ultimate evaluation must be from the viewpoint of the potential recipients/users. Many researchers have provided evaluation guidelines and have stressed on considering different aspects for information system evaluation i.e. quality of services from recipient viewpoint, relevance of information provided to the user and its assessment, system efficiency in terms of cost effectiveness, coverage of acquisition, search, performance of the retrieval system from store measured through recall and precision formula etc. They stress that an evaluation framework should be a continuous process and should be capable of eliminating many of the numerous non-satisfactory designs by directing the designer to the most advantageous ones. This evaluation, continuous monitoring and modification approach is incorporated in iterative system development models such as the Spiral Model.</p>	<p>It was also pointed out that PAK-NISEA should be developed in phases and at first focus should be on basic needs. Needs of educational administrators should be analyzed. Objectives of the PAK-NISEA should be clear and accordingly it should be planned and evaluated.</p>

6.2. The Preliminary Draft Model of NISEA Based on the Findings of the Study

Thus the preliminary draft of the Model is based on the data collected through literature review, questionnaire survey, and interviews and intends to serve as a national information system for educational administrators in Pakistan. The preliminary draft model was sent for review to the selected experts (The preliminary draft model is attached as Appendix-O).

6.3. Model Assessment and Revision

A model is an abstraction, a mental framework for analysis of a system. Although models often serve as useful research tools, these devices are in need of empirical verification. When models have not been properly validated, their employment as a knowledge source might be unwarranted (Busha & Harter, 1980; Powell & Connaway, 2004). Keeping the importance of validation or assessment by the experts in view, a preliminary draft of the proposed NISEA model was sent for assessment to the national and international experts of education, library & information science, and information systems (list of experts is attached as Appendix-I). The model was sent to the experts through snail mail, e-mail and personal visits (where possible). Coming section presents a qualitative analysis of the responses (N= 28). Detailed comments are attached as Appendix-K.

6.3.1. General Comments on the Model

The work on the model is highly professional, well-structured and expressed in good English (Sturges, Bolin, Somro). It is an excellent effort (Hameed) with a sound theoretical grounds applied to a practical problem (Bolin, Matveyeva, Iqbal, Waheed, and

Aurangzeb). The research scholar needs appreciation on contributing such a scholarly work (Hameed, Matveyeva, Fatima, Khattak, Struges, Z. Ahmed, Sabzwari, P. Ahmed, Baloch, R. A. Khan, Nageen, and Abdullah). The topic indeed is a much required research endeavor (Ramzan, Somro, Sabzwari, Ali, Majid, Anwar, and Aurangzeb). The model encompasses all important elements and stakeholders necessary for a National Information System (Bolin, Matveyeva, Sturges, and Nageen). It will prove as a very useful instrument in helping the administrators of education in discharging their duties towards achieving the desired targets of education at all levels in our country (R. Khan, Matveyeva, Bolin, Ali, Bhatti, Balloch, Sabzwari, H. Rehman, Aurangzeb, and Nageen,). The beginning is appropriate with the introduction of the model and its elements (Warner, and S. Rehman); divide and conquer strategy is used quite well as it's the only way to handle with complex systems. Spiral Model is good technique to cater with such projects since it involves element of risk analysis with it. So risk analysis formally becomes part of project which turns quite productive. Diagrams and information are quite detailed adding more emphasis on usefulness of NISEA Model (Shakeel, Sturges, Matveyeva, Nageen, Aurangzeb, and Abdullah). In the context of an academic study, what is outlined is admirable, convincing, and impressive and represents thorough and intelligent work on the part of its designer (Sturges, Matveyeva, Fatima, R. Khan, Bolin, Ali, H. Rehman, Sabzwari, Baloch, Aurangzeb, and Anwar). One information system expert wrote:

“The Model is quite comprehensive and covers all the aspects in detail. It is good to propose the model in phases by using the Spiral Model approach. I have seen no weakness in the model. Being an information system expert, I believe that the proposed model is detailed and practically applicable in Pakistani perspective. I can foresee that if implemented in true spirit, it will boost up the education sector of Pakistan” (Aurangzeb).

6.3.2. To what Extent the Model Presents a Simplified but Comprehensive View of the National Information System?

It is certainly comprehensive, in that it is hard to imagine an information source that has not been integrated into the model (Sturges, Somro, Aurangzeb, Ansari, Sabzwari, Anwar, Abdullah, and R. Khan). Whether it has been simplified is another question. It is certainly described in a clear and comprehensible way (Sturges). It is simplified (Sabzwari, R. Khan, Samdani, Matveyeva, and Abdullah), well written, well presented, and supported by relevant information (Somro, Nageen, and Fatima).

Although the model has a sound theoretical base, but it is rather a complicated suite of modules and sub models (P. Ahmed, and Iqbal). The proposed model is too simple and basic whereas the current education information and R&D systems are much more complex and comprehensive (irrespective of the fact whether or not they are functioning effectively) (Shaheen). On studying the system itself, it seems to be a little complicated and maybe over ambitious in the Pakistani scenario (Nageen), but she has taken our advice and has proposed that it should be taken up in and developed in phases (Nageen, Aurangzeb, and Shakeel). For example one reviewer mentioned:

“It is certainly comprehensive, in that it is hard to imagine an information source that has not been integrated into the model. Whether it has been simplified is another question. It is certainly described in a clear and comprehensible way, but there is a sense that simplification might have involved being more selective about the sources of information to which the system was to respond. For the purposes of administrators too much information can be as big a problem as too little. The success of this system looks as though it would be very dependent on the professionals who serve it doing very effective work in digesting content for use by the administrators” (Sturges).

6.3.3. To what Extent the Model is Practically Feasible?

It appears to be quite feasible, with communication and decision-making structures, funding, and phased implementation (Bolin, Fatima, Samdani, Matveyeva, and R. Khan). It seems practically feasible if our Government takes it seriously for implementation (Ansari, Sabzwari, and Abdullah), but challenging (Bhatti), expensive (Sturges) and risk factor is involved (Abdullah). The remarks on funding are necessarily imprecise, but the references to international funding sources are disturbing. There is also another aspect to feasibility; the ability and willingness of partner institutions to sustain their cooperation. What incentives would those inputting to the system be offered? There is a reference to material being supplied ‘automatically’ but experience suggests that nothing that involves people is automatic in this way (Sturges,).

“The proposal shows an excellent knowledge of the environment in Pakistan, and for that reason I feel very satisfied that it is applicable in the Pakistani context. I believe this proposal is the foundation for a very good dissertation that will yield abundant research material and has the potential for practical influence on national information infrastructure and policy and on the activities of libraries and information centers” (Mary Bolin).

6.3.4. Which Aspects of the Model are Weaker and how These Weaknesses can be Removed?

No particular weakness is seen in the model (Aurangzeb, Sabzwari, Bolin, Samdani, Ansari, and Matveyeva). It is not only strong conceptually and abstractly, but also includes details about things like staffing, organization, and funding (Bolin, Samdani, Ansari, Sabzwari). Taken as an abstract systematization of the possible information responses to administrative needs, it has strengths as opposed to weaknesses (Sturges).

Most of the aspects of the model are covered (Samdani and Matveyeva), the only weak point that comes to the mind is the author's expectations from the government of Pakistan about its implementation. People at helm of affairs in Pakistan have little time for such important matters of national interest (R. Khan). A little more is needed in terms of HRM and HRD who will work for the continuity of this model (H. Rehman) and 'Services to be Rendered by NISEA' need to be re-written or re-designed (Samdani). Its polycentric establishments may cause coordination complexities. It should also yield a smooth and multi-way even flow (P. Ahmed, and Iqbal). Proposal for developing an agency is the work of an expert who is engaged by the relevant agency. At the most, in the recommendations, the author may give the suggestion that the authorities may consider developing an agency (S. Rehman). In the phases of NISEA data collection and in the organizational chart of the Governing Body, Northern Areas, AJ & K and FATA have been ignored which needs to be included to justify the model as "NISEA" (Khattak).

"Give illustrations at micro level as well. I mean it should also show, how each nodal point will be connected with each other at grass root level (Draw the Benzene model/Diamond structure with its legends). Define the level of access for International community (abstracts only or 30% access to resources etc.)" (Mushahid Anwar).

6.3.5. To what Extent are you Satisfied with its Applicability in Pakistani Context?

The proposed model is detailed and practically applicable in Pakistani perspective. If implemented in true spirit, it will boost up the education sector of Pakistan (Aurangzeb, Anwar, Ansari, Sabzwari, R. Khan, Bhatti, Bolin, Abdullah, Khattak, Samdani, Somro, Baloch, Matveyeva, and Ali). The idea of nodal points proposed for data collection is quite practical (Nageen and Fatima). It would need careful and

systematic implementation (Julian), so its successful implementation cannot be assured (Iqbal). Would it work in Pakistan? The reviewer is not qualified to say. Whether it would function in practice is another matter. There is a case for a stripped-down model much less dependent on the vagaries of cooperation with other institutions. However, in the context of an academic study, what is outlined is admirable and represents thorough and intelligent work on the part of its designer (Sturges). Like in the first phase a prototype module for higher education sector of some areas of Pakistan, say the Punjab province may be developed, so that it would give an idea of the feasibility as well as usage of the system. As the results of the survey and reviewed literature reveals that universities are already using ICT for networking purposes (i.e., PERN), the universities in Punjab may be tapped for the initial phase. Most data is available with HEC (such as literacy rate, enrolment, inventories, budget and cost profiles, etc.) which should be involved along with the Punjab province universities. In the beginning it should be made as simple as can be (Nageen).

“The model has many important advantages: (1) the proposed system is national-wide; it will provide an excellent possibility to coordinate distribution of information to different regions and different levels of educational administrators; (2) author uses advanced methodology (knowledge environment model and spiral model) that allows to take into consideration multiple parameters of complex information system, to evaluate risks, and to insure feasibility of the different stages of the system’s development; (3) the model defines specific needs of different types of users with the connection to their roles in decision making process (macro level: planning and strategy; intermediate level: management and control, and micro-level: operational activities; (4) the model is detailed and well structured: description of three-phased development (p.5-6), financial sources (p.15), infrastructure of central and regional centers, structure of governing body, system’s functions and interconnections of its different components (p.16-21); major components of complex information system (clearing house, library, documentation center, and supportive units, including R&D cells) and types of information that will be acquired, organized, made accessible, digitized as needed, and delivered (mostly electronically) to different

constituencies national-wide. Ms. Shafique presented a large complex multi-phased project in a clear precise format. Her research has theoretical significance and may have positive practical applications as well. It shows the vital role of libraries, informational and data centers for the development of national education on all its levels” (Matveyeva).

6.3.6. Other Suggestions Given by the Reviewers

Components and Information resources of this model are well defined but the list of proposed services can be left open for further accommodation of new coming areas (H. Rehman). One of the core responsibility of ICT Unit must be to ensure smooth & timely development of IS, so system developer position should also be kept in ICT Unit. NISEA should be designed on Centralized full replication web based environment. It should be compatible for connection with International networks via PERN-2 (Z. Ahmed). Telecommunication infrastructure and network at national and international level should also be explained further (Bhatti). Illustrations should also be given at micro level to show, how each nodal point will be connected with each other at grass root level (Benzene model/Diamond structure can be drawn with its legends). The level of access for International community should be defined (Anwar). The essence of NISEA model should be to have an intelligent decision making system (Z. Ahmed). If all the funding will be either from federal or provincial governments, how would the foreign funding or contributions made through fee based services be explained? A very comprehensive training plan will be required to overcome IT-phobia of the intended users (Majeed). The status and grades of proposed positions of Governing Body members should also be mentioned, for instance Chairman- Grade 22, Directors- Grade 21, Assistant Directors- Grade 20 and others in Grade 19, and 18 (Sabzwari). Positions of library staff should be on the top. Research and library staff may be categorized separately (Waheed). Online

services should be added, which can assess the quality and accuracy of web information; integrate different types of resources; provide alternatives for fee based services; provide effective precision and recall, including new paradigms regarding access methods and retrieval options, and Web preservation services should also be provided (Samdani). Glossary of terms should be provided in the dissertation, because our Educational Administrators in Ministries, Directorates of Education, Schools, and Colleges are not familiar with these terminologies (Sabzwari and Shakeel). A comparison between National Education Management Information System (NEMIS) and proposed NISEA should be made to justify that the proposed model would be better than the other models, presently in vogue in Pakistan (Khattak). The author should connect her model with the data she has already in this study. The model must culminate from her research findings (Hameed, S. Rehman). A final word that if the letter P for Pakistan can be accommodated in the acronym i.e. NISEA-P would sound great (H. Rehman). For example one reviewer mentioned:

“Also, if carried out in phases then one can assess the success or failure of such a system. Therefore it is proposed that the project may be divided into three phases, first for universities, then colleges and then school level” (Nageen).

6.3. Revision of the Draft Model of PAK-NISEA

Qualitative analysis of the comments reveals that almost all the reviewers are agreed with the basic idea and theme of the proposed model. They have declared it as highly professional, comprehensive, feasible, sound, and practicable in Pakistani perspective. Besides, they have given many suggestions and/or raised some questions where they found the model unconvincing i.e., foreign funding, sustainability issues, Government help in implementation, acquisition of information resources from different

institutions and delivery of services etc. The researcher has tried to incorporate most of the suggestions by the reviewers in the final draft, where these suggestions did not clash with the survey and interview findings. The name of the model from NISEA to PAK-NISEA is also changed in the light of recommendation. It is encouraging to note that the Planning Commission, Government of Pakistan, which is responsible for assessing the feasibility of such projects in Pakistan, has also declared the draft model as feasible and practicable in Pakistani perspective. The revised and detailed draft model is as follows:

6.4. Pakistan National Informational System for Educational Administrators in Pakistan (PAK-NISEA): A Centralized Model

6.4.1. Important Features of the Revised Draft Model

6.4.1.1. Centralization

Due to its characteristics of reduced duplication, more centralized control, better standardization, and utilization of resources, the proposed model is centralized. Interview with experts of information system and library & information science made it very clear that the proposed model should be centralized and should be developed in phases.

6.4.1.2. Pooling the Existing Information Systems/Services

While keeping the interview findings and existing practices of the world information systems in view, the proposed information system attempts to pool the existing information systems and services in PAK-NISEA.

6.4.1.3. Access and Services Based on Knowledge Environment Model

Keeping in view, the diverse information needs of different level of educational administrators, the proposed system seeks to offer both a sophisticated technological

environment and also a more traditional set of services. So, the proposed products, services and access will be based on the user-centered approach offered by knowledge environment model. Remote access will be provided to the end-users through dedicated Internet links (majority of the all three categories of interview respondents agreed with the workability of this idea in Pakistan).

6.4.1.4. Development in Phases: The Use of Spiral Model Approach

All three categories of interview respondents mentioned that as the proposed model will cover all three levels of education i.e. school, college and university education, so the proposed model should emerge in phases and with the successful completion of one phase, the other should be started. The approach for this purpose used is “Spiral Model” in which the objectives, alternatives and constraints are determined, mechanism is developed for risk analysis, and then prototypes are developed and implemented. If successful, the next level plan is developed and executed.

6.4.1.4.1. Objectives, Alternatives, Constraints:- The new system requirements are defined in the coming section, after a comprehensive system study of the various education enterprise processes in Pakistan, in as much detail as possible. It involved survey and interviewing internal and external users, preparation of detailed flow diagrams showing the process or processes for which the Information System is to be developed, the inputs and outputs in terms of how the data is to be recorded/ entered and the form in which the results are to be presented. Following are the objectives of the proposed model (ranked according to the survey response):

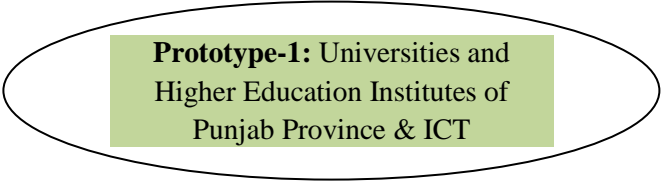
- To provide the information with easy access
- To provide update and current information in the field of education

- Training of Educational Administrators
- To ensure availability of valid, reliable and needed information
- Training of other staff members i.e., Information providers/librarians etc.
- To have linkage within educational institutes of the country
- To provide information according to the administrators' specific needs
- To develop and maintain an online full text database of educational documents related to administrators' information needs
- To generate and maintain adequate media of information
- To have linkage within educational information systems of the world.

6.4.1.4.2. Risk Analysis:- Ongoing monitoring, maintenance and evaluation will be the important part of the system development from initial stage to the complete implementation of each stage/prototype. It will include addressing any factors which may risk the successful completion of the entire project of PAK-NISEA development including alternative strategies and constraints.

6.4.1.4.3. Prototyping:- As the system will be developed in phases, so based upon the finalized strategy and the preliminary design, the first prototype of PAK-NISEA will be developed.

Prototype-1: PAK-NISEA Phase I

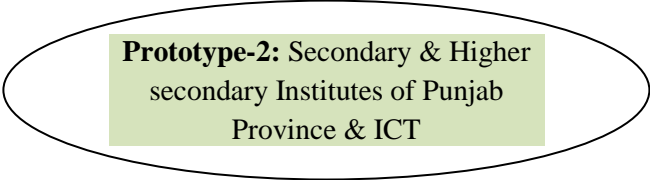


Prototype-1: Universities and
Higher Education Institutes of
Punjab Province & ICT

As a first prototype, the system will prepare a module only for higher education sector of the Punjab province and Islamabad Capital Territory (ICT) of Pakistan. As the results of the survey and reviewed literature reveals that universities are fewer in number and enjoying better ICT facilities, so the first prototype would cover higher education sector only.

6.4.1.4.4. Development and Verification of Next-level Product:- The prototype prepared will be tested against benchmarks (something of accepted quality which is used to provide a standard for comparison) based on end-users' expectations and evaluated risks to verify the various aspects of the development. Refinements and modifications of the prototype will be undertaken until target users' satisfaction is achieved before development of the next level of the system.

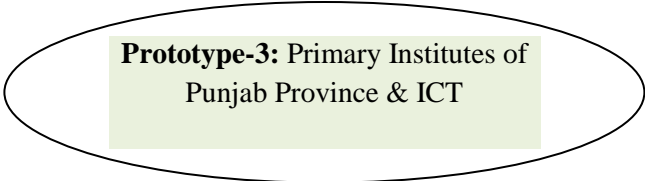
Prototype-2: PAK-NISEA Phase II



Prototype-2: Secondary & Higher
secondary Institutes of Punjab
Province & ICT

The second prototype will cover a module for secondary & higher secondary education sector of the Punjab province and ICT. The prototype-2 will be tested and verified against benchmarks.

Prototype-3: PAK-NISEA Phase III



Prototype-3: Primary Institutes of
Punjab Province & ICT

The third prototype will cover a module for primary education sector of the Punjab and ICT. The prototype-3 will also be tested and verified against benchmarks.

Plan of Next Phase for Other Provinces:- The preceding steps are iterated until the end user is satisfied that the refined prototype represents the final product desired. The final system will be constructed based on the refined prototype. The final system (An information system for Punjab Province and ICT of Pakistan, covering school, college and university sector) will be thoroughly evaluated and tested. Routine maintenance will be carried out on a continuing basis to prevent large-scale failures. In the next phase of the plan, the PAK-NISEA will be developed (applying above three prototyping approaches) in NWFP (including AJK, FATA & FANA), Sindh, and Baluchistan provinces as well. A final product will be a National Information System for educational Administrators in Pakistan.

Coming section presents the overview of major components of PAK-NISEA. Components of the information system are defined as Schroeder & Dozier (1975) have identified in their document *“Review of existing information systems and networks: Applicability to the design of the system”*. The components include: a) primary users, b) geographic acquisition and distribution coverage and type of information acquired, c) media classification, d) information acquisition, e) information selection, f) information processing, g) information storage, h) products and services, and i) management structure and funding.

6.4.2. Major Components of the PAK-NISEA

6.4.2.1. Primary Users

Users here refer to an individual, group of individuals, organizations, government agencies, or associations that need the educational information for administrative, planning and/or decision making purposes. The users will be representatives of a local, regional, provincial and national geographic region (more details about the users are covered in the section 6.2.2.7 of this chapter). In case of collaboration with international community, it will also cover the users at international level.

6.4.2.2. Geographic Acquisition and Distribution Coverage

National Level:- The proposed information system will cover the nationwide acquisition of information sources related to the educational administration. It's central, provincial, district and institutional nodal points will collect the relevant information, which will be entered into the central database. Similarly, the distribution of the information will be nationwide through web-based environment.

6.4.2.3. Geographic Acquisition and Distribution Coverage Through National Nodal Point for PAK-NISEA

The related data/information will be acquired from the following institutes at the National Center:

6.4.2.3.1. Ministry of Education:- Ministry of Education functions for the development of instructional technology; promotion and coordination of educational

research and maintains documents related to education. These documents either print or electronic will be acquired by PAK-NISEA.

6.4.2.3.2. Academy of Educational Planning and Management (AEPAM):- The Academy is mainly charged with responsibilities of training of educational administrators and planners; conducting research regarding issues related to various aspects of education development; strengthening MIS and education statistics activities; documentation services and providing professional advisory services to the Ministry of Education and Provincial Education Departments. Data collected and documented by AEPAM will be acquired by PAK-NISEA.

6.4.2.3.3. National Educational Management Information System (NEMIS):- NEMIS is an online educational management information system which collects the annual school survey data from all four provinces and creates a national profile of the government schools with regard to student enrollment, number of teachers and school facilities. The NEMIS is also responsible for collecting, processing and analyzing educational data related to ICT, FATA, FANA and AJK, and giving access to educational data and documentation of schools. Training of data collectors from these areas is an important role of NEMIS. NEMIS database will be integrated with PAK-NISEA for its better utilization.

6.4.2.3.4. Pakistan Education and Research Network (PERN2):- PERN2 is the advanced network to facilitate the education and research within higher education institutes at national level. It also connects them with international networks of education and research. This network will be integrated with PAK-NISEA.

6.4.2.3.5. Higher Education Commission of Pakistan (HEC):- HEC develops policies, procedures for education sector of the country and maintains statistics about them. HEC has also initiated many projects i.e. National Digital Library, Pakistan Research Repository etc. Such services and other documents maintained by HEC will be acquired and/or integrated with PAK-NISEA.

6.4.2.3.6. Federal Board of Intermediate and Secondary Education (FBISE):- FBISE functions to affiliate institutions imparting Secondary School Certificate (SSC) and Higher Secondary School Certificate (HSSC) education within Pakistan and abroad; prescribes courses of instructions for SSC and HSSC; and holds exams; and appoints examiners and supervisory staff within federal areas of Pakistan/ICT. Information maintained by FBISE will be acquired and made available through PAK-NISEA.

6.4.2.3.7. Federal Bureau of Statistics:- Federal Bureau of Statistics collects data related to different aspects of life in Pakistan including education. In 2005, Federal Bureau of Statistics conducted The National Education Census (NEC-2005) for the first time in the history of Pakistan to establish a comprehensive National Data Bank on education for facilitating online service for sharing and dissemination. This online service will be utilized by PAK-NISEA.

6.4.2.3.8. National Archives of Pakistan (NAP):- NAP holds a rich collection of print and non-print archival material of national interest including education, which can be helpful for educational administrators (mentioned the DG of NAP in interview). This material will be sorted, acquired and made available through PAK-NISEA.

6.4.2.3.9. National Library of Pakistan (NLP):- NLP is a legal depository for all published literary heritage of Pakistan. It also serves as depository of some international organizations like Asian development bank, International labor organization, and US department of Publications etc. Documents related to the scope of the proposed system will be acquired by PAK-NISEA.

6.4.2.3.10. Data Collected by Provincial, District and Institutional Centers of PAK-NISEA:- National Center for PAK-NISEA will collect information from its provincial, district and institutional centers. These centers will acquire educational information within their geographic regions.

6.4.2.3.11. Coordinated Activities (Acquisition and Distribution of Educational Information) with International Information Systems of Education:- International organizations such as UNESCO, World Bank etc. also manage educational data about Pakistan. This will be acquired and distributed by the proposed system. Similarly, PAK-NISEA will start cooperative activities with other international information systems in education i.e. ERIC, Eurydice, UCISA etc. to facilitate its users. Such exchange of information and services will be on reciprocal basis.

6.4.2.3.12. Other Institutes:- Other institutes, which maintain information related to the scope of PAK-NISEA will be contacted by the center for information acquisition or integration of services provided by them. Such institutes include Planning Commission, Govt. of Pakistan (Education Section) and National Education Foundation (NEF), Government of Pakistan, Islamabad etc.

6.4.2.4. Geographic Acquisition and Distribution Coverage Through Provincial Nodal Points for PAK-NISEA

Like the National Center for PAK-NISEA, the Provincial centers/nodal points will also acquire information from their geographic regions. Following institutes will come under the scope of provincial nodal points:

6.4.2.4.1. Provincial Departments of Education:- Provincial Departments of Education produce, acquire, hold and maintain education related data and information. Such documents will be acquired either in print and/or electronic form by the provincial nodal points of PAK-NISEA.

6.4.2.4.2. Provincial/Divisional Boards of Education:- Provincial Boards of Education i.e. Punjab Board etc., develop and design curriculum, contents and schedule examination up to the higher secondary school education. Documents produced and maintained by the Provincial Boards will be acquired by each provincial nodal point in their respective regions.

6.4.2.4.3. Universities in the Province:- Universities in the province will be contacted by the provincial nodal points for the acquisition of related information.

6.4.2.4.4. Provincial Archives:- Provincial archives maintain rich archival information related to education which can be helpful for educational administrators. Such information will be sorted and acquired by the provincial nodal points.

6.4.2.4.5. Provincial EMIS Headquarters:- Provincial Educational Management Information System (EMIS) headquarters i.e. Punjab EMIS, Sindh EMIS, Baluchistan EMIS, NWFP EMIS and Federal EMIS provide computerized management tools and

techniques to provincial EMIS and District based EMIS cells equipped with enhanced capacity of EMIS hardware and software. These provincial EMIS headquarters will be integrated with the Provincial Nodal Points of PAK-NISEA for the utilization of school related data/information acquired and maintained by these headquarters.

6.4.2.4.6. Other Institutes Dealing with Education at Provincial Level:-

Information will also be acquired from other institutes dealing with education at provincial level such as Directorate of Public Instruction (DPI), Textbook Board, Directorate of Staff Development, Centre of Educational Research and Assessment (CERA: a research cell of University of Education) and other university departments/cells/centers conducting research on education, academic, special and public libraries having material on education.

6.4.2.5. Geographic Acquisition and Distribution Coverage Through District Nodal Points for PAK-NISEA

District level nodal points will acquire data from regional archives/record offices; district level offices of EMIS; EDO offices; and other institutes dealing with education (including higher education) at the district level.

6.4.2.5.1. Regional Archive/record Offices:- Regional archives/record offices also maintain data/information related to educational administration. These data/information will be acquired by the District Nodal Points of the PAK-NISEA.

6.4.2.5.2. District EMIS Cells:- District Educational Management Information System (EMIS) Cells equipped with enhanced capacity of EMIS hardware and software

collect school based data. These District EMIS cells will be integrated with PAK-NISEA for better utilization of existing resources.

6.4.2.5.3. EDO (Executive District Office):- Separate Executive District Offices for school and college collect data related to their respective fields. The data collected are mostly quantitative in nature (i.e. no. of schools, colleges, teachers, status of facilities etc.). These data will be acquired by the District Nodal Points for further processing by the National Nodal Point/National Center of PAK-NISEA.

6.4.2.5.4. Other Institutes (Including Higher Education) Dealing with Education at District Level:- Other institutions dealing with education at the district level will also be consulted by the District Nodal Points for the acquisition of data/information related to the scope of PAK-NISEA.

6.4.2.5.5. Interface Connected with National & Provincial Centers for PAK-NISEA:- Acquired data by the District Nodal Points will be sent to the National Nodal Point through Web based environment for further processing. These District Nodal Points will also be connected with and monitored by Provincial Nodal Points.

6.4.2.6. Geographic Acquisition and Distribution Coverage Through Institutional Nodal Points for PAK-NISEA

To acquire and distribute the information up to the grass root level, Institutional Nodal Points will also work for PAK-NISEA. These nodal points will collect data/information from their hosted institutions and send to the National Nodal Point for further processing.

6.4.2.6.1. Designated Libraries:- Institutional Nodal Points will be hosted in designated libraries either academic, special or public containing rich resources on education. For example, Institute of Education and Research (IER) Library, and Central Library of University of Punjab, have rich collection of books and research thesis/reports related to education. Thus an institutional nodal point can be designated at the Central Library of University of Punjab, Lahore.

6.4.2.6.2. Designated Universities:- Universities dealing with and conducting educational research will be designated as institutional nodal points for the acquisition and distribution of information. University of Education, for example can be a designated university for this purpose.

6.4.2.6.3. Designated Colleges:- Large colleges will be designated as nodal points for the acquisition and distribution of information. For example, Model Town College for Women, Lahore, SE College, Bahawalpur etc., can be designated for this purpose.

6.4.2.6.4. Designated Schools:- Large schools will be designated as nodal points for the acquisition and distribution of information. For example, Govt. Central Model School for Boys, Lahore etc. can be designated for this purpose.

6.4.2.6.5. Interface Connected with National, Provincial & District Nodal Points:- Institutional Nodal Points will be connected with the National, Provincial and District Nodal Points of PAK-NISEA. Acquired information will be sent to the National Nodal Point for further processing. Figures 6.1-6.4 present geographic acquisition and distribution coverage through National, Provincial, District and Institutional Centers/Nodal Points of PAK-NISEA. Figure 6.5 presents a complete map of nodal points covering rest of Pakistan, the complete view of PAK-NISEA.

National Nodal Point for PAK-NISEA

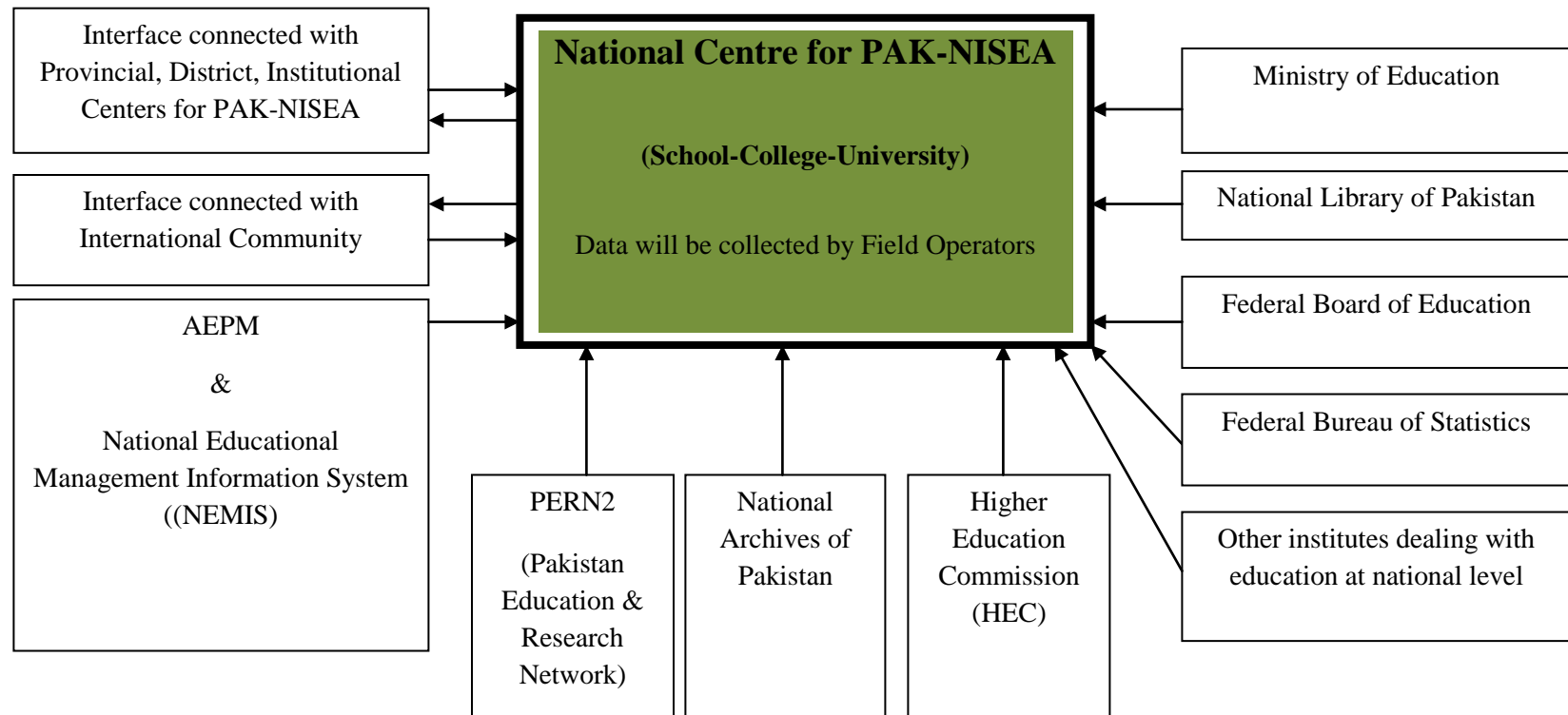


Figure 6.1. Geographic Acquisition and Distribution Coverage Through National Nodal Point for PAK-NISEA

Provincial Nodal Points for PAK-NISEA

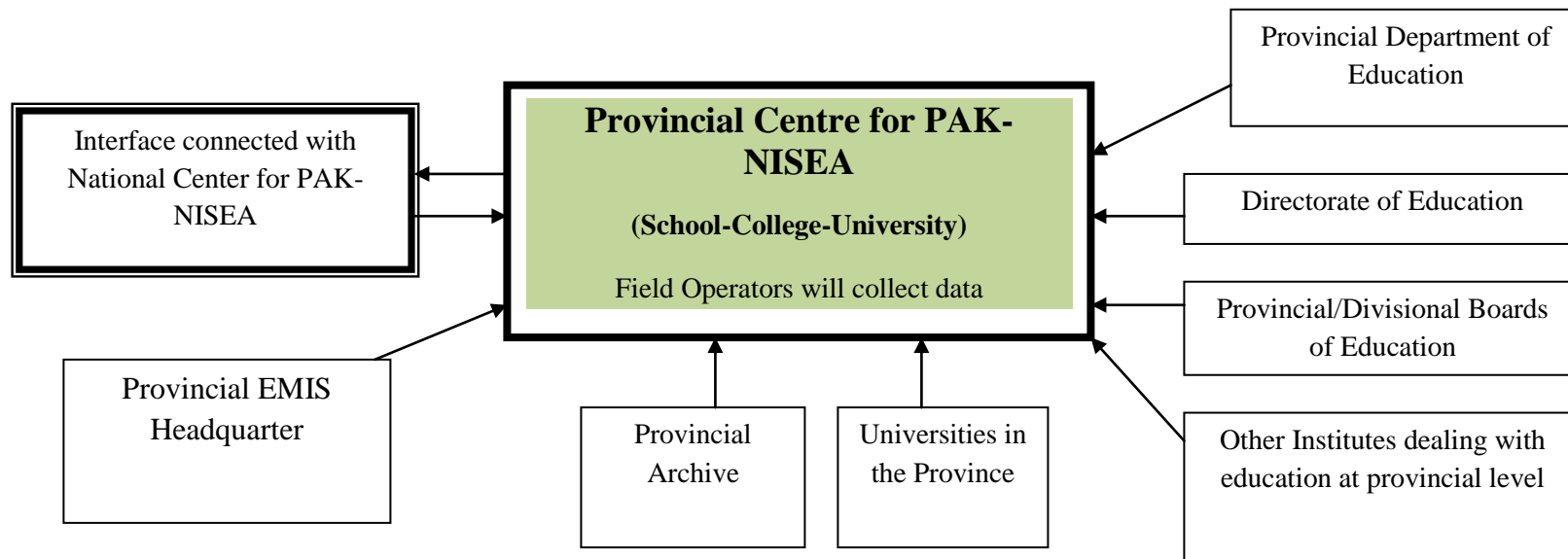


Figure 6.2. Geographic Acquisition and Distribution Coverage Through Provincial Nodal Points for PAK-NISEA

District Nodal Points for PAK-NISEA

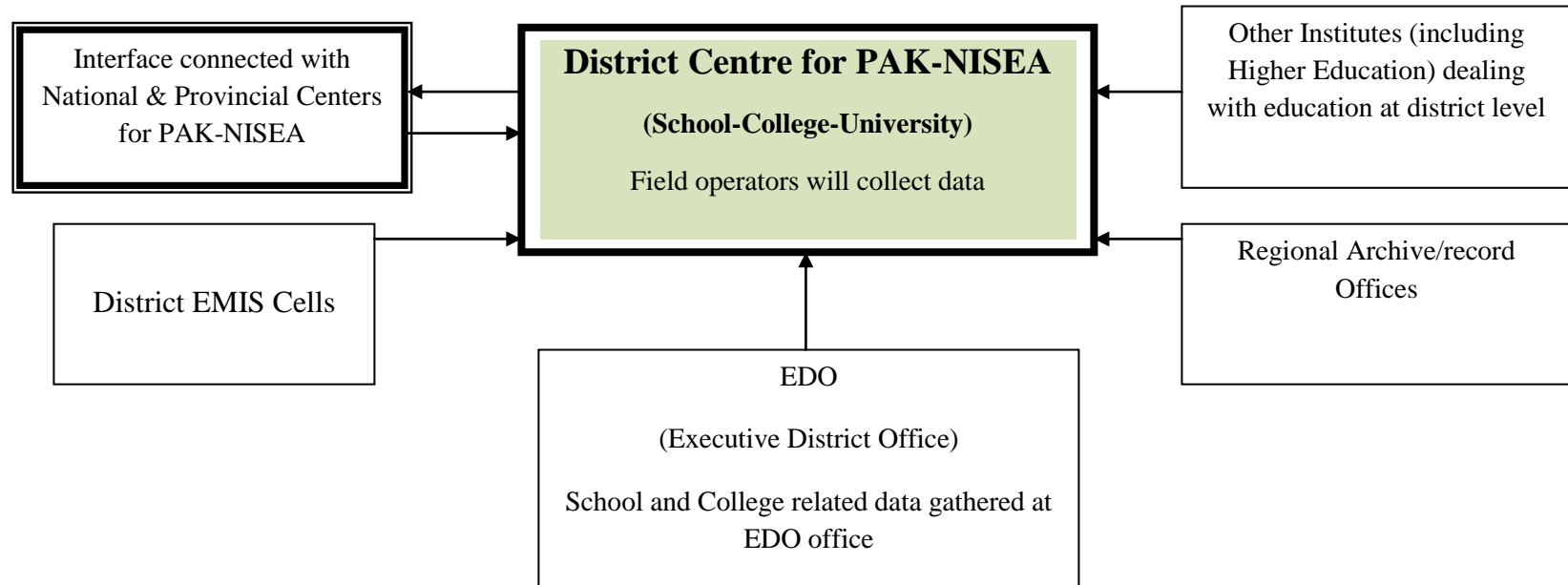


Figure 6.3. Geographic Acquisition and Distribution Coverage Through District Nodal Points for PAK-NISEA

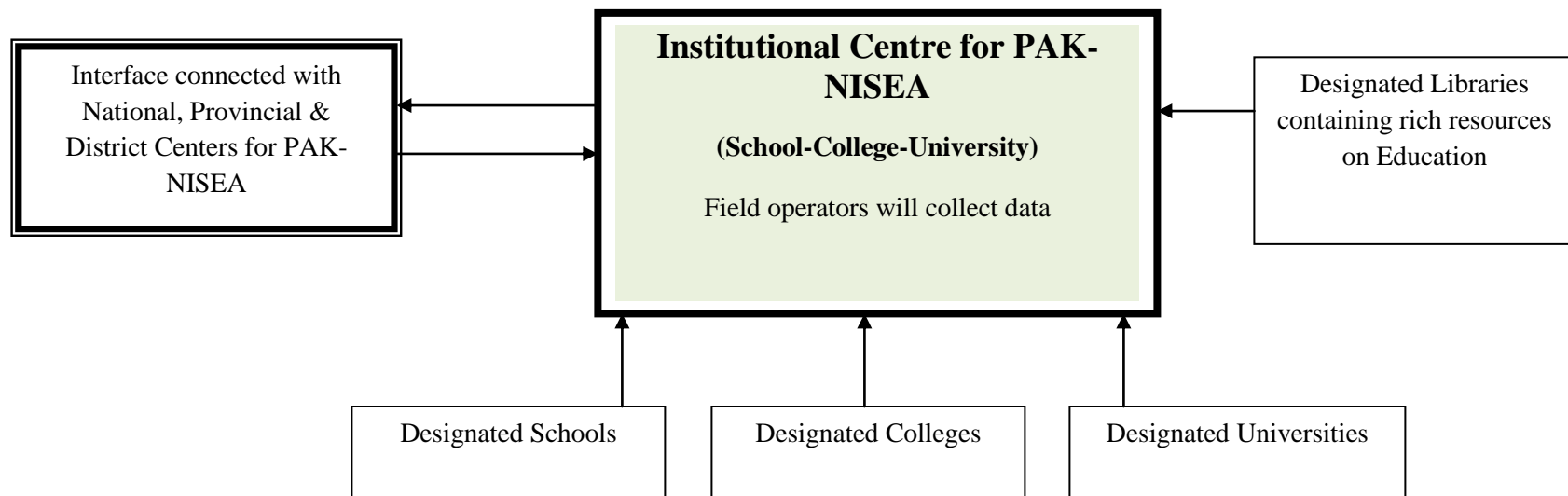
Institutional Nodal Point for PAK-NISEA

Figure 6.4. Geographic Acquisition and Distribution Coverage Through Institutional Nodal Point for PAK-NISEA

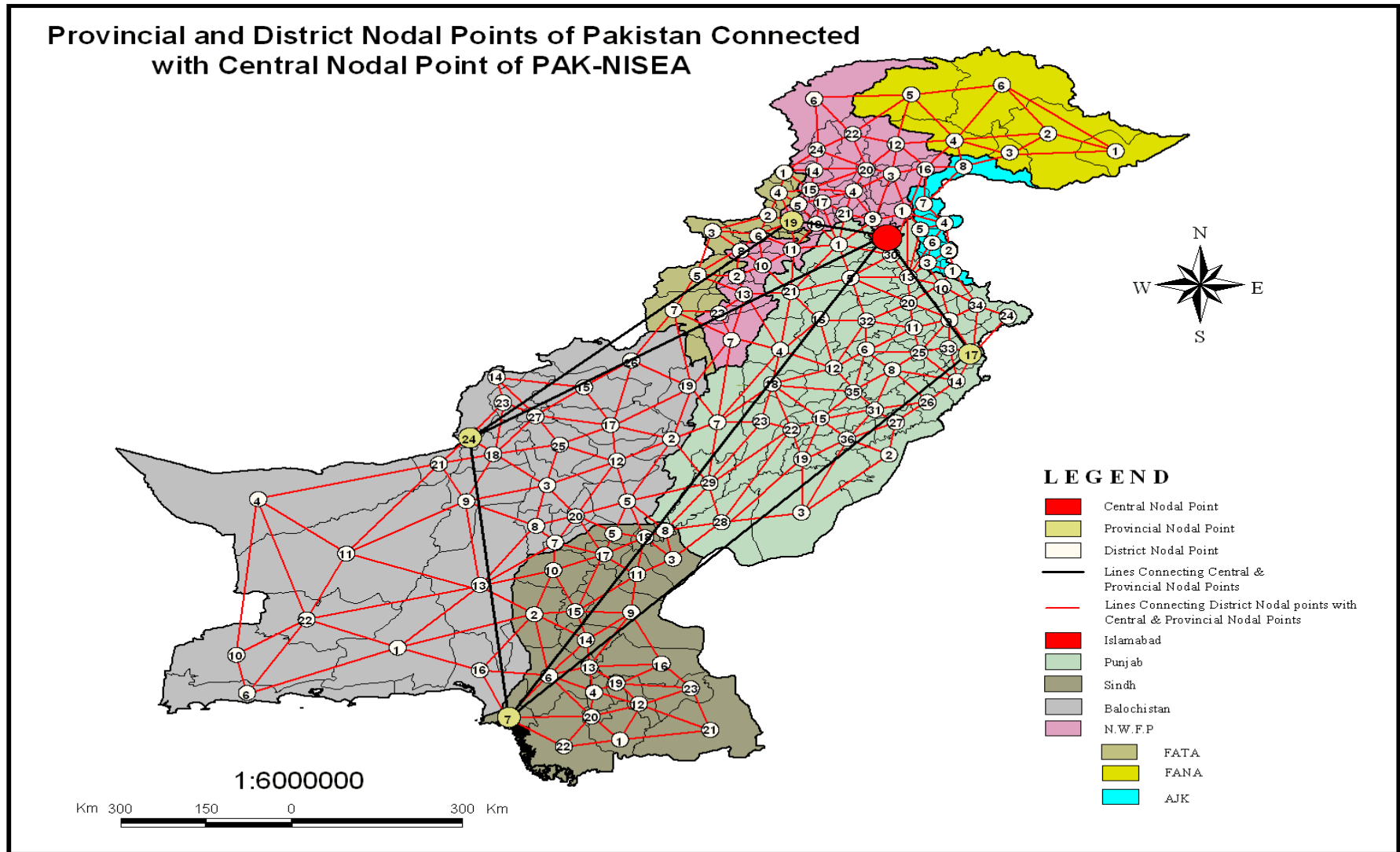


Figure 6.5. Complete Network of Provincial and District Nodal Points of Pakistan Connected with National Nodal Point of PAK-NISEA

6.4.2.7. *Type of Information Acquired*

Pakistan National Information System for Educational Administrators (PAK-NISEA) will acquire and generate information for users in the following essential fields:

- Management and administration of the education system
- Research on and planning of the education system (macro and micro)
- Monitoring and evaluation of the education system.

Generally, three different levels of data use can be determined from the reviewed literature, which correspond to the tasks and particular activities of the education system (See Figure 6.6 adapted from UNESCO). At *macro level*, administrators are responsible for strategic decisions encompassing the planning of entire education system. Decisions concerning the general policy and possible medium or long-term objectives are made at this level, so more aggregated and synthesized information (by integrating all available data) will be required for setting the objectives on national, regional or provincial level. The *intermediate level* comprises decision-makers who are in charge of management and control of the allocation of resources, for an efficient and equitable distribution. This level translates the general objectives into more technical, and operational decisions, so more specific data will be needed to detect eventual malfunctions and to optimize the use of resources. The *micro level* corresponds to operational tasks, and to more daily activities, closer to the school, college and university units. The decision here has local and immediate reach and hence will require more detailed information.

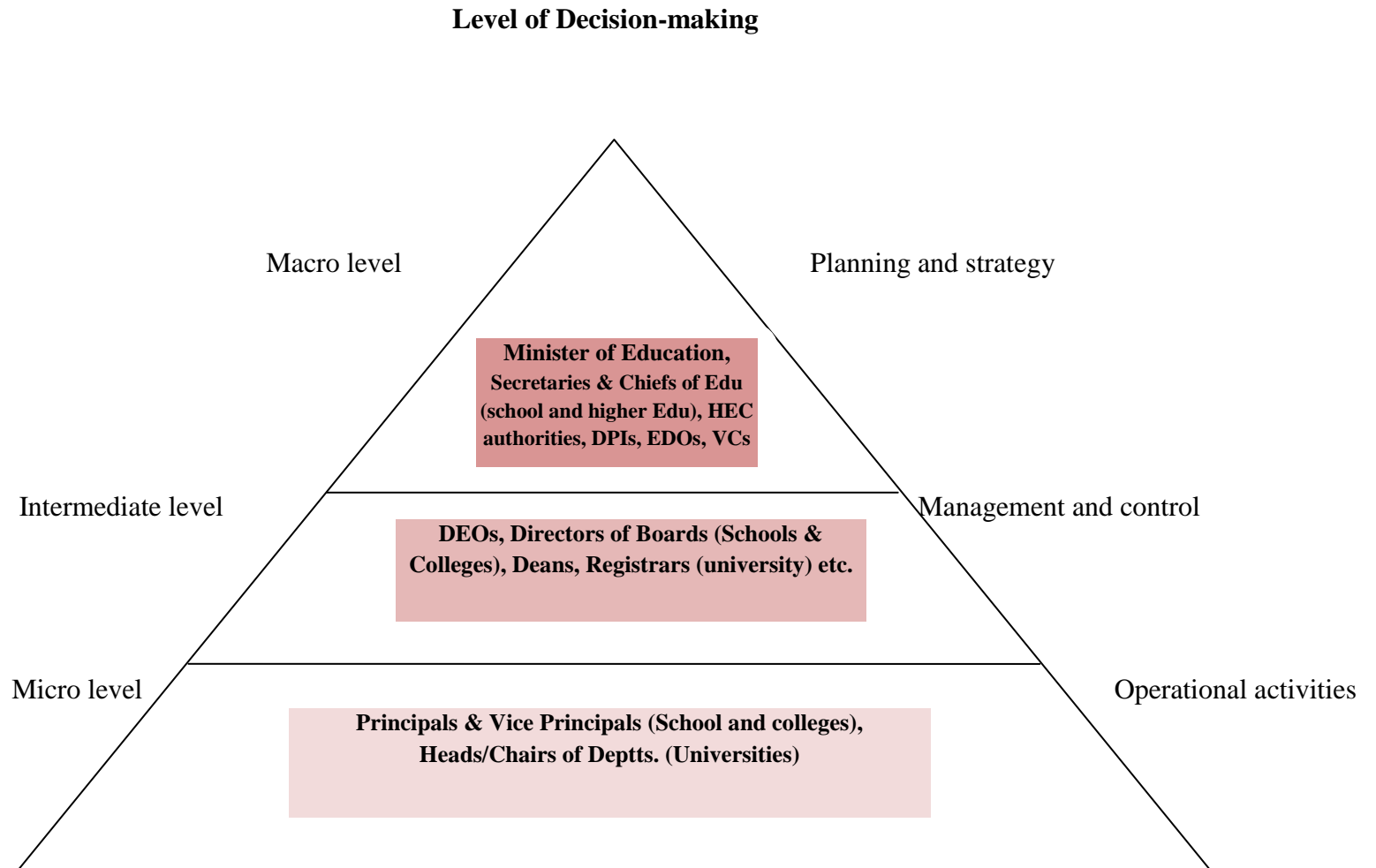


Figure 6.6. Use of Information by Level of Decision-making (Liberally adapted from UNESCO, 1992)

Thus, these three decision-making levels, which sometimes overlap each other at the administrative levels, require distinct information. They are however linked because decisions at the macro level would be relevant and efficient in as much as they are based on precise and reliable information gathered from the lower levels. The information system should necessarily integrate these complex relations between the different levels of decision making to fulfill its role efficiently. In summary, PAK-NISEA is aimed to acquire and disseminate information at all levels of the education system for all areas of reflection and decision-making.

6.4.2.7.1. Modules of the PAK-NISEA:- Contents needed by the users of PAK-NISEA were assessed during the questionnaire survey and personal interviews conducted by the researcher (analyzed in Chapter 4 & 5). These contents will be provided to the different categories of users of PAK-NISEA. Three different modules will be developed for school, college and university administrators working at micro level. Tables 6.3-6.5 present the major categories of needed information assessed during the survey. These categories will be covered in their respective modules and will help not only in their routine and operational responsibilities but will facilitate the management, control and planning activities as well. Similarly, Table 6.6 presents the major categories of needed information assessed during the personal interviews with the educational administrators (most of them were working at intermediate level). These categories will be covered in the fourth module along with aggregated data based on previous three modules and will help in their routine operational, management, control, planning & development responsibilities. The fifth module will contain aggregated data based on all four modules, which

will be used by the educational administrators working at macro level (who are engaged with strategic planning of rest of the education system).

Table 6.3. *Major Information Categories which will be Covered in School Administrators' Module*

R	Major Categories of Information Needed by School Administrators
1.	Education policy
2.	Leave rules
3.	Financial rules
4.	Pension rules
5.	Government Grants
6.	Education codes/calendar of their own schools
7.	Purchase rules
8.	Staff development
9.	Curriculum of Punjab/Federal Boards
10.	Student activities
11.	Personnel evaluation methods
12.	Govt. of Punjab employment rules
13.	Current data about educational developments
14.	Current trends in education
15.	National comparison reports of different teaching programs & teaching methods
16.	IT solutions for administrative work
17.	Personnel working behavior
18.	Market value of their school alumni
19.	Different Options and alternatives related to administrative work
20.	Community perception about their school
21.	Evaluated and aggregated data about education
22.	Demographic data related to education

Table 6.3. (continued)

-
- | | |
|-----|--|
| 23. | Human Relations |
| 24. | Govt. of Pakistan employment rules |
| 25. | Competitors' strengths & weaknesses |
| 26. | Employment rules of other provincial governments |
| 27. | Rules of other private schools |
| 28. | Politics at institutional and national level |
-

Note:- Many categories can be used for operational, management & control, and planning & strategy as well.

