CHAPTER 3

RESEARCH DESIGN, INSTRUMENTATION AND PROCEDURES

3.1 Introduction

This study used a combination of quantitative and qualitative research methodologies to obtain evidence on the integration of the Internet in teacher education in the Klang Valley as well as to examine the attitudes of teacher trainers towards Internet innovation in their teaching by ascertaining their stages of concerns. It also investigated the competency levels of teacher trainers in Internet use and the types of gratification that they derive from the use of the Internet.

It also sought to discover whether personal attributes in terms of educational background, teaching, computer and Internet experience, self-perceived competency levels in Internet use, attitudes towards the adoption of Internet innovation and gratifications derived from utilizing the Internet have significant influences on the instructional integration of the Internet.

The study also identified the teacher trainers who are early and late adopters so as to differentiate those who are already integrating the Internet in the instructional process. It also investigated how the early and late adopters are utilizing the Internet for personal use, professional communications and teacher-directed student use in classroom instruction as well as in extra-curricular activities. Finally, it investigated the perceived problems and needs of teacher trainers in utilizing this technology for their teaching and learning purposes.

3.2 Research Design

There is a growing consensus among evaluation experts that both qualitative and quantitative methods have a place in the performance of effective research (Patton, 1990). Patton (1990) advocates that in the investigation of human behavior and attitudes, it is most fruitful to use a variety of data collection methods. Thus, by using different sources of methods at various points in the research process, the researcher attempted to build on the strengths of each type of data collection method to minimize the weaknesses of any single method.

According to Grendall *et al* (1996), the benefits of using mixed methodologies is that the use of these methods enhances the value of scientific investigation as each can extend the usefulness to both practicing educators and theoretical or basic researchers. The second advantage is that each method can build upon the strengths of the other.

The design of this study can be categorized as mixed-method research design using both quantitative and qualitative data analyses. Green *et al* (1989) highlighted complementarity as one of the main advantages of mixed-method research design. This group of researchers stated that complementarity means that results from qualitative analyses are used to help clarify and illustrate results from the quantitative analyses. In addition, mixed-method research design provides richness and detail to the study by exploring specific features of each method. Integration of quantitative and qualitative procedures mentioned above will expand the breadth of the study. A research strategy integrating different methods is also likely to produce better results in terms of quality and scope (Birbili, 2000).

Rogers (1995) also encourages the mixed-method research design as appropriate for studying the theory of diffusion of innovations. Thus, a mixed-method research design which used the quantitative methodology (selected response survey items) coupled with qualitative methodologies (open-ended questionnaires and semi-

structured interviews) were selected for the purpose of investigating the differences between teacher trainers who readily adopted the Internet in the teacher-training curriculum and those who did not.

In this study, the open-ended questionnaires and interviews added information about the learning process via the Internet and helped to justify the scores and statistics in the quantitative analysis. The in-depth interviews with teacher educators also provided new insights as to how they are utilizing the Internet and its applications in the teacher-training curriculum.

3.3 Sampling

This study was carried out in all the five teacher training colleges in the Klang Valley. The colleges come under the Teacher Training Division of the Ministry of Education, which supervises the major courses such as the pre-service teacher courses like the KDPM (Diploma Course of Teaching in Malaysia) and in-service teacher courses for graduates such as the KPLI (Teaching Course for Graduates), PKPG (Special Twinning Program for Graduate Teachers) and the KSPK (Graduate Teaching Program for Special Education) and other minor courses.

According to Hinkle *et al*, (1985) small populations require responses from substantial proportions of their membership to generate the same accuracy that a much smaller proportion will yield for a larger population. For example, a random sample of 132 is required for a population of 200 to achieve the same accuracy that a random sample of 384 will provide for a population of one million. In cases, such as the former, it usually makes more sense to poll the entire population than to sample. Likewise, since the sample in this study consisted of a small population of sixty-five education lecturers, the researcher decided to poll the entire population as the sample of the study.

All the teacher trainers from the education departments in each of the selected teacher training colleges were used to determine the sample subjects selected for the

study. This is to avoid the mediating effects of other disciplines offered in the teacher-training curriculum towards the integration of the Internet in the instructional process.

At the time of the administration of the instruments, the target sample for this study included 65 education lecturers. However, initial investigations by the researcher revealed that only 55 of the education lecturers had started utilizing the Internet while the other 10 had yet to do so. Consequently, the 10 education lecturers were excluded from the study.

For the qualitative part of the study, 14 early adopters and 41 late adopters were identified from the 55 education lecturers in the study. Consequently, all the 14 early adopters were interviewed. However, only 14 out of the 41 late adopters were chosen by random sampling for the interview because of cost and time constraints in carrying out the interviews. Patton (1990) also states that in-depth interviews are both expensive and time-consuming. Thus, a total of 28 education lecturers (14 early and 14 late adopters) were interviewed for the qualitative part of the study.

3.4 Design of Instruments

In order to gather data on the incorporation of the Internet in the teacher training colleges in the Klang Valley, five questionnaires and an interview schedule were developed. The preparation of the instruments involved the following stages:

i. Preliminary study of related journals and websites for quantitative and qualitative instruments relevant to the study

ii. Advice from a panel of experts

iii. Translation of quantitative and qualitative instruments into the Malay Language

iv. Pilot study of quantitative instruments

i) Preliminary Study of Related Journals and Websites for Quantitative and Qualitative Instruments Relevant to the Study

Since this is a relatively new field, there were not many studies that had been carried out on the integration of the Internet in the sector of teacher education in Malaysia. Thus, relevant journals and websites were reviewed to find some of the instruments used in the study. The researcher then adopted and modified the quantitative and qualitative instruments that were found in the various journals and websites to suit the purposes of this study.

(ii) Advice from a Panel of Experts

At the same time, advice from a panel of three experts in the field of IT (see Appendix B for the panel) was sought to ascertain the appropriateness of the items in the four quantitative Internet questionnaires namely, Stages of Concern Instrument (SOCI), Gratifications derived from Utilizing the Internet Questionnaire (GUIQ), Internet Integration Checklist (IIC) and Self-Evaluation of Internet Competency Checklist (SICC).

The findings of the preliminary study revealed that some items were not suitable and some terms and words were difficult to understand. For example, the line "I can do all of the above" in one of the categories of the SICC instrument was rather misleading and the panel of experts suggested that it should be taken out.

In addition, the Internet skills in the SICC were all grouped into four categories, namely; unaware, aware, mastery and advanced. Each category comprised more than one Internet skill and the panel of experts raised the issue of respondents having difficulty in choosing the right categories of self-perceived Internet skills.

Consequently, specific Internet skills relevant to the teacher trainers were identified and itemized to ensure that no double measuring occurred in the SICC items. The panel of experts also found items 7, 11 13, 15, 18, 25 26, 28, and 32 in the SOCI

instrument obscure. Thus, modifications were made to make sure there was clarity of these specific items in the SOCI.

Moreover, the panel of experts also asked for certain formats of the GUIQ, SICC and IIC to be revised. Based on the feedback, all the items were restructured and itemized accordingly to the appropriate Likert Scales. The panel of experts suggested that this would also ensure a more accurate data analysis. Consequently, the necessary corrections and changes were made.

(iii) Translation of Quantitative and Qualitative Instruments

After the quantitative questionnaires were modified, they were then translated into Bahasa Malaysia. The problem of equivalence in the translation of the instruments that were developed in one culture and used in another (Secherest, Fay and Zaidi, 1972) was noted. As such, the translation of the instrument in the study followed procedures that were recommended by Hulin, Dragsow and Parsons (1983).

A language expert who is proficient in both English and Bahasa Malaysia first translated all the quantitative and qualitative questionnaires into Bahasa Malaysia. Another competent language teacher then translated the questionnaires back from Bahasa Malaysia into English. A third language teacher then compared the translated English questionnaire with the original English version.

Thus, this method was used in the translation of the quantitative instruments in the study. According to Birbili (2000), the important techniques for eliminating translation related problems include back translation as well as consultation and collaboration with other people during the translation process.

In the interview section of the study, there was also the problem with translation as the interviews were conducted in both languages because the researcher and the participants were bilingual. Consequently, the interviewers code-switched between the two languages. A similar problem was also reported in the study of Rosman and Rallis

(1998) who advocated that researchers needed to be explicit in describing their choices and decisions in translation procedures used in translating data from one language to another.

It is important to carry out these procedures as words, which exist in one language but not in another, and concepts that are not equivalent in different cultures, have to be noted in the translation process. Moreover, differences among languages in grammatical and syntactical structures are also issues that call for very specific decisions in the translation process. These decisions are important as they have a direct impact on the quality of the findings of the research and resulting reports (Birbili, 2000).

iv) Pilot Study of Quantitative Instruments

Another way of eliminating translation-related problems is to pilot test the translated research instruments in the local culture. According to Warwick and Osherson, (1973) in a pilot study, it is particularly important to ask respondents not only for their answers but also for the interpretation of the meaning of items that are not clear to them.

Thus, a pilot test was carried out in the months of June and July 1999 to establish the reliability and validity of the SOCI, GUIQ SICC and IIC, which were adopted and modified for the Malaysian samples. The purpose of the pilot study was to find out the relevance of the items in these questionnaires.

The preliminary study of the quantitative questionnaires was conducted in three teacher training colleges outside of the Klang Valley that had high Internet accessibility. The pilot study was conducted in three teacher training colleges in the north, south and middle zones of Peninsular Malaysia.

A total of 40 respondents were selected. They consisted of all the education lecturers who were present at the time of the administration of the surveys in all of the three teacher training colleges (Table 3.1).

Table 3.1
Representation of Education Lecturers from Three Main Zones in
Peninsular Malaysia in the Pilot Study

Zone	State	Teacher-Training College	Number of Education Lecturers	Percentage
North	Kedah	Institut Perguruan Darul Aman (IPDA)	16	40.0
Central	Melaka	Maktab Perempuan Melayu Melaka (MPPM)	12	30.0
South	Johor	Maktab Pergururuan Temenggung Ibrahim (MPTI)	12	30.0
		Total	40	100.0

Table 3.2 shows the gender and age of the respondents in the pilot study. The data in Table 3.2 shows that there were more male (52.5%) than female (47.5%) respondents in the pilot study. However, in the real study, there were more females than males. About half of the respondents in the pilot study were in the 46-55 age group while the remaining respondents were in the 36-45 age group. However, there were no respondents in the 30-35 age group. It can be seen from the data that the education lecturers in the pilot study consisted predominantly of senior lecturers.

Table 3.2
Gender and Age of Respondents in the Pilot Study
(N=40)

Characteristics	Frequency	Percentage
Gender of Teacher Trainers		
Male	21	52.5
Female	19	47.5
Age of Teacher-Trainers (years)		
30-35	0	0.0
36-40	9	22.5
41-45	11	27.5
46-50	18	45.0
51-55	2	5.0

The respondents in the pilot study were also asked to comment on the clarity of the items in the questionnaires as well as to point out the items that were not clear or obscure. They were also asked to offer suggestions to make these particular items clear.

Based on the feedback received from the teacher trainers, appropriate changes were made to some of the translated items in the four quantitative instruments in the study.

3.5 Instrumentation

For the purpose of gathering data for this study, six instruments were administered to the teacher trainers. They are the Stages of Concern towards Internet Instrument (SOCI, 1997, Appendix C), Gratifications Derived from Utilizing the Internet Questionnaire (GUIQ, 1997, Appendix D), Internet Integration Checklist (IIC,

1999, Appendix E), Self-Evaluation of Internet Competency Checklist, (SICC, 1995, Appendix F) and Internet Use Questionnaire (IUQ, 1998, Appendix G) and Semi-structured Interview Schedule (SIS, 1998, Appendix H). These instruments were sourced from the following journals and websites:

1) Stages of Concerns Instrument (SOCI) adapted from Wells and Anderson in the Journal of Research on Computing in Education, Volume 30, No. 1, Fall 1997.

2) Self-Perceived Internet Competency Checklist (SICC) adapted from Johnson's Mankato Rubrics (1997). These rubrics have also appeared in the Teacher Librarian: Journal of School for Library Professionals, February, 1995. The researcher contacted Johnson at the following e-mail address: johnsd@mail.mankato.msus.edu> to get permission to use the *self-evaluation* Mankato Rubrics for Teacher Internet Use.