Table 6.4. *Major Information Categories which will be Covered in College Administrators' Module*

R	Major Categories of Information Needed by College Administrators
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- | | |
|-----|---|
| 1. | Current trends in education |
| 2. | Purchase rules |
| 3. | Education policy |
| 4. | Staff development |
| 5. | Leave rules |
| 6. | Pension rules |
| 7. | Financial rules |
| 8. | Current data about educational developments |
| 9. | Personnel evaluation methods |
| 10. | Student activities |
| 11. | Human Relations |
| 12. | Government Grants |
| 13. | Personnel working behavior |
| 14. | Government of Punjab employment rules |
| 15. | Different Options and alternatives related to administrative work |
| 16. | Market value of their college alumni |
-

Table 6.4. (continued)

-
17. National comparison reports of different teaching programs & teaching methods
 18. Education codes/calendar of their college
 19. Research output of their college & faculty members
 20. IT solutions for administrative work
 21. Evaluated and aggregated data about education
 22. Ranking criteria of colleges
 23. Competitors' strengths & weaknesses
 24. Demographic data related to education, i.e., No. of colleges, teachers, students etc.
 25. Community perception about their college
 26. Government of Pakistan employment rules
 27. Curriculum of other boards and universities
 28. Research output of other colleges & faculty members
 29. Politics at institutional and national level
 30. Rules of other boards and universities
 31. Employment rules of other provincial governments of Pakistan
 32. Education codes of other colleges
-

Note:- Many categories can be used for operational, management & control, and planning & strategy as well.

Table 6.5. *Major Information Categories which will be Covered in College Administrators' Module*

R Major Categories of Information Needed by College Administrators

1. Education policy
 2. Current data about educational developments
 3. Government Grants
 4. Research output of university/faculty members
 5. Staff development
 6. Current trends in education
-

Table 6.5. (continued)

-
7. Student activities
 8. Education codes/calendar of their own universities
 9. Demographic data related to education, i.e., No. of universities, teachers, students etc
 10. National comparison reports of different teaching programs & teaching methods
 11. Curriculum of other universities
 12. Ranking criteria of universities
 13. Different Options and alternatives related to administrative work
 14. Personnel evaluation methods
 15. Market value of their university alumni
 16. IT solutions for administrative work
 17. Research output of other universities/faculty members
 18. Leave rules
 19. Human Relations
 20. Evaluated and aggregated data about education
 21. Financial rules
 22. Community perception about their own universities
 23. Purchase rules
 24. Personnel working behavior
 25. Rules of other universities
 26. Pension rules
 27. Government of Pakistan employment rules
 28. Competitors' strengths & weaknesses
 29. Education codes of other universities
 30. Government of Punjab employment rules
 31. Politics at university and national level
 32. Employment rules of other provincial governments of Pakistan
-

Note:- Many categories can be used for operational, management & control, and planning & strategy as well.

Table 6.6. *Major Information Categories which will be Covered in the Management & Control Level Administrators' Module*

R	Major Categories of Information
1.	Faculty/staff's and students' retentions, achievements and attitudes
2.	Status of available resources
3.	Government rules
4.	Political priorities/current affairs
5.	Financial rules
6.	Opportunities/grants
7.	Qualitative literature on education i.e. research reports
8.	Curricula
9.	Statistical data
10.	Management techniques for time and crisis management
11.	Literacy rate
12.	New trends in education
13.	Information about training programs
14.	Means of communication with staff
15.	Different Rules & Regulations i.e. pension & leave rules
16.	Current data about education
17.	Five years plans
18.	Ratio of institutions according to the population
19.	Information about all stake holders of education system

6.4.2.8. Media Classification

The acquired media will include printed materials, audio/visuals, microform and electronic material. Acquired material will be processed by the National Center of PAK-NISEA. The distribution format will be electronic/digital (most of the survey respondents showed their preference for e-format, though print was among the most preferred). On demand/request, the print, microform, or audio/visual material will also be provided (with

nominal charges). The details of different type of media which will be acquired, processed and maintained by the National Center is as follows:

6.4.2.8.1. *Print Media*:- refers to books, reports, pamphlets, speeches, and other types of on-paper information.

6.4.2.8.2. *Audio/Visual Media*:- refers to that information contained on slides, transparencies, photographs, educational films, audio video tapes, charts etc.

6.4.2.8.3. *Microform Media*:- refers to any form of micro-record, whether on flat or roll film, paper or other material.

6.4.2.8.4. *Electronic Media*:- refers to the digital material stored on CD-ROMs, Hard-disks, Flash or accessible through Internet.

6.4.2.8.5. *Electronic Publishing and Distribution of Information Resources*:- E-Publishing is the blanket term for a range of publishing processes by electronic means. The publication and dissemination of information by PAK-NISEA will be via the Internet. (i.e., Electronic document delivery, Electronic journal, Multimedia publishing, and Parallel publishing).

6.4.2.8.6. *Core Network of PAK-NISEA*:- Existing Optical Fiber System of PTCL/NTC and IP/ATM backbone of NTC will be utilized for the CORE network of PAK-NISEA (This architecture is already being used by PERN project). It will allow institutions to pool resources with PAK-NISEA through a national fiber network and to access Internet from the respective nodal points.

6.4.2.9. Information Acquisition

The proposed Information System will be based on information resources acquired from: a) Libraries (i.e., National Library of Pakistan, academic, special and public libraries etc.); b) Archives (i.e., National Archives of Pakistan, Provincial archives, and institutional archives etc.); c) Data and Documentation Centers (i.e., NEMIS, Federal Bureau of Statistics, Population Association of Pakistan (PAP) Secretariat etc.); d) Institutes dealing with education at school, college and university level (i.e., HEC, Federal Board of Education, Provincial Boards of Secondary and Intermediate Education, Ministry of Education, Planning Commission of Pakistan etc.).

6.4.2.9.1. Methods for Acquiring Information:- Different methods of agreement are currently used for this purpose. Government of Pakistan should designate the proposed system PAK-NISEA as a national repository of educational resources by passing a bill through Parliaments. Thus the all above mentioned institutes will provide information to PAK-NISEA through a standing agreement. According to this agreement, the educational information producers and/or suppliers in the public/government sector will be bound to provide PAK-NISEA with copies of newest or most up-to-date information related to the scope of PAK-NISEA.

Besides these standing agreements, solicited acquisition (on request) and unsolicited acquisition (information pieces sent to the system without request by different sources be assumed to be useful for the system) channels will also be utilized. PAK-NISEA will also acquire information from private sector institutions/suppliers/vendors within the country and abroad through standing orders (a contracted provision of

information to a system by a supplier at cost). Above mentioned agreements are currently used by different information systems of the world i.e. ERIC, NTIS etc.

6.4.2.10. Information Selection

Information will be selected by the PAK-NISEA. Survey findings have revealed the area of interest of different sectors of educational administrators (i.e. school, college and university). All education related information (accepted in terms of content, scope of coverage, reproducibility, availability and media of presentation) will be acquired by PAK-NISEA. All three kinds of information resources i.e. formal (Published material), informal (unpublished material and/or grey literature- not available from commercial channels) and tabular (Statistical data) will be selected and collected by PAK-NISEA from different sources (See Figure 6.7). PAK-NISEA will be consisting on: 1) a Library; 2) a Data Center; 3) a Clearing House; 4) a Digitization Unit; 5) an ICT Unit; and 6) two Research and Development (R&D) Cells. Relevant information will be selected, acquired and then processed by these units of the PAK-NISEA (See Figure 6.8). The functions of each unit will be as follows:

6.4.2.10.1. Library:- The library will work in the National Center (PAK-NISEA) to: a) function as a repository of educational resources; b) acquire/collect, process, organize and lend primary and secondary sources of information i.e., books, journals, thesis, reports etc.; c) prepare and maintain card catalog and OPAC; and d) provide access to online resources and Internet.

6.4.2.10.2. Research and Development (R&D) Cells: Two separate R&D Cells for school and higher education will work in the National Center to: a) collect data and conduct research on different aspects of education; b) collect research studies conducted

by different institutes on different institutes of education; c) acquire the tacit knowledge through interviews and send it to CH; and d) develop reform programs based on the research findings.

6.4.2.10.3. Clearing House (CH):- will work in the National Center to: a) act as a link between information producers and publishers related to the scope of PAK-NISEA; b) acquire and publish informal and unpublished resources for publication; c) separate the policy and administrative information items from operation and research resources; d) seek out users of PAK-NISEA and maintain their information need profiles and receive users' feedback for further actions; e) evaluate and synthesize available information for meeting potential users' information needs; f) provide SDI, CAS, TOC etc.; g) provide Human support and full computer-assisted support for information discovery and access process; and h) conduct user education programs.

6.4.2.10.4. Documentation Center:- will work in National Center to: a) digest the primary sources of information into a form which is directly accessible for the users of PAK-NISEA; b) compile bibliographies; c) prepare indexes and abstracts; and d) translate the resources (in English, Urdu and regional languages etc.).

6.4.2.10.5. Digitization Unit:- will work in the National Center to: a) digitize the resources acquired or prepared by the National Center; and b) provide the digital copy (Online and on CD-ROM) to the ICT Unit for its online availability to the sub centers and potential users

6.4.2.10.6. ICT Unit:- will work in the National Center to: a) connect the national, provincial, district and institutional Nodal Points/Centers with each other; b)

maintain the online database of digitized resources of PAK-NISEA; c) assign metadata to the digital information resources; and d) provide online access to these resources.

6.4.2.11. Information Processing and Storage

Keeping the findings of the study in view, the data/Information collected by the provincial, district, and institutional centers will be sent to the National Center of PAK-NISEA. The processing of the data/information will be at National Center. Different organizational units of PAKNISEA will play their assigned role in the processing i.e. digitization (from other formats), assigning metadata to e-resources, indexing, abstracting, classification, cross referencing and cataloging of the material etc. (as shown in Figure 6.8). Online access will be provided to each member Nodal Point/Center of the PAK-NISEA.

6.4.2.11.1. Centralized Processing Supported by Web based Environment:- The centralized processing will be supported by the Web based environment as it is recommended by most of the interviewees and emphasized in the literature. The field coordinators will collect the data from their specified geographic regions and/or institutions and will provide it to their respective nodal points. The data operators at those nodal points will enter the data in the central database accessible through WWW. This data will be further processed by the National Center of PAK-NISEA to maintain the uniformity.

Note: The information gathered by all the nodal points and integrated systems will be collected at the National Center for PAK-NISEA. Since data (electronic) will come from different sources, the file format of all the data types would be different (i.e.,

some file format would be in PDF file some in Microsoft word. Similarly some data would be recognized by Windows OS and some by Linux). This variety of file formats would create difficulties. At this level, the IT Center of PAK-NISEA should create a program that would act as interpreter between the data and the end-user. This program will read all the data and then convert all the data into **.csv** file (Comma Separated Values (CSV) File format). After this processing all the data would become in one format and this will enable the data for further use by PAK-NISEA staff and end-users.

6.4.2.11.2. Information Stored in Online Database from Local Files:- The processed information will be stored in online database from local files (See Figure 6.9). Users' feedback (comments from users about what has been proposed and/or offered by PAK-NISEA) will also be received through online interface and will be analyzed and used by Clearing House for further actions and changes.

6.4.2.11.3. Language of Material:- Keeping the survey findings in view, most material will be in English (On demand translations of documents will be provided in Urdu and Regional Languages i.e., Punjabi, Sindhi, Saraiki, Pushto, and Balochi etc.). Similarly, documents from Urdu and regional languages will also be translated in English.

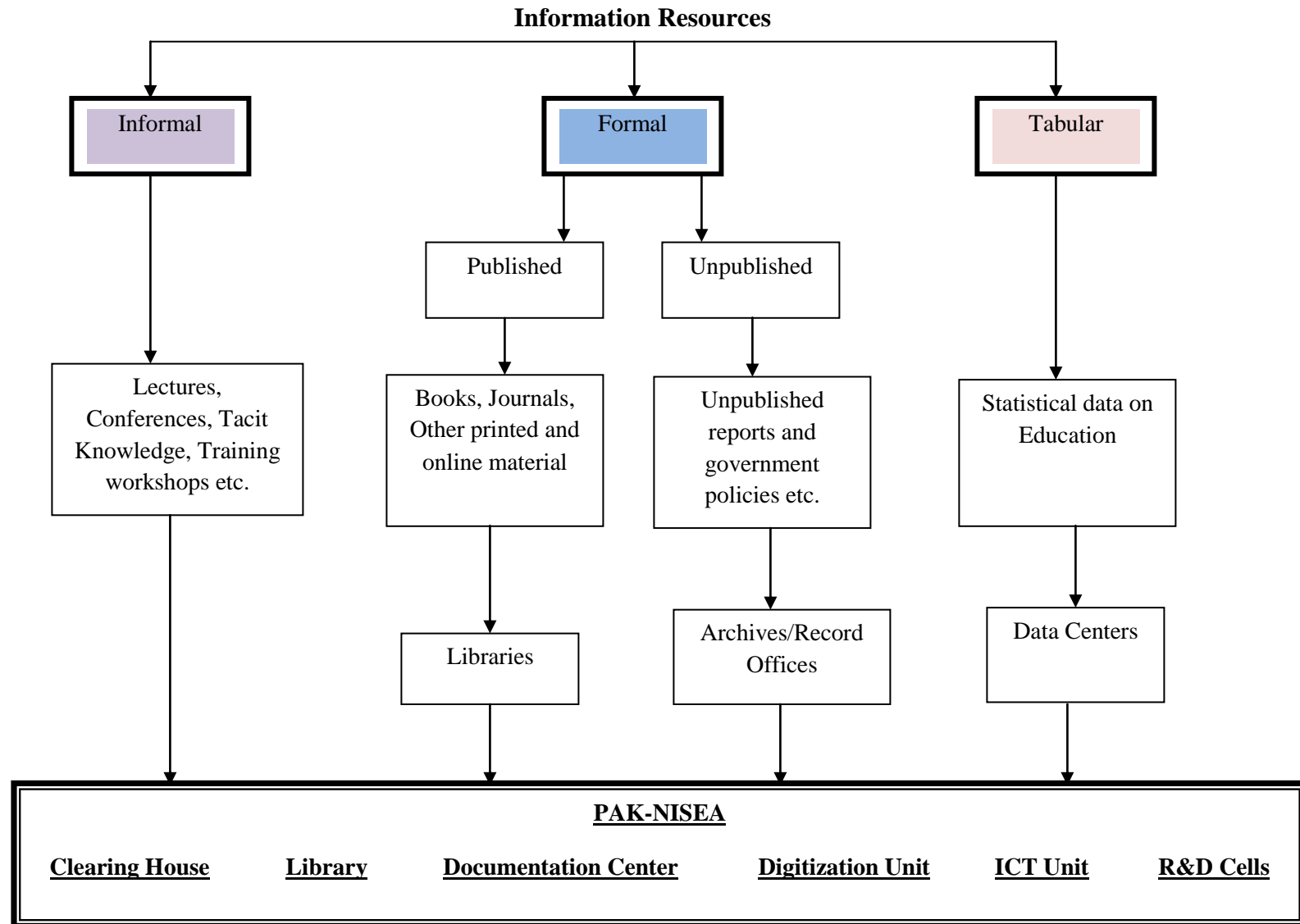


Figure 6.7. Types of Information Resources which will be Acquired by PAK-NISEA (Continues as figure 6.8)

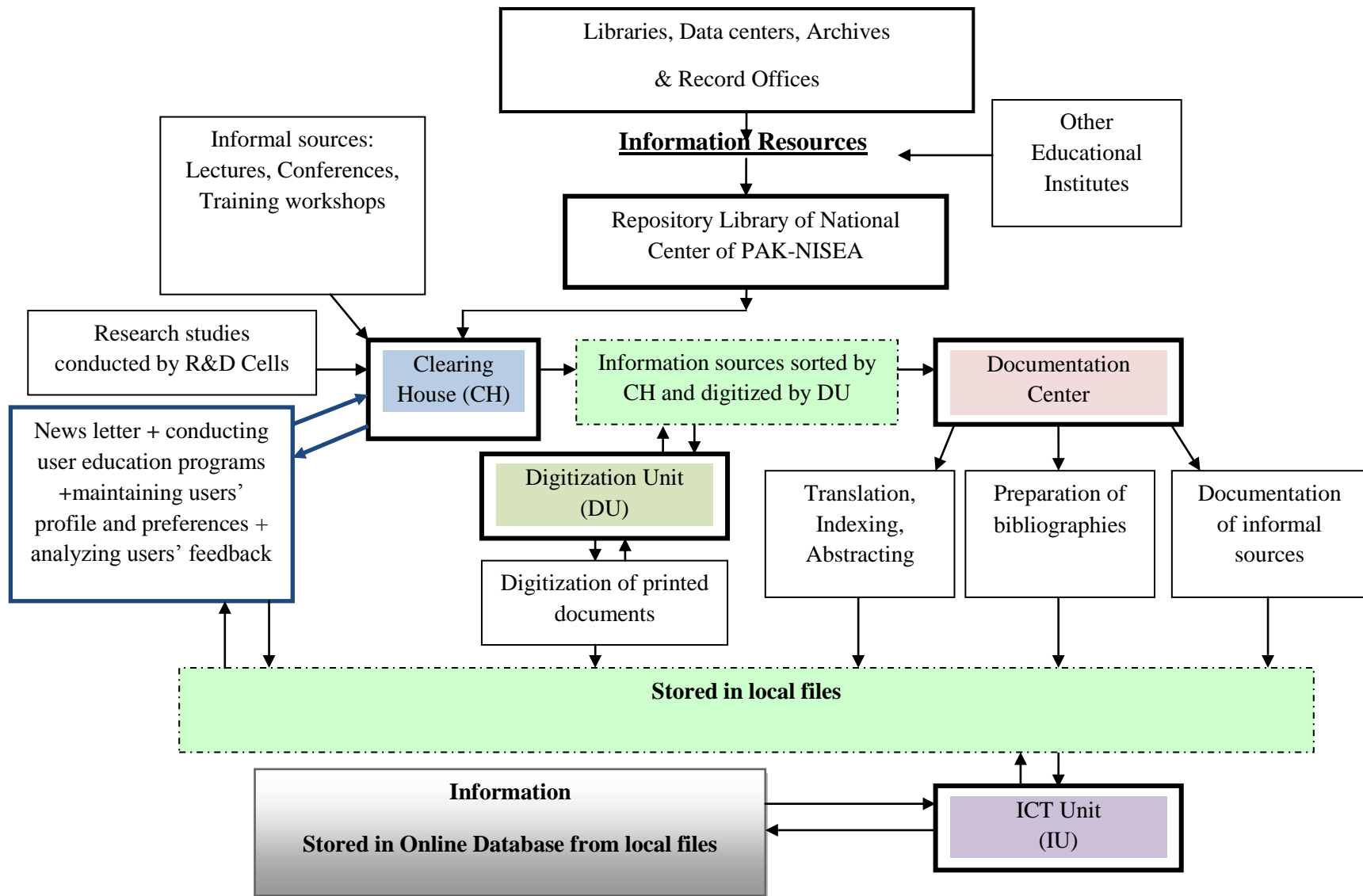
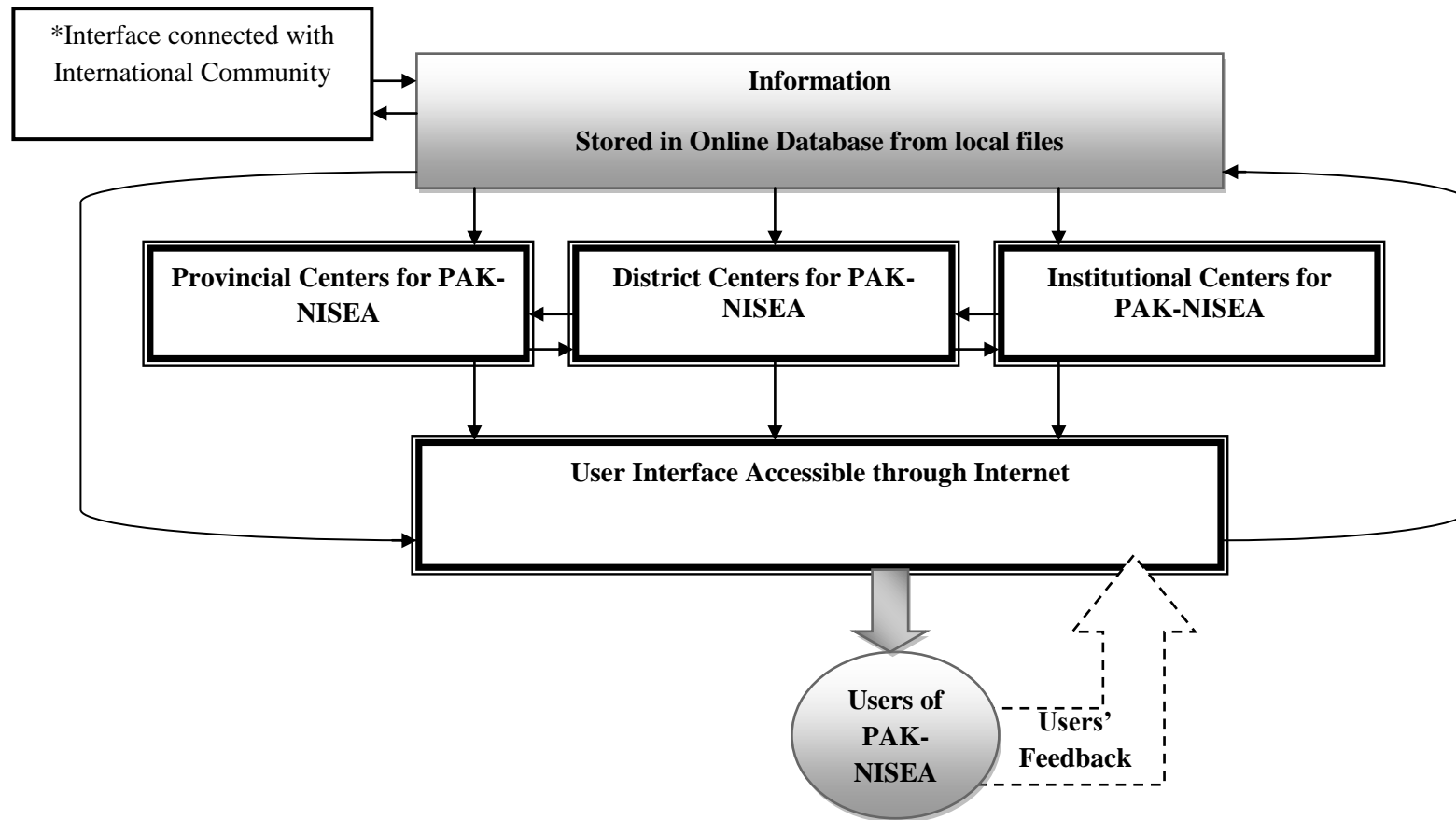


Figure 6.8. Organizational Units of PAK-NISEA (Continues on figure 6.9)



***International Community**= Information systems and services of other countries i.e. ERIC, etc.

Figure 6.9. Integrated Web Based Environment of PAK-NISEA

6.4.2.12. Products and Services

The services will be based on “Knowledge Environment Model”, which is less system focused, and more clients focused. So following will be the prominent features of the proposed services/products: a) available information will be timely, accurate, relevant, valid and reliable; and b) adaptability, noise reduction, low cost, comprehensiveness, easiness of use, and high quality. The products and services proposed here are based on survey and interview findings. Following products and services will be rendered by the proposed information system:

6.4.2.12.1. Bibliographical Services:- such services will be provided to inform the users on the published material related to education and for this purpose a bibliography will be produced consisting of a continuing series of publications, or bibliographical information as requested.

6.4.2.12.2. Documentation Services:- Semi published material, reports, proceedings, minutes of the meetings and other related material will be acquired, documented and communicated to the PAK-NISEA users.

6.4.2.12.3. Indexes, Abstracts, and Full Text Resources:- Classified abstract of current books, and periodicals accompanied by adequate bibliographical descriptions will be provided to enable the users to trace the relevant publications or articles. An index (a detailed alphabetical list or table of topics, names of persons, places, etc) will also be provided. Besides these indexes and abstracts, full text resources (electronic versions of documents) will also be accessible for the users of PAK-NISEA either through subscription-based services or via open access.

6.4.2.12.4. State of the Art (Techniques and Technologies):- Alerting services will be provided with an intention to keep the users aware of state of the art teaching and

administration techniques and new technologies/tools in the field of education. These services will be provided through email, news letter, workshops, and/or through PAK-NISEA website.

6.4.2.12.5. Data Services:- Data on population, literacy rate, Gross Enrollment Rate (GER), Net Enrollment Rate (NER), inventories, cost profiles, etc. will be integrated with external data (such as survey reports etc.) and will be mounted in the central database. The data stored in central database of PAK-NISEA could be used to provide the educational administrators especially at the upper level with a consistent and reliable view of overall activities of the education enterprise.

6.4.2.12.6. Reference Services & Referral Services:- Assistance will be provided to the users in their search for information on various subjects. Such reference services will be provided on physical visit to the library of PAK-NISEA and through online chatting and/or email as well. Referral Services will also be provided to the users to guide them to the appropriate sources such as libraries, agencies, documentation centers and individuals.

6.4.2.12.7. Reprography:- The rare educational documents will be reproduced in facsimile of documents of all kinds by any process using light, heat or electric radiation (i.e. photocopies, microcopies, blueprints, electro-copies, thermo-copies, etc).

6.4.2.12.8. Translation:- Literary compositions of classic value from education point of view will be turned from one language into another (i.e. English or Urdu).

6.4.2.12.9. Web OPAC:- PAK-NISEA Library OPAC will be made available to users via a Web browser.

6.4.2.12.10. News Letter:- A monthly newsletter will be Issued by the PAK-NISEA, which will keep its users informed about the current happenings in the education enterprise.

6.4.2.12.11. Online Digital Library of Educational Resources:- An online digital library consisting on subscribed and open access resources related to education will be developed. The library will also provide access to the resources prepared and/or digitized by the PAK-NISEA. These resources will be stored in online database entitled 'PAK_Edubase', a highly detailed database of educational resources. An online thesaurus will also be produced to search the Digital Library.

6.4.2.12.12. Computer Mediated Communication (List-serve & Discussion Group):- To provide the users of PAK-NISEA, an opportunity of interaction with each other through computer, the listserv and online discussion group (an electronic forum accessible via Usenet for the world-wide discussion of education related topics) will also be provided, where educational administrators will share their experiences, views and problems with each other at national and international level.

6.4.2.12.13. Verbal Information Provided by Experts:- Verbal information will also be provided by a scholarly person (education expert) for providing individual users with customized solution of their specific problem. This service will be provided through email, telephone and personal visits.

6.4.2.12.14. Intranet & Portals:- An in-house network (constructed on the same model as the Internet) operating within the domain of PAK-NISEA will be provided to the users. The use of Web browsers will allow easy access and searching (as users apply standard Internet techniques). A *portal* or access point will be provided to all the electronic services that an end user could carry out the full range of tasks associated with PAK-NISEA. The resources will be made available brought together from more than one source with single sign-on. This portal will be personalized to the extent that upper level management will see a different view and will enjoy a different level of access than that of middle and/or lower level management.

6.4.2.12.15. Wikis for Encouraging User Participation:- Wiki (a website or other hypertext document collection) will be provided that will allow any user to add content and permit that content to be edited by others.

6.4.2.12.16. SDI, CAS, TOC, Article Alerts:- Updating and user specific services will be provided to the end users to keep them update with their area of interest. Such as SDI (Selective Dissemination of Information; the system whereby literature items will be matched against the interest profiles of end-users of PAK-NISEA and relevant documents/abstracts will be supplied to them immediately); CAS (Current Awareness Service), Article Alerts and TOC (Table of Contents service will include all forms of textual, electronic and Audio/Visual material, bibliographic datasets, statistical and other forms of data).

6.4.2.12.17. Full On-site and Remote Access:- All above mention services will be provided not only on-site but online remote access will also be provided to the users.

6.4.2.12.18. Users' Training and Continuing Education Programs:- PAK-NISEA will arrange different training programs for its users at national, provincial, district and institutional level for the better utilization of its resources and services.

6.4.2.13. Management Structure

Keeping the interview findings in view, PAK-NISEA will be a new setup under Ministry of Education, Government of Pakistan. The National Center of PAK-NISEA will be located at Islamabad. A separate governing body will be formed for its management. The governing body will be consisting on a chairman, a board of directors (8 directors), deputy directors (4), assistant directors (4), regional directors (4), researchers (4), field coordinators and data operators, librarians, subject experts, indexers/abstractors, information experts, IT experts and coordinators. Regional Directors will work in Provincial Centers of PAK-NISEA and will supervise the District Centers as

well. Field Coordinators will work in National, Provincial, District and Institutional Centers and will be responsible for data collection within their specified geographic areas. Their number would vary according to the population size of the area covered. Data Operators will work in National, Provincial, District and Institutional Centers for entering data into the online central database of PAK-NISEA through Web-based environment (See Figures 6.10 & 6.11).

6.4.2.14. Funding

According to the interview responses, principal funding body will be the Federal Government of Pakistan, besides Provincial Governments will also contribute their share in the funds. Other sources of generating funds will also be explored for fund raising and sustainability of the PAK-NISEA, such as fee based services (Membership fee & specialized services fee will also be charged from the private sector only) and/or foreign funding (funds from international organizations on the conditions not contradicting with the basic objectives of PAK-NISEA will be explored and availed. Such organizations include UNESCO, World Bank, Asian Bank, JICA, IIEP, IBE, UNICEF, UNDP etc.). Thus 60% funding will come from Federal Government, 35% from Provincial Governments and 5% from other sources i.e. fee based services and foreign funds (if possible). All the funds (100%) will be allocated to the National Center of PAK-NISEA. The funds to the Provincial Centers of PAK-NISEA will be provided according to their requirements (i.e. population size). Each District and Institutional Center will get their share from the funds provided to the respective Provincial Centers.

Government of Pakistan

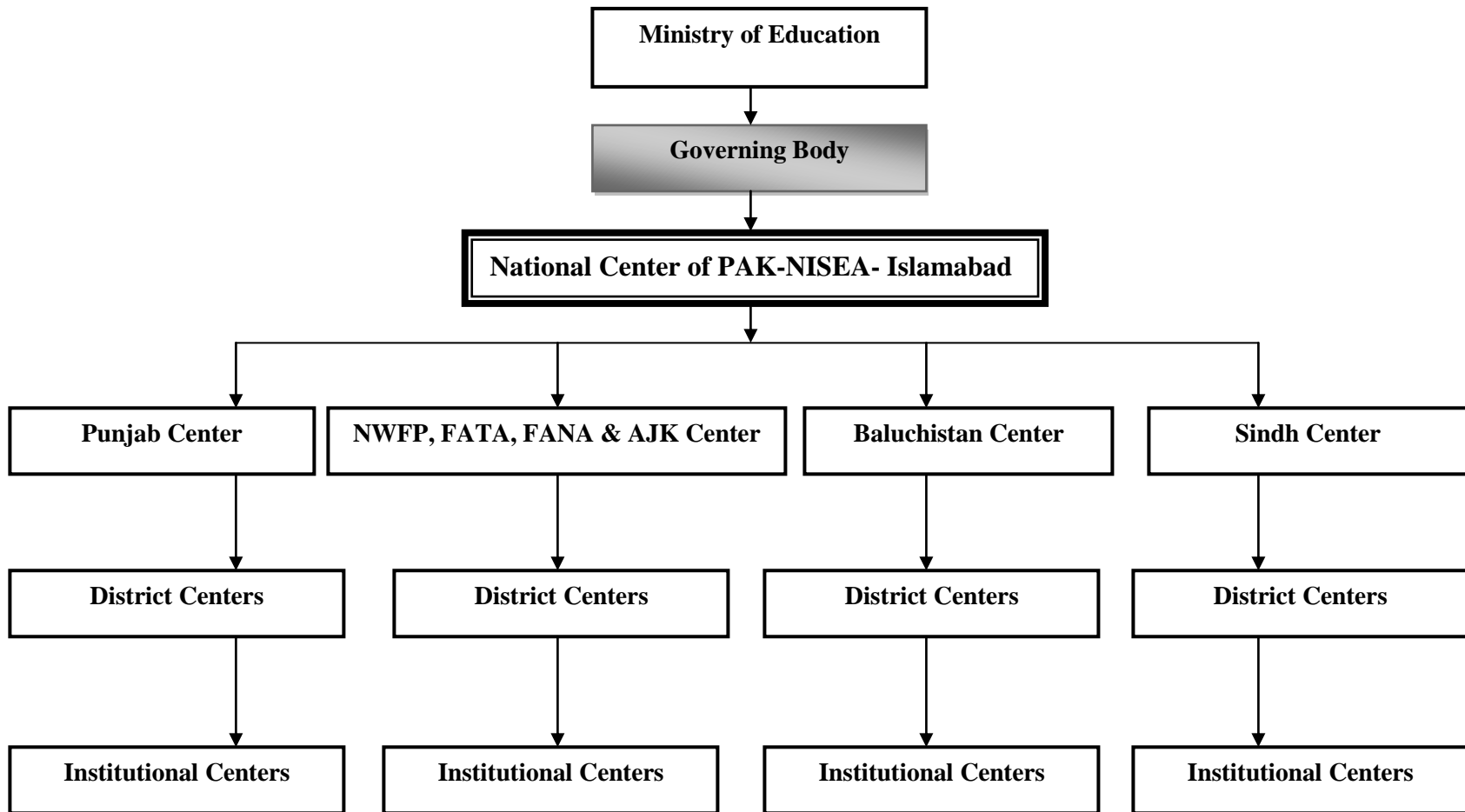
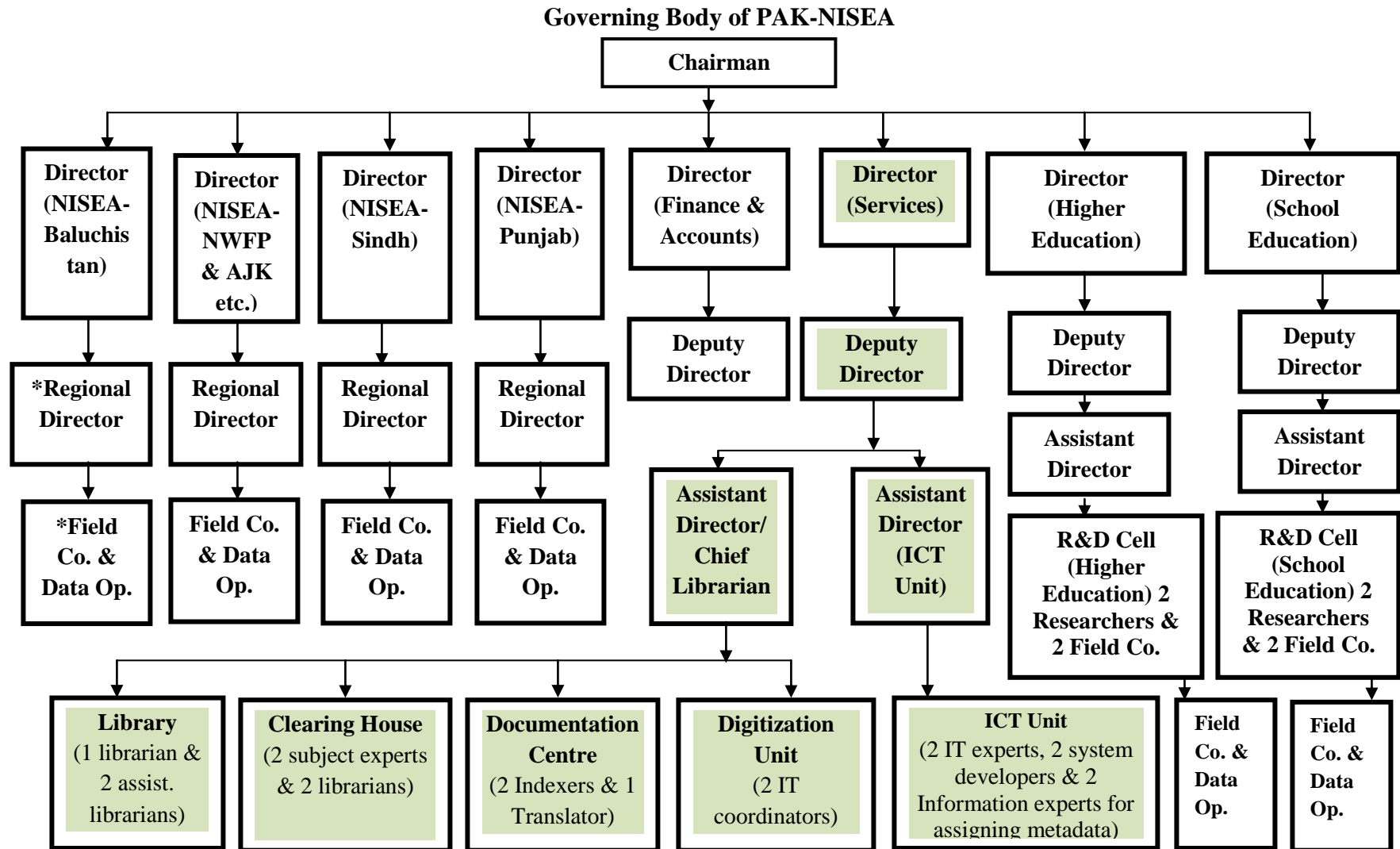


Figure 6.10. Organogram of PAK-NISEA



***Regional Directors**= will work in Provincial Centers and will supervise the District centers as well. ***Field Coordinators**= will work in National, Provincial, District and Inst. Centers and will be responsible for data collection. There number would vary according to the population of geographic area covered. ***Data Operators**= will work in National, Provincial, District and Inst. Centers for entering data into the Online central database of PAK-NISEA through Web-based environment.

Figure 6.11. Organizational Chart of Governing Body for PAK-NISEA

6.5. Findings of the Chapter

The proposed draft Model is based on the data collected through literature review, questionnaire survey and interviews of experts and intends to serve as a National Information System for Educational Administrators in Pakistan. This chapter aims to provide some ideas to facilitate the construction of PAK-NISEA and its development. It also intends to show that this construction is attainable and assessed by the experts of the field. In the light of experts' recommendations, a revised draft of a centralized model accessible through integrated web-based environment is proposed. Its development is proposed in phases by using the *Spiral Model*. Services and access issues are tried to be made more user-centered with the help of *Knowledge Environment Model*. Major components of the model include: primary users; geographic acquisition and distribution coverage and type of information acquired; media classification; information acquisition; information selection; information processing; information storage; products and services; and management structure and funding. Diagrams and illustrations are provided to make the processes more understandable.

Chapter 7

CONCLUSIONS AND RECOMMENDATIONS

This chapter aims at concisely summing up the findings and conclusions of the study and proposing some recommendations. It also puts forward topics for further research.

7.1. Scope and Conduct of the Study

The definitive purpose of this research is to develop a draft model for educational administrators in Pakistan. The study was conducted in four phases. In the first phase, literature search was conducted for the better understanding of the theoretical and technical aspects of the study and for developing the theoretical framework of the study. This thorough literature search led to the second phase of the study i.e. the development of survey instruments. In this phase the qualitative and quantitative data were collected with the help of survey instruments. The data were then quantitatively and qualitatively analyzed to reach at conclusions. In the third phase, an initial draft model of ‘Pakistan National Information System for Educational Administrators- PAK-NISEA’ was developed on the basis of findings of the study. The initial draft model was sent for assessment to the experts of Library & Information Science, Information System and Education within the country and abroad. In the final phase, the draft model was revised in the light of experts’ opinion and was presented in the thesis.

7.2. Findings Related to the Research Questions

This study tried to answer the three main and their further sub research questions. Major findings regarding the research questions are as follows:

***RQ-1. What is the Role of Information System in the Promotion of Education
Within a Country?***

In current age of science and technology, the role of education has come to be acknowledged as a vital factor for human development. Developed world achieved extraordinary socio-economic and technological developments because of the realization of this fact. Free flow of information is obviously an essential requirement for achieving educational goals and objectives, so they have sound information systems to facilitate their educational administrators and policy makers. Many information systems exist in not only the developed countries but in developing countries as well to connect the education enterprise in and between different countries to facilitate not only the research and other activities related to education but to assist their administrators/managers in their administrative pursuits. For example, Eurydice: The Information Network on Education in Europe; UCISA: Universities and Colleges Information Systems Association; ERIC: Education Resources Information Center; MREN: Metropolitan Research & Education Network; JANET: the UK's Education and Research Network; CANARIE: Network of Canada; DANTE: Delivery of Advanced Network Technology to Europe; AARNet: Australia's Academic and Research Network; INASP: International Network for the Availability of Scientific Publications; APAN: Asia-Pacific Advanced Network; SingAREN: Singapore Advanced Research and Education Network; CERNET: China Education and Research Network; NEIS: National Education Information System (Korea); EMIS: Education Management Information System (South Africa); and ERNET: Education and Research Network (India).

***RQ-1a. What are the Design Considerations of a User Centered Information
System in Education?***

Any information system makes sense only in the context of the purpose for which it was developed and used. The design of information systems has to take into account a number of factors. Indeed, the reason many information systems fail is because social issues (users and their work environment) are not taken into account at design and implementation stages. The researchers have provided many guidelines for information system development in education. They stress on the need to distinguish at least two basic dimensions; *the technological dimension*, which includes the physical infrastructures that support a network and ensure communication and information flows; and *the social dimension*, which includes both the system of relations between persons tied or linked by some common interest, such as system or institution and culture, that non-explicitly controls contacts between members of the network.

These guidelines can be listed as follows: a) Know the Background; b) Users and Their Needs; c) Types of Users; d) Types of Information Needs; e) Coverage; f) Centralized or Decentralized; g) Services; h) Organizational Considerations; i) Manpower Requirement; and j) Qualitative Considerations.

The interviewees suggested developing the prospective draft model of PAKNISEA in phases. With the successful completion of one phase, the other should be started. The approach for this purpose used is *Spiral Model* in which the objectives, alternatives and constraints are determined, mechanism is developed for risk analysis, and then prototypes are developed and implemented. If successful, the next level plan is developed and executed. For the design and provision of user-centered information services, the *Knowledge Environment Model* is good to be followed.

RQ-1b. What is the Existing System of Education and its Administration in Pakistan?

Pakistan, administratively comprised of four provinces, follows centralized system of education and there is statutory requirement for all schools and colleges to follow a national curriculum. The system has adopted three-tier mode (8+4+4) with distinct stages. Education is organized into five levels: primary (grades one through five); middle (grades six through eight); high (grades nine and ten, culminating in matriculation); intermediate (grades eleven and twelve, leading to an F.A. diploma in arts or F.Sc. science; and university programs leading to undergraduate and advanced degrees.

The Federal Government is assigned with the responsibility for policy, planning, and promotion of educational facilities in the federating units. In practice however, major education policies are formulated at federal level and they are passed on to the Provincial Education Departments for implementation. The Federal Ministry of Education administers the educational institutions located in the federal capital territory. Academic and technical education institutions are also the responsibility of the federal Ministry of Education, which coordinates instructions through the intermediate level. Above that level, a designated university in each province is responsible for coordination of instruction and examinations. Universities located in various provinces are administered by the provincial governments, but are exclusively funded by the federal government through the Higher Education Commission (HEC). Educational administration system in all the provinces of Pakistan is decentralized. Despite this fact, there are certain parameters, which differentiate the educational administration system of the provinces from one another.

RQ-1c. What is the Existing Information System/Network of Education in Pakistan?

A sound IT infrastructure exists in Pakistan. By utilizing this infrastructure, few information systems are available in different disciplines for example, geography,

health and education etc. National information infrastructure not only covers the technological aspects i.e. telecommunication networks but the institutions as well, which are the backbone of any information infrastructure. Role of libraries and information centers cannot be denied in this information infrastructure. In Pakistan, libraries are starved of materials, particularly foreign journals, so the importance of networking had long been recognized in Pakistan. Very few library and information networks are available in Pakistan. For example, PASTIC, PopLibNet: Population Libraries Network of Pakistan, and Pakistan Library Network. Many Pakistani library websites are accessible through World Wide Web (WWW). Similarly few educational information networks exist in Pakistan. For example, Pakistan Education and Research Network- PERN (2); National Educational Management Information System (NEMIS); iEARN Pakistan: International Education and Resource Network; and GÉANT network which connects Pakistan to 100 million researchers in Europe and Asia. The Electronic Government Directorate (EGD) has also planned many programs for the promotion and use of Internet for education and has decided to start capacity building programs at the IT institutes and universities and computer literacy programs for academic institutes.

RQ-2. What are the Information Needs and Seeking Behavior of Potential Users of Educational Information System?

The questionnaire survey and interviews conducted to find out the information needs and seeking behavior of educational administrators reveal that educational administrators are a distinct group of information users, whose information needs and information seeking preferences are largely conditioned by the demands and context of their work. They need information for performing different administrative tasks. These tasks vary from long term planning to daily and routine tasks.

They require government rules, grants, and policies for planning and/or decision-making. No formal information source/system is available for assisting the educational administrators, so they mostly rely on informal methods i.e. ask their peers, colleagues, ex- seniors and use social networks. For planning and decision making, they also rely on their tacit knowledge/experience. They use internal documentary sources or ask sister/government organizations, but rarely visit the library for their administrative information needs. English is the most preferred language for reading material and print is the most preferred format though electronic and A/V are also among the preferred formats.

RQ-2h. What are the Problems Being Faced by the Educational Administrators?

The data in this study identify many problems being faced by the educational administrators in Pakistan. For example, both information providers and seekers are not well trained in proper utilization of information, there is no connection between them and their behaviors are the bottle neck in this process. There is lack of ICT training and information literacy programs for educational administrators. Status of availability of needed information to all three sectors is not encouraging though university sector seems slightly better in this regard. Educational administrators in all three major education sectors are underprivileged in the availability of needed information, which is badly affecting the planning and decision making process. Currently existing educational management information system entitled “NEMIS”, working under Academy of Educational Planning and Management (AEPM), is not covering all tiers of education and Academy only conducts research on basic education. There is no institutionalized basis for collecting, processing and analyzing data, no technical support staff and little influence in policy making.

No integrated information system exists in real sense to facilitate the educational administrators up to the tehsil, district, provincial and national level. The administrators working at these stages require various types of educational information and data for proficient decision making and realistic planning. However, they often complain about the non-availability of the required and authentic information, in the nonexistence of which they have to fill the slits by rough calculations. They feel the need of having a proficient information system. There is scarcity of research on information needs and seeking behavior of educational administrators.

RQ-2a. Which Studies are Available on Information Needs and/or Seeking Behavior of Educational Administrators in Pakistan?

The literature reviewed in this study shows that no study to date has been conducted at national or local level to find out the information needs and seeking behavior of educational administrators covering the school, college and university level administrators in Pakistan, which is the core requirement for proposing or developing an information system to cater the nationwide needs. Only two local studies at master's level can be mentioned here which discovered the information needs and seeking behavior of college and school teachers and administrators within the Bahawalpur City.

RQ-2b. Which Tasks are Performed by the Educational Administrators?

The data collected through literature review, questionnaire survey and personal interviews suggest that educational administrators' information needs depend on their work environment and the work tasks/roles for which they are responsible. These tasks vary from long term planning to daily and routine tasks, such as budgeting, forecasting, controlling, problem solving, official correspondence, monitoring, curriculum development, staff development, personnel evaluation,

teaching & research, handling students' affairs, marketing strategies, fund raising, personal professional development, and time and crisis management. The literature reveals that the level of administration (macro, intermediate, and micro) also affects the information needs of the educational administrators.

RQ-2c. Which Sources are Used by the Educational Administrators in Pakistan for Seeking Needed Information?

The data in this study reveal that the educational administrators prefer the informal and personal sources of information, however as the experience increases the use of even informal sources decreases. This is may be due to the reason that experienced educational administrators at a certain stage of their professional life start using their personal experience and intuition. The preference for a source largely depends on the reliability and high quality of the source. They usually ask their seniors, peers, colleagues and/or other members of their social network. The internal documentary sources are also used, however the use of many formal sources such as library resources, and online information systems was comparatively low.

The use of different information and communication technologies among educational administrators has increased the efficiency of their work. and has made the information seeking and searching process easier. The results show that in Pakistan the use of ICTs (particularly Internet) has increased among educational administrators and they also perceive that it has made their work easier.

RQ-2d. Is There any Statistical Relationship Between the Information Source Preferences and the Administrative Experience?

The researchers also tried to find out whether there is any relationship between the administrative experience and the use of different formal and informal information sources. To test it statistically, the administrative experience was divided into three categories, i.e., 1-10 years, 11-20 years and 21-30 years and/or onwards. As both the

variables i.e., administrative experience and use or non use of formal and informal information sources represent the nominal level of measurement, the Chi-Square test was used. The results show that the use of these informal sources is significantly high among educational administrators although the use of even such sources decreases as the administrative experience increases. This is may be due to the reason that more experienced educational administrators prefer using their tacit knowledge and personal experience. On the other hand the use of other formal and informal sources is not different among all three categories of administrative experience. Almost all the formal sources (except formal staff meetings and result output) are less used by the educational administrators. On the other hand most of the informal sources (except discussion with librarian, communities of practice, intelligence staff and walking around) are most used by all three categories of educational administrators.

RQ-2e. What are the Information Needs of Educational Administrators?

The literature reveals that at the macro level the administrators need information for the overall policy making and planning. The intermediate level needs more detailed information on different aspects of the policy/plan to make those executable/implementable. On the other hand the micro level managers need more detailed information at the operational level. The educational administrators in Pakistan usually need information related to financial, employment and other government rules, current data about education i.e., curricula, literacy rate, ratio of institutions according to the population etc. The administrators were more concerned about the validity and reliability of information.

RQ-2f. To what Extent the Needed Information is Available to them?

The data in this study reveal that there is a gap in the availability and/or provision of needed information to the educational administrators. The reviewed literature also identifies that in Pakistan another problem faced by the policy makers

and planners is the non availability of accurate data about educational outputs and outcomes. According to the World Bank Group-IEG (2007), trends in output indicators (enrollment rates) are available, but outcome trends (learning achievement and employment) are not.

RQ-2g. Is There any Statistical Difference Between the Needed and Available Information to Educational Administrators in Pakistan?

Sector wise comparison of information needs and seeking behavior of all three groups (with Paired Samples T-Test) do not show major difference in their information needs and its availability, though university sector at some points seemed better in the availability of needed information. Thus it can be concluded that there is statistically significant gap in the availability of needed information to the educational administrators working in all three sectors of education. This gap in the availability of information is badly affecting the planning and decision making process. This fact is also traced from the open ended suggestions by the respondents.

RQ-3. How a Draft Model can be Evolved on the Basis of Reviewed Literature, and Views of Potential Users and Service Providers, Determined Through a Questionnaire Survey and Personal Interviews?

The results reveal that unluckily neither any comprehensive source is available for fulfilling the information needs of educational administrators in Pakistan, nor any manual, which can guide to their needed information resources. The accessibility of the already collected/available data is a big issue. The questionnaire survey and interview data highlighted the need for a national information system which can provide easy access to the information and will satisfy the information needs of educational administrators.

For designing a draft model of information system, a survey was conducted to assess the information needs and seeking behavior of school, college and university

administrators. Public sector schools (secondary) and colleges within Punjab and Islamabad Capital Territory (ICT) were selected through multistage cluster sampling. On the other hand, all the Public sector universities of Punjab province and ICT were covered for the survey. Interviews of three different categories of experts within Punjab and ICT were also conducted for in depth understanding of the phenomena. These interviews and review of the related literature helped in the evolving and designing of the system. Thus the proposed draft model is based on the data collected through literature review, questionnaire survey and interviews of experts and intends to serve as a National Information System for Educational Administrators in Pakistan.

RQ-3a. What are the Major Findings of Reviewed Literature?

Reviewed literature reveals that Pakistan has a reasonable Information and Communication Infrastructure. Many networks and information systems are working in their specific domains. Government is also taking interest in advanced ICT initiatives for the promotion of research and education culture in Pakistan. It is also evident that existing information systems designed to facilitate the educational administrators are not robust and well planned, as a result unable to facilitate the educational administrators in realistic planning and decision making. Most of the problems within the education enterprise exist due to the poor planning and unrealistic decision making by the educational administrators. This problem is also realized by the educational administrators and they often complain for the non-availability of an effective and efficient information system. An information system is the basis of educational planning and management process. During this process, the information system should inform its users on the state of the sector, its internal and external efficiency, its pedagogical and institutional operations, its performance, deficiencies and needs. A solid information system should be as complete as possible because the needs for information are varied and becoming increasingly complex. The system

should cover all the needs and areas for information and not only aim to collect, store data and process information but should also help in the formulation of educational policies, their management and their evaluation. An effective information system can be designed by analyzing the information needs of its users. On the other hand, the reviewed literature reveals that so far no comprehensive study was conducted to find out the information needs of educational administrators at school, college and university level in Pakistan for model information system development. There is a gap in assessing the information needs and seeking behavior of educational administrators for designing an effective and user centered/friendly information system in education at national level. This can be stated as the basic reason besides others that existing educational management information systems such as NEMIS, working under Academy of Educational Planning and Management (AEPAM) has not proved itself to be user centered. It is also noted that no comprehensive and well integrated information system is available in Pakistan covering all tiers of education- schools, colleges and universities- for facilitating the educational administrators especially at macro level. Such a system can provide a holistic and inclusive overview of education enterprise for realistic planning and resource allocation.

RQ-3b. What are the Major Findings of Questionnaire Survey of Potential Users

i.e., Educational Administrators?

Statistical analysis of the quantitative data collected through questionnaire survey reveals that administrators need information for performing different administrative tasks. These tasks varied from long term planning to daily and routine tasks. The sources most used for seeking information were informal and social and they perceived those sources as more reliable before making decisions and/or developing new plans. Status of availability of needed information to all three sectors is not encouraging though university sector seems slightly better in this regard. Thus it

can be concluded that educational administrators in all three major education sectors are underprivileged in the availability of needed information, which is badly affecting the planning and decision making process. This fact is also traced from the open ended suggestions by the respondents and reviewed literature.

Respondents perceived that ICT has made information seeking and gathering process easier and it was encouraging to note that more than half of the respondents were using Internet for their administrative work. English was the most preferred language for reading material and print was the most preferred format though electronic and A/V were also among the preferred formats. The idea of developing Pakistan National Information System for Educational Administrators (PAK-NISEA) was strongly supported by the respondents along with all the objectives and proposed services. Many respondents also recommended that such a system should be developed in reality and they anticipated that it would boost up the education sector in the country.

RQ-3c. What are the Major Findings of Interviews of Educational Administrators and Service Providers i.e., Librarians/Information Professionals and IS/IT Experts?

The interview responses reveals that educational administrators are a distinct group who are responsible for the overall management and administration of education in the country. Their information needs largely depend on the type of job and the level of decision making they are involved with. For their decision making and planning, they mostly use informal sources and/or their internal documentary sources. It was identified by the interviewees that there is a gap in the provision of needed information to the educational administrators in Pakistan which in turn influences the educational planning and resource allocation process. This gap has greatly affected the overall education of the country. All the respondents (n=55) were

of the view that Pakistan National Information System for Educational Administrators (PAK-NISEA) should be developed. They also foresaw that the idea of providing full remote access to e-resources will work in Pakistan because now many Information and Communication Technologies (ICTs) are largely being used even in remote areas of Pakistan. Information System/IT experts and information professionals favored the centralized processing mechanism for PAK-NISEA. They suggested that the PAK-NISEA should be developed in phases by keeping the available resources and ground realities of Pakistan in view. Interviewees were of the view that Ministry of Education should be its parent body. Beside the federal and provincial governments' funds, fundraising through other sources i.e. foreign grants and fee based services was also proposed. It was stressed that the services of the proposed PAK-NISEA should be user centered and user friendly.

RQ-3d. To what Extent These Findings Support the Evolving of a User Friendly Information System for Educational Administrators in Pakistan?

Keeping the findings of the reviewed literature, questionnaire survey and personal interviews in view, a centralized draft model entitled 'Pakistan National Information System for Educational Administrators- PAK-NISEA' accessible through integrated web-based environment is proposed. Its development is proposed in phases by using the *Spiral Model*. The proposal of services and access mechanism is tried to be made more user-centered with the help of *Knowledge Environment Model*. Diagrams and illustrations are provided to make the processes more understandable. Major components of the model include: primary users; geographic acquisition and distribution coverage and type of information acquired; media classification; information acquisition; information selection; information processing; information storage; products and services; and management structure and funding.

RQ-3e. Which Agency can Function as Focal Point Both for the National Educational Information System of Pakistan and as a Coordinator with International Educational Information Systems?

In the field of education, potential network members are easily identifiable. At the national level are the libraries of various departments of the Ministry of Education which implement education programs. At the state/provincial level, the education cells or branches lodged in the regional offices of the Ministry of Education. At the lower level, potential members include schools, colleges and universities etc. Libraries, documentation centers, clearing houses, referral centers, information centers, information analysis centers, and data centers are also the key organizational units of a national information system in education. Most of the international educational information systems are working under Ministry of Education. Similarly, UNESCO's project EMIS is proposed to work within the Ministry of Education (MoE). EMIS is responsible for the promotion and use of information for policy planning and implementation, decision making, monitoring and evaluation of an education system. According to the interview responses, the Ministry of Education (MoE), Pakistan should be the focal agency for the development of PAKNISEA.

RQ-3f. What Should be the Functions of a Model Information System for Educational Administrators?

The proposed information system will cover the nationwide acquisition of information sources related to the educational administration. It's central, provincial, district and institutional nodal points will collect the relevant information, which will be entered into the central database. Similarly, the distribution of the information will be nationwide through web-based environment. The proposed system will function to:

- a) provide the information with easy access;
- b) provide update and current information in the field of education;
- c) training of Educational Administrators;

ensure the availability of valid, reliable and needed information; training of other staff members i.e., Information providers/librarians etc.; have linkage within educational institutes of the country; provide information according to the administrators' specific needs; develop and maintain an online full text database of educational documents related to administrators' information needs; generate and maintain adequate media of information; and have linkage within educational information systems of the world.

RQ-3g. Which Information Services, Products and Programs can be Proposed for the Information System Users?

It is evident from the all three types of data findings that the services should be user-centered rather than system-centered. The services proposed by the survey respondents and the interviewees strengthen the idea of Gorman & Cullen (2000), according to which more user-centered information services can be provided even in Asian countries by employing the *Knowledge Environment Model* approach of library networking. Different services, products and programs can be offered by the Proposed System, such as: training workshops; Selective Dissemination of Information (SDI); Online Digital Library of educational resources; News Letter; statistical data about education; Electronic Document Delivery Services (E-DDS); access to full text information; translation service; online catalog; bibliographic services; verbal information provided by a scholarly person; Computer Mediated Communication (List serve & discussion group and use of other social media); reprography/photocopy; Intranet & portals; Wikis for encouraging user participation; Chat Reference Service; Abstracts and Indexes; email and article alerts; information literacy; new arrivals' alert; Inter Library Loan (ILL); and directory of educational administrators in Pakistan

RQ-3h. How the Draft Model can be Improved in the Light of Experts' Recommendations?

Qualitative analysis of the comments reveals that almost all the reviewers are agreed with the basic idea and theme of the proposed model. They have declared it as highly professional, comprehensive, feasible, sound, and practicable in Pakistani perspective. Besides, they have given many suggestions and/or raised some questions where they found the model unconvincing i.e., foreign funding, sustainability issues, Government help in implementation, acquisition of information resources from different institutions and delivery of services etc. The researcher has tried to incorporate most of the suggestions by the reviewers in the final draft, where these suggestions did not clash with the survey and interview findings. The name of the model from NISEA to PAK-NISEA is also changed in the light of recommendation. It is encouraging to note that the Planning Commission, Government of Pakistan, which is responsible for assessing the feasibility of such projects in Pakistan, has also declared the draft model as feasible and practicable in Pakistani perspective.

7.3. Conclusions

The data presented in the study show that Education in Pakistan is the provincial subject and the system has adopted three-tier mode (8+4+4) with distinct stages. Most of the problems within the education enterprise exist due to the poor planning and unrealistic decision making by the educational administrators. This problem is also realized by the educational administrators and they often complain for the non-availability of an effective and efficient information system.

The study also reveals that the information behavior of the educational administrators in Pakistan is similar to that of managers in general. However, the study shows that a number of factors are impacting their information behavior, such as the work environment of the educational administrators, professional/administrative experience and work tasks performed by them. The

information environment in education sector of Pakistan is one characterized by fragmentation of the information resources. The study identifies a gap in the provision of required, authentic and reliable information/data to the educational administrators working at tehsil, district and divisional level. The micro level administrators are not get involved in the planning and policy making process. This could be the problem of information flow or even a management problem, and further research should be carried out to establish this. The sources most use by the educational administrators are informal and personal. The study also identifies their administrative tasks and information needs with the help of literature review, questionnaire survey and personal interviews. The study also identifies the need of a national information system for educational administrators along with basic objectives, functions, organizational structure and services etc. of the prospective system. The study shows that information seeking is hampered due to the fact that there is no formalized, reliable, authentic and user centered information system or network is available.

This study was framed by four assumptions. The first assumption was that the educational administrators in Pakistan have problem in locating and finding the information that they need for effectively carrying out their administrative tasks. The findings of the study have shown that first assumption of the study holds. It is evident that although the information is available, it does not reach to the educational administrators. Even in their home departments or offices the information is not well organized. Sometimes it becomes difficult to retrieve a single letter, and same is the case with government policy documentation and correspondence. It is also clear that available data do not address their information needs fully and as a result they mostly fill the gap with approximation. Thus the study also partially holds the second assumption that the tasks are completed with little relevant information and

approximation. The personal interviews reveal that though no formal channel is available however they use the informal and personal sources to fill the gaps.

The third assumption was that the information does exist either in the form of routinely collected data or in libraries. However, there is a need for integrating the disparate sources into an integrated information system accessible to all the educational administrators in Pakistan from macro level to the micro level. The data in the study verifies this assumption. The information is available but not in easily accessible form. The sources either are scattered or the user is not aware about its availability. The study also highlights the need of an integrated information system connecting all three tiers of education.

In the light of reviewed literature, personal interviews and suggestions of the experts (who assessed the initial draft model), the study also holds the fourth assumption that the Government of Pakistan would be the major force for developing an effective, efficient and user centered information system for educational administrators in Pakistan. The financial, technical and managerial support by the government can help in developing a well integrated and user-friendly information system for educational administrators in Pakistan. It is hoped that such an information system can bring desired revolution in the education sector of Pakistan.

7.4. Recommendations

Since the findings of this study are of worth to numerous audiences, the recommendations are presented into different parts: for government organizations, for educational administrators, for library and information professionals and for Information System experts.

Recommendations for Government Organizations

1. Government authorities should pay special attention on filling the identified gap, which has caused the less informed planning and decision making by the educational administrators.
2. As the proposed model is based on empirical data collected through comprehensive research, thus it should be developed in reality to fulfill the information needs of educational administrators in Pakistan.
3. The Government of Pakistan should pass a bill through its parliaments for development and effective functioning of the system as proposed in the dissertation.
4. The proposed system should be a new setup under Ministry of Education.
5. Help of the private sector can be sought on contractual basis for the development of the proposed model.
6. Geographic Information System (GIS) should be used for geographic mapping of Educational Institutes in Pakistan. Similarly, NADRA number can be utilized for keeping track of educational achievements by the Pakistani individuals.
7. Public campaign should be started through mass media, conferences and workshops for introducing the benefits of PAK-NISEA to the educational administrators at macro and micro levels.
8. Educational institutes especially in the remote and far flung areas should be provided with better IT facilities and training opportunities for better and real utilization of the proposed system.

Recommendations for Educational Administrators

1. In the light of problems indicated in the reviewed literature (in Section 2.12.10.2 and so on) and data findings, training programs should be

arranged for educational administrators and their assistants for helping them in effectively searching and retrieving their needed information.

2. The educational administrators should be informed on the real state and problems of education enterprise. It will enable them to make the realistic plans for education sector in Pakistan.
3. Educational administrators should also try to assess the reliability of the available data on their own. The policies designed for the education sector of the country should be based on real facts and figures and close to ground realities. The practices of devising the policies at the macro level with approximation and/or incomplete data/information should be discontinued.
4. The micro level administrators are not get involved or even sometimes not informed about the planning and policy making process. Further research should be carried out to establish the reasons of this problem.

Recommendations for Library and Information Professionals

1. The library and information professionals should revisit their roles as service providers to the educational administrators. As the data discussed in Section 5.2.3 revealed, the educational administrators do not prefer to use the library services/sources.
2. The library schools should consider replicating the study in other provinces as well for understanding of the information needs and seeking behavior of the educational administrators in other regions of Pakistan.

Recommendations Information System Experts

1. The Information system experts should not only keep the ground realities in view but the systems designed by them should be user-centered rather than system-centered.

7.5. Areas for Further Study

The study has opened different offshoots for further study; the following are some suggestions in this regard:

1. Comprehensive survey of information needs and seeking behavior of educational administrators from other provinces of Pakistan should be conducted.
2. The study should be replicated after five years to co-operate with the rapidly changing information and ICT scenarios.
3. Detailed Modules for IS in education should be proposed after comprehensive research.
4. Studies should be conducted for proposing such models in other disciplines and developing countries as well.
5. If implemented, post implementation survey for assessing the users' satisfaction with the PAK-NISEA should be conducted.

Appendix A

COVER LETTER FOR QUESTIONNAIRE SURVEY



Department of Library & Information Science
University of the Punjab

Quaid-e-Azam Campus, Lahore-54590

October 07, 2008

Dear Sir/Madam,

Assalam-o-Alaikum

In partial fulfillment of the requirements for my doctoral studies in library and information science at the University of the Punjab, I am conducting a research study concerned with the formulation of “*Model Information System for Educational Administrators in Pakistan*”. The need of this study arose from the fact that in current age of science and technology, the role of education has come to be acknowledged as a vital factor for human development, which is the core of all developmental efforts. Developed world achieved extraordinary socio-economic and technological developments because of the realization of this fact. Free flow of information is obviously an essential requirement for achieving educational goals and objectives, so they have sound information systems to facilitate their educational administrators and policy makers.

A number of factors are influencing building up of a sound and reliable educational structure but the key factor is the user-centered/user-friendly information system for educational administrators, which is a neglected connection in Pakistan’s national schemes. I believe that the findings of this study will be useful and will add significantly to the development of education and information system in Pakistan.

The study requires the collection of data by various methods. Survey of information needs and seeking behavior of educational administrators from school, college and university sector is part of the study. Being an educational administrator of an eminent institute you have been selected to participate in this survey.

You are requested to fill in the questionnaire and send it to the undersigned as early as possible.

Your cooperation is imperative to the successful completion of my study.

With my best regards,

Yours sincerely,

(FARZANA SHAFIQUE)

Doctoral Candidate

&

Lecturer

Deptt. Library & Information Science

The Islamia University of Bahawalpur

Appendix B

**QUESTIONNAIRES
FOR
SCHOOL, COLLEGE & UNIVERSITY SURVEY**

QUESTIONNAIRE**INFORMATION NEEDS & SEEKING BEHAVIOR OF UNIVERSITY****ADMINISTRATORS**

Q 1. Name _____

Q 2. Gender: Male ☐ Female ☐

Q 3. Name of Institute _____

Q 4. Designation _____ Q 5. Age: _____

Q 6. Please mention your highest academic qualification: _____

Q 7. Please mention your experience (in years) at the university:

Professional experience _____ Administrative experience _____

Q 8. Do you use Internet for your administrative work? YES _____ NO _____

If **YES** then please name some most used websites:

Q. 9. As an Administrator do you need information for: (Pls. tick all that apply)

- | | |
|---|--|
| 1. Planning | 17. Decision making |
| 2. Budgeting | 18. Monitoring |
| 3. Forecasting | 19. Government policies |
| 4. Controlling | 20. Political Scenarios |
| 5. Problem solving/handling complaints | 21. Current affairs |
| 6. Emerging new scenarios | 22. Teaching & Research |
| 7. Handling students' affairs | 23. For seeking government grants |
| 8. Marketing strategies | 24. Teachers/staff training |
| 9. Fund raising | 25. Staff development |
| 10. Official correspondence | 26. Day to day official activities |
| 11. Rules & procedures | 27. Personnel evaluation |
| 12. Leadership roles | 28. Curriculum development |
| 13. Personal professional development | 29. Crisis management |
| 14. To choose between alternatives based on cost, benefits and outcomes | 30. Team work |
| 15. Time management | 31. Showing personal concern |
| 16. Reducing uncertainty | 32. Building trust & goodwill |
| | 33. Growth of a particular corporate culture |

Q 10. Mention the degree of need and availability of different type of information for your administrative work:

Sr.	Do you need information about:	Degree of Need				Degree of Availability			
		Most	To some extent	Least	Not at all	Most	To some extent	Least	Not at all
1.	Education policy								
2.	Government Grants								
3.	Community perception about your university								
4.	Competitors' strengths & weaknesses								
5.	Curriculum of other universities								
6.	Rules of other universities								
7.	Government of Punjab employment rules								
8.	Government of Pakistan employment rules								
9.	Employment rules of other provincial governments of Pakistan								
10.	Education codes/calendar of your own university								
11.	Education codes of other universities								
12.	Ranking criteria of universities								
13.	Research output of your university/faculty members								
14.	Research output of other universities/faculty members								
15.	Politics at university and national level								
16.	Financial rules								
17.	Purchase rules								
18.	Leave rules								
19.	Pension rules								
20.	Current trends in education								
21.	Market value of your university alumni								
22.	Personnel evaluation methods								
23.	IT solutions for administrative work								

Sr.	Do you need information about:	Degree of Need				Degree of Availability			
		Most	To some extent	Least	Not at all	Most	To some extent	Least	Not at all
24.	Personnel working behavior								
25.	Human Relations								
26.	Staff development								
27.	Student activities								
28.	Current data about educational developments								
29.	Demographic data related to education, i.e., No. of universities, teachers, students etc.								
30.	National comparison reports of different teaching programs & teaching methods								
31.	Evaluated and aggregated data about education								
32.	Different Options and alternatives related to administrative work								

Q 11. How do you obtain information for better decision making and planning? Pls. tick all that apply.

- | | |
|--|--|
| 1. By walking around (Grape wine) | 9. Social networks |
| 2. By discussing with assistant staff | 10. From individuals you trust |
| 3. Through computerized information system | 11. Internal documentary sources |
| 4. Through intelligence staff | 12. From library resources |
| 5. By discussing with librarian | 13. From result output |
| 6. By discussing with students | 14. From Institutional ranking by HEC |
| 7. Through staff meetings | 15. From foreign educational information systems |
| 8. From communities of practice | |

Q 12. From which sources do you obtain ideas for new developments? Pls. tick all that apply.

- | | |
|---------------------------------------|---|
| 1. Local Journals | 13. News papers/magazines |
| 2. Foreign Journals | 14. TV/Radio programs |
| 3. Books/monographs | 15. By attending conferences/meetings |
| 4. Visits to foreign countries | 16. By discussing with peers outside the university |
| 5. Through other institutes' websites | 17. By discussing with sub ordinate staff |
| 6. University bulletins | 18. By getting feedback from students |
| 7. Research studies | 19. By discussing with your ex-seniors/retired & senior persons |
| 8. Employ surveys | |

9. Persuasive interviews
 10. Project proposals
 11. Staff meetings
 12. Advertisements
 20. Government publications
 21. Dissertations/thesis
 22. From private sector universities
 23. Circulars

Q 13. Please indicate your preferred language for reading material.

☐ English ☐ Urdu ☐ Any other (pls. specify) _____

Q 14. What format of information do you prefer? Please rank the following:

Format	Most Preferred	Preferred	Less Preferred
Electronic			
Print			
Audio / Visual			
Microform			

Q 15. Which of the following Information and Communication Technologies (ICTs) do you use for seeking information?

- ☐ Telephone ☐ E-mail
☐ Internet search engines/websites ☐ Online chatting
☐ Teleconferencing ☐ Atmospheric communication(Radio/T.V)
☐ Any other (pls. specify) _____

Q 16. Have ICT made information seeking and gathering process easier or more difficult?

- ☐ Easier ☐ More difficult ☐ Much more difficult ☐ About the same

Q 17. To what extent do you agree that Pakistan should have a National Information System for educational administrators?

- ☐ Strongly Agree ☐ Agree ☐ Don't Know ☐ Disagree ☐ Strongly Disagree

Q 18. What should be the objectives of National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Sr.	Objectives	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
1.	To provide the information with easy access					
2.	To ensure availability of valid, reliable and needed information					
3.	To generate and maintain adequate media of information					
4.	To have linkage within educational institutes of the country					
5.	To have linkage within educational information systems of the world.					
6.	Training of Educational Administrators					
7.	Training of other staff members i.e., Teachers/Information Providers/librarians etc.					
8.	To provide update and current information in the field of education					

9.	To provide information according to the administrators' specific needs					
10.	To develop and maintain an online full text database of educational documents related to administrators' information needs					

Q 19. Which services should be rendered to the educational administrators by the PAK-NISEA?

Sr.	Services to be Rendered	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
1.	Bibliographic Services					
2.	Electronic Document Delivery Services					
3.	Statistical Data about education					
4.	Chat Reference Service					
5.	Reprography/photocopy					
6.	Translation					
7.	Online Catalog					
8.	News Letter					
9.	Online Digital Library of Educational Resources					
10.	Computer Mediated Communication (List serve & Discussion group)					
11.	Verbal information provided by a scholarly person					
12.	Intranet & portals					
13.	Wikis for encouraging user participation					
14.	Information for your specific needs on request					
15.	Training workshops					
16.	Access to full text information					
17.	Abstracts and Indexes					

Suggestions:

THANK YOU

QUESTIONNAIRE

INFORMATION NEEDS & SEEKING BEHAVIOR OF COLLEGE

ADMINISTRATORS

Q 1. Name _____

Q 2. Gender: Male ☐ Female ☐

Q 3. Name of Department/Institute _____

Q 4. Designation _____ Q 5. Age: _____

Q 6. Please mention your highest academic qualification: _____

Q 7. Please mention your experience (in years) at college:

Professional experience _____ Administrative experience _____

Q 8. Do you use Internet for your administrative work? YES _____ NO _____

If **YES** then please name some most used websites:

Q 9. As an Administrator do you need information for: (Pls. tick all that apply)

- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Planning 2. Budgeting 3. Forecasting 4. Controlling 5. Problem solving/handling complaints 6. Emerging new scenarios 7. Handling students' affairs 8. Marketing strategies 9. Fund raising 10. Official correspondence 11. Rules & procedures 12. Leadership roles 13. Personal professional development 14. To choose between alternatives based on cost, benefits and outcomes 15. Time management 16. Reducing uncertainty | <ul style="list-style-type: none"> 17. Decision making 18. Monitoring 19. Government policies 20. Political Scenarios 21. Current affairs 22. Teaching & Research 23. For seeking government grants 24. Teachers/staff training 25. Staff development 26. Day to day official activities 27. Personnel evaluation 28. Curriculum development 29. Crisis management 30. Team work 31. Showing personal concern 32. Building trust & goodwill 33. Growth of a particular corporate culture |
|---|---|

Q 10. Mention the degree of need and availability of different type of information for your administrative work:

Sr.	Do you need information about:	Degree of Need				Degree of Availability			
		Most	To some extent	Least	Not at all	Most	To some extent	Least	Not at all
1.	Education policy								
2.	Government Grants								
3.	Community perception about your college								
4.	Competitors' strengths & weaknesses								
5.	Curriculum of other boards and universities								
6.	Rules of other boards and universities								
7.	Government of Punjab employment rules								
8.	Government of Pakistan employment rules								
9.	Employment rules of other provincial governments of Pakistan								
10.	Education codes/calendar of your college								
11.	Education codes of other colleges								
12.	Ranking criteria of colleges								
13.	Research output of your college & faculty members								
14.	Research output of other colleges & faculty members								
15.	Politics at institutional and national level								
16.	Financial rules								
17.	Purchase rules								
18.	Leave rules								
19.	Pension rules								
20.	Current trends in education								
21.	Market value of your college alumni								

Sr.	Do you need information about:	Degree of Need				Degree of Availability			
		Most	To some extent	Least	Not at all	Most	To some extent	Least	Not at all
22.	Personnel evaluation methods								
23.	IT solutions for administrative work								
24.	Personnel working behavior								
25.	Human Relations								
26.	Staff development								
27.	Student activities								
28.	Current data about educational developments								
29.	Demographic data related to education, i.e., No. of colleges, teachers, students etc.								
30.	National comparison reports of different teaching programs & teaching methods								
31.	Evaluated and aggregated data about education								
32.	Different Options and alternatives related to administrative work								

Q 11. How do you obtain information for better decision making and planning? Pls. tick all that apply.

- | | |
|--|--|
| 1. By walking around (Grape wine) | 9. Social networks |
| 2. By discussing with assistant staff. | 10. From individuals you trust |
| 3. Through computerized information system | 11. Internal documentary sources |
| 4. Through intelligence staff | 12. From library resources |
| 5. By discussing with librarian | 13. From result output |
| 6. By discussing with students | 14. From Institutional/college ranking by HEC |
| 7. Through staff meetings | 15. From foreign educational information systems |
| 8. From communities of practice | |

Q 12. From which source do you obtain ideas for new developments at your college? Pls. tick all that apply.

- | | |
|---------------------------------------|--|
| 1. Local Journal | 13. News papers/magazines |
| 2. Foreign Journals | 14. TV/Radio programs |
| 3. Books/monographs | 15. By attending conferences/meetings |
| 4. Visit to foreign countries | 16. By discussing with peers outside the college |
| 5. Through other institutes' websites | 17. By discussing with sub ordinate staff |

6. college bulletins
7. Research studies
8. Employ surveys
9. Persuasive interviews
10. Project proposals
11. Staff meetings
12. Advertisements
18. By getting feedback from students
19. By discussing with your ex-seniors/retired & senior persons
20. Government publications
21. Dissertations/thesis
22. From private sector colleges
23. Circulars

Q 13. Please indicate your preferred language for reading material.

☐ English ☐ Urdu ☐ Any other (pls. specify) _____

Q 14. What format of information do you prefer? Please rank the following:

Format	Most Preferred	Preferred	Less Preferred
Electronic			
Print			
Audio / Visual			
Microform			

Q 15. Which of the following Information and Communication Technologies (ICTs) do you use for seeking information?

- ☐ Telephone ☐ E-mail
☐ Internet search engines/websites ☐ Online chatting
☐ Teleconferencing ☐ Atmospheric communication(Radio/T.V)
☐ Any other (pls. specify) _____

Q 16. Have ICT made information seeking and gathering process easier or more difficult?

- ☐ Easier ☐ More difficult ☐ Much more difficult ☐ About the same

Q 17. To what extent do you agree that Pakistan should have a National Information System for educational administrators?

- ☐ Strongly Agree ☐ Agree ☐ Don't Know ☐ Disagree ☐ Strongly Disagree

Q 18. What should be the objectives of National Information System for Educational Administrators (NISEA) in Pakistan?

Sr.	Objectives	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
1.	To provide the information with easy access					
2.	To ensure availability of valid, reliable and needed information					
3.	To generate and maintain adequate media of information					
4.	To have linkage within educational institutes of the country					
5.	To have linkage within educational information systems of the world.					
6.	Training of Educational Administrators					
7.	Training of other staff members i.e., Teachers/Information Providers/librarians etc.					

8.	To provide update and current information in the field of education					
9.	To provide information according to the administrators' specific needs					
10.	To develop and maintain an online full text database of educational documents related to administrators' information needs					

Q 19. Which services should be rendered to the educational administrators by the NISEA?

Sr.	Services to be Rendered	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
1.	Bibliographic Services					
2.	Electronic Document Delivery Services					
3.	Statistical Data about education					
4.	Chat Reference Service					
5.	Reprography/photocopy					
6.	Translation					
7.	Online Catalog					
8.	News Letter					
9.	Online Digital Library of Educational Resources					
10.	Computer Mediated Communication (List serve & Discussion group)					
11.	Verbal information provided by a scholarly person					
12.	Intranet & portals					
13.	Wikis for encouraging user participation					
14.	Information for your specific needs on request					
15.	Training workshops					
16.	Access to full text information					
17.	Abstracts and Indexes					

Suggestions:

THANK YOU

QUESTIONNAIRE**INFORMATION NEEDS & SEEKING BEHAVIOR OF SCHOOL****ADMINISTRATORS**

Q 1. Name _____

Q 2. Gender: Male ☐ Female ☐

Q 3. Name of Institute _____

Q 4. Designation _____ Q 5. Age: _____

Q 6. Please mention your highest academic qualification: _____

Q 7. Please mention your experience (in years) at the school:

Professional experience _____ Administrative experience _____

Q 8. Do you use Internet for your administrative work? YES ____ NO ____

If **YES** then please name some most used websites:

Q 9. As an Administrator do you need information for: (Pls. tick all that apply)

- | | |
|---|--|
| 1. Planning | 17. Decision making |
| 2. Budgeting | 18. Monitoring |
| 3. Forecasting | 19. Government policies |
| 4. Controlling | 20. Political Scenarios |
| 5. Problem solving/handling complaints | 21. Current affairs |
| 6. Emerging new scenarios | 22. Teaching & Research |
| 7. Handling students' affairs | 23. For seeking government grants |
| 8. Marketing strategies | 24. Teachers/staff training |
| 9. Fund raising | 25. Staff development |
| 10. Official correspondence | 26. Day to day official activities |
| 11. Rules & procedures | 27. Personnel evaluation |
| 12. Leadership roles | 28. Curriculum development |
| 13. Personal professional development | 29. Crisis management |
| 14. To choose between alternatives based on cost, benefits and outcomes | 30. Team work |
| 15. Time management | 31. Showing personal concern |
| 16. Reducing uncertainty | 32. Building trust & goodwill |
| | 33. Growth of a particular corporate culture |

Q 10. Mention the degree of need and availability of different type of information for your administrative work:

Sr.	Do you need information about:	Degree of Need				Degree of Availability			
		Most	To some extent	Least	Not at all	Most	To some extent	Least	Not at all
1.	Education policy								
2.	Government Grants								
3.	Community perception about your school								
4.	Competitors' strengths & weaknesses								
5.	Curriculum of Punjab Board								
6.	Rules of other private schools								
7.	Government of Punjab employment rules								
8.	Government of Pakistan employment rules								
9.	Employment rules of other provincial governments of Pakistan								
10.	Education codes/calendar of your own institute								
11.	Politics at institutional and national level								
12.	Financial rules								
13.	Purchase rules								
14.	Leave rules								
15.	Pension rules								
16.	Current trends in education								
17.	Market value of your school alumni								
18.	Personnel evaluation methods								
19.	IT solutions for administrative work								
20.	Personnel working behavior								
21.	Human Relations								
22.	Staff development								
23.	Student activities								
24.	Current data about educational developments								

Sr.	Do you need information about:	Degree of Need				Degree of Availability			
		Most	To some extent	Least	Not at all	Most	To some extent	Least	Not at all
25.	Demographic data related to education, i.e., No. of schools, teachers, students etc.								
26.	National comparison reports of different teaching programs & teaching methods								
27.	Evaluated and aggregated data about education								
28.	Different Options and alternatives related to administrative work								

Q 11. How do you obtain information for better decision making and planning? Pls. tick all that apply.

- | | |
|--|--|
| 1. By walking around (Grape wine) | 9. Social networks |
| 2. By discussing with assistant staff. | 10. From individuals you trust |
| 3. Through computerized information system | 11. Internal documentary sources |
| 4. Through intelligence staff | 12. From library resources |
| 5. By discussing with librarian | 13. From school results output |
| 6. By discussing with students | 14. From Board exams output |
| 7. Through staff meetings | 15. From foreign educational information systems |
| 8. From communities of practices | |

Q 12. From which sources do you obtain ideas for new developments at your school? Pls. tick all that apply.

- | | |
|---------------------------------------|---|
| 1. Local Journal | 13. News papers/magazines |
| 2. Foreign Journals | 14. TV/Radio programs |
| 3. Books/monographs | 15. By attending conferences/meetings |
| 4. Visit to foreign countries | 16. By discussing with peers outside the school |
| 5. Through other institutes' websites | 17. By discussing with sub ordinate staff |
| 6. School bulletins | 18. By getting feedback from students |
| 7. Research studies | 19. By discussing with your ex-seniors/retired & senior persons |
| 8. Employ surveys | 20. Government publications |
| 9. Persuasive interviews | 21. Dissertations/thesis |
| 10. Project proposals | 22. From private sector schools |
| 11. Staff meetings | 23. Circulars |
| 12. Advertisements | |

Q 13. Please indicate your preferred language for reading material.

- ☐ English
 ☐ Urdu
 ☐ Any other (pls. specify) _____

Q 14. What format of information do you prefer? Please rank the following:

Format	Most Preferred	Preferred	Less Preferred
Electronic			
Print			
Audio / Visual			
Microform			

Q 15. Which of the following Information and Communication Technologies (ICTs) do you use for seeking information?

- ☐ Telephone
 ☐ E-mail
☐ Internet search engines/websites
 ☐ Online chatting
☐ Teleconferencing
 ☐ Atmospheric communication(Radio/T.V)
☐ Any other (pls. specify) _____

Q 16. Have ICT made information seeking and gathering process easier or more difficult?

- ☐ Easier
 ☐ More difficult
 ☐ Much more difficult
 ☐ About the same

Q 17. To what extent do you agree that Pakistan should have a National Information System for educational administrators?

- ☐ Strongly Agree
 ☐ Agree
 ☐ Don't Know
 ☐ Disagree
 ☐ Strongly Disagree

Q 18. What should be the objectives of National Information System for Educational Administrators (NISEA) in Pakistan?

Sr.	Objectives	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
1.	To provide the information with easy access					
2.	To ensure availability of valid, reliable and needed information					
3.	To generate and maintain adequate media of information					
4.	To have linkage within educational institutes of the country					
5.	To have linkage within educational information systems of the world.					
6.	Training of Educational Administrators					
7.	Training of other staff members i.e., Teachers/Information Providers/librarians etc.					
8.	To provide update and current information in the field of education					
9.	To provide information according to the administrators' specific needs					
10.	To develop and maintain an online full					

	text database of educational documents related to administrators' information needs					
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Q 19. Which services should be rendered to the educational administrators by the NISEA?

Sr.	Services to be Rendered	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
1.	Bibliographic Services					
2.	Electronic Document Delivery Services					
3.	Statistical Data about education					
4.	Chat Reference Service					
5.	Reprography/photocopy					
6.	Translation					
7.	Online Catalog					
8.	News Letter					
9.	Online Digital Library of Educational Resources					
10.	Computer Mediated Communication (List serve & Discussion group)					
11.	Verbal information provided by a scholarly person					
12.	Intranet & portals					
13.	Wikis for encouraging user participation					
14.	Information for your specific needs on request					
15.	Training workshops					
16.	Access to full text information					
17.	Abstracts and Indexes					

Suggestions:

THANK YOU

Appendix C

LIST OF INTERVIEWEES

LIST OF INTERVIEWEES**Library and Information Professionals**

1. Abdul Waheed
2. Ata ur Rehman
3. Bushra Almas Jaswal
4. Ch. Muhammad Hanif
5. Ch. Nazir Ahmed
6. Ch. Yaqoob Ali
7. Ishtiaq Ahmed
8. Kanwal Ameen, PhD
9. Khalid Mahmood, PhD
10. Mamoon Kousar
11. Maqsood Shaheen
12. Mian Muhammad Ramzan
13. Midrarullah
14. Mirza Muhammad Naseer
15. Mirza Waseem Baig
16. Muhammad Ajmal Khan
17. Muhammad Anwar
18. Muhammad Anwar Ejaz
19. Muhammad Fazil Khan, PhD
20. Muhammad Rafiq
21. Muhammad Rafiq Awan
22. Muhammad Ramzan
23. Muhammad Ramzan, PhD
24. Muhammad Saeed
25. Muzammil Tahira
26. Naushad Ghazanfer
27. Pervaiz Ahmed
28. Ramooz Ahmed Khan
29. Rana Muhammad Iqbal
30. Rubina Bhatti, PhD
31. Tariq M. Chohan

Educational Administrators

1. Abdul Hameed, PhD
2. Abdul Rehman Malik
3. Ch. Ghulam Rasool Akhtar
4. Habib Khan, PhD
5. Inamul Haq Kousar, PhD
6. Karamat Ali, PhD
7. M. Ashraf Moten, PhD

8. Muhammad Abdullah Khan Salaary
9. Parveen Iqbal
10. Qazi Khalid Farooq
11. Rafique Ahmed, PhD
12. Salamat Ali
13. Talib Hussain Talib
14. Zafar Iqbal, PhD

IT and Information System Experts

1. Adil Imdad
2. Aurangzeb
3. Mushahid Anwar, PhD
4. Nageen Ainuddin
5. Nazir A. Sangi, PhD
6. Saima Abdullah
7. Salman Shakeel
8. Syed Aun Muhammad
9. Syed Khaldoon Khurshid
10. Zulfiqar Ahmed

Appendix D

**REQUEST LETTER & SCHEDULE
FOR INTERVIEW
OF
EDUCATIONAL ADMINISTRATORS**



Department of Library & Information Science

University of the Punjab

Quaid-e-Azam Campus, Lahore-54590

October 07, 2008

Dear Sir/Madam,

Assalam-o-Alaikum

In partial fulfillment of the requirements for my doctoral studies in library and information science at the University of the Punjab, I am conducting a research study concerned with the formulation of “*Model Information System for Educational Administrators in Pakistan*”. The need of this study arose from the fact that in current age of science and technology, the role of education has come to be acknowledged as a vital factor for human development, which is the core of all developmental efforts. Developed world achieved extraordinary socio-economic and technological developments because of the realization of this fact. Free flow of information is obviously an essential requirement for achieving educational goals and objectives, so they have sound information systems to facilitate their educational administrators and policy makers.

A number of factors are influencing building up of a sound and reliable educational structure but the key factor is the user-centered/user-friendly information system for educational administrators, which is a neglected connection in Pakistan’s national schemes. I believe that the findings of this study will be useful and will add significantly to the development of education and information system in Pakistan.

The study requires the collection of data by various methods. Interviewing some educational administrators is a part of the study. Being an eminent contributor to the field of education, you have been selected as an interviewee for this study.

You are requested to fill in the attached address sheet and return it to me as soon as possible so that I could be able to easily contact you for interview schedule.

Your cooperation is imperative to the successful completion of my study.

With my best regards,

Yours sincerely,

(FARZANA SHAFIQUE)

Doctoral Candidate

&

Lecturer

Deptt. of Library & Information Science

Islamia University of Bahawalpur

Interview Schedule

Q. 1. What type of information do educational administrators need for administrative work?

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Q. 5. Which problems do they face in getting the required information?

Q. 6. Whether a National Information System (NISEA) should be developed to facilitate them?

Q. 7. Which services should be offered through the proposed National Information System for Educational Administrators (NISEA)?

Appendix E

**REQUEST LETTER & SCHEDULE
FOR INTERVIEW
OF
LIBRARY & INFORMATION PROFESSIONALS**



Department of Library & Information Science
University of the Punjab

Quaid-e-Azam Campus, Lahore-54590

October 07, 2008

Dear Sir/Madam,

Assalam-o-Alaikum

In partial fulfillment of the requirements for my doctoral studies in library and information science at the University of the Punjab, I am conducting a research study concerned with the formulation of “*Model Information System for Educational Administrators in Pakistan*”. The need of this study arose from the fact that in current age of science and technology, the role of education has come to be acknowledged as a vital factor for human development, which is the core of all developmental efforts. Developed world achieved extraordinary socio-economic and technological developments because of the realization of this fact. Free flow of information is obviously an essential requirement for achieving educational goals and objectives, so they have sound information systems to facilitate their educational administrators and policy makers.

A number of factors are influencing building up of a sound and reliable educational structure but the key factor is the user-centered/user-friendly information system for educational administrators, which is a neglected connection in Pakistan’s national schemes. I believe that the findings of this study will be useful and will add significantly to the development of education and information system in Pakistan.

The study requires the collection of data by various methods. Interviewing some information professionals is a part of the study. Being an eminent professional and contributor to the field of library and information science, you have been selected as an interviewee for this study.

You are requested to fill in the attached address sheet and return it to me as soon as possible so that I could be able to easily contact you for interview schedule.

Your cooperation is imperative to the successful completion of my study.

With my best regards,

Yours sincerely,

(FARZANA SHAFIQUE)

Doctoral Candidate

Interview Schedule

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Q. 3. Which factors should be considered, while designing National Information System for Educational Administrators (NISEA)?

Q. 4. Which resources are already available in the form of existing information services/information systems?

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Q. 5. Whether the NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Q. 7. Which services should be offered through the proposed NISEA?

Q. 8. What should be the organizational structure of NISEA and from where did the finance should come for NISEA?

Appendix F

**REQUEST LETTER & SCHEDULE
FOR INTERVIEW
OF
IT/ INFORMATION SYSTEM EXPERTS**



Department of Library & Information Science

University of the Punjab

Quaid-e-Azam Campus, Lahore-54590

October 07, 2008

Dear Sir/Madam,

Assalam-o-Alaikum

In partial fulfillment of the requirements for my doctoral studies in library and information science at the University of the Punjab, I am conducting a research study concerned with the formulation of “*Model Information System for Educational Administrators in Pakistan*”. The need of this study arose from the fact that in current age of science and technology, the role of education has come to be acknowledged as a vital factor for human development, which is the core of all developmental efforts. Developed world achieved extraordinary socio-economic and technological developments because of the realization of this fact. Free flow of information is obviously an essential requirement for achieving educational goals and objectives, so they have sound information systems to facilitate their educational administrators and policy makers.

A number of factors are influencing building up of a sound and reliable educational structure but the key factor is the user-centered/user-friendly information system for educational administrators, which is a neglected connection in Pakistan’s national schemes. I believe that the findings of this study will be useful and will add significantly to the development of education and information system in Pakistan.

The study requires the collection of data by various methods. Interviewing some IT experts is a part of the study. Being an eminent professional and contributor to the field of Information Technology, you have been selected as an interviewee for this study.

You are requested to fill in the attached address sheet and return it to me as soon as possible so that I could be able to easily contact you for interview schedule.

Your cooperation is imperative to the successful completion of my study.

With my best regards,

Yours sincerely,

(FARZANA SHAFIQUE)

Doctoral Candidate

&

Lecturer

Deptt. Library & Information Science

The Islamia University of Bahawalpur

Interview Schedule

Q. 1. Should National Information System be developed for educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.) in Pakistan?

Q. 2. Which factors should be considered while designing National Information System for Educational Administrators (NISEA) in Pakistan?

Q. 3. Is the Idea of Integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface practically feasible? If YES, then how?

Q. 4. Is there any information system already existing in each sector i.e., school, college or university? If YES then, whether these systems/resources can be utilized for developing a National Information System for Educational Administrators (NISEA) in Pakistan?

Q. 5. Either the NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Q. 6. Similarly, will the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” work in Pakistani perspective?

Q. 7. What should be the organizational structure of NISEA?

Appendix G

ACCEPTANCE FORM FOR INTERVIEW

ACCEPTANCE FORM

Yes, I am ready to participate in this research as an interviewee

Name _____

Designation _____

Address (office) _____

Phone _____ Fax _____

Email _____

Address (home) _____

Phone _____ Fax _____

Email _____

Appendix H

TRANSCRIPTS OF INTERVIEWS

INTERVIEW TRANSCRIPTS OF LIBRARY & INFORMATION

PROFESSIONALS

Abdul Waheed

Chief Librarian, GC University Lahore

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. Management of education is known as the educational administration. Effective way of administration is to plan, organize, command, coordinate, staffing, budgeting, etc. (POSDCORB).

Every educational institute has its own structure of management/administration. The purpose of the management is organizing the tasks against the goals. To organize the human and physical resources they need information. So about every activity which comes within this domain, they need specific information. Their information needs are very dynamic and varies according to day to day activities. On the other hand their information seeking behavior varies according to their style of management, so first issue is to know the type of information they need. Mostly for their administrative work the educational administrators need master academic record system, Human Resources Management System, financial information, Scholarship details, space data (historical background of spaces/locations, where the projects are going to be planned), information about sponsors of different projects, faculty, alumni, other staff, personal property of individuals/employees, development data, and scheduling of future plans and tasks, transportation data, current and retrospective data about students' performance and background data (Both qualitative and quantitative).

Q. 2. How their information needs can be fulfilled?

Ans. Mostly to fulfill their information needs they rely on different resources. For example, sometimes they do come to the library and librarian but most of the time they consult the Internet and relevant staff to which the data is associated i.e., registrar office, treasurer office, examination office, Planning and development division etc. To facilitate the educational administrators, GCU have a System Analysis Office (SAO), Financial Aid Management System etc. But there is no integrated system to facilitate the educational administrators in a convenient way at national level.

Should a National Information System be developed for this purpose?

Yes, a National Information System should be developed.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Information should be update, valid. Accurate data should be collected. In the beginning focus should be on specific sector i.e. university because here you would get more accurate data than school sector and even college sector. Data should be collected systematically for better analysis and interpretation. Then gradually we can move to the college and then school sector.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. I think that resources are available but not in an integrated and systematic way. These available resources can be integrated.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Centralization is not suitable. It should be decentralized.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes, the idea is excellent and there is no harm in providing remote access through dedicated Internet links. The data should be hosted at a central place and remote access should be provided to all the stakeholders.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. SDI, CAS, Information alerts, Users profiles should be developed for understanding their areas of interest. Training for administrators should also be provided.

Q. 8. What should be the organizational structure of PAK-NISEA?

Ans. Ministry of Education
Provincial
Regional bifurcation

Q. 8. From where should the finance come for PAK-NISEA?

Ans. Finance= Federal and provincial governments can provide the funds. Similarly funds from foreign bodies (i.e. UNESCO etc.) can also be sought. Free for public sector but fee based can also be offered for private sector.

(Interview recorded on 22nd November, 2008 at office).

Ata ur Rehman

Assistant Manager (Library)

National Centre for Physics, QAU Campus Islamabad

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans: Information needs for education administrators are of two types:

- 1- Administrative needs
 - a. HR Development / Trainings
 - b. Budgets / Financial Matters
 - c. Daily routine news about politics/Govt. policies, etc
 - d. News about their market competitors
 - e. Trends in advertisement and marketing
 - f. Staff/Teachers available in market
- 2- Academic needs
 - a. Scholarships available
 - b. Board / University/HEC policies
 - c. Curriculum updates
 - d. Academic needs of their staff / students

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans: Currently all of their needs are not being fulfilled from any central location / source. They have to check newspapers, media channels for govt. policies and political scenarios which can affect their business (In private sector, we have to consider these institutions as business units). They use internet to search for budgets/budgeting techniques and budget

documents available in soft format. Websites of concerned govt. organizations (Board, University, HEC) also are the sources of their information needs.

In few cases libraries and librarians are also the source of information for them. They discuss these matters in community meetings and seek information from one another.

As far as any central source of information is concerned, in my point of view it is necessary to have such information system. Especially for the community which we are discussing (Deans, Principals, VCs), such central source can provide better information for their particular need.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans: The following factors can be considered:

- This is a big project and must be completed according to Project Management Techniques.
- Target audiences must be mentioned clearly before proceeding
- Multilingual system is necessary while developing such level system
- As it will be a knowledge-base for knowledge seekers, information sources for this knowledge-base must be defined clearly
- Copyright issues/intellectual property rights will be involved during the development of such system. So proper licensing and legal issues must be addressed clearly in the planning phase
- A mechanism for information updation is most important for end-user. Remember a good system can be good or best only if updated regularly
- Priorities are changed during different political systems, so a mechanism must be defined to save this project from the political influence
- Systems which are designed or managed by personalities can not be stable and sustainable so this system may be controlled by some strong institution/body

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans: The following sources are already available:

- Newspapers / Magazines
- Archives of different newspapers on websites
- Academic Libraries / Special Libraries
- Archives of 8 National English Dailies from 2000 to date (Lok Sujag Organization)
- Web-portals/Websites of different Govt. Deptts. (HEC, Univ., Board)
- Websites of international renowned universities
- Prospectus/ other printed material of different educational institutions (National as well as International)

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans: I will go with the Centralized, Web-based solution. The modern systems are built centrally; hence are easy to manage, update, and upgrade. Another benefit of central processing is that it can be accessed by various users at a time and information can be updated in real-time. Multiple users can input the data in the system easily.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans: In this scenario, we can assume that the target users have high quality/ high speed internet facility, so the best option is to provide this system online.

But initially CD/DVD version of some (selected) information can be released simultaneously after a specific period of time, so that the information can be used in any unusual condition.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans: Information services by pull as well as push technique. For this purpose modern technologies of Web 2.0 can be used, so that the users can participate in the information updating process. Blogs/Wikis/Forums can be used to get the users participation.

Meetings, seminars and workshops can be arranged on different issues like budgets, appraisals, etc.

Access to telephone directory and staff directory

Access to the topics of theses for Masters/MPhil and PhD students

List of University/College rules

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans: Most of good projects fail due to the budget and organizational imbalances. Self-help basis projects are more sustainable. In my point of view this project can be designed, managed through participatory approach. Different organizations can take part in the activities of this system according to their expertise. For example an organization can provide space for website hosting. Another can provide infrastructure for hardware. Someone can provide help in staff trainings etc.

Foreign funding, Fee based services from the private sector. It should work under Ministry of Education. (Interview recorded on 2nd April, 2009 at office).

Bushra Almas Jaswal

Chief Librarian & Associate Professor

Forman Christian College (A Chartered University), Lahore

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. They usually need information related to educational statistics, standards, quality control of education, financial grants, and economy trends etc.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. Mostly their administrative information needs are not related to the library. For the provision of administrative information there should be an information system. So of course a National Information System for Educational Administrators should be developed (PAK-NISEA).

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Finance, skilled manpower, IT infrastructure etc.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. HEC has made some efforts in this regard i.e., PERN, Digital Library etc. Ministry of Education and UNESCO has also maintained such data, which can be useful for educational administrators. Try to explore such available resources

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. I think decentralized could be more economical than the centralized one. It can be cheaper, if the processing would be manual.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. In Pakistani perspective it would be more ambitious. I don't think that it would work in near future.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Many services can be provided for example, User Training, Information literacy programs, email alerts, updates, and document delivery service etc.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. I think a new institute should not be developed. Try to utilize existing resources and infrastructure. A separate Board should be established, which can work under Ministry of Education. It can work by utilizing the existing resources

(Interview recorded on 25th November, 2008 at office).

Ch. Muhammad Hanif

Chief Librarian, Punjab University Library, Lahore

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. They need information about education policy, government rules, and procedures. In higher education sector they ask for HEC rules, regulations and program, ranking criteria, information about students, faculty and employees, syllabus of other universities, institutional rules and calendars, and codes of other institutes.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. A proper information system should be available for fulfilling their information needs as you want to propose. Library are rarely used by the educational administrators. There is a need to provoke the role of libraries in this regard. National Library can play an active role in this regard. So I strongly favor the development of a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Nature and kind of different educational institutions and their administrators' information needs should be kept in mind while designing PAK-NISEA. So a comprehensive survey should be conducted for finding the information needs of end users of PAK-NISEA. Besides this local environment, budget constraints, bureaucratic mindset and inconsistent political scenarios should also be kept in view. Required manpower and technical assistance are not big issues now, for this purpose help can be sought from the private sector. Training would be a big issue when it would be handed over to the public sector administrators and even the training of end users as well.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Many institutional libraries of Pakistan are very rich in educational resources which can help the educational administrators. For example, Central and IER (Institute of Educational Research) libraries of Punjab University, Ministry of Education, LUMS library, Public libraries, federal and provincial assembly libraries, National and provincial archives. Similarly few online system are available i.e. NEMIS, PERN, other educational institutions' websites etc.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Centralized processing supported by web based environment is more efficient and effective approach in current era, because web based environment enhances the work performance.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes, it will work in Pakistan because there is rapid change in people behavior and it is already working in some other cases. People are now easily using the mobile phones and Internet even in remote areas. DSL connections are now available at most of the places.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Many services can be offered but to name some can be links to related resources, search engines, FAQs, etc.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. It should work under the Federal Ministry of Education with regional offices at provincial level. But it should be mainly monitored by the Federal government upto the zonal or/and district level and Federal government should finance it. I think PAK-NISEA is a good idea and it should be developed practically.

(Interview recorded on 25th March, 2009 at office).