3) Gratifications derived from Utilizing the Internet Questionnaire (GUIQ) adapted from Anderson and Harris in the Journal of Education Technology and Research Development, Volume 45, No. 1, 1997. The researcher contacted Anderson via e-mail to get a copy of the survey at the following address: Sue Anderson<sanderson@gamma.is.tcu.edu>. This instrument is also available at the following website: (http://gamma.is.tcu.edu/~Sanderson/tenet.study.html).

4) Internet Integration Checklist (IIC) adapted from Norris and Solloway's SnapShot Survey via e-mail (1998). The researcher contacted Norris at the following e-mail address: Norris@tac.coe.unt.edu to get permission to use the instrument, and also to enquire details about the reliability of this instrument. The researcher then adapted this instrument to form the IIC. The original Snapshot Survey is currently available at the following web site: (http://www.tcet. unt.edu /START/profdev/stages.htm).

5)   Internet Use Questionnaire (IUQ) and Semi-structured Interview Schedule (SIS) were adapted from Becker and Anderson's (1998) study. This survey is available at the following website: (http:// www.crtio.uci.edu/TLC/FINDINGS/internet-use).

3.5.1 Stages of Concern towards Internet Instrument (SOCI) (Appendix C)

The Stages of Concern towards Internet instrument was adapted from Anderson and Wells' Stages of Concern Instrument towards Internet Innovation (1997). Anderson and Wells' instrument is in fact an adaptation of the original Stages of Concern Instrument for Innovations, which was developed by Hall George, and Rutherford (1977).

The Stages of Concern Instrument by Hall *et al.* (1977) is used frequently to measure changes in attitudes over a period of time in the adoption of a new innovation. The first four stages in the instrument (awareness, informational, personal, management) are related to the learner's perceptions of the innovation as they relate to the internal focus and the last three stages (consequence, collaboration, refocusing) are linked to the learner's perceptions of the innovation as they relate to the external focus.

In the adapted instrument (SOCI), there are seven stages of concern that a potential adopter of Internet innovation might go through. The stages of concern are explained below:

(a) Awareness Stage

The first stage is awareness of Internet innovation and it addresses the extent to which an individual is cognizant in the innovation. According to Anderson and Wells (1997), at this stage, there is little concern about or involvement with the new innovation.

(b) Informational Stage

The second stage is the informational stage. Anderson and Wells (1997) state that this stage addresses the desire of the individual to learn more about Internet innovation. A general awareness of the innovation and interest in learning more details about the innovation are also indicated.

The individual does not seem to be worried about himself or herself in relation to the innovation. He or she is interested in the substantive aspect of the innovation in a selfless manner such as general characteristics, effects and requirement for usage.

(c) Personal Stage

The third stage is the personal stage, alluding to how the individual perceives Internet innovation and its direct effects on himself/herself. At this stage, the individual focuses his/her attention on the processes and tasks of using the innovation for information and resources.

(d) Management Stage

The management stage focuses on the time constraints imposed on individuals when they utilize Internet innovation. The individual's concerns are closely related to issues such as efficiency, organizing, managing, scheduling and time demands of the innovation.

(e) Consequence Stage

The fifth stage is the consequence stage, which addresses perceived impacts of Internet innovation on the individual. At this stage, attention is focused on the impact of the innovation on an individual's immediate sphere of influence. The focus is on the relevance of the innovation for students; evaluation of student outcomes, including performance competencies and changes needed to increase student outcomes.

(f) Collaboration Stage

The sixth stage is the collaboration stage and provides an indication of the individual's comfort or acceptance of Internet innovation to the extent to which he or she can place his or her attention on broadening its utility. At this stage, the focus is on coordination and cooperation with others regarding the usage of the innovation.

(g) Refocusing Stage

According to Anderson and Wells (1997), at this stage, the focus of the individual is more on the exploration of universal benefits of Internet innovation. The individual also considers the possibility of major changes or replacement with a more powerful alternative. In addition, the individual has definite ideas about alternatives to the proposed or existing form of the innovation.

The items in the SOCI questionnaire are divided into seven stages of concern. Specific items in the questionnaire represent specific stages of concern. They are outlined in Table 3.3. The researcher also revised the instrument and several statements were modified to suit the purpose of the study. For the statements that were worded negatively, they were scored in reverse order on the seven point Likert Scale in the instrument.

Table 3.3
Items in the SOCI and Corresponding
Stages of Concern (Anderson & Wells, 1997)

Items in the SOCI	Stages of Concern
Items 3, 12, 21, 23, 30	Stage 0 (Awareness)
Items 6, 14, 15, 26, 35	Stage 1 (Informational)
Items 7, 13, 17, 28, 33	Stage 2 (Personal)
Items 4, 8, 16, 25, 34	Stage 3 (Management)
Items 1, 11, 19, 24, 32	Stage 4 (Consequence)
Items 5, 10, 18, 27, 29	Stage 5 (Collaboration)
Items 2, 9, 20, 22, 31	Stage 6 (Refocusing)

Respondents marked their answers on a seven-point Likert scale ranging from "not true at all" to "very true of me now." The mean scores for each of the seven stages of concern were computed and these scores were then interpreted by comparing them to the corresponding mean scores for the stages of concern scores obtained in Anderson and Wells (1997) research.

The sum of the five items for each category provides an indication of a subject's concern towards adopting Internet innovation. A maximum score of 35 points would indicate a very strong concern towards a specific stage in the adoption of Internet innovation and a minimum score of zero points would indicate otherwise. A mid-point score of 17.5, which is derived from half of the maximum score of 35 points, would reflect a neutral response towards a stage of concern.

A total of 35 statements listed under the SOCI were given to the lecturers. The respondents had to state whether they felt "Not true of me now", "Somewhat true of me now", "Very true of me now" with the statements. From their statements, the scores were calculated. Based on the range of the scores, seven mean scores were calculated to form the seven levels of concern as shown in Table 3.4.