Ch. Nazir Ahmed

Director General, National Library of Pakistan, Islamabad

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. People working in the Ministry of education have very prescribed information needs. They ask for rules, regulations, policy matters etc. They do not use library themselves. Mostly they ask their assistant staff for needed information.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. As I told earlier there is a set pattern and mechanism for information. Development of a Pakistan National Information System for Educational Administrators (PAK-NISEA) is not an easy task, although it is strongly needed. Off course I am in favor of PAK-NISEA.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. It is a very complicated task and would need proper planning and vast resources i.e. finance, human resources, IT infrastructure, access/bandwidth, and politics etc.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Many statistics are available online although not integrated with each other.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. I am in favor of centralized processing supported by web based environment.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Now computer has become a ubiquitous machine, so I think it is not a big issue now. Training would be needed for this purpose.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Full text information should be provided. Abstracts and indexes should also be provided.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. Ministry of Education should be at the top. I think it is a very big project and would require a huge setup like a ministry or department.

Finance should come from both federal and provincial government. Funds from foreign bodies should also be acquired if available. Fee based services can also be offered to the private sector. (Interview recorded on 1st April, 2009 at office).

Ch. Yaqoob Ali

Chief Librarian, International Islamic University Library, Islamabad

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. Mostly administrators do not prefer to come to the library but in some cases they ask for proceedings, reports etc. from the librarian. In-fact there is a gap between the librarians and the educational administrators for identifying their information needs. Anyhow they need resources which can help in performing their administrative work or can provide solution to their problem.

Q. 2. How their information needs can be fulfilled?

Ans. There are different ways for fulfilling their information needs especially by using the Information and Communication Technologies (ICTs). Through email their required resources can be provided at their desktop. Interactive online environment can also be helpful. Referral services can be provided by giving online links to the relevant sources on the website. Available administrative documents/archival documents can be indexed and cataloged for facilitating the educational administrators.

Q. 3. Whether a National Information System should be developed for this purpose?

Ans. Yes, a National Information System should be developed for educational administrators. It is strongly needed. I know many examples where the prime minister even lack proper information for making some planning decisions and education is one of them. Such system should be developed, which will not only facilitate the school, college and university administrators at each level but higher authorities as well. Information professionals can play a special role in this regard.

Q. 4. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Cultural environment and ground realities of Pakistan should not be ignored while designing a National Information System of Pakistan. First of all need and information seeking behavior of educational administrators should be assessed and analyzed. Proper planning will be needed for designing a National Information System for educational Administrators. Available resources should also be analyzed. In this age seeking finance or grants is no more difficult, only awareness and pursuance will be needed by the master planners. Training of the end user and the manpower is also very important in this regard. Self motivated group of volunteers can also play an active role in its development but the thing is to create awareness at national level.

Q. 5. Which resources are already available in the form of existing information services/information systems?

Ans. HEC has developed ETD database by outsourcing the project. Similarly International Islamic University Library has developed such a database for its user community. On the other hand we have many large organizations, which have rich collection to facilitate the educational administrators i.e. National Library of Pakistan, National Archives of Pakistan etc. Besides this many networks are available at local or individual level, such resources should be detected and integrated with each other. Such resources will come on the scene when awareness about this PAK-NISEA, its importance, need will be created.

Q. 6. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Centralized processing supported by Web based environment is ideal but it would require strong IT Infrastructure. Before implementing it practically, sound homework and orientation will be needed. Central Processing will lessen the expert manpower at each nodal point. To prepare the plan in white and black is easy but its practical implementation is not an easy task. First few systems should be observed before its final planning and its execution. Without continuous effort and patience such projects will fail. Although both central processing and decentralized processing have its merits and demerits, but centralized processing through web based environment will be a better option. Because if we will digitize the documents or enter the data at nodal points in a web based environment by simple computer operators, then this digital data gathered at the center can be processed by the Information experts at the center i.e. Metadata assigning, classification, indexing and abstracting etc. In this way expert manpower will be needed only at the center not at each nodal point.

Q. 7. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes, the idea will work in Pakistan but sound awareness and orientation campaign will be needed. Many equalizers are now available, which can be used for providing the remote access. Training and orientation will be needed to introduce idea and its benefits. Infrastructure is available only attitudes should be changed. It would not be possible within a day or two. A phased plan is required.

Q. 8. Which services should be offered through the proposed PAK-NISEA?

Ans. Many services can be developed when the system will be on its way for example, access to e-resources, orientation and training programs for the end users, document delivery services etc. Manuals can be developed, print copy can also be provided on demand.

Q. 9. What should be the organizational structure of PAK-NISEA?

Ans. Under Ministry of Education and Ministry of Communication, a separate body or department or sub ministry under these ministries can be developed. Then up to the provincial level and district level a chain can be developed, which can be directly supervised by the main body.

Q. 10. From where should the finance come for PAK-NISEA?

Ans. Finance can come from both federal and provincial governments. Foreign funding can also be sought.

Q. 11. What do you think about the fee based services esp. to the private sector institutes?

Ans. Yes, off course fee based services can also be provided to the private sector institutes because they are also educating a large portion of our population so should not be ignored. HEC is providing grants etc. not only to the public sector institutes but the private sector as well. So if funding can be provided then why not access to the PAK-NISEA services. (Interview recorded on 5th December, 2008 at office).

Ishtiaq Ahmed

Director Library- Higher Education Commission, Islamabad
(Ex-Head of the Deptt. of Library and Information Science, AIOU)

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Policy matters, statistical data related to different aspects of education. Descriptive/qualitative data is less required by them.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. For their administrative information needs they rarely visit the library. Although library can provide great help in this regard either through its own resources or through Inter library loan or by referring to other libraries or information agencies.

They usually use their social networks and/or search through Internet. They also use their institutional documents or ask their sister organizations for needed information sources. For fulfilling their information needs, a National Information System should be developed. National Library of Pakistan should play an active role in this regard.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. International standards should be followed for developing PAK-NISEA. One thing is very crucial that Skilled manpower will be needed for developing such systems. Local environment and end users' attitude towards IT are also important factors which should be kept in mind while designing PAK-NISEA. IT infrastructure and bandwidth issues are also important.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. HEC has worked a lot in this direction and has developed many databases and networks i.e. PERN, National Digital Library and Pakistan Research Repository.

Q. 5. Whether the PAK-NISEA model should be based on "Centralized Processing Supported by Web based Environment" or it should be decentralized?

Ans. I think in the beginning regional databases should be developed which can be integrated at later stage with National Information System. So in the beginning I am in favor of decentralization but at later stage it can switch towards the centralization.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. I think mostly people are hard copy dependent. But with training end users should be trained and motivated by introducing its benefits to them. So in nutshell the idea would work in Pakistan.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Abstracts, Indexes, full text databases, manuals in digital and print format. User education should be the most important component of its services.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. Although this project is related to many ministries i.e. Ministry of Education, Ministry of IT and Planning Commission of Pakistan etc. But I think Ministry of Education should be its parent body. There should be an Executive Body with the member from all stake holders i.e. HEC, National Library, Academy of Educational Planning, educational administrators from each province, IT experts, and library & information professionals etc. Finance should be provided by the federal government but provincial governments should also contribute their share. Foreign funds can also be sought i.e. UNESCO etc. Fee based services can be offered for the private sector but may be at later stage. (Interview recorded on 1st April, 2009 at office).

Kanwal Ameen, PhD

Professor, Department of Library and Information Science

University of the Punjab, LHR

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. Information needs of educational administrators depend on the type of job they are engaged with. Mostly they need information about available resources, institutional rules, regulations, and etc. They also need information for their routine correspondence, about their own roles and responsibilities, their duties downward and upward. In fact they need information for performing their duties in a better way. Lack of information and/or ignorance of laws may cause great disaster.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. It again depends on the type of users and their information needs. The mechanism of information provision will also differ from sector to sector. There should be a standardized information system and source for educational administrators, which can provide their specific information but no such system is currently available.

Yes, a Pakistan National Information System for Educational Administrators (PAK-NISEA) should be developed.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Many things should be kept in view i.e. human resources, financial & technological resources, IT skills and IT Infrastructure, and different forms of information etc. We

have many education systems running parallel to each other. There is no concept of standardization in our education system so proper planning up to the grass root level will be needed.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. HEC has developed some sources i.e. PERN etc. Although resources are available but the possibility of their integrity is again a big issue because every system has its own pros and cons. Without standardization, it would be difficult to integrate the existing information systems and resources.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Centralized processing would be more cost effective than the decentralized one.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. I think it would be difficult to provide full remote access. At every place the bandwidth rate will not be the same. Electricity provision is another issue, which cannot be ignored in our country. Without powerful IT infrastructure and bandwidth it would be difficult.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Services can be SDI, email alerts, User orientation, user friendly interfaces, Table of Content Alerts, Indexes & Abstracts. Full text information should also be available.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should finance come for PAK-NISEA?

Ans. PAK-NISEA should work under Ministry of Education. Its control should remain under federal government up to the grass root level rather than giving it under provincial governments at the second level of Hierarchy. There should be a separate Board/Governing Body for its better functioning and monitoring.

Both Federal and provincial governments should provide the finance for PAK-NISEA. International grants should also be availed for this purpose.

(Interview recorded on 25th November, 2008 at office).

Khalid Mahmood, PhD

Professor & Chairman, Department of Library and Information Science
University of the Punjab, LHR

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Definitely they have information needs. As education sector is related with educating the whole nation so a large number of manpower is associated with education either in public sector or private sector. Teachers are concerned only with teaching but the administrators have to supervise all the academic and managerial tasks. So the role of educational administrators is very important. They need information for planning, budgeting, forecasting, controlling, problem solving, handling students' affairs, marketing strategies, fund raising, official correspondence, rules & procedures, personal professional development, time management, decision making, monitoring, government policies, current affairs, teaching & Research, staff development, personnel evaluation,

curriculum development, crisis management etc. I think they need information for performing all the administrative tasks you have mentioned in your survey questionnaire.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. Unluckily there is no comprehensive source for fulfilling the information needs of educational administrators in Pakistan. Neither any comprehensive source nor any manual is available, which can guide to their needed information resources. Even in their personal offices the information is not properly organized and sometimes it becomes difficult to find out a simple letter because there is no mechanism for retrieval. Libraries are less used for this purpose. No formal method exists, so they use informal methods i.e. they mostly ask their peers, colleagues, and use social networks etc. There should be a formal method and source, which will provide easy access to the information and will satisfy the information needs of educational administrators. Even the tacit knowledge of the predecessors should also be managed for the successors. As you asked about the development of a National Information System, yes it should be developed and it is strongly recommended for easier access to the required information.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Factors are the needs which should be properly assessed, skilled manpower, funds, hardware software components, its structure, its controlling and maintenance body, who will be the members of the body. In fact you are asking about the essential ingredients of the system and from where the needed ingredients will come. I think for assigning all the needed ingredients, proper planning will be needed before developing this system. If you will provide a proper plan in your thesis, then it will be a good contribution.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Resources are available but there exists no single repository from where these resources can be found. The focus should be on how an educational administrator can be facilitated with access to the required information without wasting the time. So if it is tried to integrate the available resources. As you know that ERIC is a comprehensive source of educational documents from primary education to higher education and it is working under Ministry of Education, USA. Similarly, in Pakistan many resources and networks are available which can be used for this purpose i.e. PERN, NEMIS, Education database, Planning and management commission maintains many education related resources, many other institutes have maintained their calendars, rules, regulation and results, etc. The need is of their proper integration and their availability at one source. There is no harm in integrating the information sources of schools, colleges and universities and this model is working in most of the developed countries of the world.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. The data should be processed centrally supported by Web based environment. It is most economical than the decentralized processing. At district level their nodal points/ coordinating offices can be developed but other functions should be performed at the center. Centralization will facilitate the availability of expert and skilled manpower at one place and it will be easy to manage them.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes the idea of full remote access to e-resources through dedicated Internet links will work in Pakistan. Many studies of the recent years show that use of Internet and e-resources is increasing day by day in Pakistan. It means to introduce this idea in Pakistan is not far from reality. Although in the beginning it would be difficult to digitize all the resources but with the passage of time when we will have all resources in digital form, it will become easier to access them.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. A long list of services can developed i.e. Indexes, abstracts, SDI, CAS, E-mail alerts, OPAC, ILL, list of new arrivals etc. User Training or information literacy programs should be designed. I think information should be provided both in print and digital form.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should finance come for PAK-NISEA?

Ans. It should be developed under Ministry of Education but after that it should not go under provincial ministry. I think PASTIC model is the good one. There should be a separate Advisory Body of PAK-NISEA, which should consist of Government officials, HEC members, school, college and university representatives, Information and IT professionals. The principal responsibility of funding and overall monitoring should stay with Federal Government. Funds from foreign bodies (i.e. UNESCO, USAID), can also be sought for PAK-NISEA. Fee based services can also be offered by PAK-NISEA for fund raising. I mean if abstract is open and freely available but on demand full text can be provided after charging some nominal fee.

(Interview recorded on 25th November, 2008 at office).

Mamoona Kousar

Chief Librarian, Air University-Islamabad

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Their information needs are relevant to the departments and their duties. For example they need rules, regulations, curriculum of other institutes, accreditation information, education and other government policies.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. Their information needs can be fulfilled through different ways and methods. But the most important thing is the availability of the required resources through a proper system and channel, which does not exist in Pakistan. Libraries are also not playing active role in this regard. So such an information system should be developed at national level as you want to propose. I am in favor of the development of PAK-NISEA.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Different things should be considered for example, feedback should be acquired from the end users, I mean what type of information and in which form do they need. Other factors i.e. funds, trained manpower, bureaucratic setup etc should also be considered.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Many comprehensive resources of educational information are available but they are not integrated with each other i.e. HEC, PEC, AEPM and Ministry of Education are rich in such resources. These should be utilized.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Although both have their merits and demerits but centralized processing is a better choice in Pakistani perspective.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. As this is the age of Information technology so I think it is not a big issue now even in remote areas as well. Especially when mobile and Internet access has reached almost everywhere. I think orientation programs should be launched for its proper training and working.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Services could be SDI, CAS, full text, indexes and abstracts, online reference services, article alerts, blogs, wikis, and RSS feeds.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. Ministry of Education should be its parent body. There should a board or body which should handle it. Different people should be its members for example education planners, government policy makers, educational administrators from school, college and university sectors, IT and information dissemination experts etc. It should be controlled by the federal and provincial governments with clear division of roles and responsibilities.

Funds should be granted by the federal government only. Foreign funds should be acquired if available without any hard and fast conditions. Fee based services are not a bad option but it should be only for private sector.

Conclusion: I think it is a good idea and it would also create awareness among the education and information community. They would come to know that there are systematic ways for fulfilling the information needs at national level. In Pakistan resources are available but their access and easy availability is a big issue. So PAK-NISEA should not only be proposed but actually it should be developed.

(Interview recorded on 25th March, 2009 at office).

Maqsood Shaheen

Reference Librarian, American Information Center, Islamabad

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Resources related to HRM, new changes in curricula worldwide, developments in education, the pedagogy, institutional and government rules and regulations.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. Information needs can be fulfilled by assessing the needs and then designing the user specific information services. List serves can be joined, seminars, workshops can be attended, short courses for orientation of available information resources.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Separate modules should be developed for different sectors of education i.e. schools, colleges and universities etc. but access can be provided to these resources through a single interface. Training of all stake holders is very important.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Different bodies like Ministry of education and AEPM should be behind this project and their resources can be utilized.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Centralized processing if it is supported by web based environment, then it will be better then decentralized processing at each nodal point. Nodal points should add their stake/share in the main stream or repository.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. It is already working in Pakistan, so I do not think that there is any harm. Training will be needed especially for the remote area educational administrators.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Personal profiles of the end users should be developed esp. about their areas of interest etc. many services can be developed like List serves, SDI, CAS, online reference service. Scrolling links of relevant resources and history of most used links etc.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should finance come for PAK-NISEA?

Ans. Ministry of Education

Body consisting on ministers, educational administrators, information professionals etc. should be developed under the Ministry.

(Interview recorded on 6th December, 2008 at office).

Mian Muhammad Ramzan
Chief Librarian, Islamic International Medical College
Ripha International University, Islamabad

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Educational administrators have two types of information needs i.e. administrative information needs and academic information needs. Academic information needs cover syllabus, text books, and articles etc. Administrative needs cover not only information about their institution but information about related organizations as well i.e. HEC, Ministry of Education etc. For this purpose they usually need internal reports, manuals and rules etc. On the other hand they also need information about current affairs, which can be provided through media resources.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. All type of information resources can be utilized for fulfilling their information needs. Not all the libraries are organizing information sources used by the administrators, so they do not come to the library. In our case, we usually scan the administration related up-to-date information for our administrators. Information professionals should change their attitude in this regard. Off course a national information system should be developed but efforts should not be duplicated. There should be a national platform for a specific group of users.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Service provision environment of the PAK-NISEA, finance, human resources, user training and orientation programs are the major factors for its successful development and execution.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. No single platform is available in the field of education as it is available in some other fields i.e. Science and Technology field for example PASTIC, PMDC, Pakistan Engineering Council. HEC has made some efforts, which can be utilized. Cooperative efforts are needed in this regard.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. It should be centralized but data gathering can be decentralized. Like OCLC gateway model, small pockets can be developed at regional or district level then access can be provided through a single gateway.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes, the idea will work. If we will successfully create the awareness in this regard, introduce its benefits and orientation will be provided to the target users, then the idea will definitely flourish.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Ask the users about the type of information services they want. I think whatever the service will be provided, it should be user specific.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should finance come for PAK-NISEA?

Ans. I strongly believe that this system will not flourish in the public sector, private sector should own it. Now the concept of public private sector partnership is emerging. In the beginning a city level model can be introduced then this can be gradually generalized at national level. Funds should also be generated collaboratively.

(Interview recorded on 6th December, 2008 at office).

Midrarullah

Librarian, Army Medical College (NUST), Islamabad

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. They need information for planning and decision making. They mostly require required statistics, research reports, government rules, policies, grants, current

development in the education sector, HEC rules and ranking criteria, curricula of other institutes.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. In very few cases their information needs are being fulfilled by the libraries. Usually they rely on their own resources i.e. peers, sister organizations, and internal documentary resources etc. There is no single source for fulfilling their information needs. I think it is a good proposal to develop a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. It is a very big project, its different aspects should be considered and planned carefully. I mean funds, staff, equipments, place, political environment and acquisition of information resources etc. and how this information would be disseminated. There should be an act/constitution for the development and support of PAK-NISEA.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Many educational resources are available through Internet which can be useful in this regard i.e. HEC digital library, PERN, Pakistan Repository of Dissertations, Academy of Educational Planning and Management (AEPM) resources, E-government, Ministry of Education etc.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Centralized processing supported by web based environment is a good choice than the decentralized one.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Now Internet is available everywhere except at few remote areas. People are gradually becoming familiar with IT resources. With awareness campaigns, training and proper orientation it would be possible.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Access should be provided to the different type of data useful for the educational administrators. Information should be full text. Indexing and abstracting services, SDI, CAS, ILL, online reference services, wikis, portals and print information on demand should also be provided.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. Ministry of Education should be responsible for its development and overall management. A separate governing board should be developed consisting of members from ministry, HEC, all three education sectors, IT and information professionals. Federal government should manage it up to the district level rather than giving it under provincial governments. Thus uniformity and unity of command can be achieved. Finance should come from federal government with a 25% share from provincial governments. There is no harm in getting foreign aids and funds from UNESCO, WorldBank, Islamic Development Bank etc. Similarly priced/fee based services can be offered to the private sector.

Conclusion: I think proper planning and development of PAK-NISEA can bring effective change in the overall administration and management of education sector of Pakistan. It will also open many other new avenues.

(Interview recorded on 25th March, 2009 at office).

Mirza Muhammad Naseer

Librarian, Institute of Space Technology, Islamabad

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Their information needs are very diverse. They need the information, which can help in performing their administrative tasks and can help in controlling, planning and decision making. They want to know about rules, regulations, available budget, resources, and priorities of higher authorities.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. Now-a-days I am working at Institute of Space Technology. We have an Information System, which was developed at SUPARCO and implemented as Institute of Space Technology as well. Its routine activities are 100% automated and it connects all its regional campuses. Its administrators can have even micro level information about its resources, employees and real data about their activities. Such information helps the administrators in monitoring, planning and decision making. Such systems should also be developed at national level, so off course PAK-NISEA should be developed.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Proper planning will be needed. A large infrastructure, huge funding and skilled manpower will be needed. New developed system should be a combination of MIS (Management Information System) and Digital repository of routine tasks, reports, research studies, tacit knowledge resources, demographic facts and figures about education etc. Contractual services can be hired from the private sector for developing this system.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. PERN, HEC Digital dissertation repository (ETD) etc. are available. A new repository should be developed where already available relevant digital resources can be stored and more data can also be digitized. It should manage the tacit knowledge as well.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Internal repository can be developed at each nodal point. I mean the district level nodal points will digitize their own data relevant to educational administrators and can be stored in the repository and such different district level repositories can be integrated with each other. Thus it would be centralized processing. Each university, college and school should start automating their routine tasks and managerial tasks thus it would be easier to collect them at a main stream.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Although it seems to be difficult but gradually trend is changing and people are becoming familiar with Internet and e-resources.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Remote access should be provided to the full text, executive summaries and customized and further links to full text reports and detailed information should be provided. Hi-tech environment will be difficult to learn by the users (esp. senior/old employees), so training can help in this regard.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should finance come for PAK-NISEA?

Ans. Ministry of Education should be its parent body. From federal to provincial government then up to the district level as it is the current practice in education sector. Rather than developing a new institute already existing institutes should be used and tasks can be automated and available resources can be digitized. When the whole system of education will be automated then it will not be difficult to develop an information system. (Interview recorded on 5th December, 2008 at office).

Mirza Waseem Baig

Library Officer

National University of Sciences & Technology

College of Electric & Mechanical Engineering, Rawalpindi

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. Most of the educational administrators need information about new educational trends, subjects and course contents etc. taught in sister organizations.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. I think the information providers should be aware of the available resources which can be utilized for fulfilling their information needs. Currently we see that libraries are not playing active role in this regard. Their needed information should be provided to them without wasting their time. The information provision system should work around the clock. Off course there is no uniform source at national level for fulfilling the information needs of educational administrators. No doubt, a National Information System for Educational Administrators should be developed.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Technical resources are the main issue. Anyhow cultural environment i.e. politics, skilled labor, IT skill of users, finance etc should also be kept in view.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Many systems are available like PASTIC, PINSTIK and KMIC but these are in the field of science and technology. In education I know efforts of HEC i.e. PERN or in school sector Academy of Educational Planning and Management (AEPM) has developed a system i.e. NEMIS.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Data gathering and digitization should be at each district center then this data can be gathered in central database, where it can be processed by the expert manpower at the center.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. It would work although not very easy. I think people will not feel easy in the beginning but with proper training, orientation, and user friendly infrastructure it can work in Pakistan.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Full text information should be provided. Similarly SDI, CAS, email alerts, List serves, photocopy, hyper links to related resources etc.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should finance come for PAK-NISEA?

Ans. There should be a separate body under Ministry of Education. I think for organizational structure PASTIC model should be followed.

Funding should be provided by the federal government. On the other hand provincial governments can also be asked for funds according to their share of use. I mean if Punjab province has larger infrastructure than other three provinces, then it should provide more funds for PAK-NISEA. Similarly foreign bodies can also provide funds for this purpose.

(Interview recorded on 6th December, 2008 at office).

Muhammad Ajmal Khan

Chief Librarian

National University of Computer and Emerging Sciences (FAST), LHR

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Mostly the education administrators use Internet or other sources for seeking their required information. They rarely come to the library. For administrative information needs they usually ask for Newspaper clippings, Government policy documents, information related to grants and scholarships and university/college ranking criteria etc.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. As I told you that most of their information needs are being fulfilled by the informal sources i.e. they consult their peers or sister organizations or use Internet etc. There is no formal system available esp. at national level to fulfill their information needs. An information system or at-least a portal should be provided for educational administrators. Off course a National Information System should be developed for educational administrators in Pakistan.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Available local resources should be utilized. Awareness should be created in this regard. Trained manpower, IT resources, preciseness and quality of contents, user friendly system, user training and availability of funds should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA).

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. HEC resources are available which can be utilized. Many resources are freely available through Internet. All these resources can be made accessible through a web portal.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Centralized processing is better, I mean different regional offices should gather the digitized data in web-based environment but it should be finally organized and further processed at the centre. I think it would be cheaper than sending the print copies to the center for digitization and further processing.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes, I think it can work in Pakistani perspective. Infrastructure is available which can be utilized for this purpose.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Services should be user friendly. These services may include Inter Library Loan (ILL), wikis, list serves, e-mail alerts, user specific information provision, Multimedia information, Graphical User Interface (GUI), information literacy and IT training workshops.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should finance come for PAK-NISEA?

Ans. Ministry of Education should be its parent organization. I believe that existing infrastructure and institutions should be utilized for this purpose. For example National Library can be good source. (Interview recorded on 26th November, 2008 at office).

Muhammad Anwar

Chief Librarian

University of Management and Technology (UMT), Lahore

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. Information needs of educational administrator mostly differ depending on the type of institutions they are serving for. For day to day decision making they usually use long experiences attached with them. Kind of information needs also depend on the kind of duties being performed by the educational administrators. Mostly they need information for their day to day duties and decision making. So their information needs are less fulfilled by the libraries.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. Currently tacit knowledge is most used by the administrators for satisfying their information needs and they are using personal communication, social networks for this purpose. So there should be a mechanism for the preservation of tacit knowledge (Knowledge Management). Currently there is no liaison between information professionals and educational administrators. This liaison should be developed for properly fulfilling their information needs.

Yes, I agree that a national information system should be developed although it seems to me very difficult. I perceive that when government or higher authorities will be involved in this process, then the impact will be totally changed.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. People aptitude, attitudes and anxieties should also be kept in view. The services should be presented in the form, in which the target users feel easy. How the existing resources can be utilized should also be explored. Try to bring the person in a confidence and comfort zone if you really want to serve the people in real sense. Private sector should also be involved for developing a good system.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Off course resources are available for example PERN, PASTIC etc. Within government domain many good examples are available. Already available staff, infrastructure, tools, offices and resources can be utilized for this purpose.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. The information should come from different streams and then it should be merged in the center. Information gathering should be at regional or district level. So data gathering should be decentralized but processing can be centralized. Involve the users in information gathering and processing as the banks are doing.

Ans. Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes, it will work and there is no harm in introducing it.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Initially only free services should be provided when the user will feel that the information contents and services are good they will be ready to pay for fee based services as well.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should finance come for PAK-NISEA?

Ans. Definitely it should work under Ministry of Education. Then different hubs can be developed at provincial and district level. An independent committee can be developed with a variety of combination for its proper working. PERN and PASTIC models can also be explored for the structure of PAK-NISEA.

Many funding opportunities are available not only in government sector but in private sector as well. Many foreign agencies are also providing funds for such projects. Proper exploration and planning is needed for availing such opportunities.

(Interview recorded on 29th November, 2008 at office).

Muhammad Anwar Ejaz
Director, HITEC Libraries, Texila

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. They need information resources related to policy matters, rules, regulations etc. They try to seek information which will help them in decision making and forecasting.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. In most of the cases educational administrators do not rely on libraries for their administrative information needs. In my opinion, information professionals should play the proactive role for providing information services to the educational administrators. Person specific information services should be provided to them. Off course a national information system should be developed for fulfilling their information needs. At national level information should be gathered and standardized. Information professionals should be trained for providing the standardized information services for satisfying information needs of dynamic users. A national information system is needed for this purpose.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. First of all their information needs should be assessed. Training should be given to information providers. How the information will be gathered, organized and accessed, whether the users will feel easy with new ICTs, contents for different categories of users and what will be the organizational structure of the proposed system.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. As HEC has developed the directory of Universities, IQRA University has published the bylaws/charters of different universities. Similarly Planning Commission has gathered dynamic statistics about schools and has developed an online database of schools, which is accessible through its website. Asian Bank, World Bank etc. also maintain resources related to our region. Different organizations should be integrated for this purpose i.e. National Library, National Archives. Research thesis conducted by different universities or individual studies should also be digitized for presenting a qualitative view of education.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web-based Environment” or it should be decentralized?

Ans. Processing can be centralized and it will be beneficial because standardization of information will be easier. For data gathering from all parts of the country, district or division level nodal points can be developed. Standardization of information should be done at the center by a team of experts because in case of decentralization at each point a team of expert of similar quality will be difficult to hire. This will also affect the standardization of information.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Most of the resources should be in electronic form. Its access through Internet is a good idea. I don't think that people will not prefer it and it will be more economical. We can see many examples of remote access i.e. Raabta Ghar (Village Tele-centers), Kudo etc. Now Internet rates are becoming cheaper day by day. The number of Internet users in Pakistan is increasing very rapidly.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Information should be full text but abstract should also be provided. Extensible training programs should be designed. Their research interest should be assessed and their personal profiles should be developed. Interactive environment should be provided to the users. Outreach and chat reference services, alerts of new arrivals (through email or

mobile phone), SDI and demanded information should be provided within a few hours. Proper segmentation will be needed.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should finance come for PAK-NISEA?

Ans. An independent/autonomous set up can be developed under Ministry of Education with clear objectives. The set up should be more flat rather than involving a large hierarchy. For initial setup private sector's help can be sought, as NADRA is a project of Government but for the development of its Information System, it outsourced the project and it is working very well. Funding is no more a problem, if federal and provincial governments cannot provide sufficient funds then foreign funding can also be availed.

(Interview recorded on 29th November, 2008 at home).

Muhammad Fazil Khan, PhD
Professor & Chairman, Department of Library and Information Science
The University of Sargodha

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Most of the educational administrators need resources which can help in their administrative tasks.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. For this purpose they do not come to the libraries mostly they use their internal documentary resources, or consult their peers and sister organizations. It is needed to create awareness. Seminars and workshops should be conducted. User specific services should be designed for them.

Right now no single platform is available, which can fulfill all their information needs. In this scenario definitely a Pakistan National Information System for Educational Administrators (PAK-NISEA) is needed. I think it would be a good effort to work in this direction.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Proper planning of all kind of resources is most important. Many factors should be considered i.e. manpower, IT resources, electricity, and proper orientation of the people etc. I suggest modifying the foreign information system designs in Pakistani perspective.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Many resources are available in different libraries (public and private sector), information centers, and archives etc. Similarly HEC has developed PERN, digital library and many information cells are working at Quaid-e-Azam University.

Q. 5. Whether the PAK-NISEA model should be based on "Centralized Processing Supported by Web based Environment" or it should be decentralized?

Ans. Data should be gathered from all the regions but it should be processed at the center by the library science experts. Government officials should collect the data for this purpose from different schools, colleges, universities, HEC, ministries, libraries, archives and other related agencies. So I am in favor of centralization.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. I think people are now becoming familiar with ICT, so I do not think that the idea will not work in Pakistan. Awareness should be created about the benefits of remote access to e-resources. Anyhow again I will stress that proper planning and allocation of resources is most important in this regard.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Basic information services, Indexes & Abstracts, full access to current and archival e-resources, full text and print copy on demand, CAS, and SDI etc.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. An autonomous body should be developed under federal ministry i.e. Ministry of Education. A separate cell/board can also be developed in National Library of Pakistan for the same purpose. National Library should play a prominent role in this regard. Provincial/Local governments should be involved but the standard should be followed by each provincial government. Senior government officials should also be in the board otherwise it would be difficult to seek finances from government.

Finance should be provided by both federal and provincial governments. Funds generation is not an easy task. For fund raising, fee-based services can also be provided but only to the private sector. Funds can also be generated through foreign grants. In this regard UNESCO can be a good source.

(Interview recorded on 15th January, 2009 on telephone).

Muhammad Rafiq

Senior Librarian, Government College University, Lahore

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Their information needs are related to their future planning and decision making. For this purpose they need information about resources, processes and services of their own institute and other related institutes, which are affecting them i.e. HEC, Government rules, policies etc. Passive needs can be fulfilled through media but active needs should be focused more here.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. A campus wide information system is needed at first for monitoring, controlling and planning of institutional resources, processes and services. Minimum level of information dissemination by each educational institute esp. through its website should be set. Yet no national information system is available to fulfill the educational administrators' information needs. So definitely, a National Information System for Educational Administrators should be developed and it is strongly recommended.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Sector wise information needs analysis and then further segments should be developed in each sector. Then minimum level of information provision by PAK-NISEA should be developed. International Information System should be studied. Many good examples are available (i.e. China has developed its information system in each sector

and then they are trying to integrate them). Pre-requisites should be kept in view and then accordingly the system should be designed. Political will and financial support is also very important. Ground realities should be kept in view.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. There is no integration even within a single institute. Enterprise Resource Planning (ERP) is needed. I think 80% IT projects in Pakistan fail not due to lack of resources but due to lack of planning. Things are available but not in organized form, so the need is to explore what is already available for avoiding the duplication of effort and how it can be integrated.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Data processing should be centralized. Data should be collected at the district level and then this data can be stored and further processed at the central place. Objectives should be very clear.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Definitely it will work and it is very important as well. Remote access through Internet will be cheaper and easier one. I think people are no more reluctant in the use of ICTs, so there is no harm in providing e-resources through remote access. Even in villages mobile and wireless connections are being used.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Customized reports should be generated. Similarly customized solutions to their problems should also be provided and there should be a proper mechanism for its delivery.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. There should be a standing committee under Ministry of Education. All the stakeholders should be given presentation in this committee. Monthly or quarterly meeting should be held for its active working.

Besides the federal and provincial governments' funding, alternative funding should also be sought; I mean Foreign aids, fee-based services etc.

(Interview recorded on 22nd November, 2008 at office).

Muhammad Rafiq Awan

Chief Librarian

University of Gujarat Library, Gujarat

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. Basically there are two types of educational administrators according to their kind of responsibilities. One is pure administrator i.e., registrars, EDOs etc. The other category has semi managerial responsibilities i.e. Deans, heads of departments/Chairmen, principals etc. accordingly their information needs vary.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. Pure administrators seek information from peers, sister organizations. They also seek information from upward to downward by asking their assistant staff. Similarly they seek information from downward to upward by getting information from their super ordinates. They also use internal documents and legal documents to get assistance about their duties and tasks ahead. For their administrative information needs, they rarely use the libraries. In my observation, the internet is not too much used by pure administrators. On the other hand the semi administrators more use the Internet. They also get training and information through mentoring.

There should be an integrated Information System, which should facilitate not only the school, college and university administrators but the higher authorities involved in educational planning i.e. ministers should also be kept in view. So a Pakistan National Information System for Educational Administrators (PAK-NISEA) is the need of hour.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Many factors should be kept in view i.e. finance, manpower, IT infrastructure, cultural environment.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. HEC has developed many such databases which can facilitate the administrators.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. It can be processed centrally after acquiring from different nodal points. So for the data collection different institutes can be designated as nodal points where a single computer operator can enter the data through web based environment and then this data can be processed at the main center i.e. Meta data assigning, indexing abstracting etc.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes definitely it will work in Pakistan. Now we can see that many Internet cafés are working even in rural/remote areas.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. whatever the services will be designed, these should be user centered. CAS, SDI, online reference services can be provided. Users’ feedback should also be welcomed.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should finance come for PAK-NISEA?

Ans.	Ministry of Education	
Provincial Governments	Directorate of Schools	HEC
	EDO Offices	

After Ministry of education, provincial governments should also be involved. Direct federal government influence may result in the non-cooperation by the provincial governments and many such projects were failed due to the existence of parallel systems (i.e. federal and provincial sector bureaucracy) and controversy.

(Interview recorded on 2nd December, 2008 at home).

Muhammad Ramzan
Director General
National Archives of Pakistan, Islamabad

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. They mostly need statistical data, government publications, related surveys, reports from related sectors.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. Many strategies can be adopted, for example National Archives of Pakistan (NAP) sends alerts to the relevant people including the educational administrators but there is still a wide gap. I think NAP is very rich in resources which can be useful for educational administrators. In the developed world such resources are accessible through Internet for their planners and decision makers. So a comprehensive information system is the need of hour for the development of education sector. I agree that a Pakistan National Information System for Educational Administrators (PAK-NISEA) should be developed in Pakistan.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. As PAK-NISEA would be a high profiled system/network, it would require comprehensive planning and large management. It has to acquire the data, organize and preserve it, so a lot of factors from funds, technical assistance and physical resources to the human resources. It should be developed in phases.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. I think information available through Internet is of secondary value, although it should also be organized and utilized but the primary resources available at libraries, archives or other repositories should also be utilized. These resources should be digitized.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. I am in favor of centralized processing supported by web based environment. I think it is the best approach from different aspects.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. I think e-resources will be used by most of the educational administrators. Training and user education can be a big help in this regard.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Easy access to the needed information should be the primary goal. Besides this the technical support should also be provided to the end users. So in the beginning indexes and abstracts should be developed then gradually services should be enhanced and increased up to the International standard.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. As per tradition, it should work under Ministry of Education. I believe that there should be an executive body consisting of members representing all the stake holders and provinces. Up to the district level it should be under the federal ministry for its better

monitoring and management because otherwise it would be difficult to maintain a national level system. Finance should be provided by the federal government. I am also in favor of seeking the foreign funds but I would oppose the fee based services even for private sector as well. (Interview recorded on 1st April, 2009 at office).

Muhammad Ramzan, PhD

Chief Librarian

Lahore University of Management Sciences (LUMS), LHR

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Mostly their role is twofold. One is related to teaching and research and other is related to administrative responsibilities. As an administrator, they have to plan and decide about different things i.e. allocation of budget, human resource management. So they need not only books but they also need related statistics. They also require information related to regional and national level regarding curricula, government support for education, and budget available for different educational activities. They want to know the strengths and weaknesses of their competitors, and about new programs. They usually ask for government rules, grants/aids (both national and international), status of funds, resources,

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. For administrative information needs they do not rely on libraries. For information about their own organization, they rely on internal resources, on establishment department of their institution but for getting information related to outside of their organization there is no proper channel and/or system to facilitate them. There is certainly a need for Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. For designing such a system you have to design its different components. For this purpose study the existing systems at international level. If it is not efficient then suggest how it can be improved with the development of PAK-NISEA. A sustainable, secured and feasible system should be designed. The information provided by this system should be current and authentic. You have to keep in view the bureaucratic hurdles, fake statistics which are available, need of skilled manpower, and IT infrastructure. Instead of creating the new positions, existing manpower should be utilized.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. As it would be an online information system so I think it is good and more appropriate to utilize the already available resources and IT infrastructure. IT infrastructure of PERN, NEMIS and NADRA can be utilized for this purpose.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Centralized processing will work in Pakistan. For this purpose district level nodal points should be assigned i.e. EDO offices can work as nodal points.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes, it would work in Pakistan. Mobile technology has brought revolution even in remote and rural areas. So people will use it.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. First thing is the access to the digitized resources. Executive summaries should be provided along with full text resources. I think end users should be asked about the required services.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. Ministry of Education can be its parent body, and HEC, AEPM, secondary and higher secondary educational boards should be its member organizations. There should be an executive body which would have members not only from above mentioned organizations but from all three sectors of education, IT and information science professionals as well. Provincial governments should also be involved in it because federal governments cannot work properly without their help and coordination.

Finance should be provided by both federal (35%) and provincial (65%) governments. Foreign aids should also be acquired for this purpose. For example UNESCO, US-AID, UN Millennium Development Goals (MGDs) have funds for such projects. Fee based services should be only for business sector not for the public sector.

(Interview recorded on 26th March, 2009 at office).

Muhammad Saeed

Chief Librarian

University of Engineering and Technology, LHR

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. They usually need government policies and rules, HEC and Ministry of Education related documents, educational related proceedings, circulars and statistical data etc.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. Usually their required information is available in unpublished form, so it becomes difficult to get it through commercial channels. Their administrative needs are less fulfilled by the libraries but they use their internal documentary sources or ask sister organizations and peers or use Internet for fulfilling their information needs. It is a drawback that yet no formal and comprehensive source is available. So it is strongly needed and recommended to develop a Pakistan National Information System for Educational Administrators (PAK-NISEA).

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Cooperation and coordination should be developed among all the stakeholders because many institutes will be involved in this project. Attitude of people can be changed through proper marketing and training activities, so this factor should also be considered.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Ministries and statistical departments of government are rich in information resources, which can be helpful for educational administrators. Similarly many libraries or archives can also be helpful in this regard.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. I think centralized processing is better because thus we can maintain uniformity.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes I think it is not a big issue now a days. Training can be helpful in this regard.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Abstracts, indexes should be provided beside the full text. Document Delivery Services (DDS) can be offered on demand. But this project and its services can developed and offered step by step.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. Ministry of Education should monitor it but other related organizations should also coordinate with it i.e. HEC, PITBs (Provincial Information Technology Boards), Ministry of IT, Planning Commission of Pakistan. I think existing board of IT can be used for handling the data of PAK-NISEA as well.

Funds would be granted by Federal Ministry of Finance and Planning. Similarly there is no harm in seeking the foreign funds but fee based services is not a good choice.

(Interview recorded on 27th March, 2009 at office).

Naushad Ghazanfer

Librarian, Bahauddin Zakria University, Multan

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. They usually need rules, regulations and policy related material. Mostly they do not come to the library for their administrative information needs. They consult the library mostly for leisure or subject related reading materials.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. After analyzing their information needs, these can be satisfied. Many ways can be adopted for fulfilling their information needs but no proper mechanism or platform is available for this purpose.

Yes, the Pakistan National Information System for Educational Administrators (PAK-NISEA) should be developed.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. At first analyze the current status of available resources. These resources could be in the form of human, financial, material or IT infrastructure. These resources should be utilized first. Try to bring the available resources in a connection with each other.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Many resources exist in different libraries and archives. These resources should be organized and online access should be provided to them. Then on demand the digital copy should be provided through PAK-NISEA.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. The resources should be cataloged and online access should be provided to the bibliographical details of the available resources. If the user will demand for the full text, then the center should ask the regional/district office for print or digital copy of the document. Then the digitized copy should be provided to the user. The focus should be on demand and then supply rather than digitizing everything without assessing whether it is needed or not. Processing should be centralized.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes, it can work but it will take some time. It is good to provide the digital copy through email etc. but if someone asks for the print copy then there is no harm in providing it.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Bibliographic services, OPAC, Document Delivery Service, SDI etc.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should finance come for PAK-NISEA?

Ans. PAK-NISEA should work under Ministry of Education. A separate wing/unit can be developed in National Library of Pakistan. I think available resources should be utilized by integrating them with each other. It will also save the funds.

(Interview recorded on 5th November, 2008 at office).

Muzammil Tahira

Librarian

Govt. Degree College for Women, Gulshan-e-Ravi, Lahore

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. For administrative purpose they need budget rules, regulations, formal letters, rules about services, and literature related to current trends in education. They also need information for communication with higher authorities.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. For fulfilling their information needs, they usually ask their seniors, peers, sister organizations or persons they trust. They do not use libraries for their administrative needs but they ask their assistant staff i.e. clerks etc. for the provision of needed information and use their internal documentary sources.

I think librarians should also be trained for handling and providing the official information. Besides this, there should be a centralized system which can fulfill their administrative needs. So I agree that a National Information system should be developed.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. First of all need should be analyzed of educational administrators. Availability of skilled manpower, resources, finance, political scenarios and the contents, which will be

available through this system. This system should be developed in steps, initially at district or division level then at provincial and later at national level. Be realistic rather than idealistic.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. I think currently within college sector EDO offices maintain their statistical database. These databases can be utilized for this purpose. Similarly many university libraries have many research studies which can be helpful for educational administrators i.e. IER library (PU, LHR), sociology and social work department libraries (PU, LHR).

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. I will go with centralized processing supported by web based environment.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. I think it seems to be difficult in remote and less developed areas of Pakistan but as the trend is changing very rapidly, it is not impossible now. So with training or by providing IT assistants they can be motivated for the use of e-resources even in remote areas as well. If higher authorities will be determined to implement it then it would not be impossible.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Many services can be proposed for example SDI, CAS, Indexes, simple and detailed abstracts along with full text, and email alerts etc.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. Although I believe that many good plans fail in government sector due to bureaucratic setup. So the ideal situation would be if private sector would develop it. Anyhow as the government funds would be needed, so we can keep it under Ministry of Education. There should be a separate executive body for its proper functioning. HEC and DPI members, school, college and university administrators from each province, IT experts, and Library professionals should also be its members. Upto the district level it should be under Federal government.

Finance should be provided by the federal government with a share from provincial governments (may be 25%). Foreign funds should also be sought with acceptable conditions. There is no harm for offering fee based services for only private sector.

(Interview recorded on 26th March, 2009 at home).

Pervaiz Ahmed

Head, Department of Library and Information Science

Allama Iqbal Open University, Islamabad

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. They need information for evaluating and revising their existing programs and initiative of new programs. For this purpose they also need information about new trends, currents status of available resources, competitors' strengths, students' intake and statistical data about population and education related affairs etc.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. Their administrative needs are multi dimensional which are mostly fulfilled through different methods. For example they use Internet or their social networks. Library use is not very common for this purpose. There is no National Information System for the preservation and availability of educational data. Many meetings, conferences and workshops are arranged but their minutes and proceedings are not available from a single platform. So I strongly agree that a National Information System for Educational Administrators should be developed to overcome these problems.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. A need analysis is needed before going to propose any model information system. Factors may include availability of staff, place, funds and IT infrastructure etc. HEC can play the role of a hub in this regard.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. HEC efforts can be a good source in this regard. Many libraries have rich collection which can be helpful for educational administrators. These resources should be availed by networking them. National Library and National Archives should also play their role in this regard. Although it is good to utilize the existing resources and services but there should be a separate system with required resources and staff to work as PAK-NISEA.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Both methods should be used i.e. centralized within a province but decentralized between provinces, then it should be gathered from all provinces at the central database. As a whole it should be centralized processing.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes, it will work in Pakistan. Right now in Pakistan there exists network of mobile, Internet and satellites and number of their users is increasing very rapidly. So I think it's not a big issue at all. Training programs should be designed for its proper utility.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. There should be a directory of related persons, so the people can contact each other. Many other services i.e. online/chat reference service, online access to databases, Document Delivery Services (DDS), Selective Dissemination of Information (SDI), Current Awareness Services (CAS) etc.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. It should work under Ministry of Education and there should be separate executive body under the Ministry. There should be sub bodies in each province but the system should be centralized. Hierarchy should be as followed; federal, then provincial, then divisional and then district level. Finance should come for federal and provincial governments.

(Interview recorded on 5th December, 2008 at office).

Ramooz Ahmed Khan
Head, Department of Library and Information Science
The Islamia University of Bhawalpur

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Most of the educational administrators usually need information regarding the daily routines and academic activities. The most information they usually require is about rules, regulations, curricula, and text books/reports etc.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. So far so their administrative needs are concerned, they have to rely upon their supportive staff or use information provided by the establishment branch. In some cases the reliability and validity of the available information is questionable.

No uniform source at national level is available to satisfy their information needs, so a Pakistan National Information System for Educational Administrators (PAK-NISEA) is needed. I think PAK-NISEA is most essential.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Factor which need due consideration is finance, the availability of resources. Proper planning will be needed. Availability of skilled manpower is another issue. Such deficiencies can be overcome by providing proper training. This project will be possible through coordination of all the stakeholders. Information needs of educational administrators should also be assessed before planning such an infrastructure.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. I am not aware of such information systems exist for educational administrators. If such a system is available it should be brought in the notice of target users.

The example of NEMIS is not the good one. NEMIS is no doubt a source of quantitative information about education but the qualitative aspect is missing. On the other hand it only provides data about school, so a national information system for all level of education accessible through single interface.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Both type of processing methods have their own merits and demerits. So a combination of both can be used. I mean data can be gathered at regional or district level and finally it can be collected and processed at federal agency.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. It seems to be a dream because if the basic infrastructure will be provided, then what about the electricity? To me it does not look very easy in current scenario.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Personal profiles should be developed for providing SDI, CAS etc. Abstracts and indexes should be provided and later on full text can be provided on demand. E-mail alerts can be provided. Assistance should be available about strategic planning, or other

administrative tasks. Such services can be provided through email or chatting if not by personal visits. As the private sector is providing user specific services, it should also be provided in public sector.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. It should function under federal government. There should be an independent body/board under Ministry of Education, which will be responsible for this project. Up to the district level the federal government should supervise this project rather than giving it under each provincial government, because thus it will be difficult to maintain the uniformity.

Finance should come from federal government and the provincial government as well. Fee based services are not very welcomed in Pakistan but these can be offered to private sector. Foreign organizations like UNESCO, World Bank, US-AID, UNDP and local NGOs can also be consulted for funds.

(Interview recorded on 12th January, 2009 at office).

Rana Muhammad Iqbal
Senior Executive (Library)

Planning Commission, Govt. of Pakistan, Islamabad

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. They need information about finance, new developments in the education, demographic/statistical data about institutes, available resources, related research studies etc.

Q. 2. How their information needs can be fulfilled?

Ans. HEC has developed many such services not only for the teacher, researchers and students but for the administrators as well for example, CMS (Campus Management Solution). Related documents can be acquired and user centered services can be designed for providing access to these resources.

Q. Whether a National Information System should be developed for this purpose?

Ans. Yes, it is needed but it seems to be difficult to connect all three levels of education i.e. schools, colleges and universities. But there is no debate regarding its usefulness.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Comprehensive planning, trained manpower, IT infrastructure, processing and continuous maintenance are the major factors, which should not be ignored.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Ministry of education and Planning receive many reports and studies. An intellectual control can be developed for their proper utilization. Resources of AEPM can also be helpful. For its initial execution the project can be outsourced. When a system will be developed then the central body of PAK-NISEA can supervise it.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Centralized processing supported by Web based environment is most suitable. Business Process Re-engineering (BPR) should be employed to see which steps can be

ignored for quicker processing. All the steps should be mapped, from where the document was generated. It should be tried to create born digital documents, which can be monitored by the central body I mean where the document is right now. Milestones can be set for proper monitoring of generated and processed information. Thus accountability and control over all the steps will be developed and documents will be available at the right time for the end users.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. Yes, it will work in Pakistan. For example, only 20% geographical area has left, which is not covered by the Mobile Telephone networks, so if telephone access is available then Internet access can also be provided. People are rapidly becoming aware of these ICTs.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Full text access should be provided and access should be open for all. Services should be designed on the pattern of e-governments.

Q. 8. What should be the organizational structure of PAK-NISEA and

Ans. Ministry of Education should be its execution agency. There should be a separate body for running this project. As ERRA (Earth Rehabilitation Authority) was developed immediately and it is working but up to the grass root level it should remain under federal government rather than giving it under provincial government. Body should be consist of all the stake holders i.e. government official, civil society, educational administrators from each sector, NGOs, teachers and student representatives, IT and information professionals.

Q. From where should the finance come for PAK-NISEA?

Ans. Federal government and foreign funding bodies (i.e. UNESCO, IDB, World Bank, Asian Development Bank, Jaika, OIC etc.) can provide fund for this project. Education is the only sector, which should not be free and state should finance it. Fee based services should be avoided and open access should be provided to all stake holders whether they are in public sector or in private sector.

(Interview recorded on 6th December, 2008 at office).

Rubina Bhatti, PhD

Asst. Professor, Department of Library and Information Science
The Islamia University of Bahawalpur

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.)?

Ans. Needs are the expectations expressed or unexpressed. Without information no one can survive now-a-days. Scope of the institutional objectives, the type of job and responsibilities set the type of information needs of educational administrators. In school sector, the needs will be different. Similarly college and university related administrators will have different information needs.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. Normally there is a library for this purpose but there are some other sources. In Pakistan people rely on their own sources either formal or informal rather than visiting the library for administrative information needs. Besides books they use other sources as

well. They also use institutional records, newspapers, magazines, Radio, TV, Internet etc. They also ask their seniors and colleagues. The availability of information for educational administrators is not easy esp. the situation in schools and colleges is very gloomy. It is off course of significant importance to develop PAK-NISEA. It is a good idea and it should be developed in reality as well.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. First of all the information needs of educational administrators of each sector should be assessed. On the bases of findings the model should be proposed. Other factors which should be considered include manpower, availability of resources, budget etc.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. Libraries have good sources which can be of good use for educational administrators. Few efforts were made by HEC but I don't think any sources are available in integrated form. No efforts are made by the government in this regard.

Q. 5. Whether the PAK-NISEA model should be based on "Centralized Processing Supported by Web based Environment" or it should be decentralized?

Ans. Processing should be centralized. It would make the uniformity and standardization possible.

Q. 6. Whether the idea of "full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links" will work in Pakistani perspective?

Ans. It seems difficult in Pakistani perspective. Only e-resources are difficult to provide and use due to the IT illiteracy and electricity failures. So I think a combination of print and e-resources would work here.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Latest information should be provided as it is a practice in the developed world. I mean CAS, SDI, user training, article alerts etc should be provided.

Q. 8. What should be the organizational structure of PAK-NISEA and from where should the finance come for PAK-NISEA?

Ans. There should be body under Ministry of Education. The body should have members from all these sectors. There should be IT and library & information science professionals as well in the body. The body should work only under federal government or under provincial government as well. The federal government should supervise it up to the district level. There should be institutional repositories as well in each district.

Finance should be provided by both the federal and provincial governments. The ratio could be 50% for both governments or 75% for federal and 25% for provincial governments. Foreign grants can also be made available. There is no harm in fee-based services but only nominal charges should be charged especially from the private sector.

(Interview recorded on 17th December, 2008 at office).

Tariq M. Chohan

Chief Librarian

Central Library of the Islamia University of Bhawalpur

Q. 1. What are the information needs of educational administrators (i.e., school & college principals, heads of Depts., deans and registrars etc.)?

Ans. Mostly they come to the library for their academic information needs only not for their administrative information needs. They ask for newspapers, magazines and Journals etc. Sometime they ask for their subject related material. Rarely they ask for administrative material i.e. material related to staff development and training, form development and HR related resources.

Q. 2. How their information needs can be fulfilled? Whether a National Information System should be developed for this purpose?

Ans. User education should be provided at first for creating the awareness about available resources, which can be useful for them. Alerts or current awareness services should be provided. Only libraries cannot fulfill their information needs. A mechanism should be developed for serving their information needs at National level. Obviously a National Information System should be developed for educational administrators in Pakistan.

Q. 3. Which factors should be considered, while designing Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. IT literacy rate is very low. Proper training of the related personnel and end users will be needed. Availability of funds is also very important.

Q. 4. Which resources are already available in the form of existing information services/information systems?

Ans. I think many good resources are available in different libraries which can be utilized for this purpose.

Q. 5. Whether the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. I think it should be processed centrally rather than on each nodal point. I feel nodal points should work for the digitization of data only.

Q. 6. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective?

Ans. I think hundred percent (100%) IT based environment is not possible in Pakistan. So both traditional method of service provision and new ICT based methods should go hand in hand.

Q. 7. Which services should be offered through the proposed PAK-NISEA?

Ans. Information should be full text. Similarly email alerts, provision of soft copy through email or on CD. Print copy or online expert opinion should be priced.

Q. 8. What should be the organizational structure of PAK-NISEA and from where did the finance should come for PAK-NISEA?

Ans. A complete Hierarchy should be maintained up to the lower level. Federal Government should own it. I mean Ministry of Education then provincial governments, and then it should go up to the District and institutional level. For finance only federal government should be responsible.

(Interview recorded on 6th November, 2008 at office).

INTERVIEW TRANSCRIPTS OF EDUCATIONAL ADMINISTRATORS

Abdul Hameed, PhD

Professor & Director

School of Professional Advancement

University of Management and Technology, Lahore

Ex Chairman, Department of Special Education, University of the Punjab, Lahore

Q. 1. What type of information do educational administrators need for administrative work?

Ans. All kind of information will be needed which can help them in their planning and decision making. For example data on literacy rate, Gross and Net enrollment rate, drop out rate, human resources i.e. information about faculty at large, new trends in education in the country and across the globe, status about the available literature on education, curricula, students' retentions, achievements and attitudes towards their studies.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. I don't think that they have databases available to them, so they usually make decisions on their tacit knowledge that is the reason the decisions made are not very effective. Bureau of Statistics and Academy of Education Planning and Management (AEPM) do collect educational data but their copies are not available in schools. So the accessibility of the already collected data is a big question. Their needed information is not easily available. Sometimes data is available at the local libraries but they usually do not use libraries due to not only their personal behaviors but the passive behaviors of the information providers as well. Both information providers and seekers are not well trained in its proper utilization. there is no connection between them and their behaviors are the bottle neck in this process.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. For getting information they usually rely on their own resources, friends, peers, colleagues or contact with sister organizations. As I mentioned earlier they usually do not go to the formal information agencies i.e. libraries, archives or other such offices etc. Sometimes they contact government organizations for obtaining needed information.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Not all the people use Internet for administrative work, however now a great number of educational administrators has started its use. No doubt ICT has made information seeking and gathering process easier, efficient and cheaper. Availability of Internet at least to the administrators only should be assured for making information seeking process easier and efficient even for those who are sitting in remote and less developed areas. Thus they would become knowledge seekers because everyone has an inbuilt tendency and mechanism for seeking knowledge which should be activated through training.

Q. 5. Which problems do they face in getting the required information?

Ans. I think the training of the administrators is most important which is not focused by the higher authorities. Those who cannot use online resources, they have to rely on the helping staff. Although mostly available helping staff for information searching is young and do not stay for longer on a job. So as they get trained, they leave the job. I think administrators should be trained themselves at least in online searching and browsing etc.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Yes, off course it should be developed. This system should be reliable and all encompassing. Although we have NEMIS in school sector but it provides only statistical data not the qualitative data which is also needed by the educational planners and decision makers. Although government agencies many times sponsor the research studies but no efforts are made for the accessibility and availability of those reports. All such studies should also be available through PAK-NISEA which you want to propose.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. As we are moving towards the paperless society, so soft copies should be provided of the quantitative and qualitative data. Tacit knowledge should also be preserved for the help of young administrators. Services like chat reference, current, relevant and specific information needed by the individuals (SDI, CAS etc.), user training and Wikis etc should be provided. End users should be the main focus.

Q. 8. What do you think about the provision of expert solutions to individuals through telephone or chat services?

I think that educational problems are so complicated and qualitative in nature and do not have readymade solutions. There would be multiple diagnoses and multiple solutions for a single problem depending on their contexts. So specific solutions cannot be easily advised only through online interaction. Although it may be helpful for initial diagnoses only but the ultimate and effective solution cannot be proposed without real understanding of the context and face to face interaction with the local subjects.

(Interview recorded on 29th November, 2008 at office).

Abdul Rehman Malik

Executive District Officer (EDO) Education, Lahore District

Q. 1. What type of information do educational administrators need for administrative work?

Ans. It depends on the job requirement. Mostly we need statistical data.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. EDOs mostly acquire information through their assistant staff i.e. Dos (District Officers etc). Their information seeking process is very defined one.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. Field visits, feedback provided by the higher authorities and even by the assistant staff as well.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes we do use Internet and it facilitates us a lot. It has made our work easier.

Q. 5. Which problems do they face in getting the required information?

Ans. Mostly available information is 90% accurate. The problem is with the quick availability of the information when it is needed. For information from the very remote and far flung areas, usually telephone is used. That is why validity and reliability of such information provided only on phone is a big issue.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Yes, it should be developed as soon as possible.

Q. 7. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective esp. In remote areas?

Ans. Regarding your question whether the idea of e-resources through Internet would work esp. In remote areas. So, yes, it will work. Now government has decided to provide at least 15 computers in secondary and higher secondary schools even in rural areas as well. A trained IT teacher or assistant would also be provided at each institute. So there would be no more issue of lack of ICT facilities and training etc. Administrators would have no other choice rather than using it.

Q. 8. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. I think it is your field to think about the services. I know only one thing that it should provide us with the reliable information, whenever we need it.

(Interview recorded on 27th November, 2008 at office).

Ch. Ghulam Rasool Akhtar
DEO (R)- Secondary Education, Bahawalpur

Q. 1. What type of information do educational administrators need for administrative work?

Ans. They usually need information for planning budgeting, forecasting, controlling, problem solving, students affairs, marketing and promotion of their institutes, funds seeking, rules and regulations, time management, decision making, current affairs etc.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. They mostly get information through field visits, from institutional documents, through telephone calls, Internet etc. They also discuss with assistant staff, colleagues, friends and related experts. Their needed information is not easily available.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. They use newspapers, other institutes web sites, meeting minutes, conference proceedings, TV, Radio and Internet etc. for this purpose.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes, they do use the Internet but not all the administrators. Of course ICT has made their task easier and they can get information while sitting in their offices.

Q. 5. Which problems do they face in getting the required information?

Ans. As I mentioned earlier that their needed information is not easily available which is a big problem and barrier in decision making and planning etc.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Yes, definitely it should be developed and we need it.

Q. 7. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective esp. In remote areas?

Ans. Why not, off course, it will work. Now there are big grants for computer labs in secondary schools even in villages. Now each principal will definitely use it. I mean him/herself or with the help of computer staff.

Q. 8. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. All the services of international standard should also be offered for educational administrators in Pakistan. (Interview recorded on 3rd November, 2008 at Office).

Habib Khan, PhD

Ex Director General

National Educational Management Information System (NEMIS), Islamabad

Q. 1. What type of information do educational administrators need for administrative work?

Ans. It depends on their nature of work and responsibilities. They want to know the nature and requirement of their job, information about teachers, students and other facilities, political priorities, etc.

As DG of NEMIS I was supposed to generate information for educational administrators. I was responsible for planning and managing school information. Similarly other administrators' information needs depend on their work and environment etc.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. They mostly require demographic information, population information, legal rules, government grants, political scenarios etc. No their needed information is not easily available, if it is available then they are not aware about it. Mostly for their decision making they rely on their personal sources and experiences.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. I think most of the educational administrators do not generate new ideas, but they just follow the already existing ideas and plans. If someone wants to do something new, then s/he has to effort him/herself. S/he would explore the Internet, website of other related institutes or will consult the related literature.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Most of the people are reluctant in using the technology. There is no doubt that ICT has enabled everything.

Q. 5. Which problems do they face in getting the required information?

Ans. I think that our behaviors are the basic bottleneck in this regard. On the other hand information is also scattered. They and their staff are not aware and trained how to search and get this scattered information.

Q. 6. Whether a National Information System for Educational Administrators (PAK-NISEA) should be developed to facilitate them?

Ans. Yes, a national information system is needed but it should be a national information system in real sense. Initially it should be developed separately for each sector i.e. schools, colleges and universities etc, then these can be integrated with each other to make them accessible through a single interface.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Services should be based on real need analysis. Do not plan without involving the end users. Before designing its services, ask them what, why, how and for whom questions, even how it is going to be helpful. I think now we are living in technologically enabled society. People go to the banks and use ATM etc, so why not in education sector as well. If government will give it importance then definitely people will start using it. (Interview recorded on 20th January, 2009 on telephone).

Inamul Haq Kousar, PhD
Ex Director General Federal Board of Pakistan

Q. 1. What type of information do educational administrators need for administrative work?

Ans. As administrators have to perform multiple roles and responsibilities, so their information needs are also very dynamic. They want to know about their resources, budget, staff, students, government rules, policies and grants etc. If they have to arrange any training courses or their staff, they would like to know about such opportunities.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. For fulfilling their information needs, they usually rely on survey reports, ask their colleagues, friends, assistant staff etc. easily available information is mostly less reliable so they cannot fully depend on that.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. Most of them rely on available literature and on personal observations and experiences. Sometime they ask their junior staff, friends, senior colleagues etc.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes, now it is easily available everywhere and definitely it has affected our work performance that is the reason its use is increasing day by day.

Q. 5. Which problems do they face in getting the required information?

Ans. Availability of valid and reliable information is a big problem for administrators. Sometimes they know that provided statistics are not accurate but they have no other choice. If an administrator is responsible then he would try to confirm him/her self from other sources as well. Otherwise no proper channel/system is available to facilitate them.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. I agree with your idea of developing a Pakistan National Information System for Educational Administrators (PAK-NISEA). It is needed and it will facilitate them. There

should also be some mechanism for the preservation of knowledge and experiences of ex-seniors (tacit knowledge). Although it is a laborious work.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. There should be a database to facilitate the educational administrators. Different training programs, workshops and exhibitions should be arranged by PAK-NISEA. Services should be according to the need and requirements of the actual users.

(Interview recorded on 26th November, 2008 during his visit to Lahore).

Karamat Ali, PhD

Ex. Vice Chancellor, Bahauddin Zakria University, Multan

Q. 1. What type of information do educational administrators need for administrative work?

Ans. As educational administrators are concerned with the planning and management of educational resources, so they need information not only about their own institutes but about the national and international institutes as well. For planning they need information which is not possible without the availability of accurate information. Basically the whole world is transforming into an information and knowledge based society. As information is a power now a days, so they need reliable information for planning and decision making.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. They fulfill their information needs through different ways. By reading the literature (i.e., books, journals etc.) which is coming all the time. The other source is Internet, media, conferences, meeting etc. Good administrators keep an eye on not only local and national scenarios only but on global aspects and changes as well. They use both formal and informal sources of information. The basic purpose is to be quick and efficient in decision making.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. Administrators and planners need to have very broad vision. They should be able to fore-see 30/40 years ahead into the future. This insight comes through reading, through media, interacting with the different people, concentration, and deep thinking about the rapid changes. In other words administrators use not only formal and informal sources for getting information and new ideas but they do use their personal experiences and tacit knowledge as well for planning, decision making and new developments. The understanding and ideas for new developments can be acquired by visiting other countries either physically or virtually.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes mostly they do use but again it depends on individuals' behavior. It is the question of attitude, not everyone is going to use Internet. Anyhow there is a lot of comfort in its use.

Q. 5. Which problems do they face in getting the required information?

Ans. Plenty of information is available but the issue is its reliability and comprehensiveness. I believe that now-a-days acquiring the information is not a problem

but the relevancy and reliability of the information is a big issue. As administrators need condensed information which is not easily available to them. The problem is that how to use the junk of available information. There is too much centralization in our institutes. An educational administrator has to do a lot of things which effects the quality of work. There is no proper concept of trained assistant staff which can separate the useful and needed information from the less important and not needed one. No such information system is available which can fill this gap.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Yes it is strongly recommended and as you asked, off course all three levels i.e. school, college and university sector should be integrated through PAK-NISEA model. There are many information systems in the developed world which provide the information from the Montessori level up to the higher education level. I think we should have a national information system, which would have international perspective. This is a lame excuse that information system of international standards cannot be developed in Pakistan. I think such a system is the need of the hour if we have to survive in this global village.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Access to condensed information about all sectors of education i.e. schools, colleges and universities should be the major focus of PAK-NISEA.

(Interview recorded on 21st January, 2009 at Office).

M. Ashraf Moten, PhD

Senior Chief (Higher Education)

Planning Commission, Government of Pakistan, Islamabad

Q. 1. What type of information do educational administrators need for administrative work?

Ans. Mostly they need statistical data i.e. number of institutions in each region, number of students and enrollment, teachers and their qualification, curricula being taught, facilities available to them, status of funds, existing policies and rules, etc.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. They usually use their internal documentary sources or get statistics from the Ministry of Education, Board of Directors, HEC, EDO offices and websites etc.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. Depends on the person. Mostly the highly qualified administrators obtain information and ideas from foreign country visits or from foreign institutions' websites, journals etc.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes, they do use Internet for seeking information. Definitely ICT has affected the information seeking and gathering process and made it easier for them.

Q. 5. Which problems do they face in getting the required information?

Ans. Reliability and validity of the available information is a big issue. It is not easy to access and use available information.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Yes, it should be developed but it is very difficult to integrate all three levels of education i.e. schools, colleges and universities at one. It can be developed gradually.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Whatever the services would be provided but the efforts should be made for collecting the valid and reliable data. Internet based services are good option.

(Interview recorded on 1st April, 2009 at office).

Muhammad Abdullah Khan Salaary
Ex-Principal
Govt Muslim H/S, Rehman Galli, Lahore

Q. 1. What type of information do educational administrators need for administrative work?

Ans. Rules, procedures, status of available facilities, data required for correspondence with the higher authorities, information about staff and students etc. In fact what is needed depends on the type of job.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. They usually get information from their internal sources, documents, through Internet, libraries or from the relevant government agencies etc. In fact their needed information is not easily available, they have to struggle hard for this purpose. They usually do not go to libraries.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. Through social networks i.e. staff, colleagues, friends, senior experts or consult govt. organizations.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes, many administrators are using it, but it's use is not very common yet. Although the government has provided many facilities i.e. computer labs with Internet connections. Anyhow this can be overcome through training and with the provision of IT staff. There is no doubt that it has made the process easier.

Q. 5. Which problems do they face in getting the required information?

Ans. Many problem are being faced, I mean if any information is required then they have to struggle themselves because there is no mechanism or system for this purpose. Sometimes, school administrators have to provide information to the higher authorities on his/her own expenses.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Off course there should be such a system. Government should pay special attention in this regard.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. It should facilitate the educational administrators with needed information. Services can be provided through Internet. Training is very important in this regard. If government will provide us with proper infrastructure, equipments and staff, then it will be a good facility. (Interview recorded on 28th November, 2008 at home).

Parveen Iqbal

District Education Officer (DEO, W-EE), Lahore City

Q. 1. What type of information do educational administrators need for administrative work?

Ans. They usually need information for planning, budgeting, so they want to know about government policies, rules, grants, financial rules, leave and pension rules, latest data about education, changes in policies, information about administrative rules and roles, time schedule for any task to be accomplished, any addition or revision in curriculum, current trends in education around the globe, information about ICT training programs, new researches in education, and management methods etc.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. Information about routine matters is available but information on other aspects is not available. If available then it is not organized at all.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. For planning and decision making, they usually rely on Internet resources, circulars, staff meetings, telephonic communication, and ask from their current or retired seniors, peers and colleagues. They also visit the sister organizations for getting new ideas.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes, it is used by most of the administrators but not everyone use it. No doubt ICT has affected their information seeking habits and has made this process quick and easier.

Q. 5. Which problems do they face in getting the required information?

Ans. As DOs (District Officers) have to collect information mostly through field visits, but they are not provided with proper transport facility. Proper manpower is not available for field work. Lack of training of administrators and staff is also a big problem. Sometimes relevant school or college staff do not cooperate in the provision of needed information.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Yes, PAK-NISEA is needed and we really need such a system. It would make our work easier and efficient. I think it is easier to save the record on computer and then retrieve it.

Q. 7. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective esp. In remote areas?

Ans. Yes it will work and now government is making serious efforts in this regard by providing computers and IT staff to every school and college. Thousands of computer labs are being developed in each district.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Online database should be developed, administrators and even teachers should be trained. There should be a mechanism for the provision of information on phone even. (Interview recorded on 1st December, 2008 at home).

Qazi Khalid Farooq

District Education Officer (DEO), Secondary Education, Lahore-Cantt.

Q. 1. What type of information do educational administrators need for administrative work?

Ans. We as administrators usually need statistical data about institutes which come under our responsibility.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. In fact we get data and needed information through personal visits, field work. Sometimes we get data through telephone. Persons working as headmasters/principals who provide us with needed information related to schools or colleges are well educated and responsible people. Anyhow, for us availability of data is not a big issue. But it takes too much time in travelling each place and getting data for our planning.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. Once we have data/information in our hand, we analyze the collected data, and rationalize and then plan and allocate resources accordingly.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes, now most of the administrators do use the Internet. It is very useful.

Q. 5. Which problems do they face in getting the required information?

Ans. As I mentioned earlier that we get data from field work so we do not have problem with the availability of data, although it is difficult to get data in this way.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Yes, it should be developed on urgent bases. We need such a system which can facilitate us in our planning and decision making.

Q. 7. Whether the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” will work in Pakistani perspective esp. In remote areas?

Ans. Regarding the possibility of use of e-resources in remote and rural areas, it is not a problem now. We have planned and even advertised in the news papers that each secondary and higher secondary school will be provided with 15 to 20 computers along with an IT teacher. So this idea is workable now in Pakistan.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Access to the print and soft material should be provided through this system. Besides this e-mail alerts, SDI, Executive summaries, and full text information should be provided.

(Interview recorded on 27th November, 2008 at Office).

Rafique Ahmed, PhD

Ex Vice Chancellor, Islamia University of Bahawalpur

Ex Vice Chancellor, University of the Punjab, Lhr.

Q. 1. What type of information do educational administrators need for administrative work?

Ans. Responsibilities of educational administrators are very dynamic in nature. For example as a vice chancellor I had to perform multiple responsibilities. I was supposed to know about university resources, employees, funds, students etc. Besides this government rules, policies and political scenarios etc. Accordingly I used to plan and decide about the other tasks.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. They mostly walk around for needed information or consult their assistant staff, colleagues, friends and seniors etc. Besides this they use survey reports, conference and proceedings etc.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. Most of them rely on official documents and personal experiences. Staff meetings, informal discussion with colleagues and peers, foreign visits and media programs are a good source for new developments. In fact in my case I always got ideas by discussing with people for new developments or for solving the local problems.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes, the trends now has changed and people are now using it definitely it has made administrators' work easier.

Q. 5. Which problems do they face in getting the required information?

Ans. As a matter of fact most of the administrators rely on the available facts and figures, although they know that those statistics are not 100% correct and reliable. Availability of valid and reliable information is a big problem. No proper system is available to facilitate the educational administrators.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Yes, why not it should be done many years ago. Developed world has such systems for many years and we are today thinking about it. This the difference you can see in their education and our education. When decisions will be made on fake statistics then how it can improve the education of the country. I strongly agree with the idea of developing a National Information System for educational Administrators in Pakistan. In fact it should be developed in reality.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Needed information should be provided immediately to the administrators. Special efforts should be made that the provided information is reliable and valid. Experiences of ex-seniors should also be stored in the system for the new generation.

(Interview recorded on 2nd December, 2008 at office-Nazria Pakistan Trust, Lahore).

Salamat Ali
Asst. Director (Regional)
District Teachers & Support Centre (DTSC for Primary Schools)
CIDA project, Kasur
Principal, Govt H/S Hussain Khanwala Hithar

Q. 1. What type of information do educational administrators need for administrative work?

Ans. We usually need information related to each aspect of work, i.e. teachers' training programs, students activities, academic and extracurricular activities, feedback from all stake holders, rules, regulation etc.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. There are some manual books, and policies; we have to follow for our work. Besides these formal sources we discuss with our super-ordinate and sub-ordinate staff individually or in meetings, ask students, parents and our other friends or peers in sister organizations. Few things i.e. teachers' codes etc are available in the form of published books.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. The situation itself guides you towards the decision making. Some administrators use personal contacts for seeking grants or planning for new developments. They discuss with their staff for new ideas or even use the literature. They mostly do not use the library for this purpose.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes they do use but not all the administrators use it. I personally feel that it has facilitated the administrators to great extent. Otherwise it is difficult to manage the information manually i.e. report generation, maintenance of records etc. Now Internet and computers have reached even in villages. Even many Foreign NGOs are funding such projects, CIDA is one of such a project.

Q. 5. Which problems do they face in getting the required information?

Ans. Many problems are being faced by the administrators. Information is scattered in so many offices and sources. There are separate authorities for primary schools, then elementary, secondary and colleges etc. Even one district there is no coordination between all these levels of education. Similarly there are bureaucratic setup and cultural barriers which are hindering in getting needed information. Available data is not very reliable.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Yes, it is a good idea, if possible it should be developed. Available systems should be used. For example CIDA (Canadian International Development Agency) services/network can also be utilized for this purpose.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Refresher courses, conferences and workshops, for administrators' training to make them aware regarding the use of PAK-NISEA. At least three months training should be provided on all related aspects. Email alerts, manuals, indexes, executive summaries, and full text on demand. (Interview recorded on 1st December, 2008 at Office).

Talib Hussain Talib

Chief of Education

Planning Commission Government of Pakistan, Islamabad

Q. 1. What type of information do educational administrators need for administrative work?

Ans. As we are involved in planning at national level so we need data about rest of the country. We need consolidated information from each province for our planning. Information about the funds available, five years plans etc. We do not only need quantitative data but qualitative information as well for our planning which is not available to us. I mean output of the educational policies implemented by the government, their effects on education, students' and teachers' satisfaction with these policies etc.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. No valid system is available to assist us in our planning. Although we have Education Management Information System (EMIS) at each district but its performance is not reliable. We cannot plan according to the need of the actual population.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. For development tasks committees are developed and they prepare five years plans for education. Educational planners usually rely on the available data and statistics although they know that its reliability is not intact.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes the administrators mostly use the Internet for their administrative work many departments are connected with each other through Internet. Off course ICT has made information seeking and gathering process easier because one can get information while sitting in his/her office.

Q. 5. Which problems do they face in getting the required information?

Ans. The problem is with the validity and reliability of the available data. Developmental tasks demand coordinated efforts and authentic data and feedback which is a missing element in Pakistan. Planners cannot go out and collect reliable data themselves so they have to rely whatever is available to them. Many efforts were made even many years ago. For example at Queta a comprehensive Information System was developed with the help of UNESCO and NISEF. Complete educational data was available through GIS

(Geographical information System). But the problem is with the sustainability of the system which is a big issue in Pakistan. No proper channel is available for administrators.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Yes, definitely I strongly favor the development of PAK-NISEA. It would be a great help for boosting the education sector of Pakistan. When we will have reliable information system, the planning efforts will be more realistic and effective. Such a system should be available which will integrate all three tiers of education and will be accessible through a single interface. Because separate systems are available but they are not coordinated with each other. So a system is needed which will coordinate already existing resources and information systems. Try to think on its different aspects and plan different steps for the sustainability of the system.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. Online access to the current and valid data should be provided through PAK-NISEA. (Interview recorded on 1st April, 2009 at office).

Zafar Iqbal, PhD

Dean Faculty of Education, Allama Iqbal Open University, Islamabad

Q. 1. What type of information do educational administrators need for administrative work?

Ans. They require information about roles and responsibilities of themselves and their assistant staff, means of communication for employees, their performance, financial allocation, government rules, regulations etc.

Q. 2. How do they fulfill their information needs? Is their needed information easily available?

Ans. Their information needs are fulfilled through multiple ways i.e. through upward and downward mobility of information, through computer based databanks, peer reviewing etc. Now for employees' performance beside the internal documentary sources, CCTVs (Closed Circuit Televisions) are also used.

Q. 3. From which sources do they obtain information and ideas for planning, decision making and new developments?

Ans. They usually ask their sister organizations, or verify their parent organizations' master plan then they try to plan within that limit.

Q. 4. Do they use Internet for their administrative work? Have ICT made information seeking and gathering process easier or more difficult for them?

Ans. Yes, now people have started Internet use. No doubt it has made information seeking and gathering process easier.

Q. 5. Which problems do they face in getting the required information?

Ans. If the information is available then it is not easily accessible. Personalization of information is a barrier. I mean people sitting in the offices consider it their personal property, They do not provide the needed information easily. Even our personal office related information sometimes becomes difficult to obtain. Staff is not properly trained. No systematic approach is available in the institutions to make the information easily available.

Q. 6. Whether a National Information System (PAK-NISEA) should be developed to facilitate them?

Ans. Yes, I agree that a National Information System for Educational Administrators should be developed. We have a dire need of such a system. It would be a great achievement to develop a system which can integrate all three major sectors of education, i.e. schools, colleges and universities.

Q. 7. Which services should be offered through the proposed Pakistan National Information System for Educational Administrators (PAK-NISEA)?

Ans. An online databank should be provided. Administrators should be trained for its proper use. Try to assess their information needs and then accordingly plan the services and/or other aspects of this system. Information should be organized and made accessible through Internet. (Interview recorded on 6th December, 2008 at office).

INTERVIEW TRANSCRIPTS OF IT / INFORMATION SYSTEM EXPERTS

Adil Imdad

Software Engineer - Strategic System International (SSI), LHR

Q. 1. Should National Information System be developed for educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.) in Pakistan?

Ans. Yes, a national Information System should be developed for Educational Administrators in Pakistan because it will be useful and we are lacking such a system. If used properly then it would be very helpful for overall education of Pakistan.

Q. 2. Which factors should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. Its technical aspects, physical location, needs of end users, training and orientation of users and service providers, financial resources, IT infrastructure and design and development of user friendly interface etc. should be considered while designing this system.

Q. 3. Is the Idea of Integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface practically feasible? If YES, then how?

Ans. Yes, we can integrate all three levels of education and can provide their data through a single interface. If we have a centralized database with a restricted access for all the stake holders.

Q. 4. Is there any information system already existing in each sector i.e., school, college or university? If YES then, whether these systems/resources can be utilized for developing a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. I know about PERN and many intra-university networks which can also be utilized for developing a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan. But it all depends on the will of the holding organizations.

Q. 5. Either the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. I would favor the Centralized processing supported by Web based environment. Data should be entered directly rather than digitizing the documents because digitization

of documents create another layer and make the system slow. With direct data entry it would be speedy.

Q. 6. Similarly, will the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” work in Pakistani perspective?

Ans. Regarding the availability of IT infrastructure, it is possible but in terms of people's attitude, I think it is not easy for all the people to use e-resources. Anyhow gradually and with proper training of people it can work. End users should be convinced through personal visits and training workshops.

Q. 7. What should be the organizational structure of PAK-NISEA?

Ans. Ministry of Education should be its parent body. There should be an executive body. IT Boards of all the provinces should also collaborate in the development and maintenance of this system. Up to the district/zonal level the system should be under control of federal government rather than involving the ministries of provinces.

Funds should be provided by both the federal and provincial governments. I am not in favor of foreign funds and fee based services.

(Interview recorded on 27th March, 2009 at office).

Aurangzeb

Deputy Director IT

Directorate of IT, The Islamia University of Bahawalpur

Q. 1. Should National Information System be developed for educational administrators (i.e., school & college principals, heads of Departments, deans and registrars etc.) in Pakistan?

Ans. Obviously there is no question/debate regarding the establishment of an information system at national level for educational administrators. Definitely there should be a NIS not only in education but in other areas as well. There exist different information systems ranging from the Management Information Systems to Specialized Information Systems designed in a way to help the core management of those organizations. These systems not only help in decision making but minimize the efforts of the policy makers as well because the information retrieval is fast. Efforts can be minimized while using these Information Systems. So a proper national information system for educational administrators is must.

Q. 2. Which factors should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. Both manpower and funds are the most important factors. Two things will be considered while designing PAK-NISEA. Online PAK-NISEA will be its application side, while its physical infrastructure will also be designed. I mean identification of educational data repositories from where the data will be gathered in the nominated nodal points etc. In fact even basic needs are not fulfilled in Pakistan. Try to satisfy the basic information needs at first and then go for the intellectual information needs. Proper training would be needed along with the clear identification of objectives.

In fact Information is the key but it is useless if it is not accessible to those who need it. First of all clear and concise objectives should be set. Proper infrastructure should be designed and training should be provided. The key stake holders and problems should be

identified. Proper and speedy funding should be arranged because many good projects fail due to non availability of funds.

Again I will stress on the design of the system. Whatever segments you choose for your system they should be IT enabled, IT literate and IT ready. Otherwise the system will be collapsed. Currently not a single transaction is possible if you are not IT enabled. Any IS should be inclined with all the social and IT experts. There should be constant interplay among all the stake holders.

First of all identify the central location point, then identify and divide in other regions and sub regions which will be connected with central point location as nodal points.

Q. 3. Is the Idea of Integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface practically feasible? If YES, then how?

Ans. It seems to be very difficult if not impossible. Off course there are information systems connecting all three sectors of education through a single interface. But those systems did not get developed within a day or two.

Q. 4. Is there any information system already existing in each sector i.e., school, college or university? If YES then, whether these systems/resources can be utilized for developing a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. I don't know specific information systems in the education sector but HEC's project PERN and National Digital Library etc. can be used for this purpose. Off course available online sources and services can also be integrated in PAK-NISEA model.

Q. 5. Either the PAK-NISEA model should be based on "Centralized Processing Supported by Web based Environment" or it should be decentralized?

Ans. I would recommend a centralized processing supported by Web based environment I mean with the availability of the hardware & specialized skills at one place there will be no redundancy of those particular hardware and information organization skills at different places. When we talk about web based environment, it minimizes the need of specific application software for each nodal point. No highly specialized IT expertise would be needed for processing the information in web based environment, just a terminal and a scanning device with a single operator would be sufficient for entering or digitizing the data from a nodal point. This data can be further processed (i.e. assigning metadata, indexing & abstracting etc.) in the central sever based at the central body. Data collection should be in parts. In the beginning data should be collected on simple and routine matters then gradually move towards your actual target.

First of all you have to develop an infrastructure for developing an information system. Both data entry and then access can be provided through Web based environment.

In centralized processing, no need to provide the maximum infrastructure at the client side but you need only a terminal or client machine to provide. On the other hand there would be fast machines called server machine which should be more powerful. If hundred or thousand users are accessing the same machine, even then it should be fast.

Suppose we have 100 clerical staff at the district nodal points entering the data through client machines. Even then the processing of the main server should be fast. This information entry will be in a web based environment. This data would be gathered through server in a central database. Then the information experts will further process the data i.e. organization of data and assigning Meta data or developing other service packages from the processed information. At the district nodal points just simple

computer operators will be needed. On the other hand at the central body IT and Information experts should be employed for further processing of the gathered data. Similarly the access should also be provided through web. Web based application advantages are more than any computer based applications. Now systems are developed in web based environment without using any complex programs. Just open the Internet browser and login the system for processing and access as well, so no need to install any specific application. The next age is of Web based application.

Q. 6. Similarly, will the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” work in Pakistani perspective?

Ans. Yes, it will work but in rural areas it would be difficult without proper IT infrastructure. Although many alternatives are available for providing remote access esp. in the rural and far flung areas i.e. Wireless phone, Satellite, Mobile phones. There are few projects which are working in the rural areas but the key question is the access and speed of the Internet. In fact the selected people i.e. educational administrators are the key users so special facilities can be provided to this segment to connect them with the PAK-NISEA.

Q. 7. What should be the organizational structure of PAK-NISEA?

Ans. In my opinion, it should work under Ministry of Education. Federal Government should be responsible for its overall administration and management up to the district level but local/provincial government cooperation is also important. Try to bypass the bureaucracy of provincial governments without losing their cooperation. There should be a separate board consisting on directors from each province. In total there should be six directors and a chairman of the board (Minister of Education). Then there should be deputy directors, assistant directors, field coordinators (for data gathering etc.), IT experts, library and information science professionals, educationists, social, educational & IT researchers and Information System Management officers at asst. director level. As more IT expertise would be needed so there should be a separate IT cell working under the Board of PAK-NISEA.

Whatever the organizational Hierarchy will be proposed, it should be simplified. For designing a good organizational structure try to explore the structure of few good organizations i.e. NRSP etc. More system analysts would be needed for this project. Up to the district level senior professionals should be engaged. For any social centric information system funding and manpower is also a problem. For this purpose foreign funds can also be arranged (i.e. from UNESCO, Asian Development Bank, Islamic Development Bank etc.).

Conclusion: Plan should be proposed in phases and proper infrastructure should be designed. I mean in the beginning just focus on Universities, then on colleges and then on colleges. Universities have the infrastructure and are fewer in numbers, so first focus on universities then on other segments. Requirements of the target users should be analyzed. You should try to propose a good system because one should not stop the work that it is very big. In fact it would open the door for such research work in Pakistan.

(Interview recorded on 26th January, 2009 at Office).

Mushahid Anwar, PhD

Asst. Professor & Chairman, Department of Geology

The Islamia University of Bahawalpur

Q. 1. Should National Information System be developed for educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.) in Pakistan?

Ans. Yes, it is important to develop such a system at national level. Ministry of Education should gather and organize all type of information for this system. This information can be helpful in decision making at macro and micro level. On the other hand currently in Pakistan, decisions are being made without any realistic data. So the system should not only focus on collecting such data but the its validity and easy access should also be assured.

Q. 2. Which factors should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. Many factors should be considered i.e. trained manpower, finance, IT infrastructure throughout the country. I would like to suggest that Geographical Information System (GIS) should also be used for this purpose, as it is a practice in many developed countries. One simply would login in a GIS and by clicking on a specific location/area he/she would be able to find out number of schools, colleges, students, teachers ratio etc in that area. I would like to add the example of an Indian Information System entitled “Silicon Valley” developed for farmers and milk sellers. We also have reasonable IT infrastructure in the form of satellites, mobile phone networks etc. Similarly many efforts were made by the government of Pakistan as well to provide such facilities to the remote areas as well in the form of tele-centres (i.e. Raabta Ghar etc).

Q. 3. Is the Idea of Integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface practically feasible? If YES, then how?

Ans. Yes, all three tiers can be integrated with each other and practically it is feasible although it is a laborious task. Ministry of Education can play an effective role in this regard. Different Secondary and Intermediate Boards, EDO Offices, NEMIS, HEC networks i.e. PERN can be integrated with each other to make them accessible through a single interface.

Q. 4. Is there any information system already existing in each sector i.e., school, college or university? If YES then, whether these systems/resources can be utilized for developing a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. Yes, off course as I have mentioned earlier, the names of many networks which can be utilized for this purpose i.e. NEMIS, PERN etc.

Q. 5. Either the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. I think centralized processing supported by Web based environment is the new and easiest solution and it would work in Pakistan as well.

Q. 6. Similarly, will the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” work in Pakistani perspective?

Ans. Full remote access to e-resources through Internet would take some time in its proper execution in Pakistan esp. in remote areas. Although people are becoming technology users rapidly but even then it would take some time. Anyhow if government

would take serious actions in this regard and would provide proper training to end users, then definitely it is not impossible to implement it.

Q. 7. What should be the organizational structure of PAK-NISEA?

Ans. As I mentioned earlier that it should be under Ministry of Education. There should be a board of directors, who would be the representatives of different provinces and sectors of education. Similarly without IT experts, it would be difficult to implement such a system. Up to the district level federal government itself should take care of this system. EDO offices should be designated as district nodal points.

Finance should be provided by the federal government of Pakistan. Foreign funds can also be utilized. I think fee based services can also be a good option but only for business organizations not the for the public sector institutions.

(Interview recorded on 20th February, 2009 at Office).

Nageen Ainuddin

Director General

Pakistan Scientific and Technological Information Centre, Islamabad

Q. 1. Should National Information System be developed for educational administrators (i.e. school & college principals, heads of Deptts., deans and registrars etc.) in Pakistan?

Ans. Yes. It is needed. Such a system will help in decision making and planning of education resources.

Q. 2. Which factors should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. Expertise, Funding, Manpower, study of examples of such systems in other countries, behavior and attitudes (bureaucratic culture and general culture of the country).

Q. 3. Is the Idea of Integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface practically feasible? If YES, then how?

Ans. Difficult to comment at this stage, as I have not studied this kind of system. However I have been told that such systems exist in various other countries. A thorough study of such a system (successful ones) may be undertaken and then planned in the light of local scenario it might work.

Also, if carried out in phases then one can assess the success or failure of such a system. Therefore it is proposed that the project may be divided into three phases, first for universities, then colleges and then school level.

Besides, if any agency like UNESCO, the World Bank or the Asian Development Bank or any other organization which has also been involved in such projects abroad is involved as consultants and funding partners, then the project has more chances of success.

Q. 4. Is there any information system already existing in each sector i.e., school, college or university? If YES then, whether these systems/resources can be utilized for developing a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. A somewhat similar system such as HEC – PERN in the field of digital published literature (digital library) is successfully running for the Higher Education sector. Therefore, Higher Education Commission can work on this kind of system as well.

Q. 5. Either the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. A Centralized Processing supported by Web based environment is recommended for proper record keeping and organization, otherwise the scattered data would be lost and would require un-necessary efforts and time. The data be collected at district level and pooled at the Federal Government level. Over all control should be administered by the Federal Government.

Q. 6. Similarly, will the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” work in Pakistani perspective?

Ans. As proper implementation of this project would take a few years from now, in the mean time internet access and use would become more common and it can work. Besides if the stakeholder, particularly, the educational administrators, principals, registrars, Board officers etc are provided trainings at district level with refresher courses from time to time, there are more chances of its better use.

Q. 7. What should be the organizational structure of PAK-NISEA?

Ans. Keeping in mind the importance of this project and system, it is suggested that a PAK-NISEA Cell be created under the PM Secretariat for proper implementation of the task. The HEC, all the Board Offices, etc., should collect data from the district, where sub-cells for compiling of data should be set up and this data should be pooled at the PM, Secretariat PAK-NISEA Cell, which should be available to all stakeholders.

**PM Secretariat
PAK-NISEA Cell**

HEC	Board Offices
District PAK-NISEA Sub Cells	District PAK-NISEA Sub Cells
Universities & Colleges	Colleges & Schools

(Interview recorded during her visit at IUB, Bahawalpur on 24th January, 2009 at Executives Hostel).

Nazir A. Sangi, PhD

Chairman, Computer Science Department, AIOU- Islamabad

Q. 1. Should National Information System be developed for educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.) in Pakistan?

Ans. Yes, off course it is needed for this purpose. Administrators are the persons who are engaged in overall planning of education, so they should be provided with such opportunities.

Q. 2. Which factors should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. I think before designing this system, the information needs of educational administrators should be assessed and problem areas should be identified. Focus should be on how to make their needed information available to the educational administrators. Synchronized environment will be needed for two way communication.

Q. 3. Is the Idea of Integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface practically feasible? If YES, then how?

Ans. Yes, why not. With the help of object oriented techniques it is possible.

Q. 4. Is there any information system already existing in each sector i.e., school, college or university? If YES then, whether these systems/resources can be utilized for developing a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. Yes in school sector such systems are available which gather information at district level, for example EDO offices collect such information. Similarly NEMIS, HEC, Ministry of Education (MoE) and Federal schools and college Directorate, provincial boards of education have information which can be useful for educational administrators. Although the information might be in hybrid form. This meaningful data should be converted into digital form and stored in the database.

Q. 5. Either the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Initially it should be decentralized. Because you only do not only develop the system but you have to maintain it as well. Later on switch to the centralized processing through Web based environment.

Q. 6. Similarly, will the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” work in Pakistani perspective?

Ans. If IT infrastructure at national level and availability of required resources can be ensured then it is not difficult. I think training can be helpful in this regard.

Q. 7. What should be the organizational structure of PAK-NISEA?

Ans. I think Ministry of Education (MoE) is most appropriate for this project with a separate governing body having members from all sectors of education. MoE is just a mediating body. Up to the district level, it should remain under federal government. It should be developed in phases. Similarly federal government should provide finance for this information system. (Interview recorded on 1st April, 2009 at Office).

Saima Abdullah

Lecturer

Department of Computer Science & IT

The Islamia University of Bahawalpur

Q. 1. Should National Information System be developed for educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.) in Pakistan?

Ans. Yes, off course there should be a National Information System for Educational Administrators. Such system will help them in their decision making and planning.

Q. 2. Which factors should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. The factors that should be considered i.e. level of IT expertise, Training, Funds and their consistent availability, Government support, maintenance requirements, IT infrastructure and expert manpower. Awareness should be created about its benefits through media, conferences, and workshops at local and national level to remove the hesitation. There should be some documentary programs in which good example organizations with efficient information systems can be shown. In urban areas it may be easily implemented but it may be difficult in rural areas. People started using mobile

phones when they were convinced that it is a facilitator which connects them with their dear ones, so awareness campaign should be started before executing it in real sense.

Q. 3. Is the Idea of Integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface practically feasible? If YES, then how?

Ans. It does not seem feasible in current scenario. It could be possible only by developing the working systems in each sector then these can be integrated. A sound plan should be designed before proposing such a system. Three different modules should be designed i.e. school, college and university modules separately then these can be made accessible through a single interface. Few good examples should be observed deeply before designing such a system.

Q. 4. Is there any information system already existing in each sector i.e., school, college or university? If YES then, whether these systems/resources can be utilized for developing a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. Currently I can only name NEMIS, PERN etc. Anyhow its a good idea to utilize the existing systems/services for developing a National Information System for educational Administrators.

Q. 5. Either the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. I think at the early stage it should be decentralized then it should switch to centralized processing supported by web based environment. In fact centralized processing supported by web based environment is the best solution and high expertise will not be needed at each nodal point.

Q. 6. Similarly, will the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” work in Pakistani perspective?

Ans. Yes, the idea will work. As I discussed earlier that now people are getting familiar with new ICTs. So I think people will accept it easily and it would be good for them.

Q. 7. What should be the organizational structure of PAK-NISEA?

Ans. It should work under Ministry of Education. Up to the district level it should work under the federal government. Decision making should be decentralized among different districts. As it is the current practice in the education sector. There should be a governing central body for its proper working, implementation and monitoring. Funds should come from the government side, although foreign funding can also be sought. Fee based services only to the private sector can also be offered.

(Interview recorded on February 25, 2009 at Office).

Salman Shakeel

Software Engineer- Techlogix, Lahore

Q. 1. Should National Information System be developed for educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.) in Pakistan?

Ans. Yes, it is a great proposal and it should be developed. It would be a good facility for educational administrators in Pakistan. We cannot plan until we do not have access to the realist data. Such data analysis helps us in identifying the actual problems and then we

can plan the solution in the light of acquired results. So again I will strongly support this idea.

Q. 2. Which factors should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. The crucial factor is the availability of resources and Strong IT infrastructure throughout the country. Then a cost-benefit analysis should be conducted. Then social environment/culture cannot be ignored as well, in terms of manpower needed for its development and its end users' attitudes and preferences. Bureaucratic mindset may also create problem in data sharing among institutes.

Q. 3. Is the Idea of Integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface practically feasible? If YES, then how?

Ans. Yes, the idea of integrating all three levels/tiers of education is feasible. It would work like a data warehousing scheme. It will be base on a hybrid model which will connect all the three different databases of schools, colleges and universities. The thing which should be considered is that it should be developed in phases. As the universities are less in numbers and have more sophisticated IT infrastructure, so it should start working from universities, then colleges and at the end the schools should also be integrated with it. Thus the order will be from easy to difficult.

Q. 4. Is there any information system already existing in each sector i.e., school, college or university? If YES then, whether these systems/resources can be utilized for developing a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. It is difficult to talk about the availability of such information systems at very basic level. Mostly available information systems have hybrid data which should be converted into proper digital form for its better utilization. NADRA networks and resources can also be utilized. Similarly GIS can be used for getting school information. If data available through NEMIS is in synchronized form then it is use full for this purpose. On the other hand universities already have good infrastructure which can be integrated with each other.

Q. 5. Either the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. Centralized processing through Web based environment would be more appropriate. Because in Web based environment no specific application software and training would be needed for data entry. Although very good Internet speed would be needed because data would be coming from different nodal points at a same time, then it would require more sophisticated Internet connections. Similarly compatibility of data being shared, and to bring the data at a single layer will not be very easy. Hybrid model can also be used which is neither centralized nor decentralized.

Q. 6. Similarly, will the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” work in Pakistani perspective?

Ans. Yes, it is workable in Pakistan if extensive training and guidance would be provided to the end users.

Q. 7. What should be the organizational structure of PAK-NISEA?

Ans. It should be owned by the Ministry of Education and up to the district level it should remain under federal governments' supervision. A body can be devised for this purpose

which would take care of it matters. People representing all the stake holders of the system should be the members of the system.

Finance should be the responsibility of federal government, although other options should also be kept in mind like foreign funds, priced services etc.

Conclusion: I think it is a good proposal and as an Information System expert I can foresee its benefits for boosting the education sector in Pakistan. I would like to add that this system should be developed practically. Anyhow it should be developed in phases keeping the rule of from easy to difficult or from narrower to the broader one.

(Interview recorded on 6th January, 2009 at Office).

Syed Aun Muhammad
Lecturer- Software Engineering Center,
Deptt of Computer Science & Engineering
University of Engineering & Technology –LHR

Q. 1. Should National Information System be developed for educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.) in Pakistan?

Ans. It should be developed because it would satisfy the educational administrators' information needs and as a result, they would make better and realistic decisions. Their planning would be on sound footings.

Q. 2. Which factors should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. Educational administrators' information needs should be assessed. Then required data/information should be collected at a single platform. I think this is the most important thing. On the other hand availability of skilled manpower is not a big problem now. In my opinion it should be developed in phases. First of all it should be developed only for the Punjab province. If it will work successfully then it can be executed in other provinces of Pakistan as well.

Q. 3. Is the Idea of Integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface practically feasible? If YES, then how?

Ans. Yes it is practically feasible and more needed because higher authorities are in need of data about all the tiers of education.

Q. 4. Is there any information system already existing in each sector i.e., school, college or university? If YES then, whether these systems/resources can be utilized for developing a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. Some information systems are already working i.e. examination system of different boards and universities, NEMIS etc but these are not accessible to all the administrators. So there should be a central system for higher authorities for resource allocation, planning and decision making. Similarly in universities many subsystems are available but those are not integrated with each other. If these systems can be integrated with each other, then it will also a good source of information for administrators.

Q. 5. Either the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. It should be based on centralized processing supported by Web based environment because thus uniformity can be maintained.

Q. 6. Similarly, will the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” work in Pakistani perspective?

Ans. I think this is feasible except few far-flung or less developed area of Pakistan.

Q. 7. What should be the organizational structure of PAK-NISEA?

Ans. As a tradition it should be under Ministry of Education. There should be an executive body for this purpose. Different organizations i.e. HEC, all the educational boards of Pakistan should be its members. Educational administrators from all provinces and sectors should be its members. IT experts and information professionals have very vital rule in this system. After federal government, provincial government should take care of this system up to the district level.

Finance should be shared by both the federal and provincial governments. I mean 75% by federal and 25% by the provincial government.

Foreign funding can also be sought from NGOs, UNESCO, US Aid, etc. Fee based services can also be provided to the private and foreign customers.

(Interview recorded on 31st March, 2009 at Office).

Syed Khaldoon Khurshid
Lecturer- Software Engineering Center,
Deptt of Computer Science & Engineering
University of Engineering & Technology -LHR

Q. 1. Should National Information System be developed for educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.) in Pakistan?

Ans. Yes, it should be developed to provide the uniformed platform for educational information.

Q. 2. Which factors should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. First of all the availability of resources, expert manpower, should be considered. If it can be provided then need analysis will be necessary for developing this system.

Q. 3. Is the Idea of Integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface practically feasible? If YES, then how?

Ans. Yes, why not. It is feasible and such information systems are available in the world.

Q. 4. Is there any information system already existing in each sector i.e., school, college or university? If YES then, whether these systems/resources can be utilized for developing a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. I cannot name any existing information systems related to the education sector right now. But if such systems are available then these can be integrated with each other.

Q. 5. Either the PAK-NISEA model should be based on “Centralized Processing Supported by Web based Environment” or it should be decentralized?

Ans. The PAK-NISEA model should be based on centralized processing supported by Web based environment. It is more appropriate.

Q. 6. Similarly, will the idea of “full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links” work in Pakistani perspective?

Ans. If end users will be provided with required access and proper training then the idea will work in Pakistan as well. I feel that we are not very backward in technology.

Q. 7. What should be the organizational structure of PAK-NISEA?

Ans. Ministry of Education should play the role as its parent organization. A body should be developed for its administration. Educational administrators and IT professionals should be its members.

I think finance should be the responsibility of federal government. Foreign NGOs or multinational companies can provide funds for the purpose. Fee based services are another source for fund generation.

(Interview recorded on 31st March, 2009 at Office).

Zulfiqar Ahmed

Assistant Director IT (MIS)

Institute of Space Technology, Rawalpindi

Q. 1. Should National Information System be developed for educational administrators (i.e., school & college principals, heads of Deptts., deans and registrars etc.) in Pakistan?

Ans. Yes, off course a national Information System should be developed for Educational Administrators in Pakistan. In Pakistan most of the problems in education sector are due to improper planning and administration. They plan things in a shell without realistic data, as a results country's education is suffering with many problems.

Q. 2. Which factors should be considered while designing Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. Manpower, financial resources, IT infrastructure etc. should be considered while designing this system.

Q. 3. Is the Idea of Integrating all three tiers/levels of education i.e., schools, colleges and universities through a single interface practically feasible? If YES, then how?

Ans. Yes, it is possible technically.

Q. 4. Is there any information system already existing in each sector i.e., school, college or university? If YES then, whether these systems/resources can be utilized for developing a Pakistan National Information System for Educational Administrators (PAK-NISEA) in Pakistan?

Ans. Yes, NEMIS, HEC's projects i.e. PERN etc. are available which can be utilized for the purpose. Many universities have their internal information systems which can also be integrated with the PAK-NISEA model.

Q. 5. Either the PAK-NISEA model should be based on "Centralized Processing Supported by Web based Environment" or it should be decentralized?

Ans. Centralized processing supported by Web based environment is a good solution.

Q. 6. Similarly, will the idea of "full remote access to e-resources (i.e., most materials in e-format) through dedicated Internet links" work in Pakistani perspective?

Ans. Remote access is possible because now telephone has reached everywhere. User orientation and training can make the task easier.

Q. 7. What should be the organizational structure of PAK-NISEA?

Ans. It should be the joint venture of Ministry of Education, Ministry of IT and Planning Commission of Pakistan. An executive body should be developed comprised of members from schools, colleges and universities, IT and information professionals.