The ranges of scores were divided into low, medium and high scores for comparison purposes. A score of 0 - 11.7 would indicate a low score towards the concern, a score of 11.71 - 23.4 would indicate a medium score and a score of 23.41 - 35.1 would indicate a high score towards the particular stage of concern.

Table 3.4
Interpretation of Concern Scores Based on Means

Items in SOCI	Scores	Types of Concerns	Range of Scores	Levels for Each Concern
3, 12, 21, 23, 30	0-35	Awareness	0 - 11.7	Low
			11.71 - 23.4	Medium
			23.41 - 35.1	High
6, 14, 15, 26, 35	0-35	Informational	0 - 11.7	Low
			11.71 - 23.4	Medium
			23.41 - 35.1	High
7, 13, 17, 28, 33	0-35	Personal	0 - 11.7	Low
			11.71 - 23.4	Medium
			23.41 - 35.1	High
4, 8, 16, 25, 34	0-35	Management	0 - 11.7	Low
			11.71 - 23.4	Medium
			23.41 - 35.1	High
	0-140	Internal Concerns	0 - 46.7	Low
			46.71 - 93.4	Medium
			93.41 - 140.1	High
1, 11, 19, 24, 32	0-35	Consequence	0 - 11.7	Low
			11.71 - 23.4	Medium
			23.41 - 35.1	High
5, 10, 18, 27, 29	0-35	Collaboration	0 - 11.7	Low
			11.71 - 23.4	Medium
			23.41 - 35.1	High
2, 9, 20, 22, 31	0-35	Refocusing	0 - 11.7	Low
			11.71 - 23.4	Medium
			23.41 - 35.1	High
	0-105	External Concerns	0 - 35	Low
			35.01 - 70.0	Medium
			70.01 - 105.1	High

3.5.1.1 Validity and Reliability of the SOCI

According to Anderson and Wells (1997), Hall, George and Rutherford (1997) developed the 35-item stages of concern instrument to measure the evolving attitudes of learners exposed to an innovation. In the original instrument, the variable word is

'innovation.' Hall *et al* (1997) suggested that other researchers might substitute this word with any other variable, which is a new innovation in their organization.

Hence, Anderson and Wells (1997) in their study adapted this original instrument to study the stages of concern towards the adoption of Internet innovation. They reported their instrument to be reliable with an alpha coefficient of 0.91.

The researcher also used the Cronbach alpha method to determine the reliability of the instrument. Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the underlying construct (Hatcher, 1994; Santos, 1999). The purpose of this test is to determine error variance and confirm whether true scores are assessed; a coefficient value closer to 1.0 shows that all the items in the construct measure the same thing and as such, the items in the instrument are said to have a high reliability (Nunnaly, 1978).

Table 3.5 shows all the items that constituted the factor of attitudes towards Internet innovation.

Table 3.5
Reliability Item Index for Each Item if Item Deleted and Standardized Item Alpha for
the Modified SOCI

Items	Alpha if item deleted	Standardized Item Alpha
Stage 0		
Item 3	0.8050	
Item 12	0.8402	0.8529
Item 21	0.8274	
Item 23	0.8294	
Item 30	0.8104	
Stage 1		
Item 6	0.8129	
Item 14	0.7496	0.8040
Item 15	0.7622	
Item 26	0.7547	
Item 35	0.7340	
Stage 2		
Item 7	0.7879	
Item 13	0.7950	0.8102
Item 17	0.7611	
Item 28	0.7727	
Item 33	0.7488	
Stage 3		
Item 4	0.8848	
Item 8	0.7743	0.8285
Item 16	0.7900	
Item 25	0.7824	
Item 34	0.7701	
Stage 4		
Item 1	0.8512	
Item 11	0.8551	0.8481
Item 19	0.7826	
Item 24	0.8072	
Item 32	0.7903	
Stage 5		
Item 5	0.8657	
Item 10	0.7157	0.8263
Item 18	0.7740	
Item 27	0.7859	
Item 29	0.8006	
Stage 6		
Item 2	0.8823	
Item 9	0.8066	0.8583
Item 20	0.8119	
Item 22	0.8040	
Item 31	0.8424	

Alpha coefficient ranges in values from 0 to 1 and may be used to describe the

reliability of factors extracted from multi-point formatted questionnaires and scales (i.e.

rating scale: strongly disagree, strongly agree). The higher the scores, the more reliable the generated scale is. Nunnaly (1978) has indicated 0.7 to be an acceptable reliability coefficient, but lower thresholds are sometimes used in related literature.

The standardized alpha of all the stages of concerns is above 0.8, indicating there is high reliability in the modified SOCI. The values of alpha if each item is deleted when compared to the standardized alpha shows that all items have high reliability and are consistent.

3.5.2 Gratifications Derived from Utilizing the Internet Questionnaire (GUIQ) (Appendix D)

The GUIQ was adapted from the original Educational Telecomputing Systems Questionnaire (ETSQ) developed by Anderson and Harris (1997). The original version consisted of a 70-item electronic mail survey, which measured five categories of variables: personal attributes, environmental characteristics, perceived media characteristics, usage and gratification outcomes. It was designed to identify factors that best predict the amount and perceived benefits of network use.

The GUIQ was adapted from a section of the original Educational Telecomputing Systems Questionnaire (ETSQ). According to Anderson and Harris (1997), the selection and categorization of variables in the ETSQ were guided by several theoretical perspectives (Dutton *et al.,* 1985; Katz *et al.,* 1974; Rogers, 1986; 1995) and previous studies (Anderson, 1992; Honey and Henriquez, 1993; Steinfield, 1986; Swift, 1989), which had identified them as being important to understand the usage of telecomputing network systems. Whenever possible, survey questions were also based on items that had been used in previous studies (Anderson, 1992; Culnan, 1984; Frazier and Frazier, 1993; Garramone, Haris & Anderson, 1986; Hiltz and Johnson, 1989; Honey and Henriquez, 1993; Marshall, 1987; Rafaeku, 1986; Steinfield, 1986; Swift, 1989).

The items in the instrument and the selection of the variables were also based on a model for studying personal computing development by Dutton, Kovaric and Steinfied (1985) which, in turn, was based on the diffusions of innovations (Rogers, 1986, 1995) and uses and gratification theory (Katz, Blumler & Gurevitch, 1974).

The uses and gratification theory examines how individuals used the media to satisfy their needs and achieve their goals (Katz *et al.,* 1974). The extent of communication with other adopters after implementation has been associated with the extent to which users reported positive gratification by using a computer system (Williams, Rice & Rogers, 1988).

There are fifteen items in the GUIQ, five items in each type of gratification, namely Personal, Professional and Instructional that measure the benefits that educators derive from their use of the Internet. Each item asks respondents to indicate the degree to which they agree with statements describing various outcomes of Internet use by selecting from a five-point Likert Scale ranging from "strongly agree" to " strongly disagree".

The ranges of scores for each of the three gratification types were divided into low, medium and high scores for comparison purposes. A score of 5 - 11.7 would indicate low gratification derived from the use of the Internet, a score of 11.71 - 18.4 would indicate medium gratification derived from Internet use, and a score of 18.41 - 25.1 would indicate high gratification derived from the use of the Internet as shown in Table 3.6.

Table 3.6
Interpretation of Gratification Scores Based on Mean Scores

Items in GUIQ	Scores	Types of Gratification	Range of Scores	Levels of Gratification
1-5	5-25	Professional	5 - 11.7	Low
			11.71 - 18.4	Medium
			18.41 - 25.1	High
6-10	5-25	Personal	5 - 11.7	Low
			11.71 - 18.4	Medium
			18.41 - 25.1	High
11-15	5-25	Instructional	5 - 11.7	Low
			11.7 - 18.4	Medium
			18.41- 25.1	High

3.5.2.1 Validity and Reliability of the GUIQ

According to Anderson and Harris (1997), the ETSQ developed and tested in their study measured a wide range of variables that were important in understanding the usage of computer-mediated communication systems. Anderson and Harris (1997) also carried out internal consistency testing to confirm the appropriateness of the items in the ETSQ instrument. The Alpha coefficients ranged from 0.65 to 0.92.

Table 3.7 shows descriptive statistics and reliability coefficients for the gratification variable in the ETSQ that were found by Anderson and Harris (1997).

Table 3.7
Descriptive Statistics for Gratification as Measured by the Educational
Telecomputing Systems Questionnaire (ETSQ)

Gratifications obtained	Number of Items	Alpha	Possible Range	N	M	SD
Personal	5	0.74	5-25	179	19.05	3.73
Professional	5	0.75	5-25	179	15.60	4.42
Instructional	5	0.88	5-25	179	15.60	5.04

Table 3.7 shows that Anderson and Harris (1997) obtained alpha values that ranged from 0.74 - 0.88 for the items in the original instrument. The researcher's

modified GUIQ is shown in Table 3.8. It shows all the items that constituted the types

of gratifications derived from the utilization of the Internet.

Table 3.8
Reliability Item Index for Each Item if Item
Deleted and Standardized Item Alpha
for the Modified GUIQ

Category	Items in GUIQ	Alpha if item Deleted	Standardized Item Alpha
Professional Gratification	Item 66	0.8639	
	Item 67	0.8919	
	Item 68	0.8572	0.8319
	Item 69	0.8679	
	Item 70	0.8705	
Personal Gratification	Item 71	0.8223	
	Item 72	0.7964	
	Item 73	0.7628	0.8937
	Item 74	0.8061	
	Item 75	0.7894	
Instructional Gratification	Item 76	0.7973	
	Item 77	0.7458	
	Item 78	0.7897	0.8307
	Item 79	0.8400	
	Item 80	0.8007	

The standardized alpha of 0.8319 for professional gratification, 0.8937 for

personal gratification, and 0.8307 for instructional gratification in the modified GUIQ

are high. The value of an alpha if an item is deleted when compared to the standardized

alpha shows that all the items in the modified GUIQ have high reliability and are

consistent.

3.5.3 Internet Integration Checklist (IIC) (Appendix E)

The Internet Integration Checklist (IIC) is adapted from a SnapShot Survey

developed by Norris and Solloway (1999) who had modified it from the original Stages

of Technology Questionnaire developed by Russell (1995).

The SnapShot Survey is currently listed on the web page of Texas Research Educational Instruments *(http://www. tcet. unt. edu/ stages. html)* as one of the instruments for measuring teachers' attitudes towards the adoption of technologies.

Norris and Solloway (1999) developed the SnapShot Survey to measure how prevalent technology is in the American education system and what American educators believe about information technology. It is basically developed to track the growth of technology use in American classrooms. The survey consists of the following sub-sections:

a) needs of educators who are integrating technology in the school curriculum

b) beliefs about the Internet and technology

c) time spent on computer-based activities and the Internet by teachers

d) six stages of adoption of technology

The six stages of adoption of technology were based on the Stages of E-Mail Adoption that was developed by Russell (1995). According to research conducted by Russell (1995), adults learning new technology pass through six stages before becoming confident technology users. These learners may begin at any point and progress at their own rates. The original stages include (a) awareness, (b) learning the process, (c) understanding and application of the process (d) familiarity and confidence (e) adaptation to other contexts, and (f) creative applications to new contexts.

For the purpose of the study, the researcher will only use the section on the adoption of technology in the IIC, as the other sub-sections of needs, beliefs and frequency of use of computers for teaching and learning purposes in the SnapShot Survey are not relevant to this study. Thus, to investigate the perceived level of integration of the Internet in the teaching and learning by teacher trainers, the six stages of adoption of technology that are outlined in the SnapShot Survey will be adapted by the researcher to form the six stages of integration of the Internet in the IIC.

They are awareness of the Internet, learning the process of the Internet, understanding and application of the Internet, familiarity and confidence in the Internet, adaptation of the Internet to other contexts and creative application of the Internet to new contexts.

According to Norris and Solloway (1999), the six stages of the adoption of technology can be explained as follows:

(a) Awareness Stage

At this stage, teachers are aware that a certain technology exists, but they have not used it, and some intentionally avoid it.

(b) Learning the Process Stage

At this stage, teachers are currently trying to learn computer basics and they sometimes become frustrated when using computers. They also lack the confidence and necessary competencies to utilize computers at this stage.