(Interview recorded on 2nd April, 2009 at Office).

Appendix I

LIST OF EXPERTS FOR MODEL ASSESSMENT

LIST OF EXPERTS FOR MODEL ASSESSMENT

1. **Abdul Hameed, Phd**
 Professor & Director
 School of Professional Advancement
 University of Management and Technology
 C-II Johar Town Lahore 54770, Pakistan

2. **Abdul Waheed**
 Chief Librarian
 MA, PgDip LIS (Manchester), LL.B
 M.L.Sc, MA(Pol.Sc) MA(Urdu)
 Former Chief Librarian University of the Punjab
 GC University, Katchery Road, Lahore 54000

3. **Almas Khattak**
 Government of Pakistan
 Planning Commission
 Planning & Development Division
 (Education Section)

4. **Aurangzeb**
 D. Director I.T,
 The Islamia University of Bahawalpur

5. **Ghaniul Akram Sabzwari, Phd**
 President
 Library Promotion Bureau
 Ex. Chairman DLIS, University of Karachi,
 US Address: 4213 Heritage Way Dr., Fort Worth, TX 76137

6. **Hamid Rehman**
 Chairman
 Deptt of Library and Information Science
 University of Peshawar

7. **Julian Warner, Phd**
 Faculty member
 Queen's University Management School
 The Queen's University of Belfast
 Belfast, Northern Ireland - UK

8. Khurshid Akhtar Ansari

Department of Library and Information Science
University of Balochistan,
Quetta

9. Kramat Ali, Phd

MA, PhD. (Vanderbilt University, USA)
Ex-Vice Chancellor, Bahauddin Zakria University, Multan

10. M. Zafar Iqbal, Phd

Director
Institute of Literacy & Mass Education
Ex-Dean Faculty of Education
Allama Iqbal Open University

11. Mary Bolin, Phd

Chair, Technical Services
University of Nebraska, USA

12. Muhammad Fazil Khan, PhD

Chairman
Department of Library & Information Science
University of Sargodha

13. Muhammad Ramzan, Phd

Chief Librarian
LUMS, Lahore, Pakistan

14. Mushahid Anwar, Phd

Chairman
Department of Geography
The Islamia University of Bahawalpur

15. Nageen Ainuddin

Director General (Acting)
Pakistan Scientific & Technological Information Center (PASTIC)
QAU Campus, Islamabad, Pakistan

16. Nasim Fatima, Phd

Principal Investigator, Sindh Archives, Karachi.
 Ex-Chairperson, Department of Library and
 Information Science, University of Karachi

17. Paul Sturges, Phd

Emeritus Professor of Library Studies
 Department of Information Science,
 Loughborough University, Leicestershire, UK

18. Pervaiz Ahmed

HOD
 DLIS, AIOU, Islamabad

19. Rais Ahmed Samdani, Phd

Rais Ahmed Samdani (Ph.D)
 Associate Chief Editor, PLISJ
 Ex-Chief Librarian, Govt. College for Men, Nazimabad, Karachi

20. Ramooz Ahmed Khan

Chairman
 Department of Library and Information Science,
 The Islamia University of Bahawalpur

21. Rubina Bhatti, Phd

Asist. Professor
 Department of Library and Information Science,
 The Islamia University of Bahawalpur

22. Saima Abdullah

Lecturer
 Department of IT & Computer Sciences
 The Islamia University of Bahawalpur

23. Sajjad-ur-Rehman, Phd

Professor & Director, MLIS Program
 Department of Library and Information Science,
 College of Social Sciences, Kuwait University, Shuwaikh Campus
 P.O. Box.68168 Kaifan – 71962, Kuwait

24. Salman Shakeel

Software Engineer
Techlogix, Lahore

25. Shaheen Majid, Phd

Associate Professor
Director, MSc (Knowledge Management)
Division of Information Studies
Wee Kim Wee School of Communication & Information
Nanyang Technological University
31 Nanyang Link, Singapore 637718

26. Sheerin Gul Somro

Asist. Professor
Ex-HOD
Department of Library and Information Science,
The Sindh University Jamshoro, Pakistan

27. Susan Matveyeva, Phd

Associate Professor, Institutional Repository Librarian
Wichita State University, Kansas, U.S.A

28. Zulfiqar Ahmed

Group Head IT
Institute of Space Technology, Islamabad
Pakistan

Appendix J

LETTER FOR MODEL ASSESSMENT



Department of Library & Information Science
University of the Punjab

Quaid-e-Azam Campus, Lahore-54590

May 17, 2009

Dear Sir/Madam,

Assalam-o-Alaikum

In partial fulfillment of the requirements for my doctoral studies in library and information science at the University of the Punjab, I am conducting a research study concerned with the formulation of “*Model Information System for Educational Administrators in Pakistan*”. Keeping your knowledge and expertise in view you have been identified as the most suitable person to validate the proposed model entitled “*Pakistan National Information System for Educational Administrators (PAK-NISEA)*”. The need of this study arose from the fact that in current age of science and technology, the role of education has come to be acknowledged as a vital factor for human development. Developed world achieved extraordinary socio-economic and technological developments because of the realization of this fact. Free flow of information is obviously an essential requirement for achieving educational goals and objectives, so they have sound information systems to facilitate their educational administrators and policy makers. A sound, reliable and user-centered/user-friendly information system for educational administrators is a neglected connection in Pakistan’s national schemes of things.

In the attached pages, A proposed model of PAK-NISEA is presented. You are requested to evaluate the viability of the model in the light of following questions:

1. To what extent the model presents a simplified but comprehensive view of the National Information System.
2. To what extent the model is practically feasible?
3. Which aspects of the model are weaker and how these weaknesses can be removed?
4. To what extent are you satisfied with its applicability in the Pakistani context?

Your evaluation does not have to be question based. Instead, you may write an overall assessment of the model keeping in view the above questions.

You are requested to send your comments to the undersigned within 15 days, please.

Your cooperation is imperative to the successful completion of my study.

With my best regards,

Yours sincerely,

(FARZANA SHAFIQUE)

Doctoral Candidate &

Lecturer

Deptt. Library & Information Science

The Islamia University of Bahawalpur

Email: alakhdarem2001@yahoo.com

Appendix K

**EXPERTS' COMMENTS
RELATED TO
MODEL ASSESSMENT**

EXPERTS' COMMENTS RELATED TO MODEL ASSESSMENT

Abdul Hameed, PhD

Professor & Director

School of Professional Advancement

University of Management and Technology, Lahore

Dear Farzana, I have reviewed the model. It is an excellent effort. However you need to connect your model with your data you have already in this study. The model must culminate from your research.

Congratulation!

Prof. Dr. Abdul Hameed

Abdul Waheed

Chief Librarian

GC University, Katchery Road, Lahore

Dear Farzana, Thank you for sending the synopsis. Truly speaking the intelligence of a teacher is considered is better with a practical professional. So keeping in view as a professional librarian I have gone through your document and found new, interesting and informative and have with practical applications. The proposed NISAE is looking on some places visionary, theoretical as some concerned institutions/persons are not existed in the real context. The system concerned with libraries like Networked Library Model and Co-operative Network Model may be read. I am not sure the NISAE is adopted by any other country, If yes then to see in the Pakistani scenario otherwise propose new issues for Pakistan in conclusion. The literature review is latest, well planned covering requisite angles. The issues like statistical interpretation and analysis of work regarding time, university rules etc are your points of consideration.

- On p 17 positions of library staff is given in the middle rather to place on the top, it will create confusion when of course the NISEA shall be implemented. Research Staff and library staff may be categorized separately.
- On p 19 there is repetition on the positions/institutions like DPI's and provisional /divisional boards
- Is there any knowledge management model exist in Pakistan?
- Are there any library literacy knowledge standards for administrators?
- Any topic related issues are there in Education policy or policies of Pakistan?
- Public libraries system is completely black out
- The Documentation Centers term is confusing.
- Translation etc issues have been added but transliteration, newspapers and grey literature is not added.
- TEVTA, one of the promising autonomous institutions established by the Punjab government concerned with technical/commerce colleges is ignored.
- Gorman, Cullen models may also be seen and revised in Pakistan scenario

- IT concerned staff and administrators' issues (duties, expectations, working etc) may be seen and analyzed separately and must be in local context.

Regards

Abdul Waheed



13(38)Edu/PC/09
GOVERNMENT OF PAKISTAN
PLANNING COMMISSION
PLANNING & DEVELOPMENT DIVISION
(EDUCATION SECTION)

From: Muhammad Almas Khattak
Deputy Chief
Tele: 051-9202786

Subject: Comments on NISEA

Dear Farzana Shafique,

Assalam-u-Alaikum,

Please refer to your letter dated 17th May, 2009 on the above noted subject. Your efforts are worth appreciation and our comments are as under:

- In the phases of NISEA data collection and in the organizational chart of the Governing Body, Northern Areas, AJ & K and FATA have been ignored which needs to be included to justify the model as "NISEA".
- What is the difference between National Education Management Information System (NEMIS) and NISEA? It needs to be justified through comparison with other models to prove that, this model would be better than the other models, presently in vogue in Pakistan.
- As a whole, the model is very comprehensive, need based and workable.

-Sd-

Muhammad Almas Khan Khattak

Farzana Shafique

Doctoral Candidate & Lecturer,
Deptt. Library & Information Science
The Islamia University of Bahawalpur

Aurangzeb
 DDirector I.T
 The Islamia University of Bahawalpur

Farzana Shafique

I have reviewed your proposed model thoroughly but unluckily do not have enough time to write detailed comments. The Model is quite comprehensive and covers all the aspects in detail. It is good to propose the model in phases by using the Spiral Model approach. I have seen no weakness in the model. Being an information system expert, I believe that the proposed model is detailed and practically applicable in Pakistani perspective. I can foresee that if implemented in true spirit, it will boost up the education sector of Pakistan. Thank you.

Aurangzeb

Ghaniul Akram Sabzwari
 President
 Library Promotion Bureau

RE: NISEA Model Proposed for PHD Thesis

Monday, June 15, 2009 11:35 AM

Mohtaram Farzana Saheba – Walaikum Assalam

First I'll apologize for answering your letter of May 17, 2009 quite late . First letter disappeared as there was some problem in my laptop. The second letter also took little time to browse. I was in Santa Clara , CA and was winding up moving to Fort Worth, TX.

Today I did Tilawat (studied) with complete Khuzu wa Kushu (attention). I am really convinced and impressed extremely with your topic of PhD Dissertation. It will be very useful and beneficial for our future generation if adopted and implemented in its real nature and spirit. Masha Allah your proposal for NISEA is quite coherent and rational. As regards your questions I wish to submit as:

1. It is quite simplified and comprehensive if adopted and implemented in its real form and shape;
2. It seems practically feasible if our Government take it seriously for implementation.
3. I do not find any weakness but it will be highly specialized and technical for those who will be assigned to enforce and put it into effect. While writing dissertation effort should be made to simplify terms and terminologies. Our Educational Administrators in Ministries, Directorates of Education, Schools, and Colleges are not familiar with ICT terminologies.

In Education sector usually appointments are not made of able and capable persons. All appointments are made on political and personal likes and dislikes.

4. I am fully satisfied with its applicability provided it is adopted and implemented as proposed.

Now I wish to suggest that for enforcing and implementation of NISEA executive authorities at all levels should be proposed. Without high level executive authorities no plan, scheme or system would be successful. You suggested Governing Body as: Chairman, Directors, Regional Directors, Assistant Directors, etc. I suggest that their status and grades should be: Chairman: Grade 22 – Directors, Grade 21 – Assistant Directors, Grade 20 and others in Grade 19, and 18. If the executives are not given high status and grade they will not be able to carry out their job effectively and efficiently. Similar example of a system is here for your information.

In 1972 SPIL prepared a “Plan for Development of Libraries in Pakistan . (fortunately I had the honor and privilege to prepare that Plan in consultation with Maulana Muhammad Arifuddin and Mr. Muhammad Adil Usmani). In that plan National Library System was proposed. In Plan Library Authorities were proposed at all levels of National Library System as:

National, Provincial, Divisional, District, Thana/Tehsil and Big City Library authorities. The structure was:

- 1) National Library Authority: Chairman: Deputy Chairman of Planning, Commission; Secretary: Librarian National Library Grade 22 Members: Secretaries, Ministry of Education, Finance and Interior; Vice Chancellors 2, by rotation; SPIL representatives 2.
- 2) Provincial Library Authority: Chairman: Chief Secretary; Secretary: Librarian Provincial Library Grade 21; Members: Secretaries, Education, Finance, Local Government; Vice Chancellors of Universities; and Representatives of SPIL 3
- 3) Divisional Library Authority: Chairman: Commissioner; Secretary: Librarian, Divisional Library Grade 20; Members: Director of Education and five representatives of SPIL and citizens.
- 4) District Library Authority: Chairman: Deputy Commissioner; Secretary: Librarian of District Library Grade 19; Members: Representative of SPIL and educational institutions.
- 5) Thana/Tehsil Library Authority: Chairman: Assistant Commissioner; Secretary: Librarian Thana/Tehsil Library Grade 18; Members: SPIL and Heads of Schools.
- 6) Big City Library Authority: Mayor of City; Secretary: Librarian of Central City Public Library; Six elected citizen of City Council and four nominees of SPIL

This Plan was presented by Hakim Muhammad Said, President, SPIL to Zulfiqar Ali Bhutto, then President of Pakistan. He sent plan to Ministry of Education, Ministry sent to Director, National Library and the Director shelved it in closed files.

Actually librarians at that time were so down-graded that they themselves were not in favor of this plan. The Director General, National Library, at that time, himself did not take any interest in pursuing the government to consider the Plan for implementation. Thus the Plan was scraped forever.

It is just a suggestion. You may discuss with your Advisor/Guide. I wish and pray May Allah (swt) blesses you with grand success in your cherished endeavor. Wassalam.

Yours affectionately

Dr. Ghaniul Akram Sabzwari

4213 Heritage Way Dr., Fort Worth , TX 76137 – USA

Hamid Rehman

Chairman

Deptt of Library and Information Science

University of Peshawar

Dear Farzan Shafique

This letter is written with reference to your letter dated 17th May 2009 regarding the Information system model for Educational Administrators in Pakistan.

I have gone through the text of the proposed model and found very thematic. You came up with full justification and brought all the silent aspect for implementing the model. Also you gestured well about the work done in the shape of literature review. What I see in this model is that Dr. Mumtaz A. Anwar in one of his studies related with public library legislation and systems, did mention the establishment of directorate of libraries in Pakistan. A little bit help for the development of this model could be sought out from his model as well.

Cluster survey, to me seems fine but rather the cluster, how it would be if you go for random sampling with full coverage to the entire Pakistan rather the phase wise study of Punjab and NWFP. Components and Information resources of this model are well defined where as a huge list of services supposed to be offered by this model listed are okay but we can leave this list open for further accommodation of new coming areas.

A little more is needed in terms of HRM and HRD who will work for the continuity of this model. Over all this model seems little bulky. My suggestion in this context is to take out the areas of definition and references etc, at this stage; to me it seems little over Burdened

A final word that if you could accommodate the letter P for Pakistan in your acronym NISEA-P would sound great.

Over all it is a wonderful idea very comprehensive thought provoking and covering the future needs of our education lords.

Good luck and all the best.

Sincerely yours,

HAMID REHMAN

Julian Warner, Phd

Faculty member

Queen's University Management School
 The Queen's University of Belfast
 Belfast, Northern Ireland - UK

Farzana Shafique. National informant systems for educational administrators (NISEA) in Pakistan. Dissertation proposal, August 2009.

Page 1: Good opening comments on the value and function of model.

But questionnaire may contain an implicit model.

Page 3: How, if at all, does the Knowledge Environment Model relate to the content or semantic aspects of the resources which are made available?

Page 4: A similar issue needs to be considered for the Spiral Model.

Page 6: Information, corresponding to content or semantic, considerations are now introduced.

Pages 6-7: Valuable attention to levels of data use and to aggregation of data.

Pages 9-10: Distribution of information activities is persuasive.

Pages 14-18: Other material is also persuasive but it is not clear how its design is informed / is to be informed by the model indicated.

General comments. The overall design is persuasive.

It would need careful and systematic implementation.

Within the proposal, greater integration and interaction between the model (which itself could be made more explicit) and the proposed set of arrangements would add value.

Julian Warner

Khurshid Akhtar Ansari
 Department of Library and Information Science
 University of Balochistan, Quetta



Department of Library & Information Science
 University of Balochistan Quetta Ph. No. 081-9211251

ISO-9001 -2000 Certified.

Ref. No. /LIS-2006

Date 10/06/2009

Farzana Shafique
 Doctoral Candidate
 & Lecturer
 Deptt of Library and Information Science
 Islamia University of Bahawalpur

Subject: **Evaluation of the Viability of the Model of NISEA**

1. The proposed model present presents a comprehensive view of the National Information System. But it is only theoretical aspect and its effectiveness can be determined after its field application.
2. If services and resources are available the model is 80-95 % practicable
3. As the model is being at first time irrespective of weaknesses the positive aspects are considered. Always there is a space for improvement. The follow up process is maintained to such improvements.
4. As the model is comprehensively constructed I am fully satisfied with its applicability in the Pakistani Context.

Regards,
 Khurshid Akhtar Ansari

Kramat Ali, PhD

MA, PhD. (Vanderbilt University, USA)

Ex-Vice Chancellor, Bahauddin Zakria University, Multan.

Comments on “National Information System for Educational Administrators”

I think the Integrated web-based environment of PAK-NISEA is a useful model for administrators- who are decision makers- for using information as required for appropriate and quick decision making. In this age of information technology and knowledge based society with very rapid changes occurring at global level, it is very essential for administrators not only to be well informed about these changes but also to make decisions and adapt organization according to these requirements. I believe that effort of Ms Farzana Shafique is not only in the direction but also will provide a critical assistance to administrators for the development of their organizations.

Prof. Dr Kramat Ali

M. Zafar Iqbal, PhD

Director

Institute of Literacy & Mass Education

Ex-Dean Faculty of Education

Allama Iqbal Open University

Subject: **Opinion on proposed model “National Information System for Educational Administrator (NISEA) in Pakistan” by**

My dear Farzana Shafique,

After through study of proposed model ‘National Information System for Educational Administrator (NISEA)’ my expert opinion is as follows:

1. The model has sound theoretical grounds.
2. The complete model is galaxy of complicated models and sub-models.
3. The technological components needs well equipped infrastructure, where as we lack such infrastructure in educational sector.
4. As the multi-centered approach may cause complexities of coordination.
5. I am not sure about its successful implementation.
6. The scholarly approach sorry for delay of the researcher is admissible.

Wishing you all the best

With regards.

Yours Sincerely

(Dr. M. Zafar Iqbal)

Mary Bolin, PhD
Chair, Technical Services
University of Nebraska

July 6, 2009
Farzana Shafique
Lecturer
Department of Library & Information Science
The Islamia University of Bahawalpur

Dear Ms Shafique:

Thank you for asking me to review your dissertation proposal. Your cover letter asks that the following be considered:

1. To what extent the model presents a simplified but comprehensive view of the National Information System.
2. To what extent the model is practically feasible?
3. Which aspects of the model are weaker and how these weaknesses can be removed?
4. To what extent are you satisfied with its applicability in the Pakistani context?

My general evaluation of the proposal considers those four questions. The proposal is very strong, with a sound theoretical approach applied to a practical problem. The model encompasses all important elements and stakeholders necessary for a National Information System. It appears to be quite feasible, with communication and decision-making structures, funding, and phased implementation. It is strong conceptually and abstractly, but also includes details about things like staffing, organization, and funding. I do not see any particular weaknesses. The proposal shows an excellent knowledge of the environment in Pakistan, and for that reason I feel very satisfied that it is applicable in the Pakistani context.

I believe this proposal is the foundation for a very good dissertation that will yield abundant research material and has the potential for practical influence on national information infrastructure and policy and on the activities of libraries and information centers.

Sincerely,
Mary K. Bolin, PhD
Chair, Technical Services
University of Nebraska

Muhammad Fazil Khan, PhD
Chairman
Department of Library & Information Science
University of Sargodha

Ms. Farzana Shafique

Doctoral Candidate

University of Punjab, Lahore.

Subject:- **National Information System for Educational Administrators (NISEA) in Pakistan**

I have gone through the proposed model of NISEA. In my considered opinion it is a very good effort of the Research Scholar. It will be useful for the educational Administrators in their decision making. Academic libraries concentrating on education can also get benefit from it.

Wish you Best of Luck.

Prof. Dr Muhammad Fazil Khan

Chairman

Department of Library & Information Science

University of Sargodha

Muhammad Ramzan, Phd

Chief Librarian

LUMS, Lahore, Pakistan

July 27, 2009

Ms. Farzana Shafique

Lecturer

Department of Library and Information Science

The Islamia University of Bahawalpur

Subject: **Review of the Model**

Dear Ms. Farzana Shafique,

I am pleased to review and give any comments on your proposed model entitled National Information System for Educational Administrators (NISEA) in Pakistan. This indeed is a much required research endeavor, please go ahead with that. I wish you all the best.

With warm regards,

Sincerely

Dr. Muhammad Ramzan

Mushahid Anwar, Phd
Chairman
Department of Geography
The Islamia University of Bahawalpur

Dear Farzana Shafique

I have reviewed your model. The model is demanded in current scenario and we seriously lack it. It is very comprehensive and will help in boosting the education sector of Pakistan. I will like the following points to be added in your model to make it more comprehensive:

- Give illustrations at micro level as well. I mean it should also show, how each nodal point will be connected with each other at grass root level (Draw the Benzene model/Diamond structure with its legends).
- Define the level of access for International community (abstracts only or 30% access to resources etc.).

In nutshell, the model is detailed and applicable in Pakistan. Ministry of Education should own this Model and implement it. I can foresee its revolutionary effects up to the grass root level.

Wish you best of luck for your PhD.

Dr. Mushahid Anwar

Nageen Ainuddin
Director General (Acting)
Pakistan Scientific & Technological Information Center (PASTIC)
QAU Campus, Islamabad- Pakistan

Date: Saturday, July 11, 2009, 2:17 PM

Comments on “National Information System for Educational Administrators (NISEA) Model

The following is the collective reply for the following questions.

1. To what extent the model presents a simplified but comprehensive view of the National Information System.
2. To what extent the model is practically feasible?
3. Which aspects of the model are weaker and how these weaknesses can be removed?
4. To what extent are you satisfied with its applicability in the Pakistani context?

I would like to first of all commend the idea developed and the efforts put in by Ms. Farzana Shafique for the proposed system i.e. National Information System for Educational Administrators (NISEA), which is new in Pakistan. The model or the system

can be useful for Educational managers and administrators, who do not have the current information and sometimes knowledge to effectively contribute to the educational administration work because of the lack of available data. Whatever data there is, it is scattered in various organizations. As they need to make policies and plan for the future and for this all facts and figures should be available with them. She has strengthened her idea and proposal through surveys, from all relevant quarters and the proposal is based on the collected information and guidelines provided by various experts. However, on studying the system itself, it seems to be a little complicated and maybe over ambitious in the Pakistani scenario. But I am glad that she has taken our advice and has proposed that it should be taken up in and developed in phases which would make it more practical and prove its worth.

If the first phase works effectively and successfully only then the second phase should be started for the Higher Secondary and the primary sector. However, as the proposal of this model is supported by administrators and management of educational institutions as indicated in the survey then a chance should be given to this model for implementation. For this Expertise, Funding, Manpower, examples of such systems in other countries, behavior and attitudes (bureaucratic culture and general culture of the country) also requires to be evaluated and studied.

The products and services identified such as Bibliographical Services, Documentation Services, Indexes, Abstracts, and Full Text Resources, Reference & Referral services to be rendered by the proposed information system would be useful and depends on how much they are used. The Alerting services through emails, are also mentioned which will give an awareness to the users of state of the art teaching and administration techniques and new technologies/tools in the field of education.

Also, if carried out in phases then one can assess the success or failure of such a system. Therefore it is proposed that the project may be divided into three phases, first for universities, then colleges and then school level.

In addition, however, if such systems do exist in various other countries, then a thorough study of those systems (successful ones) may be undertaken and then the current proposed system may be planned in the light of local scenario. Besides, if any agency like UNESCO, the World Bank or the Asian Development Bank or any other organization which has also been involved in such projects abroad is involved as consultants and funding partners, then the project has more chances of success.

As proper implementation of this project would take a few years from now, in the mean time, internet access and use would become more common and it can work. Besides if the stakeholder, particularly, the educational administrators, principals, Registrars, Board officers, etc. are provided trainings at district level with refresher courses from time to time, there are more chances of its better use.

Nageen Ainuddin

Dr. Nasim Fatima

Principal Investigator, Sindh Archives, Karachi.
 Ex-Chairperson, Department of Library and
 Information Science, University of Karachi.

3-8-2009

National Information System for Educational Administrators (NISEA) in Pakistan

NISEA in Pakistan is actually a plan for development of Information System and Centers in Pakistan. Our administrators, especially in education needed such guidelines and infrastructures to implement education policies.

The model provides various approaches, establishes objectives, comprises Library, data center, clearing house, digitizing unit, I C T unit, R. D. Cells. Scope of research is wide. It describes clearly Information Sources, web based environmental factors and Setups, Languages, formats and Services which in future be rendered. National, provincial district and individual centers are proposed which form a hierarchy in setup and ease in implementation.

It is nicely presented in an up-to-date format. I hope this research and its findings along with a model structure will help educational administrators of Pakistan in establishing networks of Information Resource Centers and ultimately, provide Information access to end users.

I congratulate Farzana Shafique on preparing a model with “Farzangi” (intelligence).

Regards,

Dr. Nasim Fatima

Paul Sturges, Phd

Emeritus Professor of Library Studies
 Department of Information Science,
 Loughborough University, Leicestershire, UK

Dear Farzana

Here is my report on your model. I have praised what I think is good about it and questioned what I find unconvincing. I hope you agree that honest, rather than veiled, comment is best. If I were your supervisor and received this report, I would be broadly happy with it.

Best wishes

Paul

Information System for Educational Administrators in Pakistan Report on Model by Paul Sturges

The work on the model is highly professional, well-structured and expressed in good English. It is perfectly clear throughout as to what is intended and why specific proposals have been made. Taken in isolation it is not possible to verify the claims that the model arises directly from the survey responses obtained by the researcher, but the claims have been accepted as a given for the purposes of this review.

The reviewer was asked to consider whether the model was simplified but comprehensive. It is certainly comprehensive, in that it is hard to imagine an information source that has not been integrated into the model. Whether it has been simplified is another question. It is certainly described in a clear and comprehensible way, but there is a sense that simplification might have involved being more selective about the sources of information to which the system was to respond. For the purposes of administrators too much information can be as big a problem as too little. The success of this system looks as though it would be very dependent on the professionals who serve it doing very effective work in digesting content for use by the administrators.

The question of feasibility was also raised. This would be an expensive system to put in place (though the spiral, phased implementation is a sensible feature of what is recommended). The remarks on funding are necessarily imprecise, but the references to international funding sources are disturbing. This is a system for Pakistan and making it partially dependent on the policies of international funders potentially undermines it from the start. Either Pakistan wants it and will pay for it, or there is a question mark as to whether it is appropriate. There is also another aspect to feasibility; the ability and willingness of partner institutions to sustain their cooperation. What incentives would those inputting to the system be offered? There is a reference to material being supplied 'automatically' but experience suggests that nothing that involves people is automatic in this way.

Weaknesses and appropriateness to the Pakistani context are also raised as questions. Taken as an abstract systematisation of the possible information responses to administrative needs, it has strengths as opposed to weaknesses. However, the question of Pakistani context may introduce weaknesses that an outside observer (such as the present reviewer) cannot easily anticipate. From extensive experience of developing countries, it is possible to observe that efficient, highly functional systems and institutions are usually outnumbered by weaker systems. A model that is structured so much on the basis of cooperation as the present one would be difficult to implement and run if this happened to be the case in the sectors identified as contributing to the model. Would it work in Pakistan? The reviewer is not qualified to say.

To recapitulate, the model is clear, well-presented and comprehensive. Whether it would function in practice is another matter. There is a case for a stripped-down model much less dependent on the vagaries of cooperation with other institutions. However, in the context of an academic study, what is outlined is admirable and represents thorough and intelligent work on the part of its designer.

Paul Sturges, PhD

Pervaiz Ahmed
HOD
DLIS, AIOU, Islamabad

Dear Farzana

Although the model has a sound theoretical base, but it is rather a complicated suite of modules and sub models; the researcher should also provide a succinct of it. Its polycentric establishments may cause coordination complexities. It should also yield a smooth and multi-way even flow. I am afraid its implementation might experience the same treatment as that of previous LIS researches in Pakistan. I appreciate the researcher for producing such a scholarly work.

Regards,
Pervaiz Ahmed

Rais Ahmed Samdani, PhD
Rais Ahmed Samdani (Ph.D)
Associate Chief Editor, PLISJ
Ex-Chief Librarian, Govt. College for Men, Nazimabad, Karachi

Validation of Proposed Model NISEA

Farzana Shafique

Sorry for late reply. I have thoroughly examined and studied your proposed model entitled 'National Information System for Educational Administrators (NISEA)', which is also a requirement for your doctoral studies. As you mentioned in your covering letter, Answers of your questions are as under:

1. The proposed model of Information System for Educational Administrators in Pakistan is quite simple. It elaborates the objectives without any complication.
2. The proposed model is practicable. Since there is not a single model is available on the subject, the proposed model will be helpful for Educational Administrators and will provide sufficient, sound and reliable information.
3. Most of the aspects of the model are covered, It is suggested that aspect '**Services to be Rendered by NISEA**' need to be re-write or re-design, following information can be added:

On-line Services:

- 1) Online services that assess the quality and accuracy of web information.
- 2) Online services that integrate different types of resources and interrogate a range of potential repositories and systems.
- 3) Online services that provide alternatives to fee for service.
- 4) The adoption of interactive services by the library itself to deliver resources and information directly to the users, possibly on demand.

- 5) Web preservation services.
- 6) The development of new web retrieval services that provide effective precision and recall, including new paradigms regard access methods and retrieval options.
- 7) The development of specific retrieval services that meet local (as opposed to global) user needs, including the overall needs for inclusiveness.
- 8) The development of standards and programs to assist content publishers to produce useable and effective electronic content.
- 9) The creation of new information resources that can be delivered via network to the home a new paradigm where the library is a producer of information.
- 10) The development of new cataloguing and indexing standards and systems, especially systems that are outcomes-based (effective in the real world) rather than rules – based (confirming to external standards such as AACRII).

I am very much hopeful and satisfied with its applicability in Pakistan.

Regards,

Dr. Rais Ahmed Samdani

Ramooz Ahmed Khan

Chairman

Department of Library and Information Science,

The Islamia University of Bahawalpur

Comments on Model “Pakistan National Information System for Educational Administrators”

The age we are living in has been rightly called the age of information. Information is being produced at an unbelievable rate. It is said that an information explosion has taken place. As a result, we are faced with “the flood of literature or the deluge of literature. It has been very difficult to cope with this literature. However, the revolution which has occurred in Information and Communication Technology (ICT) has made it possible to use the information for the betterment of humanity.

Information has become a valuable resource. Everyone needs information for his survival in the society. “To live effectively is to live with adequate, better and fuller information and more importantly at a time when it is needed”. This quotation is equally true for an individual as well as for a nation or country. It lays emphasis on two things. The provision of information and its timely provision to information seekers. Thus it is not the possession of requisite information alone which is important, but the more important thing is its provision when it is needed. In modern age only the countries who are not only producing information but also providing the same to the information seekers can survive as free and advanced countries who are not only producing information but also providing the same to the information seekers can survive as free and advanced countries. The developed countries have made fool proof arrangement for generating more and more information and at the same time making the same accessible to those who need it. In our country no concrete efforts are being made in this field. The result is that they have been able to make headway in any walk of life. However, a few attempts have been done in the country. Some scholars have designed a few models for

providing information to persons relating to various segments of society and Ms Farzana Shafique is one of them. It deem to my pleasant duty to congratulate her on selecting such important topic for her research. It is heartening to note that Ms Farzana Shafique has proposed a model for providing information to the educational administrators who are endeavoring to promote and upgrade education in our country. Education is the only factor upon which depends the development and progress of a country.

In my opinion the model designed by the research scholar has been built in keeping in view all the important aspects of the topic of research. The model presented by the scholar is very much simplified as well comprehensible. At the same time it is comprehensive and covers all the important aspects of the subject. It is practically feasible to a large extend. The only weak point that comes to my mind is the author's expectations from the government of Pakistan about its implementation. People at helm of affairs in Pakistan have little time for such important matters of national interest.

I am very much convinced and satisfied with its application in Pakistani context. I am confident that if applied in letter and spirit, it will yield positive results. It will prove a very useful instrument in helping the administrators of education in discharging their duties towards achieving the desired targets of education at all levels in our country.

I pray all success for Ms Farzana Shafique.

Pr. Ramooz Ahmed Khan

Rubina Bhatti, Phd

Asist. Professor

Department of Library and Information Science,

The Islamia University of Bahawalpur

Comments regarding NISEA

Dear Farzana Shafique,

While the concept of formulation National Information System has been of great importance in this new global era. The main purpose of such systems is the emergence of the information society that has introduced a new dimension into it, in which information itself is the strategic resource. Having considered the importance of maintaining such systems in Pakistan, the present proposed model is a good attempt towards it, as no such study has been conducted into national context in Pakistan before.

This proposed information system model (NISEA) appears to be a systematic and efficient source of providing the needed information. Its feasibility seems somewhat challenging as it is addressing to cope with the needs of all three sectors of education in Pakistan (school, college and university). Effective information systems require reliable, low-cost and widespread technological resources such as computers, software and all the components of the telecommunications infrastructure for processing data and

information. It should discuss clearly about the physical and logical telecommunication infrastructure and network at the national level and situation of gateways to international telecommunication networks.

The study aimed to develop system for educational administrators from three different sectors. It should identify and define user education programme tailored to the need of each user group.

The finance, a big constraint, sources other than government funds are also identified. The study could be a valuable source for educational administrators at all levels in the country. in current scenario, this proposed model will be the best basis for future national system design in other fields.

I wish you all the best for your doctoral research.

Dr. Rubina Bhatti

Saima Abdullah

Lecturer

Department of IT & Computer Sciences

The Islamia University of Bahawalpur

Dear Farzana Shafique,

Subject: **National Information System for Educational Administrators**

I have studies NISEA model thoroughly this is a simple and comprehensive view of proposed National Information System of Pakistan. It covers all the domain and important pillars of educational sectors of Pakistan i.e. Universities, colleges, schools. This is client focused, keeping in view the user's expectation and their skill diversity at different levels. For this model an iterative Approach is used which will take information from all the sources, which will be ultimately helpful for the Management, research and developmental activities and Monitoring & evaluation. Scope of proposed information system is wider enough to provide all the information relating educational sector all newsletter, data services, full text sources etc.

This model is practically feasible but risk factor is involved, according to infrastructure and organizational chart of NISEA it requires funds, support and resources from Government of Pakistan as well as from all the members of education industry. First of all people must be aware of its applications, usage and benefits at all levels. Second, Ministry of Education should establish its infrastructure at all levels.

I think from the point of view of practical feasibility in Pakistan, the support and interest of education sector towards telecommunication technologies and information systems is although increasing but they have shown rigidness and resistance toward new innovation.

Young generation although respond quickly but senior employs and administrators have somewhat still questionable.

Although I am satisfied from applicability in the Pakistani context, but certain reservations are there.

At the end I want to appreciate and acknowledge your efforts. your efforts have made a concept into existence and enormously added a school of thought into existing literature review. Your research findings will enhance quality of product equipped with latest knowledge of the recent developments in the field.

Regards,
Saima Abdullah

Sajjad ur Rehman, Ph.D.
Professor & Director, MLIS Program
Department of Library and Information Science,
College of Social Sciences, Kuwait University, Shuwaikh Campus
P.O. Box.68168 Kaifan – 71962, Kuwait

Dear Farzana, Last month of the semester is very hectic, Yet, I have read the document. You might have worked hard to develop it. My comments are as follows:

1. You defined what is a model in research appropriately. Then you also mentioned some elements of one existing model.
2. You need to state clearly that these are the two models you will be testing for their relevance and use in Pakistani context.
3. Then you need to have you your data analysis and interpretation tested against the constructs in the model.
4. Then you should state whether your findings confirm the validity and applicability of models. It shouldn't be an issue for you to make these adjustments.
5. Proposal for developing an agency is the work of an expert who is engaged by the relevant agency. At the most, in your recommendations, you may give the suggestion that the authorities may consider developing an agency.

Wishing you all the best,
Sajjad

Salman Shakeel
Software Engineer
Techlogix, Lahore

Subject: **NISEA Review**

Page 5: Is the term Prototype being used correctly? Since in computer science prototype is just the skeleton or template of the actual implementation it is not the actual implementation. However from your paper it seems that you are referring prototype as actual implementation. Instead of prototype you should use Proposed Stages of the system.

Page 8: A pictorial representation would also be better at this stage representing library, data center and other functions of NISEA model.

Page 9: In the heading components of National Center for NISEA and their functions, The emphasis on operational approach is given but me being an IT person would like to have the technical emphasis as well. For example, it is quite clearly explained that information is being gathered for NISEA but that is for human use , but eventually it is data for a computer. So the transformation mechanism which makes data into information is missing.

Page 11: In the information resources, the needed informal and formal material is discussed .Since it can be of many type an emphasis on those material is required which is helpful for NISEA. For example, one of the source is books, journals but which type of books and which type of journal which would be helpful for NISEA is not mentioned clearly.

Tabular branch seems to be most relevant in this diagram. So data flow in this branch should be explained more comprehensively. For example, how raw data would be converted to information so that decision support system is intact and useful. Data transformation mechanism is missing?

Data standardization is missing? If these are explained more, then the model will be more comprehensive.

Page 12: Files are abstract. Processing on file requires introduction of middle layer between files and ICT Unit. The middle layer will standardize the files/data and make it meaningful i.e. information for the ICT unit. Generally ETL (Extract, Transform and Loading) technique is used for such purpose.

General: Infrastructural diagrams are OK but a textual paragraph description above each diagram (sort of objective) would really aid the reader to understand the diagram w.r.t. context more comprehensively.

Positives extracted from this article are:

- 1- Divide and conquer strategy is used quite well as it's the only way to handle with complex systems.
- 2- Spiral Model is good technique to cater with such projects since it involves element of risk analysis with it. So risk analysis formally becomes part of project which turns quite productive.
- 3- Diagrams and information are quite detailed adding more emphasis on usefulness of NISEA Model.

Improvements Required/Suggestions

- 1- Provide Glossary as well
- 2- Prototype meaning used in paper is quite different as opposed to its real meaning.
- 3- Paper should also have a section on technical emphasis as it is giving quite comprehensive view of operational procedures. Since the information gathered is for humans its data for computer. Technical procedure should evolve how this data would be given.

Regards,
Salman

Shaheen Majid, Phd
 Associate Professor
 Director, MSc (Knowledge Management)
 Division of Information Studies
 Wee Kim Wee School of Communication & Information
 Nanyang Technological University
 31 Nanyang Link, Singapore 637718

Dear Farzana Shafiq

I am attaching my feedback on your proposed NISEA model. I feel it is a good initial effort to propose an information system for educational administrators in Pakistan. My feedback is very candid and frank as my objective is to help you improve your model. I hope you will take my criticism more positively.

Good luck.
 Regards
 Shaheen

Feedback on NISEA Model

My major observations are:

- a. Currently many federal and provincial education agencies are functioning to meet the information needs of different users, including academic administrators. Was there any study conducted to investigate the scope, performance levels, and deficiencies of the existing information and R&D related agencies? It is possible that these agencies might already be meeting the information needs of their users at a reasonable level. How will you convince the federal and provincial governments to abandon their existing systems without any real justification and accept your proposed model?
- b. I feel the proposed model is too simple and basic whereas the current education information and R&D systems are much more complex and comprehensive (irrespective of the fact whether or not they are functioning effectively). What is the justification to replace the existing systems with a new one? If the existing systems stay, what will be their relationships with NISEA and how to avoid redundancy?
- c. The information needs, expectations, scope of activities of administrators from school, college, and university levels are considerably different. What is the rationale for merging all academic levels into one system? Almost all developed countries have separate systems and infrastructures for different levels of education. I would recommend you to just focus on institutions of higher education.

- d. Before proposing a new system, it was desirable to thoroughly study the existing education information (collection and dissemination) systems at federal, provincial and district levels to understand their scope, resources and services, and deficiencies. Without this information, it will be very difficult to propose a practical and efficient new system.
- e. Is there any study conducted to assess the performance of NEMIS and PERN systems? What is the justification for proposing a new system when NEMIS and PERN have not yet reached to their maturity phase? In such a situation, more efforts should be made to improve and strengthen these systems.
- f. Considering that it is important for any model to be practical and suitable for local conditions, I am not very sure if your proposed model will score very high on these two factors.
- g. I also foresee some challenges in implementing the proposed model:
 - i. Convincing academic management at different levels (federal and provincial levels; primary, secondary and tertiary levels).
 - ii. Replacing the existing comprehensive system with a very basic system.
 - iii. Avoiding overlaps with the other federal and provincial academic agencies, particularly with NEMIS and PERN.
 - iv. Almost all Primary/Secondary Education boards are managed by their respective provincial governments with their own unique agenda, policies and procedures. Will provincial governments and their education boards accept this 'interference' from the Centre, particularly in the current sensitive political situation in Pakistan?

Some specific comments:

- 2. Page 8 (NISEA information resources): Probably the examples of National Library of Pakistan and National Achieves of Pakistan are not appropriate as their scope of work and resources will be less relevant to your proposed model.
- 3. Component of NISEA (page 9):
 - a. It is not clear if a new library will be established at the National Centre (NISEA) or an existing (e.g. HEC) library will be given a new mandate.
 - b. R&D Cells: Are these new units? What will happen to the existing R&D cells located at different levels, i.e. federal and provincial ministries of education, HEC, public universities, school boards, etc? In addition, what will be the relationship of these cells with the existing R&D units and how task duplication will be avoided?
 - c. What type of tacit knowledge will be collected by the R&D cells; how it will be captured, from whom; and how it will be utilized? Probably simple

interviews cannot capture all the tacit knowledge, which is usually difficult to express and codify.

- d. Collection of research reports should be the responsibility of library (not the R&D cells) for their proper processing and storage.
- e. There is considerable overlap between scope and activities of the proposed library and CH. The proposed library can have a unit dealing with some specialized CH activities. Similarly, the task of publishing informal/unpublished resources could be given to the proposed R&D cells.
- f. Once again, there is some overlap between the scope and activities of Documentation Centre and Digitization Unit with the proposed Library and CH. I feel instead of proposing several independent units, you might want to propose a National Education Resource Centre which will provide different services mentioned under the Library, CH and DC.
- g. ICT Unit: I feel such units are already operating at different levels. Why there is a need to establish a new ICT unit? Actually IT-based information activities can be handled by the library/CH/DC.
- h. Page 13 – Centralized processing ... Environment: What information will be collected at different levels? What is the current state of data collection at different levels and where are the gaps? How the proposed NISEA Centre will fill these gaps?
- i. In my opinion, information/data flow should be from provincial/district/institutional centres to the central repository and not from online databases to these agencies (or there should be a two-way flow of information).
- j. Page 13 – User of NISEA: Your model provides limited information about the information needs and seeking behaviour of different categories/levels of users. As emphasis of this model is on digital information, there was a need to thoroughly study the information literacy skills of users, particularly their ICT-related skills.

4. Services to be Rendered by NSEA:

Some of the proposed services are either overlapping or redundant. Similarly, some of the services are too traditional or already out-dated (e.g. reprography)

- a. Documentation Services: What specific services will be included here?
- b. State of the Art: Do you mean some sort of current awareness, SDI or alerting service? Apparently it overlaps with your item No. 17.
- c. Data services: What are these services?
- d. Chat Reference Service should be part of the 'Reference Services'.

- e. Reprography: Do you mean digital archiving or traditional microfilming? Please note microfilming is now obsolete.
 - f. Web OPAC: It cannot be called a service.
 - g. Online Digital Library ...Education: It is not a 'service' rather a resource.
 - h. Verbal information provided by a scholarly person: Referral should be part of the 'Reference Services'. What will be the role of NISEA in providing this service – information collection and dissemination or referral only?
 - i. Intranet & portals: It is not a service rather an application or a delivery channel.
 - j. Wikis: For what purposes it will be used? Are academic administrators familiar with its use?
 - k. Full on-site and remote access: It is not a service rather a way of information dissemination.
5. Format (page 14): Have you thoroughly investigated this aspect? Do you think academic administrators at different levels have adequate ICT skills or they have mentioned their preference for electronic resources due to 'political' reasons or just for the sake of 'fashion'? Based on my research in this area, many users even those from Singapore prefer printed sources. A very comprehensive training plan will be required to overcome IT-phobia of the intended users.
 6. Finances for NISEA: If all the funding will be either from federal or provincial governments, how would you explain funding from international donors or contributions made through membership fee? What is the expected volume of funds from international organizations? What is the grantee that these funds will be actually available, for how long, and for what purposes?
 7. Infrastructure... NISEA -1 (page 16): What will be the role of provincial education ministries and education boards?
 8. Organization Chart: There is a need to indicate what positions will be at the federal and provincial levels. How the roles of Director (Higher Education) and Director (School Education) are different from NISEA directors for different provinces? What will be the relationship of the proposed structure with the other federal and provincial agencies? How will you justify DC, DU, ICT units at the district levels?
 9. NISEA – 3: How the proposed NISEA Centre is different from the existing NEMIS and PERN? Where will NISEA be physically located – under which ministry/division?
 10. NISEA - 4: In the presence of provincial agencies, what specific information needs NISEA will meet? What information needs are currently unmet?

Shaheen Majid

Sheerin Gul Somro

Asist. Professor

Ex-HOD

Department of Library and Information Science,
The Sindh University Jamshoro, Pakistan

Dear Farzana Shafique

I have gone through your proposed model and my considered opinion is as under:

- The topic is valid, valuable and could be researched for the study leading to PhD degree;
- The proposal is very well written, supported by relevant information;
- I believe that every research needs complete implementation without further delay, otherwise there will be no use of study;
- Implementation depends on the working professionals and higher authorities, if they are sincere with their profession and nation as well;
- There is dearth of awareness in our society about the importance of the National Information System for Educational Administrators, This study will help us in this regard;
- I think human resource development is also more important rather than material. Now-a-days every information either minor or major is already in our easy approach, but practical approach is not enough, therefore, our educational administrator are suffering;
- This study will facilitate our educational administrators in timely availing of information for performing their administrative responsibilities.

Kind Regards and best wishes

Sheerin Gul Somro

Susan Matveyeva, Phd

Associate Professor, Institutional Repository Librarian
Wichita State University, Kansas, U.S.A

National Information System for Educational Administrators (NISEA) in Pakistan

A review of the model proposed by Farzana Shafique

Farzana Shafique proposed an ambitious model of national information system for educational administrators. She surveyed and interviewed school, college, and university administrators and analyzed their information needs and information seeking behavior. The model of national information system is based on data received in these surveys and reviews of literature.

The model has many important advantages: (1) the proposed system is national-wide; it will provide an excellent possibility to coordinate distribution of information to different regions and different levels of educational administrators; (2) author uses advanced methodology (knowledge environment model and spiral model) that allows to take into consideration multiple parameters of complex information system, to evaluate risks, and to insure feasibility of the different stages of the system's development; (3) the model defines specific needs of different types of users with the connection to their roles in decision making process (macro level: planning and strategy; intermediate level: management and control, and micro-level: operational activities; (4) the model is detailed and well structured: description of three-phased development (p.5-6), financial sources (p.15), infrastructure of central and regional centers, structure of governing body, system's functions and interconnections of its different components (p.16-21); major components of complex information system (clearing house, library, documentation center, and supportive units, including R&D cells) and types of information that will be acquired, organized, made accessible, digitized as needed, and delivered (mostly electronically) to different constituencies national-wide. Ms. Shafique presented a large complex multi-phased project in a clear precise format. Her research has theoretical significance and may have positive practical applications as well. It shows the vital role of libraries, informational and data centers for the development of national education on all its levels.

Dr. Susan Matveyeva
 Susan Matveyeva, Ph.D., MLIS. B. Mus.
 Associate Professor, Institutional Repository Librarian
 Wichita State University, Kansas, U.S.A
susan.matveyeva@wichita.edu

Zulfiqar Ahmed
 Group Head IT
 Institute of Space Technology, Islamabad

Pakistan.

Dear Mrs. Farzana Shafique,

Wa Alaikum Assalam.

I studied your proposed NISEA model for Pakistan. It is really a great satisfaction for us that some talented brains are thinking on these lines. I really appreciate the way you have conceived this idea & finally proposed a model.

The proposed NISEA model covers almost all aspects. There are some suggestions on my part to further improve the proposed model. The suggestions are:

I. The proposed NISEA model should cater both Academic Management as well as Administrative Management Systems

II. The essence of NISEA model should be to have an intelligent decision making system

III. One of the core responsibility of ICT Unit must be to ensure smooth & timely development of IS as per national requirements

IV. NISEA should be designed on Centralized full replication web based environment

V. In Organizational Chart of Governing Body of NISEA-2, ICT Unit should have system development/deployment team

VI. National Center for NISEA should be connected to other globally functional NISEA like models via PERN-2

VII. The aspect of compatibility of NISEA model with other globally functional NISEA like models should be considered while designing, development and deployment of NISEA model

These are some suggestions. I would be available in future for any cooperation regarding NISEA model designing, development and deployment.

Regards,

Zulfiqar Ahmed

Appendix L

GLOSSARY OF TERMS

GLOSSARY OF TERMS

CSV (.csv file): The CSV ("Comma Separated Value") file format is often used to exchange data between disparate applications. The file format, as it is used in Microsoft Excel, has become a pseudo standard throughout the industry, even among non-Microsoft platforms.

AARNet: Australia's Academic and Research Network

AJK: Azad Jammu & Kashmir (Pakistan)

APAN: Asia-Pacific Advanced Network

CANARIE: Network of Canada

CAS: Current Awareness Service

CERNET: China Education and Research Network

DANTE: Delivery of Advanced Network Technology to Europe

DEO: District Education Officer

DPI: Director Provincial Instructions

EDO: Executive District Officer

EMIS: Education Management Information System (South Africa)

ERIC: Education Resources Information Center

ERNET: Education and Research Network (India).