(c) Understanding and Application Stage

At this stage, teachers are beginning to understand the process of using technology and can think of specific tasks in which it might be useful for instruction.

(d) Familiarity and Confidence Stage

At this stage, teachers start gaining a sense of confidence in using the computer for specific tasks and they also feel that they must start utilizing computers and its technologies in their teaching.

(e) Adaptation to Other Contexts Stage

At this stage, teachers regard the computer as a tool to help them and they are no longer concerned about it as a technology. They start to use the technology in many applications and as an instructional aid.

(f) Creative Application to New Contexts Stage

According to Norris and Solloway (1999), at this stage, teachers can apply what they know about technology in the classroom and are able to use technology as an instructional tool and integrate it into the school or college curriculum.

The IIC revealed the extent of integration of the Internet in the teaching and learning process as perceived by the teacher trainers. Each item asks respondents to indicate the degree to which they agree with statements about Internet integration, by selecting from a five-point Likert Scale ranging from "strongly agree" to "strongly disagree". Based on the results of the IIC, the mean scores for the six stages of integration of the Internet into the teacher-training curriculum were calculated.

A score of 15 - 25 would indicate an awareness stage of integration and a score of 25.1 - 35 would indicate learning the process stage of integration, whilst a score of 35.1 - 45 would indicate an understanding and application stage of integration. Further, a score of 45.1 - 55 would indicate a familiarity and confidence stage of integration while a score of 55.1 - 65 would indicate an adaptation to other contexts stage of integration. Finally a score of 65.1 - 75 would indicate a creative application to new contexts stage of integration.

3.5.3.1 Reliability and Validity of the IIC

The original Stages of Technology Questionnaire was adapted by Christensen (1997), as one of the research instruments for her doctoral dissertation titled, 'Effect of

Technology Integration on the Attitudes of Teachers and their Students,' conducted in the University of North Texas, Denton.

The researcher contacted Dr. Norris via e-mail to obtain permission to use the adoption of technology section for the IIC and to get details relating to the reliability of the IIC.

According to Norris (1998), the reliability for the six stages of adoption of technology is 0.72, for all needs items is 0.73, for all belief items is 0.77 and reliability for the overall instrument is 0.81.

The researcher also carried out a reliability study on the translated and modified version of the IIC. Table 3.9 shows all the items in the modified IIC that constituted the factor of instructional integration of the Internet into the teacher-training curriculum.

Table 3.9
Reliability Item Index for Each Item if Item Deleted
and Standardized Item Alpha for
the Modified IIC

Items in the IIC	Alpha if item Deleted
Item 36	0.8387
Item 37	0.8261
Item 38	0.8257
Item 39	0.8563
Item 40	0.8495
Item 41	0.8264
Item 42	0.8192
Item 43	0.8104
Item 44	0.8161
Item 45	0.8151
Item 46	0.8181
Item 47	0.8130
Item 48	0.8132
Item 49	0.8078
Item 50	0.8056
Standardized Item Alpha	0.8472

The standardized alpha of 0.8472 for the modified IIC is high. The value of an alpha if an item is deleted when compared to the standardized alpha shows that all items in the modified IIC have high reliability and are consistent.

3.5.4 Self-Evaluation of Internet Competency Checklist (SICC) (Appendix F)

The SICC is adapted by the researcher based on the Mankato Internet Skill Rubrics (MISR) developed by Johnson (1995), which was published in the journal titled 'The Emergency Librarian' in 1995. These rubrics were also published in 'The Technology Connection Journal' in 1997. These rubrics are also available in Johnson's book titled, "The Indispensable Teachers Guide to Computer Skills: A Staff Development Guide," Linworth Publishing, 1998.

The MISR is part of the Mankato Scales that provide a self-assessment of university and college faculty competencies towards Basic Teacher Computer Uses, Advanced Teacher Computer Uses and Internet Uses. According to Johnson (1998), the Mankato Scales can be used to evaluate the effectiveness of Internet development programs for teachers.

Johnson had designed the MISR for teachers to assess their own technological skills while teaching Internet skills at the Mankato State University's educational media classes. He found that teachers who had mastered these skills were able to use the computer to improve their traditional instructional tasks and present lessons via the Internet. As such, Johnson (1998) advocated that the skills in his instrument could be adapted to serve as a model for measuring Internet competencies of teachers.

The MISR has also been used by the Bellingham public schools to develop technology scales to measure their staff members' progress on Internet related competencies. The Bellingham Public Schools began administering the MISR to all its staff members in June, 1994 and the scales are now repeated at least once each year to evaluate the staff's competencies in using the Internet and its applications. In addition, the Maine Department of Education also uses the MISR to conduct assessments of the personal Internet skills of its teachers. Consequently, based on the results of the MISR,

teachers from Maine were able to determine the Internet competencies they need to improve on.

In a similar vein, McKenzie (1997) recommends that it is important to determine the Internet competencies of educators before they can integrate new technologies into the school curriculum successfully. In his article, he suggested that rubrics such as the Mankato Scales *(http://www.bham.ednet.edu/comp.htm)* can help educators carry out reliable self-assessments on their Internet competencies.

Anderson (1999) carried out self-assessment tests on technology and Internet competencies based on the Mankato Scales (*http:// www edpac.csulb.edu/techgrant*). She found that she had attained a mastery level for twenty-seven skills identified in the Mankato Scales. She also found that she had mastered all the Internet skills that were outlined in the Internet use section.

Anderson (1999) recommends the Mankato Scales as an appropriate scale to measure the Internet literacy of educators as it represents precisely the level of specificity needed to develop Internet-based programs. She states that using the Mankato Scales is a critical step in empowering learners (faculty and students) in enhancing their Internet competencies. Thus, the researcher sought permission from Johnson to use and adapt the MISR to form the SICC.

The SICC consists of two sections. They are the Personal Characteristics Checklist and the Self-Evaluation Internet Competency Checklist. The Personal Characteristics Checklist measures the personal attributes of gender, age, highest level of schooling, teaching, computer and Internet experience as well as direct and indirect use of the Internet. In addition, respondents' access to the Internet is assessed by two items that elicits answers about the accessibility of the Internet connection at the home and the workplace. All the personal attributes are assessed by single close-ended items except for the access to the Internet at the workplace and direct use of the Internet items that seek explanation for negative responses.

On the other hand, the Self-Evaluation Competency Checklist measures Internet networking skills that are vital if lecturers are to handle the Internet well and use this tool in the teaching and learning process.

The data gathered are frequency scores from the self-rating competencies in Internet use. Respondents rate themselves on a five-point Likert Scale, which ranges from having no skills in Internet use to being an expert in Internet use. The means for the four levels of Internet competencies of unaware, aware, mastery and advanced were computed.

A total of 15 statements listed under the SICC were given to the teacher trainers. The respondents had to state whether they had the following levels of competencies; "Zero, no skills," "Low, have some basics," "Moderate high," "High skills," "Expert, can guide others."

From their statements, the scores were calculated. Based on the range of the scores, four means were calculated by the researcher to form the four levels of self-perceived competencies. The education lecturers who have the highest self-perceived level of Internet competencies were classified as 'advanced' and those with the lowest Internet competencies were classified as 'unaware' (Johnson, 1995).

A score of 15 - 30 would indicate an unaware level of Internet competency and a score of 30.1 - 45 would indicate an aware level of Internet competency, whilst a score of 45.1 - 60 would indicate a mastery level of Internet competency. Finally a score of 60.1 - 75 would indicate an advanced level of Internet competency.

3.5.4.1 Validity and Reliability of the SICC

Table 3.10 shows all the items that constitute the factor of self- perceived Internet competencies of the teacher trainers in the Klang Valley.

Table 3.10
Reliability Item Index for Each Item if Item Deleted and
Standardized Item Alpha for the Modified SICC

Items in the SICC	Alpha if item Deleted
Item 51	0.9652
Item 52	0.9648
Item 53	0.9634
Item 54	0.9661
Item 55	0.9652
Item 56	0.9649
Item 57	0.9634
Item 58	0.9643
Item 59	0.9651
Item 60	0.9640
Item 61	0.9652
Item 62	0.9649
Item 63	0.9677
Item 64	0.9677
Item 65	0.9683
Standardized Item Alpha	0.9685

The standardized alpha of 0.9685 of the modified SICC is high. The value of an alpha if an item is deleted when compared to the standardized alpha shows that all items in the modified SICC have high reliabilities and are consistent.

3.5.5 Internet Use Questionnaire (IUQ) (Appendix G)

The purpose of the Internet Use open-ended Questionnaire (IUQ) was to gather qualitative data about the nature of changes that occur when the Internet is used in the teacher-training curriculum. This was because quantitative surveys allow little flexibility for respondents to express their opinions. On the other hand, comments from open-ended questionnaires are most helpful as they usually provide insightful information in a specific area of research.

Another great advantage of the open-ended questionnaire is that it can discover uncommon but intelligent opinions, of which the researcher would otherwise have

remained unaware of from the use of quantitative instruments (Strauss, 1993). In addition, there are no verbal or visual clues to influence the respondents and unlike other research methods, the research instrument does not interrupt the respondent.

According to Straus and Quinn (1997), there are other advantages of using open-ended questionnaires. They are uniformity in the presentation of questions and the absence of bias from middlemen. Moreover, the respondents are not influenced by the researcher's opinion because they answer on their own accord and time.

Thus, the researcher devised the Internet Use Questionnaire (IUQ) for the qualitative part of the study. The items selected for the open-ended questionnaire were based on a study by Becker and Anderson (1998) that investigated the use of the Internet by 4100 teachers, 800 technology coordinators and 850 principals in American schools.

Their study found that the teachers were primarily using the Internet in the classroom in three ways:

a) lesson preparation

b) teacher professional communications

c) teacher-directed student use

Thus, the researcher modified the instruments in Becker and Anderson's study to form the IUQ. All of the above aspects are investigated in the IUQ. In addition, the researcher added the perceived importance of integrating the Internet into the education syllabus as well as the problems and needs of teacher trainers in the incorporation of the Internet in the teacher-education sector.

These aspects were added to the open-ended questionnaire to yield a better understanding of the current hindrances to Internet integration among teacher educators.

The questions in the IUQ were open-ended in nature. However, there were six basic questions pertaining to frequency of questions that were close-ended with specific options to find out the type and frequency of usage of Internet applications of teacher trainers and teacher trainees alike. The other open-ended questions in the IUQ are on the following aspects:

a) Benefits derived from the use of Internet

b) Usage of the Internet for preparation of lessons

c) Directing students to use the Internet for information-gathering

d) Directing students to use e-mail for assignments

e) Collaborating with other colleges/schools on joint projects via the Internet

f) Developing materials to be posted on the WWW

g) Contributing ideas and materials to the college home page

h) Perceived importance of incorporating the Internet into the education syllabus

i) Problems faced in the instructional use of the Internet

j) Perceived needs for instructional use of the Internet

The use of the open-ended questionnaires allowed the teacher trainers to respond in their own words regarding the extent of usage of the Internet and its applications and the benefits that they have observed in student learning and in academic as well as in extra-curricular activities as a result of integrating these new technologies into the instructional process.

The questions also provide the opportunity for the respondents to highlight any ideas that they considered to be of relevance in utilizing the Internet and its applications in their teaching and learning. In addition, they are able to express problems they faced and their needs in the instructional use of the Internet that was not dealt with in the quantitative surveys.

The open-ended questionnaires were analyzed based on methods that are common to qualitative researchers. Participants' responses were condensed to reflect the emergent categories and themes and relevant excerpts were discussed extensively in the qualitative write-up of the study.

According to Charmaz (1990), qualitative researchers usually analyze comments in the questionnaires by conducting careful line-by-line analyses from the comments made in the open-ended questionnaires. They read each line or sentence and ask themselves, "What is this about?" and "How does it differ from the preceding or following statements?"

This kind of detailed work keeps the researcher focused on the data presented by the respondents instead of diverging to unimportant details. To ensure validity of the data presented in the open-ended instrument, the researcher followed a similar approach in analyzing the qualitative data from the IUQ.

3.5.5.1 Validity of the IUQ

According to Frary (1998), validity of the open-ended questionnaires is ensured when they are given to small groups, with fewer than fifty respondents. Frary (1998) also states that it may be better to ask the respondents to fill in blanks frequently in an open-ended questionnaire to capture any unsuspected information in a specific area of research.