Eurydice: The Information Network on Education in Europe

FANA: Federally Administered Northern Areas

FATA: Federally Administered Tribal Areas

FBISE: Federal Board of Intermediate and Secondary Education

GER: Gross Enrollment Rate

IBE: The International Bureau of Education

ICT: Islamabad Capital Territory

IIEP: The International Institute for Educational Planning (IIEP)

ILINET: Illinois Library and Information Network

INASP: International Network for the Availability of Scientific Publications

Internet2: U.S. Advanced Networking Consortium

JANET: the UK's Education and Research Network

JICA: Japan International Cooperation Agency
MREN: Metropolitan Research & Education Network
NEIS: National Education Information System (Korea)
NEMIS: National Educational Management Information System
NER: Net Enrollment Rate
NTC: National Telecommunication Corporation
NWFP: North Western Federal Province
OPAC: Online Public Access Catalog
PAK-NISEA: Pakistan National Information System for Educational Administrators
PDF: Portable Document Format
PERN-2: Pakistan Education & Research Network- Phase-II
PTCL: Pakistan Telecommunication Limited
SDI: Selective Dissemination of Information
SingAREN: Singapore Advanced Research and Education Network
TOC: Table of Contents
UCISA: Universities and Colleges Information Systems Association
Wikis: A website or other hypertext document collection
Windows OS: Windows Operating System
WWW: World Wide Web

Appendix M

Tables and Figures

(From Chapter 4)

Table 4.13. *Degree of Need of Different Type of Information to School Administrators*

R	Information Needed About:	Mini.	Max.	Mean	Median	Mode	S.D.
1.	Education policy	2	4	3.70	4.00	4	.524
2.	Leave rules	2	4	3.70	4.00	4	.562
3.	Financial rules	1	4	3.61	4.00	4	.670
4.	Pension rules	1	4	3.61	4.00	4	.686
5.	Government Grants	2	4	3.55	4.00	4	.578
6.	Education codes/calendar of your own institute	1	4	3.54	4.00	4	.791
7.	Purchase rules	1	4	3.52	4.00	4	.725
8.	Staff development	1	4	3.50	4.00	4	.665
9.	Curriculum of Punjab/Federal Boards	1	4	3.47	4.00	4	.737
10.	Student activities	1	4	3.43	3.50	4	.661
11.	Personnel evaluation methods	1	4	3.39	3.00	4	.719
12.	Govt. of Punjab employment rules	1	4	3.36	4.00	4	.806
13.	Current data about educational developments	2	4	3.33	4.00	4	.791
14.	Current trends in education	1	4	3.33	4.00	4	.791
15.	National comparison reports of different teaching programs & teaching methods	1	4	3.29	4.00	4	.886
16.	IT solutions for administrative work	1	4	3.26	3.00	3	.807
17.	Personnel working behavior	1	4	3.24	3.00	4	.851
18.	Market value of your school alumni	1	4	3.24	3.00	4	.847
19.	Different Options and alternatives related to administrative work	1	4	3.21	3.00	4	.874
20.	Community perception about your school	1	4	3.20	3.00	3	.803
21.	Evaluated and aggregated data about education	1	4	3.20	3.00	4	.952
22.	Demographic data related to education	1	4	3.14	3.00	3	.890
23.	Human Relations	1	4	3.12	3.00	3	.857
24.	Govt. of Pakistan employment rules	1	4	3.00	3.00	3	.835
25.	Competitors' strengths & weaknesses	1	4	2.98	3.00	3	1.005
26.	Employment rules of other provincial governments	1	4	2.88	3.00	3	.971
27.	Rules of other private schools	1	4	2.63	3.00	3	1.107
28.	Politics at institutional and national level	1	4	2.45	3.00	3	1.118

Note: Most=4, To some extent=3, Least=2, Not at all=1

Table 4.14. *Degree of Availability of Different Type of Information to School Administrators*

R	Information Available About:	Mini.	Max.	Mean	Median	Mode	S. D.
1.	Leave rules	1	4	3.10	3.00	4	.941
2.	Pension rules	1	4	3.05	3.00	4	.983
3.	Purchase rules	1	4	2.93	3.00	3	.927
4.	Education policy	1	4	2.89	3.00	3	.999
5.	Financial rules	1	4	2.77	3.00	3	1.046
6.	Govt. of Punjab employment rules	1	4	2.72	3.00	3	.965
7.	Student activities	1	4	2.71	3.00	3	.905
8.	Government Grants	1	4	2.69	3.00	3	.950
9.	Curriculum of Punjab/Federal Boards	1	4	2.68	3.00	3	1.006
10.	Education codes/calendar of your own institute	1	4	2.63	3.00	4	1.139
11.	Govt. of Pakistan employment rules	1	4	2.57	2.00	2	1.030
12.	Human Relations	1	4	2.56	3.00	3	.889
13.	Staff development	1	4	2.53	3.00	3	.906
14.	Personnel working behavior	1	4	2.46	3.00	3	.914
15.	Community perception about your school	1	4	2.45	3.00	3	.939
16.	Current trends in education	1	4	2.37	2.00	3	.957
17.	Personnel evaluation methods	1	4	2.36	2.00	2	.967
18.	Market value of your school alumni	1	4	2.36	3.00	3	1.041
19.	Competitors' strengths & weaknesses	1	4	2.32	2.00	3	.923
20.	Employment rules of other provincial governments	1	4	2.24	2.00	1	1.039
21.	Demographic data related to education	1	4	2.23	2.00	2	.923
22.	IT solutions for administrative work	1	4	2.14	2.00	2	.968
23.	Current data about educational developments	1	4	2.13	2.00	1	1.067
24.	Politics at institutional and national level	1	4	2.11	2.00	1	.939
25.	Different Options and alternatives related to administrative work	1	4	2.04	2.00	1	.999
26.	National comparison reports of different teaching programs & teaching methods	1	4	1.98	2.00	1	.967
27.	Rules of other private schools	1	4	1.92	2.00	1	.954
28.	Evaluated and aggregated data about education	1	4	1.91	2.00	1	.979

Note: Most=4, To some extent=3, Least=2, Not at all=1

Table 4.15. *Degree of Need and Availability of Different Type of Information to School Administrators*

R	Information Needed and Available About:	Means of Need	Means of Availability
1.	Education policy	3.70	2.89
2.	Leave rules	3.70	3.10
3.	Financial rules	3.61	2.77
4.	Pension rules	3.61	3.05
5.	Government Grants	3.55	2.69
6.	Education codes/calendar of your own institute	3.54	2.63
7.	Purchase rules	3.52	2.93
8.	Staff development	3.50	2.53
9.	Curriculum of Punjab/Federal Boards	3.47	2.68
10.	Student activities	3.43	2.71
11.	Personnel evaluation methods	3.39	2.36
12.	Govt. of Punjab employment rules	3.36	2.72
13.	Current data about educational developments	3.33	2.13
14.	Current trends in education	3.33	2.37
15.	National comparison reports of different teaching programs & teaching methods	3.29	1.98
16.	IT solutions for administrative work	3.26	2.14
17.	Personnel working behavior	3.24	2.46
18.	Market value of school alumni	3.24	2.36
19.	Different Options and alternatives related to administrative work	3.21	2.04
20.	Community perception about your school	3.20	2.45
21.	Evaluated and aggregated data about education	3.20	1.91
22.	Demographic data related to education	3.14	2.23
23.	Human Relations	3.12	2.56
24.	Govt. of Pakistan employment rules	3.00	2.57
25.	Competitors' strengths & weaknesses	2.98	2.32
26.	Employment rules of other provincial governments	2.88	2.24
27.	Rules of other private schools	2.63	2.00
28.	Politics at institutional and national level	2.45	2.11

Note: Most=4, To some extent=3, Least=2, Not at all=1

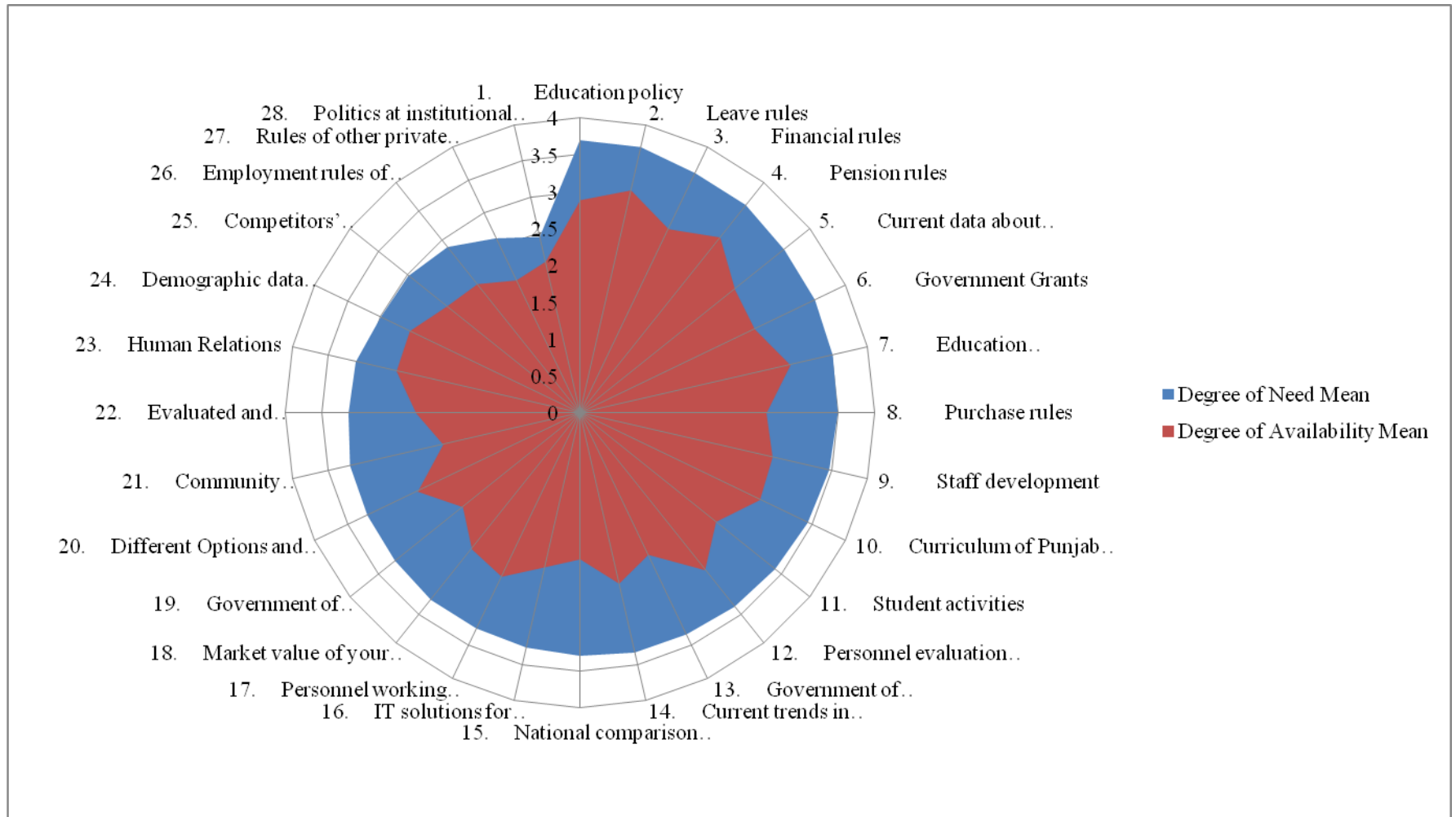


Figure 4.1. Radar Chart Shows Degree of Need and Availability of Information to School Administrators

Table 4.16. *Paired Samples Test - Difference Between the Means of Degree of Need and Degree of Availability of Information To School Sector Administrators*

Degree of Need and Availability of information about:		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference				
					Upper	Lower			
Pair 1	Education policy - Education policy	.814	.950	.096	.623	1.006	8.442	96	.000
Pair 2	Government Grants - Government Grants	.856	1.051	.107	.644	1.067	8.021	96	.000
Pair 3	Community perception about your institute - Community perception about your institute	.750	.929	.095	.562	.938	7.910	95	.000
Pair 4	Competitors' strengths & weaknesses - Competitors' strengths & weaknesses	.656	.982	.100	.457	.855	6.546	95	.000
Pair 5	Curriculum of other Boards - Curriculum of other Boards	.794	.989	.100	.595	.993	7.906	96	.000
Pair 6	Rules of private institutes - Rules of private institutes	.698	.996	.102	.496	.900	6.866	95	.000
Pair 7	Govt. of Punjab employment rules – Govt. of Punjab employment rules	.639	1.023	.104	.433	.845	6.157	96	.000
Pair 8	Govt. of Pakistan employment rules – Govt. of Pakistan employment rules	.660	.999	.101	.458	.861	6.506	96	.000

Table 4.16. (continued)

Pair 9	Employment rules of other provincial governments - Employment rules of other provincial governments	.639	1.043	.106	.429	.849	6.037	96	.000
Pair 10	Education codes/calendar of your own school - Education codes/calendar of your own school	.907	1.146	.116	.676	1.138	7.794	96	.000
Pair 11	Politics at institutional and national level - Politics at institutional and national level	.347	.884	.091	.167	.528	3.828	94	.000
Pair 12	Financial rules - Financial rules	.835	1.048	.106	.624	1.046	7.850	96	.000
Pair 13	Purchase rules - Purchase rules	.604	.888	.091	.424	.784	6.664	95	.000
Pair 14	Leave rules - Leave rules	.598	.975	.099	.401	.795	6.038	96	.000
Pair 15	Pension rules - Pension rules	.557	1.000	.102	.355	.758	5.485	96	.000
Pair 16	Current trends in education - Current trends in education	.958	1.051	.108	.744	1.172	8.883	94	.000
Pair 17	Market value of your alumni - Market value of your alumni	.884	1.061	.109	.668	1.100	8.126	94	.000
Pair 18	Personnel evaluation methods - Personnel evaluation methods	1.032	1.056	.108	.816	1.247	9.518	94	.000
Pair 19	IT solutions for administrative work - IT solutions for administrative work	1.113	1.089	.111	.894	1.333	10.074	96	.000

Table 4.16. (continued)

Pair 20	Personnel working behavior - Personnel working behavior	.773	1.026	.104	.566	.980	7.424	96	.000
Pair 21	Human relations - Human relations	.567	.912	.093	.383	.751	6.125	96	.000
Pair 22	Staff development - Staff development	.969	1.010	.103	.764	1.173	9.398	95	.000
Pair 23	Student activities - Student activities	.719	.903	.092	.536	.902	7.802	95	.000
Pair 24	Current data about educational developments - Current data about educational developments	1.433	1.154	.117	1.200	1.666	12.231	96	.000
Pair 25	Demographic data about educational institutes - Demographic data about educational institutes	.906	1.006	.103	.702	1.110	8.826	95	.000
Pair 26	National comparison reports of different teaching programs & teaching methods - National comparison reports of different teaching programs & teaching methods	1.316	1.169	.120	1.078	1.554	10.968	94	.000
Pair 27	Evaluated and aggregated data about education - Evaluated and aggregated data about education	1.295	1.119	.115	1.067	1.523	11.275	94	.000
Pair 28	Different options and alternatives related to adm. work - Different options and alternatives related to adm. work	1.168	1.058	.109	.953	1.384	10.760	94	.000

Table 4.17. *Degree of Need of Different Type of Information to College Administrators*

Sr.	Information Needed About:	Mini.	Max.	Mean	Median	Mode	S. D.
1.	Current trends in education	1	4	3.71	4.00	4	.500
2.	Purchase rules	1	4	3.69	4.00	4	.547
3.	Education policy	2	4	3.67	4.00	4	.515
4.	Staff development	1	4	3.64	4.00	4	.677
5.	Leave rules	1	4	3.63	4.00	4	.632
6.	Pension rules	1	4	3.63	4.00	4	.648
7.	Financial rules	1	4	3.62	4.00	4	.601
8.	Current data about educational developments	1	4	3.61	4.00	4	.712
9.	Personnel evaluation methods	1	4	3.60	4.00	4	.729
10.	Student activities	1	4	3.60	4.00	4	.699
11.	Human Relations	1	4	3.52	4.00	4	.691
12.	Government Grants	2	4	3.48	4.00	4	.787
13.	Personnel working behavior	1	4	3.46	4.00	4	.760
14.	Government of Punjab employment rules	1	4	3.45	4.00	4	.786
15.	Different Options and alternatives related to administrative work	1	4	3.43	4.00	4	.760
16.	Market value of your college alumni	1	4	3.39	4.00	4	.767
17.	National comparison reports of different teaching programs & teaching methods	1	4	3.38	4.00	4	.806
18.	Education codes/calendar of your college	1	4	3.37	4.00	4	.852
19.	Research output of your college & faculty members	1	4	3.37	4.00	4	.818
20.	IT solutions for administrative work	1	4	3.36	4.00	4	.803
21.	Evaluated and aggregated data about education	1	4	3.29	3.00	4	.825
22.	Ranking criteria of colleges	1	4	3.28	3.00	4	.824
23.	Competitors' strengths & weaknesses	1	4	3.17	3.00	3	.770
24.	Demographic data related to education	1	4	3.16	3.00	4	.866
25.	Community perception about your college	2	4	3.14	3.00	4	.892
26.	Government of Pakistan employment rules	1	4	3.06	3.00	4	.946
27.	Curriculum of other boards and universities	1	4	2.90	3.00	3	.886
28.	Research output of other colleges & faculty members	1	4	2.86	3.00	3	.892
29.	Politics at institutional and national level	1	4	2.70	3.00	3	1.044
30.	Rules of other boards and universities	1	4	2.61	3.00	3	1.008
31.	Employment rules of other provincial governments of Pakistan	1	4	2.54	3.00	3	1.033
32.	Education codes of other colleges	1	4	2.51	3.00	3	.997

Note: Most=4, To some extent=3, Least=2, Not at all=1

Table 4.18. *Degree of Availability of Different Type of Information to College Administrators*

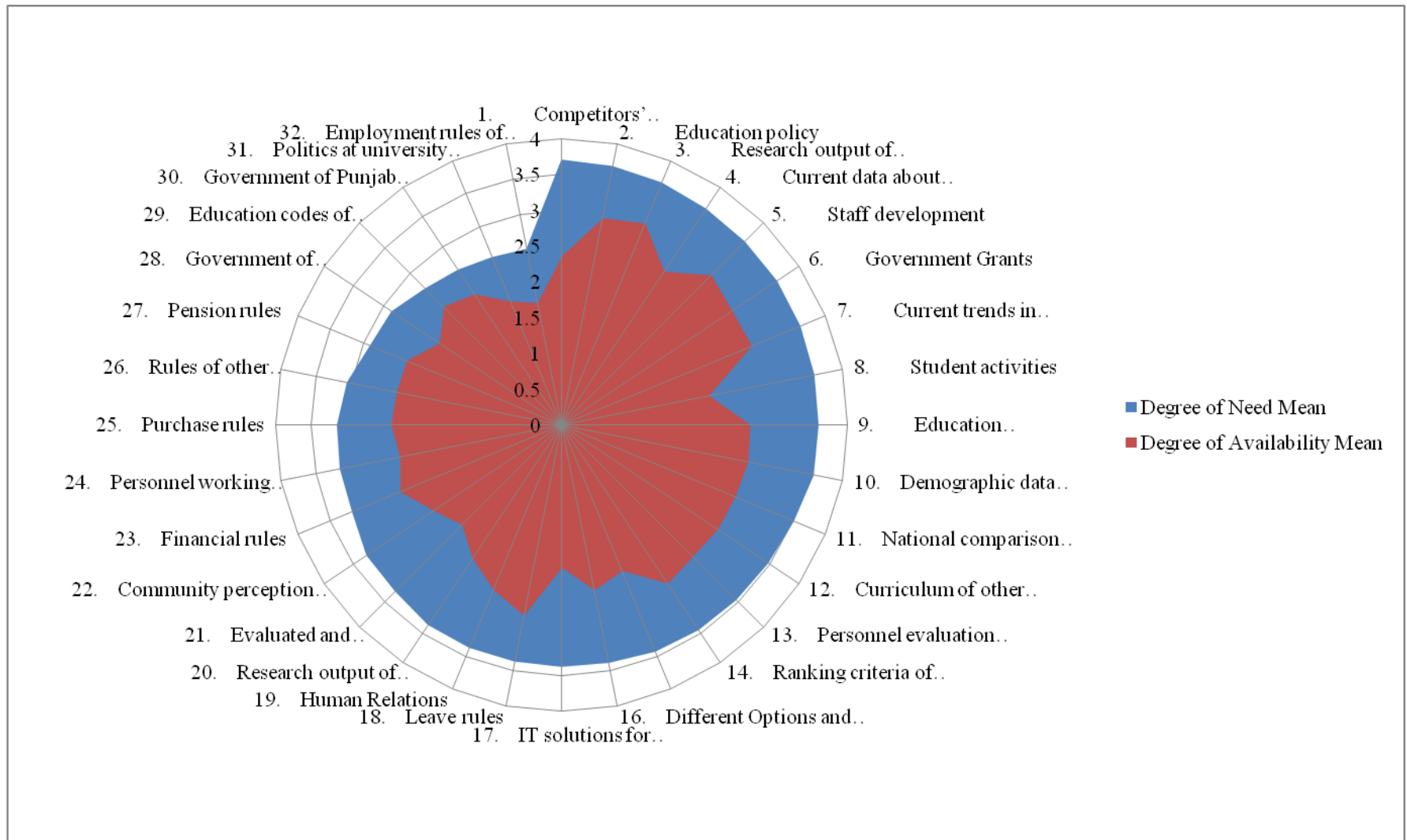
Sr.	Information Available About:	Mini.	Max.	Mean	Median	Mode	S.D.
1.	Education policy	1	4	3.05	3.00	3	.800
2.	Government Grants	1	4	2.63	3.00	3	.965
3.	Community perception about your college	1	4	2.39	2.00	3	1.058
4.	Competitors' strengths & weaknesses	1	4	2.45	2.00	3	.940
5.	Curriculum of other boards and universities	1	4	2.35	2.00	2	.983
6.	Rules of other boards and universities	1	4	2.20	2.00	2	.958
7.	Government of Punjab employment rules	1	4	2.67	3.00	3	.883
8.	Government of Pakistan employment rules	1	4	2.36	2.00	2	.788
9.	Employment rules of other provincial governments of Pakistan	1	4	1.87	2.00	2	.865
10.	Education codes/calendar of your own college	1	4	2.72	3.00	3	.990
11.	Education codes of other colleges	1	4	1.74	2.00	2	.777
12.	Ranking criteria of colleges	1	4	2.16	2.00	2	1.022
13.	Research output of your college & faculty members	1	4	2.50	2.00	2	.965
14.	Research output of other colleges & faculty members	1	4	2.06	2.00	2	.950
15.	Politics at institutional and national level	1	4	2.34	2.00	2	.894
16.	Financial rules	1	4	2.88	3.00	3	.929
17.	Purchase rules	1	4	2.95	3.00	3	.930
18.	Leave rules	1	4	2.96	3.00	3	.999
19.	Pension rules	1	4	2.87	3.00	3	.996
20.	Current trends in education	1	4	2.36	2.00	3	1.044
21.	Market value of your college alumni	1	4	2.36	2.00	3	1.044
22.	Personnel evaluation methods	1	4	2.64	3.00	3	1.005
23.	IT solutions for administrative work	1	4	2.25	2.00	2	1.014
24.	Personnel working behavior	1	4	2.60	3.00	3	.968
25.	Human Relations	1	4	2.63	3.00	3	.899
26.	Staff development	1	4	2.58	3.00	2	.994
27.	Student activities	1	4	2.66	3.00	3	1.005
28.	Current data about educational developments	1	4	2.10	2.00	2	.953
29.	Demographic data related to education	1	4	2.31	2.00	3	.922
30.	National comparison reports of different teaching programs & teaching methods	1	4	2.00	2.00	2	.958
31.	Evaluated and aggregated data about education	1	4	1.98	2.00	1	.974
32.	Different Options and alternatives related to administrative work	1	4	2.21	2.00	2	1.038

Note: Most=4, To some extent=3, Least=2, Not at all=1

Table 4.19. *Degree of Need and Availability of Different Type of Information to College Administrators*

R	Information Needed and Available About:	Means of Need	Means of Availability
1.	Current trends in education	3.71	2.36
2.	Purchase rules	3.69	2.95
3.	Education policy	3.67	3.05
4.	Staff development	3.64	2.58
5.	Leave rules	3.63	2.96
6.	Pension rules	3.63	2.87
7.	Financial rules	3.62	2.88
8.	Current data about educational developments	3.61	2.10
9.	Personnel evaluation methods	3.60	2.64
10.	Student activities	3.60	2.66
11.	Human Relations	3.52	2.63
12.	Government Grants	3.48	2.63
13.	Personnel working behavior	3.46	2.60
14.	Government of Punjab employment rules	3.45	2.67
15.	Different Options and alternatives related to administrative work	3.43	2.21
16.	Market value of your college alumni	3.39	2.36
17.	National comparison reports of different teaching programs & teaching methods	3.38	2.00
18.	Education codes/calendar of your college	3.37	2.72
19.	Research output of your college & faculty members	3.37	2.50
20.	IT solutions for administrative work	3.36	2.25
21.	Evaluated and aggregated data about education	3.29	1.98
22.	Ranking criteria of colleges	3.28	2.16
23.	Competitors' strengths & weaknesses	3.17	2.45
24.	Demographic data related to education, i.e., No. of colleges, teachers, students etc.	3.16	2.31
25.	Community perception about your college	3.14	2.39
26.	Government of Pakistan employment rules	3.06	2.36
27.	Curriculum of other boards and universities	2.90	2.35
28.	Research output of other colleges & faculty members	2.86	2.06
29.	Politics at institutional and national level	2.70	2.34
30.	Rules of other boards and universities	2.61	2.20
31.	Employment rules of other provincial governments of Pakistan	2.54	1.87
32.	Education codes of other colleges	2.51	1.74

Note: Most=4, To some extent=3, Least=2, Not at all=1



4.2. Radar Chart Shows Degree of Need and Availability of Information to College Administrators

Table 4.20. *Paired Samples Test - Difference Between the Means of Degree of Need and Degree of Availability of Information To College Administrators*

Degree of Need and Availability of information about:		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Upper	Lower			
Pair 1	Education policy - Education policy	.616	.765	.077	.464	.769	8.010	98	.000
Pair 2	Government Grants - Government Grants	.859	.958	.096	.667	1.050	8.913	98	.000
Pair 3	Community perception about your institute - Community perception about your institute	.747	1.063	.107	.536	.959	6.998	98	.000
Pair 4	Competitors' strengths & weaknesses - Competitors' strengths & weaknesses	.717	.937	.094	.530	.904	7.614	98	.000
Pair 5	Curriculum of other universities/Boards - Curriculum of other universities/Boards	.545	1.033	.104	.339	.751	5.255	98	.000
Pair 6	Rules of other universities/private institutes - Rules of other universities/private institutes	.404	1.068	.107	.191	.617	3.763	98	.000

Table 4.20. (continued)

Pair 7	Govt. of Punjab employment rules – Govt. of Punjab employment rules	.776	1.171	.118	.541	1.010	6.555	97	.000
Pair 8	Govt. of Pakistan employment rules – Govt. of Pakistan employment rules	.697	1.138	.114	.470	.924	6.094	98	.000
Pair 9	Employment rules of other provincial governments - Employment rules of other provincial governments	.667	1.059	.106	.455	.878	6.261	98	.000
Pair 10	Education codes/calendar of your own college - Education codes/calendar of your own college	.657	1.197	.120	.418	.895	5.459	98	.000
Pair 11	Education codes of other colleges - Education codes of other colleges	.765306 1	1.0433987	.1053992	.5561179	.9744943	7.261	97	.000
Pair 12	Ranking criteria of colleges - Ranking criteria of colleges	1.12244 90	1.2374342	.1249997	.8743591	1.3705388	8.980	97	.000
Pair 13	Research output of your institute/faculty members - Research output of your institute/faculty members	.877551 0	1.0078589	.1018091	.6754881	1.0796139	8.620	97	.000
Pair 14	Research output of other institutes/faculty members - Research output of other institutes/faculty members	.806122 4	.9487720	.0958404	.6159057	.9963392	8.411	97	.000

Table 4.20. (continued)

Pair 15	Politics at institutional and national level - Politics at institutional and national level	.354	1.137	.114	.127	.580	3.095	98	.003
Pair 16	Financial rules - Financial rules	.737	1.046	.105	.529	.946	7.016	98	.000
Pair 17	Purchase rules - Purchase rules	.737	.954	.096	.547	.928	7.691	98	.000
Pair 18	Leave rules - Leave rules	.667	1.040	.105	.459	.874	6.378	98	.000
Pair 19	Pension rules - Pension rules	.758	1.089	.109	.540	.975	6.923	98	.000
Pair 20	Current trends in education - Current trends in education	1.343	1.108	.111	1.122	1.564	12.063	98	.000
Pair 21	Market value of your alumni - Market value of your alumni	1.030	1.083	.109	.814	1.246	9.467	98	.000
Pair 22	Personnel evaluation methods - Personnel evaluation methods	.949	1.069	.108	.735	1.163	8.792	97	.000
Pair 23	IT solutions for administrative work - IT solutions for administrative work	1.092	1.150	.116	.861	1.322	9.403	97	.000
Pair 24	Personnel working behavior - Personnel working behavior	.869	.933	.094	.683	1.055	9.265	98	.000

Table 4.20. (continued)

Pair 25	Human relations - Human relations	.889	.957	.096	.698	1.080	9.240	98	.000
Pair 26	Staff development - Staff development	1.071	1.124	.114	.846	1.297	9.438	97	.000
Pair 27	Student activities - Student activities	.939	1.044	.105	.730	1.148	8.906	97	.000
Pair 28	Current data about educational developments - Current data about educational developments	1.505	1.082	.109	1.289	1.721	13.839	98	.000
Pair 29	Demographic data about educational institutes - Demographic data about educational institutes	.848	1.198	.120	.609	1.087	7.045	98	.000
Pair 30	National comparison reports of different teaching programs & teaching methods - National comparison reports of different teaching programs & teaching methods	1.378	1.079	.109	1.161	1.594	12.633	97	.000
Pair 31	Evaluated and aggregated data about education - Evaluated and aggregated data about education	1.306	1.196	.121	1.066	1.546	10.808	97	.000
Pair 32	Different options and alternatives related to administrative work - Different options and alternatives related to administrative work	1.214	1.124	.114	.989	1.440	10.697	97	.000

Table 4.21. *Degree of Need of Different Type of Information to University Administrators*

R	Information Needed About:	Mini.	Max.	Mean	Median	Mode	S.D.
1.	Competitors' strengths & weaknesses	2	4	3.96	3.00	3	.916
2.	Education policy	1	4	3.56	4.00	4	.654
3.	Research output of your university/faculty members	1	4	3.56	4.00	4	.623
4.	Current data about educational developments	1	4	3.56	4.00	4	.590
5.	Staff development	1	4	3.53	4.00	4	.715
6.	Government Grants	1	4	3.51	4.00	4	.730
7.	Current trends in education	1	4	3.45	4.00	4	.714
8.	Student activities	1	4	3.43	4.00	4	.779
9.	Education codes/calendar of your own university	1	4	3.38	4.00	4	.847
10.	Demographic data related to education	1	4	3.38	3.00	4	.661
11.	National comparison reports of different teaching programs & teaching methods	1	4	3.38	3.00	4	.676
12.	Curriculum of other universities	1	4	3.37	4.00	4	.845
13.	Personnel evaluation methods	1	4	3.33	4.00	4	.801
14.	Ranking criteria of universities	1	4	3.32	4.00	4	.813
15.	Market value of your university alumni	1	4	3.29	3.00	4	.766
16.	Different Options and alternatives related to administrative work	1	4	3.29	3.00	3	.726
17.	IT solutions for administrative work	1	4	3.28	3.00	3	.736
18.	Leave rules	1	4	3.24	3.00	4	.838
19.	Human Relations	1	4	3.24	3.00	3	.777
20.	Research output of other universities/faculty members	1	4	3.22	3.00	3	.798
21.	Evaluated and aggregated data about education	1	4	3.21	3.00	4	.804
22.	Community perception about your university	1	4	3.20	3.00	3	.788
23.	Financial rules	1	4	3.20	3.00	4	.949
24.	Personnel working behavior	1	4	3.15	3.00	3	.841
25.	Purchase rules	1	4	3.13	3.00	4	.956
26.	Rules of other universities	1	4	3.11	3.00	3	.773
27.	Pension rules	1	4	3.06	3.00	3	.957
28.	Government of Pakistan employment rules	1	4	2.93	3.00	3	.941
29.	Education codes of other universities	1	4	2.82	3.00	3	.753
30.	Government of Punjab employment rules	1	4	2.74	3.00	3	1.064
31.	Politics at university and national level	1	4	2.49	3.00	3	.986
32.	Employment rules of other provincial governments of Pakistan	1	4	2.33	2.00	3	1.031

Note: Most=4, To some extent=3, Least=2, Not at all=1

Table 4.22. *Degree of Availability of Different Type of Information to University Administrators*

R	Information Available About:	Mini.	Max.	Mean	Median	Mode	S. D.
1.	Education codes/calendar of your own university	1	4	3.20	3.00	4	.895
2.	Education policy	1	4	3.02	3.00	3	.836
3.	Curriculum of other universities	1	4	2.83	3.00	3	.949
4.	Leave rules	1	4	2.81	3.00	3	.902
5.	Research output of your university/faculty members	1	4	2.80	3.00	3	.774
6.	Government Grants	1	4	2.75	3.00	3	.744
7.	Purchase rules	1	4	2.71	3.00	3	.864
8.	Government of Pakistan employment rules	1	4	2.70	3.00	3	.954
9.	Financial rules	1	4	2.68	3.00	3	.859
10.	Pension rules	1	4	2.67	3.00	3	1.001
11.	Ranking criteria of universities	1	4	2.66	3.00	3	.941
12.	Current trends in education	1	4	2.62	3.00	3	.936
13.	Rules of other universities	1	4	2.59	3.00	2	.908
14.	Government of Punjab employment rules	1	4	2.58	3.00	3	.993
15.	Student activities	1	4	2.56	2.00	2	.899
16.	Staff development	1	4	2.52	3.00	3	.807
17.	Human Relations	1	4	2.50	2.00	2	.867
18.	Politics at university and national level	1	4	2.49	3.00	3	.912
19.	IT solutions for administrative work	1	4	2.49	2.00	2	.832
20.	Current data about educational developments	1	4	2.48	2.00	2	.912
21.	Personnel evaluation methods	1	4	2.47	2.00	2	.795
22.	Demographic data related to education	1	4	2.47	2.00	2	.855
23.	Community perception about your university	1	4	2.45	2.00	2	.964
24.	Personnel working behavior	1	4	2.38	2.00	2	.859
25.	Education codes of other universities	1	4	2.34	2.00	2	.792
26.	Research output of other universities/faculty members	1	4	2.33	2.00	2	.839
27.	Competitors' strengths & weaknesses	1	4	2.28	2.00	2	.896
28.	Market value of your university alumni	1	4	2.27	2.00	2	.915
29.	Different Options and alternatives related to administrative work	1	4	2.18	2.00	2	.921
30.	National comparison reports of different teaching programs & teaching methods	1	4	2.14	2.00	2	.884
31.	Evaluated and aggregated data about education	1	4	2.04	2.00	2	.882
32.	Employment rules of other provincial governments of Pakistan	1	4	1.90	2.00	1	.954

Note: Most=4, To some extent=3, Least=2, Not at all=1

Table 4.23. *Degree of Need and Availability of Different Type of Information to University Administrators*

R	Information Needed and Available About:	Means of Need	Means of Availability
1.	Competitors' strengths & weaknesses	3.96	2.28
2.	Education policy	3.56	3.02
3.	Research output of your university/faculty members	3.56	2.80
4.	Current data about educational developments	3.56	2.48
5.	Staff development	3.53	2.52
6.	Government Grants	3.51	2.75
7.	Current trends in education	3.45	2.62
8.	Student activities	3.43	2.56
9.	Education codes/calendar of your own university	3.38	3.20
10.	Demographic data related to education	3.38	2.47
11.	National comparison reports of different teaching programs & teaching methods	3.38	2.14
12.	Curriculum of other universities	3.37	2.83
13.	Personnel evaluation methods	3.33	2.47
14.	Ranking criteria of universities	3.32	2.66
15.	Market value of your university alumni	3.29	2.27
16.	Different Options and alternatives related to administrative work	3.29	2.18
17.	IT solutions for administrative work	3.28	2.49
18.	Leave rules	3.24	2.81
19.	Human Relations	3.24	2.50
20.	Research output of other universities/faculty members	3.22	2.33
21.	Evaluated and aggregated data about education	3.21	2.04
22.	Community perception about your university	3.20	2.45
23.	Financial rules	3.20	2.68
24.	Personnel working behavior	3.15	2.38
25.	Purchase rules	3.13	2.71
26.	Rules of other universities	3.11	2.59
27.	Pension rules	3.06	2.67
28.	Government of Pakistan employment rules	2.93	2.70
29.	Education codes of other universities	2.82	2.34
30.	Government of Punjab employment rules	2.74	2.58
31.	Politics at university and national level	2.49	2.49
32.	Employment rules of other provincial governments of Pakistan	2.33	1.90

Note: Most=4, To some extent=3, Least=2, Not at all=1

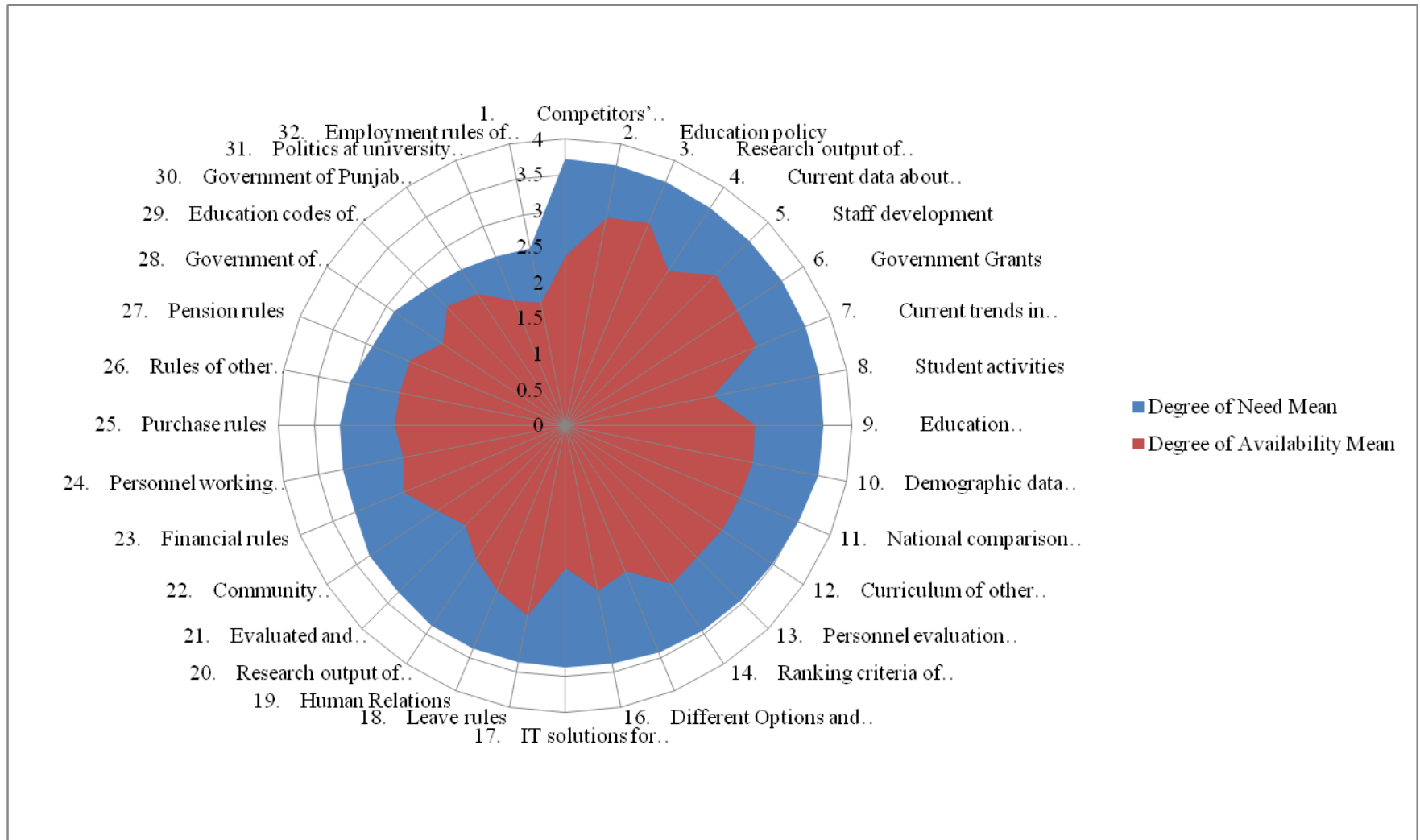


Figure 4.3. Radar Chart Shows Degree of Need and Availability of Information to University Administrators

Table 4.24. *Paired Samples Test - Difference Between the Means of Degree of Need and Degree of Availability of Information To University Administrators*

Degree of Need and Availability of information about:		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Upper	Lower			
Pair 1	Education policy - Education policy	.545	.911	.091	.365	.724	6.005	100	.000
Pair 2	Government Grants - Government Grants	.770	.851	.085	.601	.939	9.047	99	.000
Pair 3	Community perception about your institute - Community perception about your institute	.752	.865	.086	.582	.923	8.743	100	.000
Pair 4	Competitors' strengths & weaknesses - Competitors' strengths & weaknesses	.683	.882	.088	.509	.857	7.781	100	.000
Pair 5	Curriculum of other universities - Curriculum of other universities	.535	.912	.091	.355	.715	5.893	100	.000
Pair 6	Rules of other universities/private institutes - Rules of other universities/private institutes	.515	.934	.093	.330	.699	5.540	100	.000
Pair 7	Govt. of Punjab employment rules – Govt. of Punjab employment rules	.158	1.065	.106	-.052	.369	1.495	100	.138

Table 4.24. (continued)

Pair 8	Govt. of Pakistan employment rules – Govt. of Pakistan employment rules	.228	1.076	.107	.015	.440	2.127	100	.036
Pair 9	Employment rules of other provincial governments - Employment rules of other provincial governments	.426	1.071	.107	.214	.637	3.995	100	.000
Pair 10	Education codes/calendar of your own university - Education codes/calendar of your own university	.178	.899	.089	.001	.356	1.993	100	.049
Pair 11	Education codes of other universities - Education codes of other universities	.47524 75	.8317940	.0827666	.311041 0	.6394541	5.742	100	.000
Pair 12	Ranking criteria of universities - Ranking criteria of universities	.66336 63	.9303465	.0925729	.479704 3	.8470284	7.166	100	.000
Pair 13	Research output of your institute/faculty members - Research output of your institute/faculty members	.76237 62	.7765116	.0772658	.609083 1	.9156694	9.867	100	.000
Pair 14	Research output of other institutes/faculty members - Research output of other institutes/faculty members	.89108 91	.9154342	.0910891	.710370 9	1.0718073	9.783	100	.000
Pair 15	Politics at institutional and national level - Politics at institutional and national level	.000	1.149	.114	-.227	.227	.000	100	1.000

Table 4.24. (continued)

Pair 16	Financial rules - Financial rules	.515	.890	.089	.339	.691	5.813	100	.000
Pair 17	Purchase rules - Purchase rules	.416	.908	.090	.236	.595	4.600	100	.000
Pair 18	Leave rules - Leave rules	.426	.864	.086	.255	.596	4.951	100	.000
Pair 19	Pension rules - Pension rules	.386	.990	.098	.191	.582	3.921	100	.000
Pair 20	Current trends in education - Current trends in education	.822	.942	.094	.636	1.008	8.765	100	.000
Pair 21	Market value of your alumni - Market value of your alumni	1.020	.980	.097	.826	1.213	10.462	100	.000
Pair 22	Personnel evaluation methods - Personnel evaluation methods	.861	.928	.092	.678	1.045	9.332	100	.000
Pair 23	IT solutions for administrative work - IT solutions for administrative work	.792	1.013	.101	.592	.992	7.857	100	.000
Pair 24	Personnel working behavior - Personnel working behavior	.772	.947	.094	.585	.959	8.192	100	.000
Pair 25	Human relations - Human relations	.743	.902	.090	.565	.921	8.276	100	.000
Pair 26	Staff development - Staff development	1.010	.900	.090	.832	1.188	11.278	100	.000

Table 4.24. (continued)

Pair 27	Student activities - Student activities	.861	.938	.093	.676	1.047	9.225	100	.000
Pair 28	Current data about educational developments - Current data about educational developments	1.089	.971	.097	.898	1.281	11.277	100	.000
Pair 29	Demographic data about educational institutes - Demographic data about educational institutes	.911	.950	.095	.723	1.098	9.639	100	.000
Pair 30	National comparison reports of different teaching programs & teaching methods - National comparison reports of different teaching programs & teaching methods	1.238	.971	.097	1.046	1.429	12.809	100	.000
Pair 31	Evaluated and aggregated data about education - Evaluated and aggregated data about education	1.168	1.011	.101	.969	1.368	11.618	100	.000
Pair 32	Different options and alternatives related to administrative work - Different options and alternatives related to administrative work	1.109	.979	.097	.916	1.302	11.386	100	.000

Table 4.25. *Degree of Need and Availability of Different Type of Information for School, College and University Administrators*

Sr.	Information About:	Degree of Need				Degree of Availability			
		S. Ad.	C. Ad.	U. Ad.	Cum.	S. Ad.	C. Ad.	U. Ad.	Cum.
		Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
1.	Education policy	3.70	3.67	3.56	3.64	2.89	3.05	2.28	2.99
2.	Current data about educational developments	3.33	3.61	3.56	3.58	2.13	2.10	2.48	2.24
3.	Staff development	3.50	3.64	3.53	3.56	2.53	2.58	2.52	2.55
4.	Government Grants	3.55	3.48	3.51	3.52	2.69	2.63	2.75	2.69
5.	Leave rules	3.70	3.63	3.24	3.52	3.10	2.87	2.81	2.96
6.	Current trends in education	3.33	3.71	3.45	3.49	2.37	2.36	2.62	2.45
7.	Research output of your institute/faculty members	Missing*	3.37	3.56	3.48	Missing*	2.72	2.80	2.65
8.	Student activities	3.43	3.60	3.43	3.48	2.71	2.66	2.56	2.64
9.	Financial rules	3.61	3.62	3.20	3.47	2.77	2.88	2.68	2.78
10.	Purchase rules	3.52	3.69	3.13	3.44	2.93	2.95	2.71	2.86
11.	Personnel evaluation methods	3.39	3.60	3.33	3.44	2.36	2.64	2.47	2.49
12.	Education codes/calendar of your own institute	3.54	3.37	3.38	3.43	2.63	2.72	3.20	2.85
13.	Pension rules	3.61	3.63	3.06	3.43	3.05	2.87	2.67	2.86
14.	National comparison reports of different teaching programs & teaching methods	3.29	3.38	3.38	3.35	1.98	2.00	2.14	2.04
15.	Different Options and alternatives related to administrative work	3.21	3.43	3.29	3.31	2.04	2.21	2.18	2.15
16.	Ranking criteria of higher education institutes	Missing*	3.28	3.32	3.31	Missing*	2.16	2.66	2.42
17.	Market value of your alumni	3.24	3.39	3.29	3.31	2.46	2.36	2.27	2.33
18.	IT solutions for administrative work	3.26	3.36	3.28	3.30	2.14	2.25	2.49	2.30
19.	Human Relations	3.12	3.52	3.24	3.29	2.56	2.63	2.81	2.56
20.	Personnel working behavior	3.24	3.46	3.15	3.28	2.36	2.60	2.38	2.48
21.	Curriculum of other institutes/boards	3.47	2.90	3.37	3.25	2.68	2.35	2.83	2.62
22.	Evaluated and aggregated data about education	3.20	3.29	3.21	3.23	1.91	1.98	2.04	1.98
23.	Demographic data related to education	3.14	3.16	3.38	3.23	2.23	2.31	2.47	2.34
24.	Government of Punjab employment rules	3.36	3.45	2.74	3.18	2.72	2.67	2.58	2.66
25.	Community perception about your institute	3.20	3.14	3.20	3.18	2.45	2.39	2.45	2.43
26.	Government of Pakistan employment rules	3.00	3.06	2.93	3.07	2.57	2.36	2.70	2.55
27.	Research output of other higher education institutes/faculty members	Missing*	2.86	3.22	3.05	Missing*	2.06	2.33	2.21
28.	Competitors' strengths & weaknesses	2.98	3.17	3.36	3.04	2.32	2.45	2.28	2.35
29.	Rules of other universities/boards/private institutes	2.63	2.61	3.11	2.78	2.00	2.20	2.59	2.24
30.	Education codes of other higher education institutes	Missing*	2.51	2.82	2.67	Missing*	1.74	2.34	2.06
31.	Employment rules of other provincial governments of Pakistan	2.88	2.54	2.33	2.58	2.24	1.87	1.90	2.00
32.	Politics at university and national level	2.45	2.70	2.49	2.55	2.11	2.34	2.49	2.32

Note: Most=4, To some extent=3, Least=2, Not at all=1, Missing*= Not related to school sector

Appendix N

**List of EDOs and DEOs helped in Survey Sample
Selection and Data Collection from Schools and Colleges**

**LIST OF EDOS AND DEOS HELPED IN SURVEY SAMPLE SELECTION AND
DATA COLLECTION FROM SCHOOLS AND COLLEGES**

1. **Abdul Rehman Malik**
Executive District Officer (EDO) Education, Lahore District
2. **Ch. Ghulam Rasool Akhtar**
DEO (R)- Secondary Education, Bahawalpur
3. **Inamul Haq Kousar, PhD**
Ex Director General Federal Board of Pakistan
4. **Parveen Iqbal**
District Education Officer (DEO, W-EE), Lahore City
5. **Qazi Khalid Farooq**
District Education Officer (DEO), Secondary Education, Lahore-Cantt.
6. **Salamat Ali**
Asst. Director (Regional)
District Teachers & Support Centre (DTSC for Primary Schools)
CIDA project, Kasur
Principal, Govt H/S Hussain Khanwala Hithar

Appendix O

**Preliminary Draft Model of
Information System for Educational Administrators in
Pakistan
Sent to the Experts for Review and Assessment**

NATIONAL INFORMATION SYSTEM FOR EDUCATIONAL ADMINISTRATORS (NISEA) IN PAKISTAN**(Proposed by Farzana Shafique)****Introduction**

The purpose of this research is to develop a model of National Information System for Educational Administrators in Pakistan. Model development is considered an effective research method. It assists investigators and scientists in relating more accurately to reality; it also aids them to describe, predict, test or understand complex systems or events. A model is an abstraction, a mental framework for analysis of a system. It involves simplified representations of real-world phenomena. Although models often serve as useful research tools, these devices are in need of empirical verification. When models have not been properly validated, their employment as a knowledge source might be unwarranted (Busha & Harter, 1980; Powell & Connaway, 2004, p. 60).

For designing a model some data was required for situation analysis and determining future needs of the proposed information system users. Extensive studies on users and their information needs have been conducted over the last three decades and various methods have been employed in these studies. However, the method most commonly used is the survey conducted through one or more data collection tools like the questionnaire, and interview. The collection of data on these focal points helped the researcher to propose the Model. The survey was conducted to assess the information needs and seeking behavior of school, college and university administrators (i.e., school and college principals and vice principals; university deans, registrars, deputy registrars, chairs/heads of departments etc.). Public sector schools (secondary) and colleges within Punjab and Federal Area were selected through cluster sampling. On the other hand, all the Public sector universities of Punjab province and Federal Area were covered for the survey. Three separate questionnaires were executed for this purpose, targeting 100 responses from each sector (in total 300), (A detailed list of respondents' preference will be provided in the dissertation). Interviews of three different categories of experts within Punjab and Federal Area were also conducted for the in depth understanding of the phenomena. These categories included educational administrators (i.e., Ex. Vice Chancellors, EDOs, DEOs, DGs of Education Boards & Academy of educational Planning and Management, Deputy Chiefs of Education in Planning Commission of Govt. of Pakistan etc.); library & information professionals; and information system experts (working in well known public and private sector institutes). These interviews and review of the

related literature helped in the overall understanding and designing of the system. Thus the proposed Model is based on the literature review, questionnaire survey and interview data analysis and intends to serve as a national information system for educational administrators in Pakistan. Coming section presents a brief overview of major components of the Model.

National Information System for Educational Administrators (NISEA) Model

The NISEA Model is based on the **Knowledge Environment Model** and the **Spiral Model**. Knowledge Environment Model will be used for dealing with its networking, access, format and service issues, while the Spiral Model approach will provide guideline for its development in phases.

Network Approach for NISEA

NISEA will be developed by applying the network approach, although there is a difference between an information system and a network. For this purpose “**Knowledge Environment Model**” will be followed.

In different eras of network development different models were introduced depending on the sophistication of ICT. These can be divided in three main stages as presented by Gorman and Cullen (2000) in their paper entitled “Asian library partnerships: Applying the knowledge model for library networks”:

- Initial Stage = Networked Library Model
- Intermediate Stage = Co-operative Library Model
- Developed Stage = Knowledge Environment Model

Knowledge Environment Model

The “Knowledge Environment Model” is less system focused, and more clients focused. Other models tend to ask how co-operation can improve this or that specific function in isolation from other functions. The Knowledge Environment Model looks at the full range client needs and resource requirements and asks how co-operation and network can improve services to meet these needs and requirements. It recognizes that there is diversity in user expectations, and also diversity in user skills. Given this diversity, the Knowledge Environment Model seeks to offer both a sophisticated technological environment and also a more traditional set of services (See Figure 1).

Functions	Advanced (Knowledge Environment Model)
Resource acquisition	Full remote access to resources Dedicated Internet links Most materials in e-format
Resource description	Integrated resources discovery system Metadata used comprehensively
Resource discovery	Full network access to all internal and external e-resources Integrated resource discovery system
User access	Full on-site and remote access On-site access not necessary
User support	Human support + full computer-assisted support for information discovery and access process

Figure 1. Features of Knowledge Environment Model

Spiral Model

SPIRAL is an iterative approach to system development. The spiral lifecycle model is a combination of the classic waterfall model and aspects of risk analysis. This model is very appropriate for large and complex Information Systems. The spiral model emphasizes the need to go back and reiterate earlier steps a number of times as the project progresses. It's actually a series of short waterfall cycles, each producing an early prototype representing a part of the entire project. It can incorporate other models in its various developmental phases. There are usually four distinct phases of the spiral model system development approach (TechTarget, 2009). The various stages of Spiral Model are shown pictorially below:

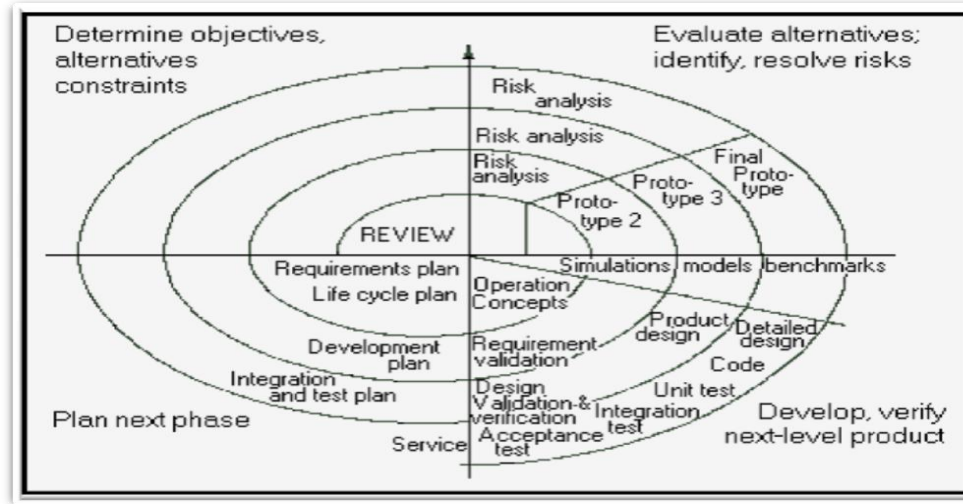


Figure 2. Spiral Model

1. **Objectives, alternatives, constraints:** The new system requirements are defined in the coming section, after a comprehensive system study of the various education enterprise processes in Pakistan, in as much detail as possible. It involved survey and interviewing internal and external users, preparation of detailed flow diagrams showing the process or processes for which the IS is to be developed, the inputs and outputs in terms of how the data are to be recorded/ entered and the form in which the results are to be presented.
2. **Risk analysis:** it includes addressing any factors which may risk the successful completion of the entire project of NISEA development including alternative strategies and constraints.
3. **Prototyping** – Based upon the finalized strategy and the preliminary design, the first prototype of the new system will be developed. This is usually a scaled-down version of the system, and represents an approximation of the characteristics of the final product.

Prototype 1: NISEA Phase I

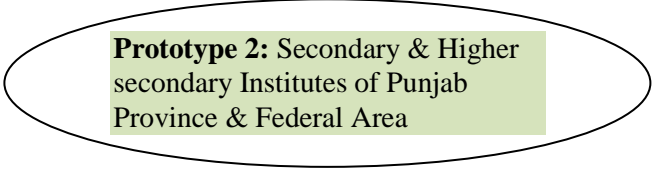
Prototype 1: Universities and Higher Education Institutes of Punjab Province & Federal Area

The system will be developed in phases. As a first prototype only the system will prepare a module for higher education sector of the Punjab province and Federal Area of Pakistan. As the results of the survey and reviewed literature reveals that universities are fewer in number and enjoying better ICT facilities so the first prototype would cover higher education sector only.

• **Development and verification of next-level product**

The prototype prepared will be tested against benchmarks based on end users' expectations and evaluated risks to verify the various aspects of the development. Refinements and rectifications of the prototype will be undertaken until target users' satisfaction is achieved before development of the next level of the system.

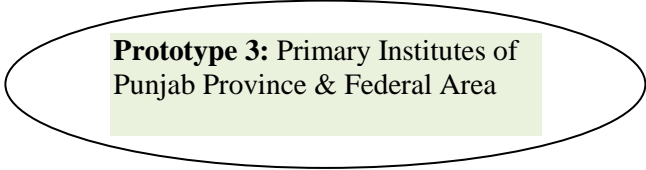
Prototype 2: NISEA Phase II



Prototype 2: Secondary & Higher secondary Institutes of Punjab Province & Federal Area

The second prototype will cover a module for secondary & higher secondary education sector of the Punjab province and Federal Area of Pakistan. The prototype 2 will be tested and verified.

Prototype 3: NISEA Phase III



Prototype 3: Primary Institutes of Punjab Province & Federal Area

The third prototype will cover a module for primary education sector of the Punjab province and Federal Area of Pakistan. The prototype 3 will be tested and verified.

Plan of next phase for Other Provinces:

The preceding steps are iterated until the end user is satisfied that the refined prototype represents the final product desired. The final system will be constructed based on the refined prototype. The final system (An information system for Punjab Province and Federal area of Pakistan, covering school, college and university sector) will be thoroughly evaluated and tested. Routine maintenance will be carried out on a continuing basis to prevent large-scale failures. In the next phase of the plan applying above three prototyping

approaches the NISEA will be developed in NWFP & AJK, Sindh, and Baluchistan provinces as well. A final product will be a National Information System for educational Administrators in Pakistan.

A detailed draft of the system is presented in the coming section:

Three Basic Axes of Information System

Information

Computer Technology

Telecommunications

Each axis will have its own organizational structure

Information

National Information System for Educational Administrators (NESIA) will generate information for users in the following essential fields:

- Management and administration of the education system
- Research on and planning of the education system (macro and micro)
- Monitoring and evaluation of the education system

Contents needed by the users of NISEA are assessed during the survey conducted by the researcher. These contents will be provided to the different categories of users of NISEA.

Users of NISEA

One generally distinguishes three levels of data use, which correspond to the tasks and particular activities of the education system. The higher the level of detail and quantity of information there is to use, the lower the level of decision making, i.e., close to the school, college unit or university department. The quantity of data required decreases as the level of decision-making goes up, the information becoming more aggregated and synthesized, integrating all available data. The people belonging to the *macro level* are responsible for strategic decisions concerning the planning of the whole of the education system. The category of decisions at this level concerns the general policy and attainable medium or long-term objectives. The information required will deal more with aggregates used for setting the objectives on the national, regional or provincial level.

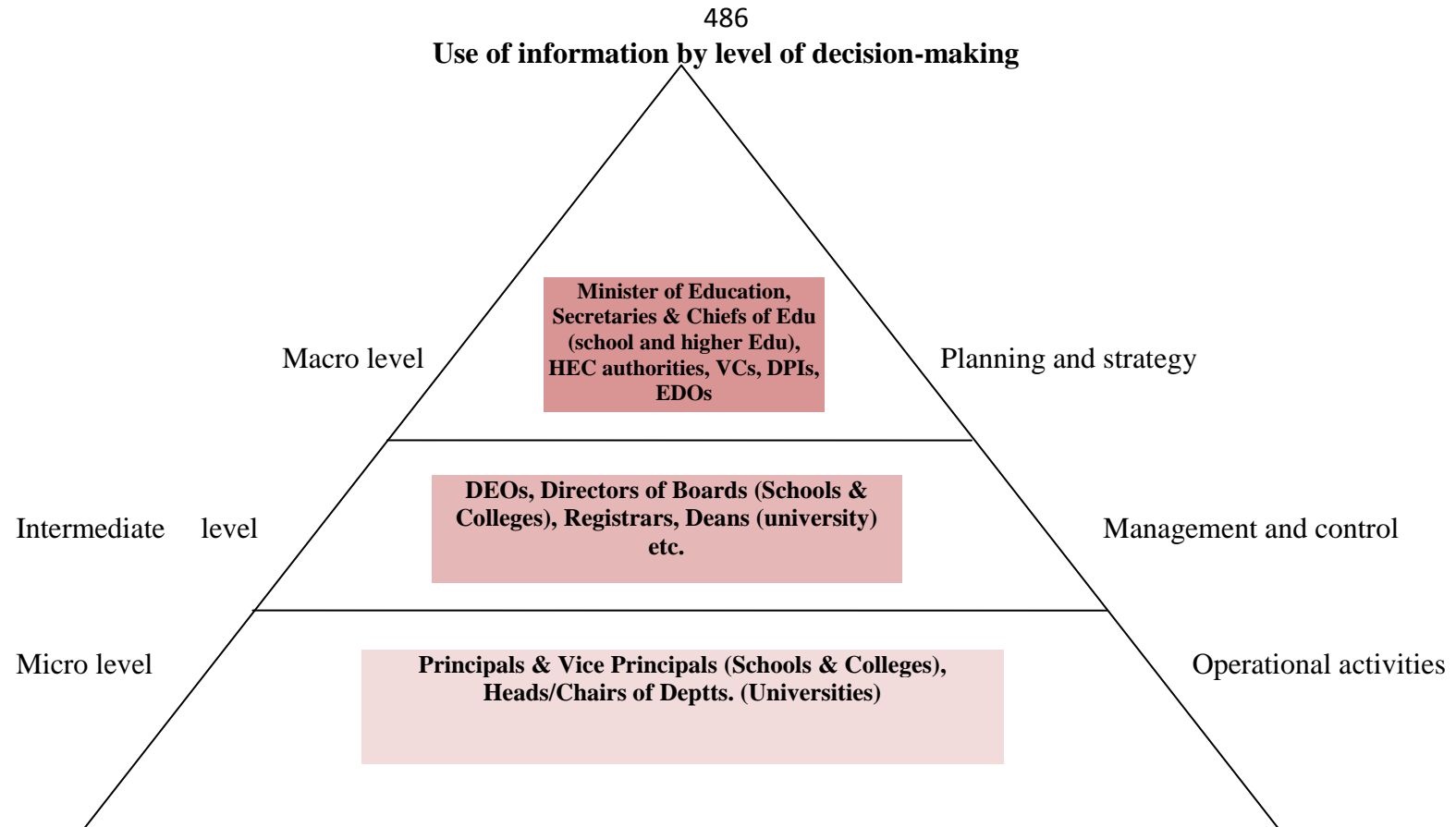


Figure 3. Liberally adapted from UNESCO (1992)

The *intermediate level* comprises decision-makers who are in charge of management and control of the allocation of resources, for an efficient and equitable distribution. This level translates the general objectives into more technical, operational decisions. It therefore requires more specific data to detect eventual malfunctions and to optimize the use of resources. The *micro level* corresponds to operational tasks, and to more daily activities, closer to the school, college and university. The decision here has local and immediate reach and hence will require more detailed information. Thus, these three decision-making levels, which sometimes overlap each other at the administrative levels, require distinct information. They are however linked because decisions at the macro level would be relevant and efficient in as much as they are based on precise and reliable information gathered from the lower levels.

The information system should necessarily integrate these complex relations between the different levels of decision making to fulfill its role efficiently. In summary, NISEA is aimed to strengthen capacities in management, planning and dissemination of information at all levels of the education system for all areas of reflection and decision-making.

NISAE will be based on information resources acquired from:

- Libraries (i.e., National Library of Pakistan etc.)
- Archives (i.e., National Archives of Pakistan etc.)
- Data Centers (i.e., NEMIS etc.)
- Documentation Centers
- Institutes dealing with education at school, college and university level (i.e., HEC, Federal Board of Education, Directorate of Education etc.)

NISEA will be consisting on:

A library

A data center

A clearing house

A digitization unit

An ICT Unit

Two R&D Cells

Components of National Center for NISEA and Their Functions

1. Library:

It will work in the National Center (NISEA):

- To function as a repository of educational resources
- To acquire/collect, process, organize and lend primary and secondary sources of information i.e., books, journals, thesis, reports etc.
- To prepare and maintain card catalog and OPAC
- To provide access to online resources and Internet

2. Research and Development (R&D) Cells:

Two separate R&D Cells for school education and higher education will work in the National Center:

- To collect data and conduct research on different aspects of education
- To collect research studies conducted by different institutes on different institutes of education
- To acquire the tacit knowledge through interviews and send it to CH
- To develop reform programs based on the research findings

3. Clearing House (CH):

It will work in the National Center:

- To act as a link between information producers and publishers related to the scope of NISEA
- To acquire and publish informal and unpublished resources for publication
- To separate the policy and administrative information items from operation and research resources
- To seek out users of NISEA and maintain their information need profiles
- To evaluate and synthesize available information for meeting potential users' information needs
- To provide SDI, CAS, TOC etc.,
- To provide Human support and full computer-assisted support for information discovery and access process
- To conduct user education programs

4. Documentation Center:

It will work in National Center:

- To digest the primary sources of information into a form which is directly accessible for the users of NISEA
- To compile bibliographies
- To prepare indexes and abstracts
- To translate the resources (in English, Urdu and regional languages etc.)

5. Digitization Unit

It will work in the National Center:

- To digitize the resources acquired or prepared by the National Center
- To provide the digital copy (Online and on CD-ROM) to the ICT Unit for its online availability to the sub centers and potential users

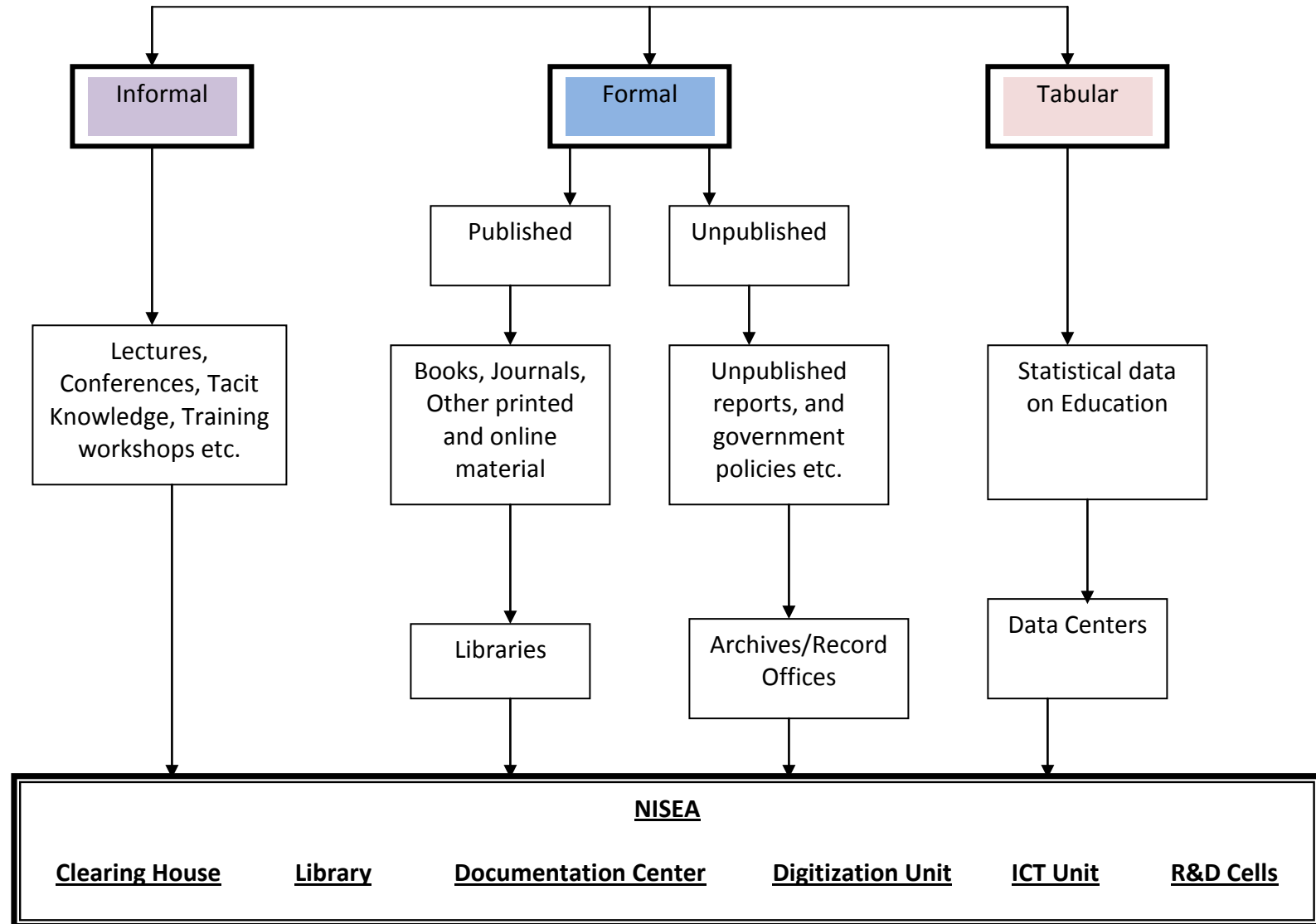
6. ICT Unit

It will work in the National Center:

- To connect the national, provincial, district and institutional centers with each other
- To maintain the online database of digitized resources of NISEA
- To assign metadata to the information resources
- To provide Online access to these resources

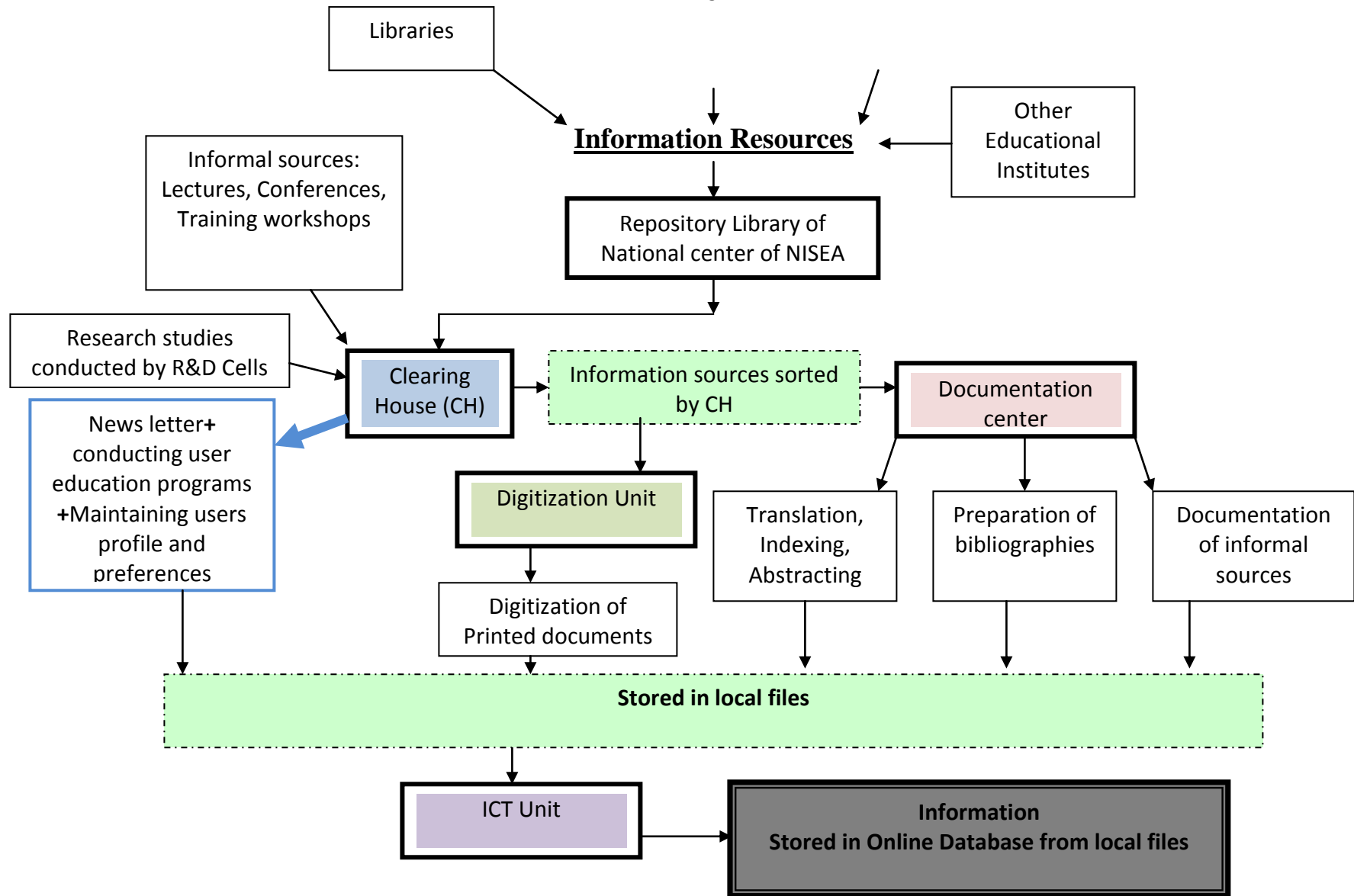
Coming section presents the details of the proposed model with the help of diagrams.

Information Resources



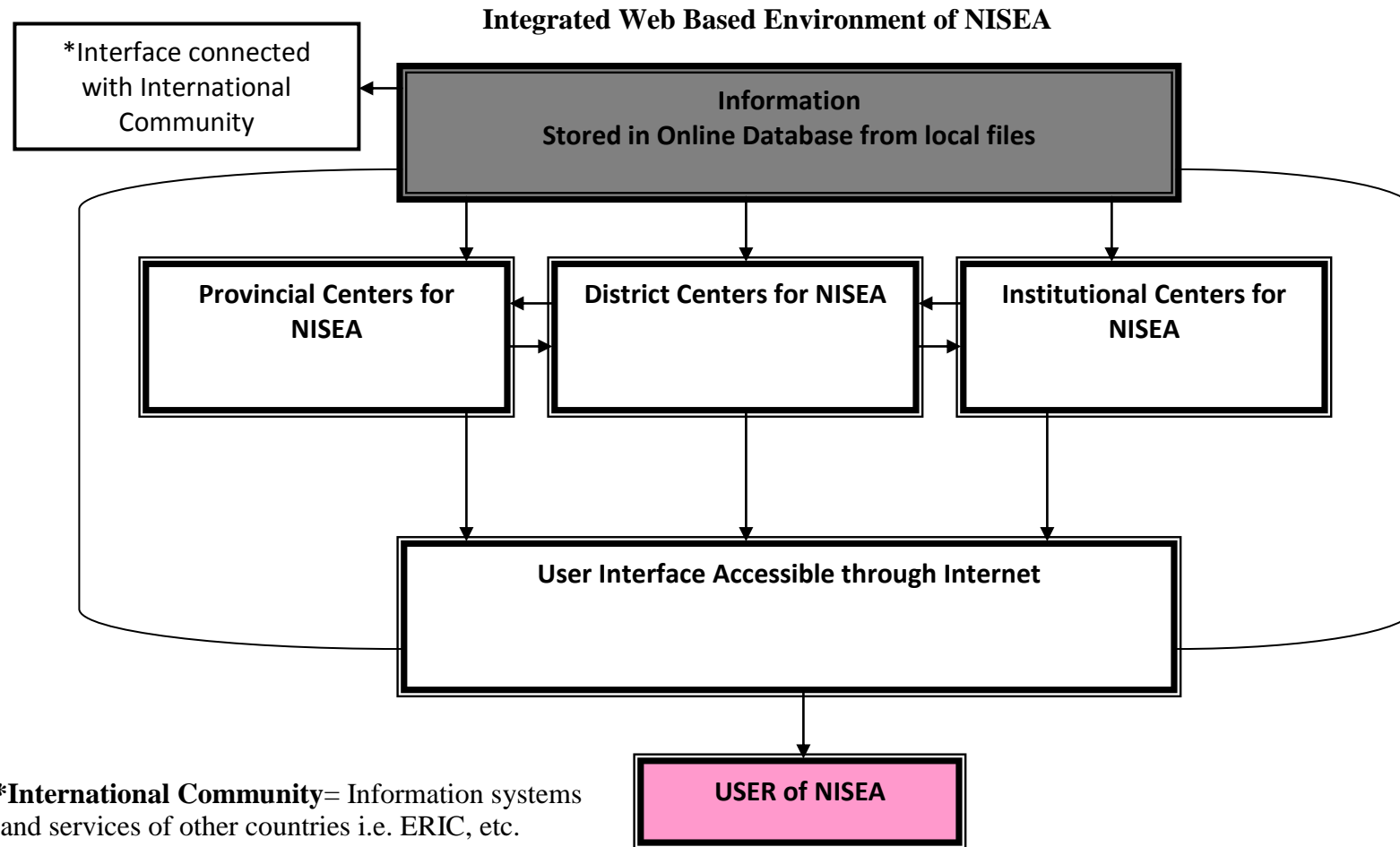
Archives/Records
Offices

Data Centers



Centralized Processing Supported by Web based Environment

Information will be acquired by the provincial, district, and institutional centers and will be sent to the “Repository library of National Center for NISEA”. This information will be processed by the “National Center” as shown in the above diagram. Online access will be provided to each member center of the NISEA.



Services to be Rendered by NISEA

Services:

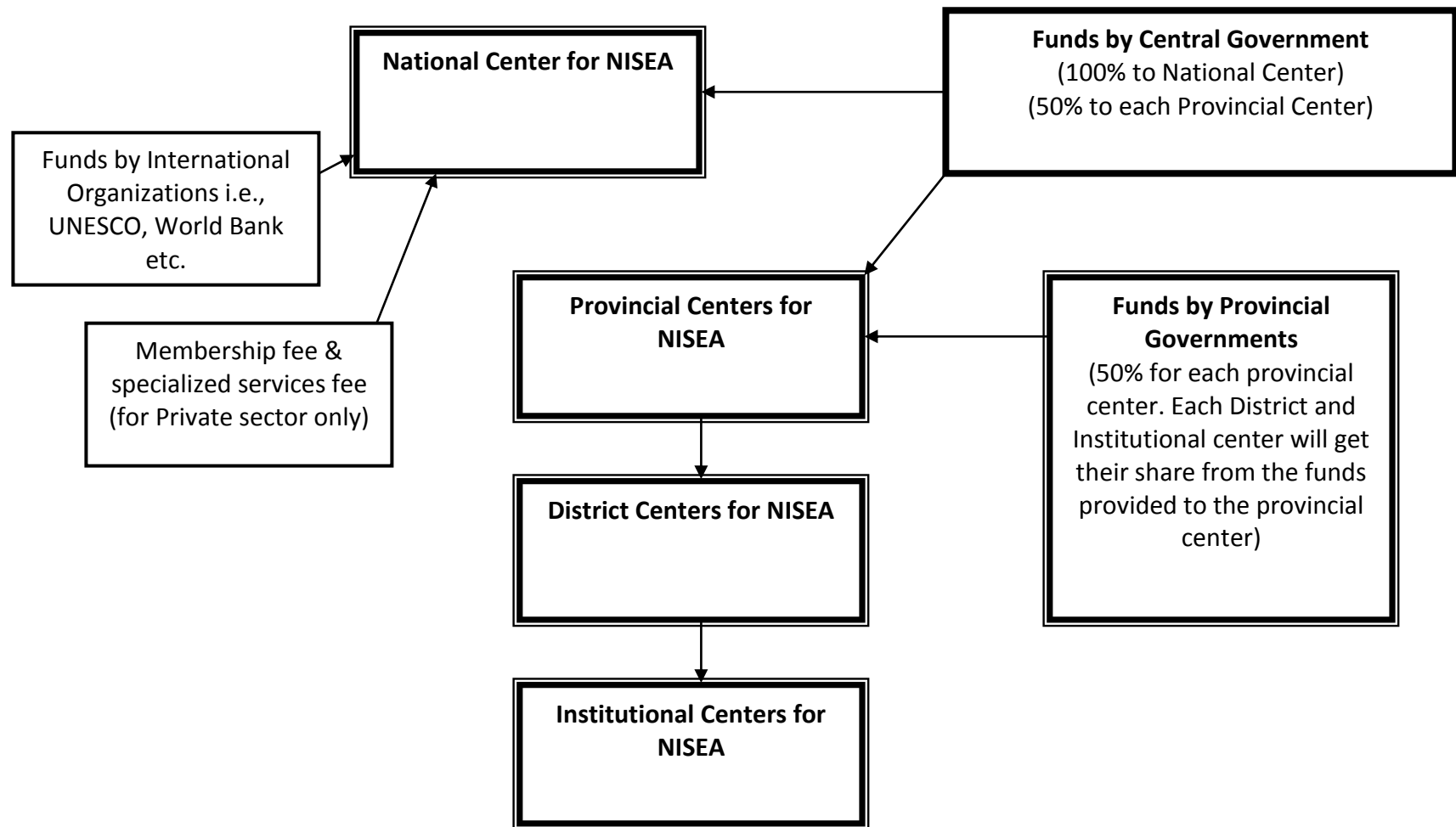
1. Bibliographic Services
2. Documentation Services
3. Indexes, abstracts, and full text resources
4. State of the Art
5. Data Services
6. Reference Services
7. Chat Reference Service
8. Reprography
9. Translation
10. Web OPAC
11. News Letter
12. Online Digital Library of Educational Resources
13. Computer Mediated Communication (List serve & Discussion group)
14. Verbal information provided by a scholarly person through email, telephone etc.
15. Intranet & portals
16. Wikis for encouraging user participation
17. SDI, CAS, TOC, Article Alerts
18. Full on-site and remote access

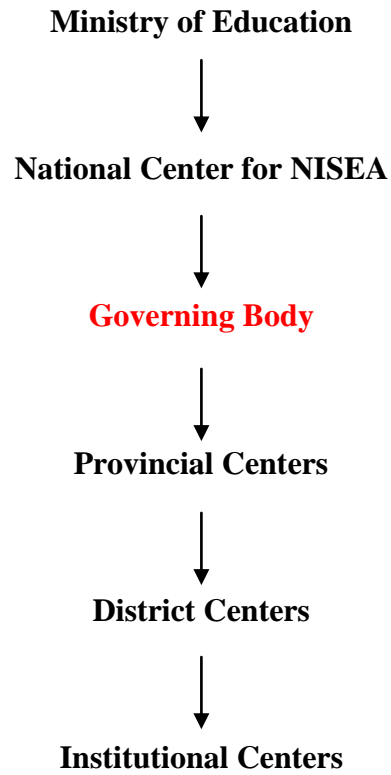
Features of Services:

1. Available information will be timely, accurate, relevant, valid and reliable
2. Adaptability, noise reduction, low cost, comprehensiveness, ease of use, and high quality will be the features of information services

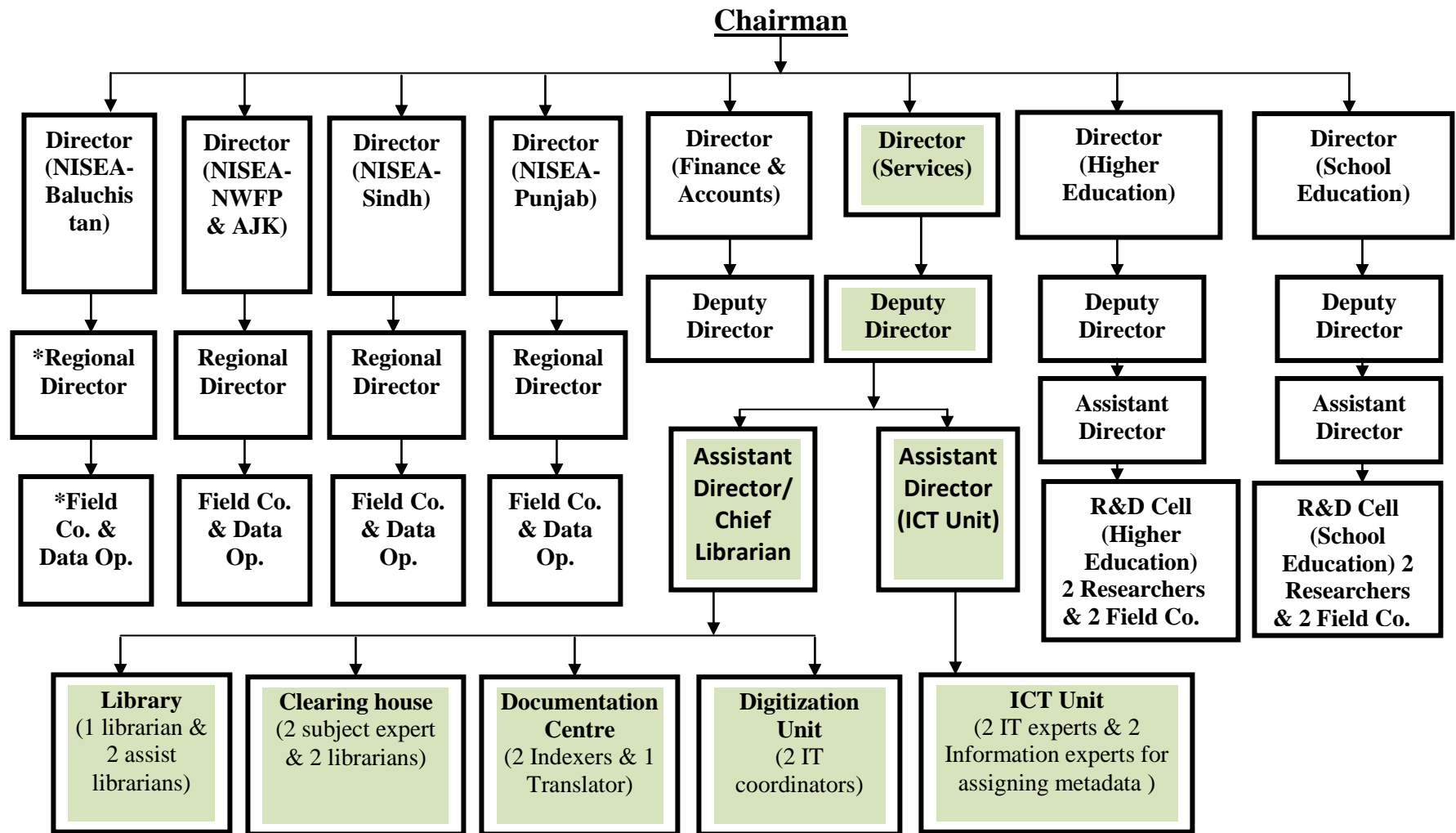
Language of NISE: Most material will be in English (On demand translations of documents will be provided in Urdu and Regional Languages (i.e., Punjabi, Sindhi, Saraiki, Pushto, Balochi etc.).

Format: The documents will be in electronic format (as most of the survey respondents favored it). Print copy can be provided on demand (with nominal charges).

Finance for NISEA

Infrastructure of Proposed National Information System for Educational Administrators (NISEA)-1

Organizational Chart of **Governing Body** of NISEA- 2

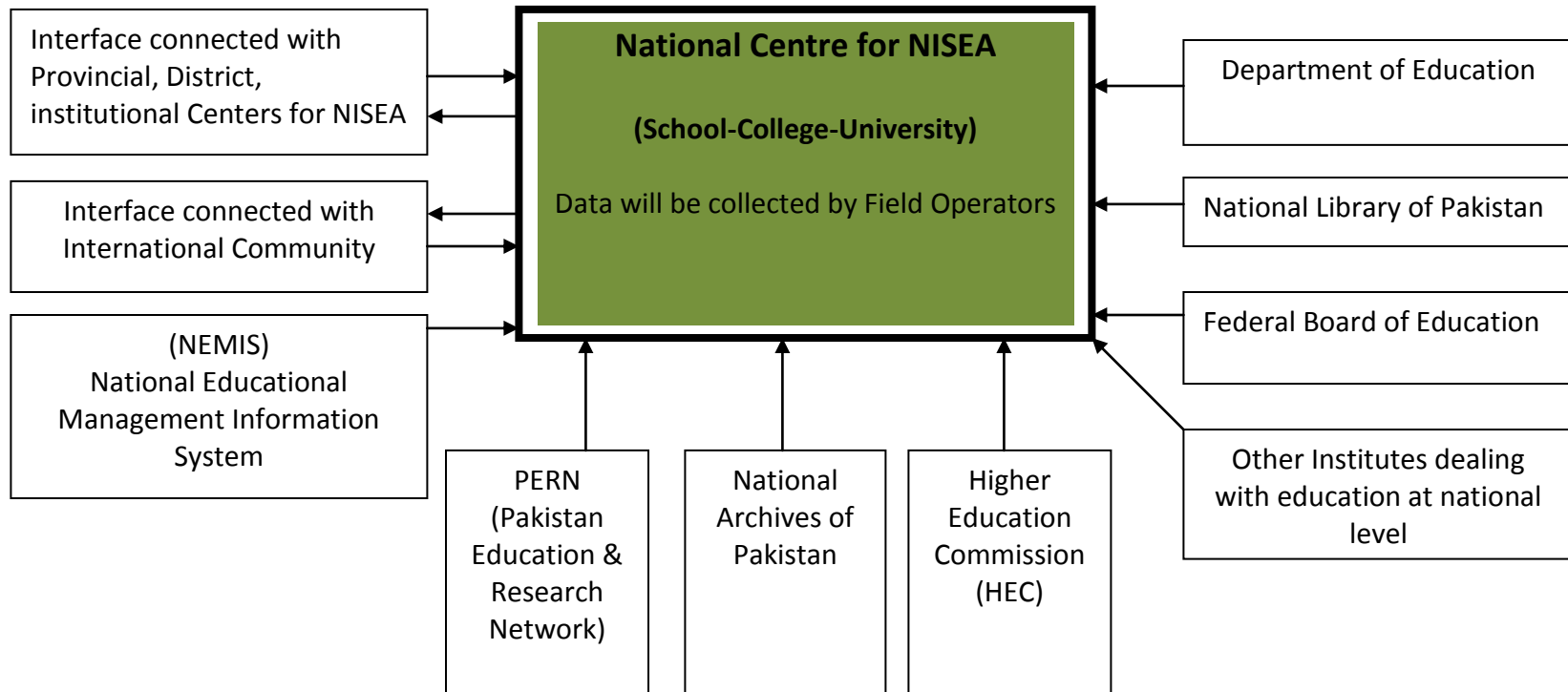


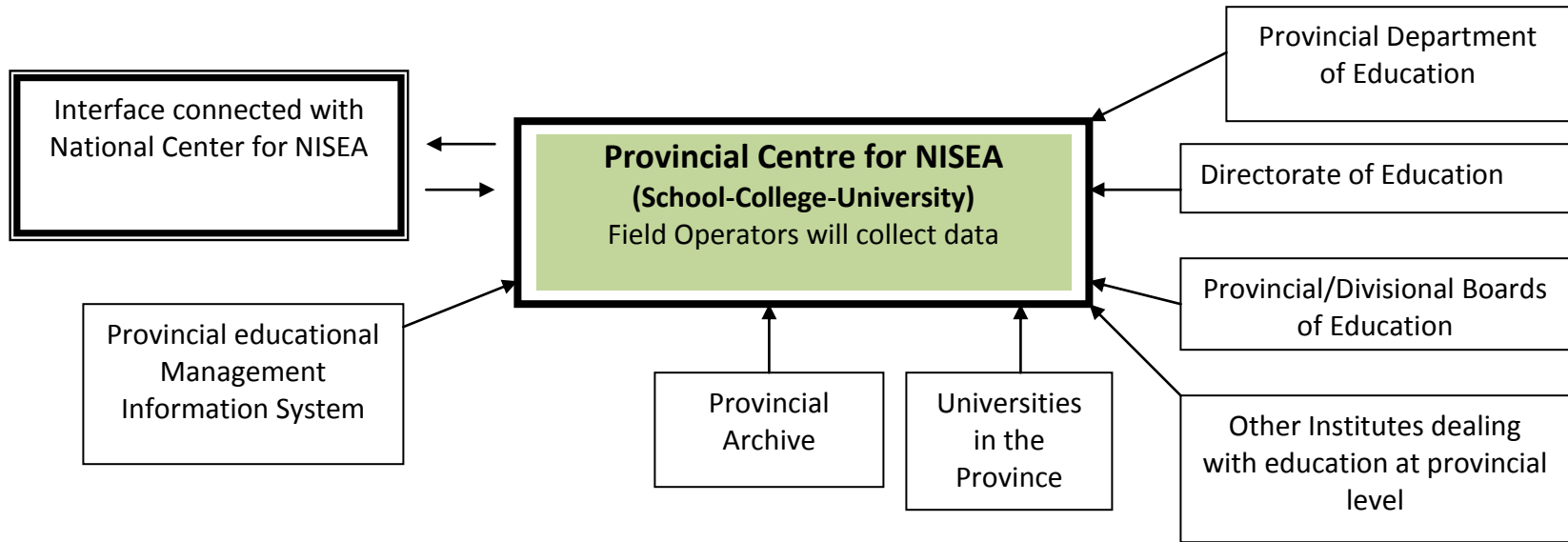
***Regional Directors**= will work in Provincial NISEA and will supervise the District NISEA as well.

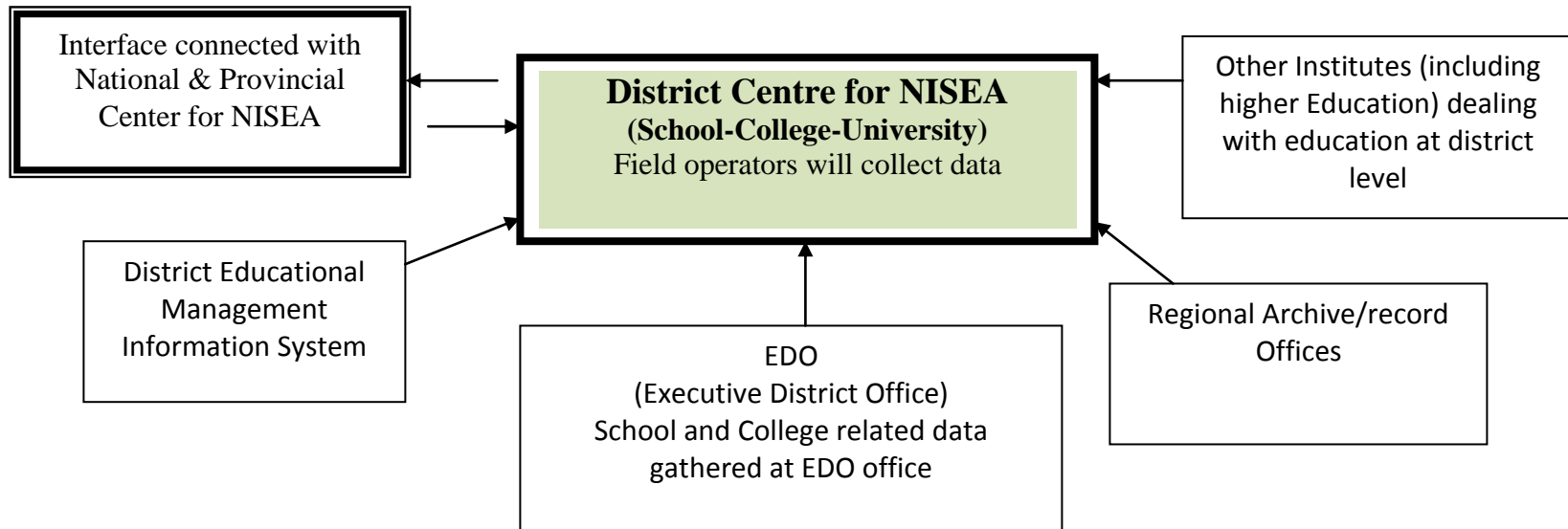
***Field Coordinators**= will work in Provincial and District NISEA and will be responsible for data collection at provincial and district level. Their number would vary according to the district population.

***Data Operators**= will work in Provincial and District NISEA for entering data into the Online central database of NISEA through Web-based environment.

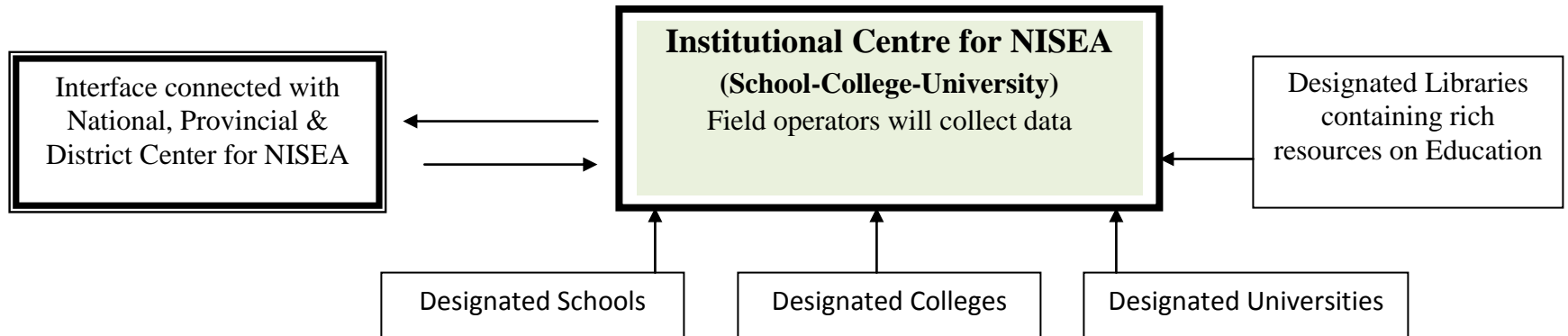
Infrastructure of Proposed National Information System for Educational Administrators (NISEA)-3



Infrastructure of Proposed National Information System for Educational Administrators (NISEA)- 4

Infrastructure of Proposed National Information System for Educational Administrators (NISEA)- 5

Infrastructure of Proposed National Information System for Educational Administrators (NISEA)- 6



Conclusion

The proposed Model is based on the literature review, questionnaire survey and interview data analysis and intends to serve as a National Information System for Educational Administrators (NISEA) in Pakistan. Thus this document aims to provide some ideas to facilitate the construction of NISEA and its development. It also intends to show that this construction is attainable.

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Appendix P

**Responses Obtained for the Study
from Schools, Colleges and Universities
of Punjab Province and Islamabad Capital Territory**

Table 3.2. Responses Acquired from Schools & Colleges of Punjab and ICT

Districts	Area (km ²)	Population (1998)	Density- people/k m ²	Tehsils (Randomly Selected)	*Target Response (School & College)	Acq. Response (School)	Acq. Response (College)
Attock	6,857	1,274,935	186	Hasan Abdal	2	2	1
Bahawalnagar	8,878	2,061,447	232	Minchinabad - Chishtian	3	3	4
Bahawalpur	24,830	2,433,091	98	BWP	3	5	6
Bhakkar	8,153	1,051,456	129	Kaloorkot	1	1	0
Chakwal	6,524	1,083,725	166	Talagang	1	1	0
D. G. Khan	11,922	1,643,118	138	D. G. Khan	2	2	2
Faisalabad	5,856	5,429,547	927	Faisalabad - Jaranwala	5	4	4
Gujranwala	3,622	3,400,940	939	Kamoke - Gujranwala	4	3	2
Gujrat	3,192	2,048,008	642	Gujrat	3	3	2
Hafizabad	2,367	832,980	352	Hafizabad	1	1	2
Jhang	8,809	2,834,545	322	Jhang - Shorkot	3	4	5
Jhelum	3,587	936,957	261	Sohawa	1	0	0
Kasur	3,995	2,375,875	595	Kasur	3	4	6
Khanewal	4,349	2,068,490	476	Jahanian	3	3	3
Khushab	6,511	905,711	139	Nurpur	1	1	0
Lahore	1,772	6,318,745	3,566	Gulberg – Shalimar & Ravi Towns	10	12	11
Layyah	6,291	1,120,951	178	Layyah	2	1	2
Lodhran	2,778	1,171,800	422	Lodhran	2	3	3
Mandi B.	2,673	1,160,552	434	Phalia	2	2	1
Mianwali	5,840	1,056,620	181	Mianwali	1	2	2
Multan	3,720	3,116,851	838	Multan Cant - Multan Sadar	4	5	6
Muzaffargarh	8,249	2,635,903	320	Muzaffargarh	3	4	3
Narowal	2,337	1,265,097	541	Shakargarh	2	1	0
Nankana S.*	-	-	-	Shahkot	1	0	0
Okara	4,377	2,232,992	510	Okara	3	2	2
Pakpattan	2,724	1,286,680	472	Arifwala	2	1	1
Rahim Y. K.	11,880	3,141,053	264	Khanpur- Rahim Y. K.	4	4	5
Rajanpur	12,319	1,103,618	90	Rojhan	2	2	2
Rawalpindi	5,286	3,363,911	636	Rawalpindi - Taxila	4	3	3

Table 3.2.(continued)

Sahiwal	3,201	1,843,194	576	Sahiwal	2	3	4
Sargodha	5,854	2,665,979	455	Sargodha	3	3	4
Sheikhupura	5,960	3,321,029	557	Muridke - Ferozewala	4	2	1
Sialkot	3,016	2,723,481	903	Sialkot	3	2	4
Toba T. Singh	3,252	1,621,593	499	T. T. Singh	2	1	1
Vehari	4,364	2,090,416	479	Vehari	3	2	3
Punjab	205,345	73,621,290	359	45 tehsils	95*2	92	95
ICT	906	805,235	889	Islamabad	5*2	5	4
Total	206,251	74,426,525	1248	46	200	97	99

Note: a) Districts marked with * were recently created and no data are available yet; b)*Target Response (School & College): minimum response targeted from each school and college according to their population size, though questionnaires distributed in each district were double from the targeted response.

Table 3.3. Responses Acquired from Universities of Punjab and ICT

Sr	Public Sector Universities in Punjab	Minimum Targeted Response	Acquired Response
1.	Bahauddin Zakariya University, Multan	7	7
2.	Fatima Jinnah Women University, Rawalpindi	1	0
3.	*Government College University, Lahore	3	4*
4.	*Government College University, Faisalabad	1	2*
5.	*The Islamia University of Bahawalpur, Bahawalpur	7	10*
6.	*Kinnaird College for Women, Lahore	3	2
7.	King Edward Medical College (university), Lahore	1	1
8.	*Lahore College for Women University, Lahore	3	4*

Table 3.3. (continued)

9.	National College of Arts, Lahore	1	1
10.	National Textile University, Faisalabad	1	1
11.	University of Agriculture, Faisalabad	1	1
12.	University of Arid Agriculture, Rawalpindi	2	1
13.	University of Education, Lahore	3	4*
14.	University of Engineering and Technology, Lahore, Faisalabad	4	5*
15.	University of Engineering and Technology, Taxila	1	1
16.	University of Health Sciences, Lahore	1	1
17.	*University of Gujrat, Gujrat	3	3
18.	*University of the Punjab, Lahore	11	10
19.	*University of Sargodha, Sargodha	3	4*
20.	University of Veterinary and Animal Sciences, Lahore	1	1
21.	Virtual University of Pakistan, Lahore	3	1
Total		61	64

Table 3.3. (continued)			
Public Sector Universities in ICT		Min. Targeted Response	Acquired Response
22.	National Defense University, Islamabad	1	1
23.	Virtual University of Pakistan, Islamabad	1	0
24.	National University of Science and Technology, Rawalpindi	3	4
25.	*Quaid-e-Azam University, Islamabad	6	5
26.	Pakistan Institute of Development Economics, Islamabad	1	0
27.	Pakistan Institute of Engineering & Applied Sciences, Islamabad	1	1
28.	National University of Modern Languages, Islamabad	1	1
29.	*International Islamic University, Islamabad	6	7*
30.	Institute of Space Technology (IST), Islamabad	3	2
31.	Federal Urdu University of Arts, Science and Technology, Islamabad and Karachi	1	0
32.	COMSATS Institute of Information Technology, Islamabad	3	1
33.	Bahria University, Islamabad	3	3
34.	*Allama Iqbal Open University, Islamabad	6	7*
35.	Air University, Islamabad	3	5*
Total		39	37
Total Response from Punjab Province & ICT		100	101

Note: a)*Extra questionnaires were distributed than the simple targets. Due to personal contact by the researcher, assistants and library professional colleagues, response exceeded from the target and are marked with *, b) General and larger universities were given more response target and are marked with*.

Appendix Q

**List of Experts Who Helped in the Selection of
Interview Sample
&
Experts for the Assessment of Initial Draft of
PAKNISEA**

List of Experts Who Helped in the Selection of Interview Sample &**Experts for the Assessment of Initial Draft of PAKNISEA****1. Abdul Hameed, Phd**

Professor & Director
School of Professional Advancement
University of Management and Technology, Lahore

2. Ajmal Khan

Chief Librarian
National University

3. Ch. Ghulam Rasool Akhtar

DEO (R)- Secondary Education, Bahawalpur

4. Inamul Haq Kousar, PhD

Ex Director General Federal Board of Pakistan

5. Khalid Mahmood, PhD

Prof. Department of Library and Information Science
University of the Punjab, Lahore

6. Parveen Iqbal

District Education Officer (DEO, W-EE), Lahore City

7. Mushahid Anwar, Phd

Chairman
Department of Geography
The Islamia University of Bahawalpur

8. Salman Shakeel

Software Engineer
Techlogix, Lahore

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