To ascertain the content validity of the IUQ, it was administered to two former education lecturers to see if they have problems in understanding the items in the questionnaire. According to Grendall *et al* (1996), one way of ascertaining the final test of an open-ended questionnaire is to try it on representatives of the target audience, as any problems with the questionnaire always show up at this stage.

The researcher who was present at the time of the piloting of this instrument reminded the respondents to ask for clarification for any item in the IUQ. According to

Grendall *et al* (1996), this procedure is important because queries raised by the respondents are indicative of problems in the questionnaire. This procedure is also very important because any open-ended questionnaire must be without any ambiguity because there will be no chance to clarify questions when the questionnaires are handed to the respondents.

Many qualitative researchers stress on the validity of an instrument rather than its reliability as documenting what occurs in an accurate manner may reveal inconsistencies (Ratcliff, 1995). This is because reality is dynamic and it changes constantly. There is also high validity in social situations; if they are constantly changing, people might see things differently as they are seeing them from different perspectives.

Ratcliff (1995) states that putting two different accounts together might result in a better understanding of the whole rather than viewing each one separately even though the consistency between those accounts might be rather low. Together, the two very different accounts reflecting low reliability could produce even higher validity in qualitative research.

According to Ratcilff (1995), extensive quotations of the comments made in the open-ended questionnaires are one of the best ways to ensure validity in qualitative research. Likewise, the researcher discussed the responses with the teacher-trainers from the open-ended questionnaires extensively when writing the qualitative section of the study.

Another way to ensure validity in qualitative research is by converging with other sources of data. For example, Fitzgerald (1996) recommends triangulating qualitative data with quantitative comparisons as well as with the current literature in the area of investigation. The researcher also used a similar approach in the presentation of the qualitative analyses.

According to Sherry (1998), before summaries of the responses to open-ended questions can be prepared, they have to be combined into categories or coded into general trends based on the responses. The researcher also interpreted the qualitative data by coding data according to the specific themes and topics that were outlined in the IUQ.

However, the use of the open-ended questionnaires has its limitations. Gestures and other visual cues are not available with open-ended questionnaires. According to Fitzgerald (1996), open-ended questionnaires probing attitudes may be severely affected. Thus, the researcher also used in-depth interviews to get more information with regards to some of the main issues in the IUQ as well as in other aspects of Internet integration that were not investigated in the IUQ.

3.5.6 Semi-Structured Interview Schedule (SIS) (Appendix H)

The structured questions in the semi-structured Interview Schedule (SIS) were based on a study by Becker and Anderson (1998). The SIS consisted of questions that served as guidelines for questions that followed the main themes in the IUQ to get more in-depth and specific information about the integration of the Internet into the teacher-training curriculum.

This is because the researcher felt that some of the answers in the open-ended questionnaires were too brief and needed further explanation and clarification from the teacher trainers. Discussion questions were drawn from some of the questions outlined in the IUQ and the researcher added the following questions for discussion:

a) Types of Internet training

b) Access to the Internet at the teacher training college and at home

c) Methods in which teacher trainers are using the Internet for classroom preparation

d)   Ways in which teacher trainers are directing their students to use the Internet

e)   Ways in which Internet applications are being used by teacher trainers

f)   Ways in which the Internet is being used for extra-curricular activities

g)   Reasons for the importance of integrating the Internet into the education syllabus

h)   Types of problems faced in the integration of the Internet in the teacher-training curriculum

i)   Types of needs for integration of the Internet in the teacher-training curriculum in the near future

3.5.6.1 Interview Procedures

Interviews were conducted with twenty-eight education lecturers to gain more in-depth information as well as data on common issues and concerns relating to the integration of the Internet into the teacher-training curriculum. The primary objectives of the interviews were to record, analyze and interpret the individual faculty members' experiences, opinions and perspectives about integrating the Internet into the teaching and learning process.

Theme identification is one of the most fundamental tasks in qualitative research (Lincoln and Guba, 1985). The transcripts of the interviews were analyzed for common, pertinent and emergent themes relating to Internet integration using a constant comparison method. Excerpts from the transcribed interview scripts were quoted and discussed extensively in the final write up to strengthen the facts and data presented in the qualitative analysis.

One of the ways to identify themes in the transcribed interview transcripts is to analyze words that occur many times as they are often seen as being salient in the

minds of the respondents. D'Andrade notes, "perhaps the simplest and most direct indication of schematic organization in naturalistic discourse is the repetition of associative linkages" (1991, p. 294).

He observes that "indeed, anyone who has listened to long stretches of talk, whether generated by a friend, spouse, workmate, informant, or patient, knows how frequently people circle through the same network of ideas" (1991, p.287).

Qualitative investigators usually read transcribed text many times and note common words or synonyms that most of the respondents use. The researcher also used this method to find themes in the analyses of the interview data.

All the interviews were audio recorded and transcribed verbatim by the researcher herself. The researcher also made sure that the quotations used for the publications were framed in such a way that the respondents' identities were masked so as not to offend any of the respondents in the study.

3.5.6.2 Validity and Reliability of the Interview Transcripts

According to Ratcliff (1995), extensive quotations from the transcribed interview scripts are one of the best ways to ensure validity in qualitative research. The researcher carried out the same procedures in presenting the analyses of the interview data.

Another way of ensuring reliability in the interview method is by multiple listening of the audiotapes and multiple transcription of the interviews by the same researcher (Ratcliff, 1995).

Thus, the researcher made two transcriptions for each of the twenty-eight interviews that were carried out. One was from the field notes and the other was from the audiotapes. These were later compared and discrepancies that existed were rectified. The field notes were also used to cover parts in the transcribed interviews that

were not audible on the audiotape. Wherever tape quality was bad or information was missing, the researcher typed in the missing information from the field notes.

Permission was also sought from the respondents to use their statements in the final report. Sherry (1998) also adhered to a similar procedure in her qualitative research on the diffusion of Internet within a Graduate School of Education.

To ensure validation of the interview process, five scripts were randomly selected and returned to respective interviewees for validation, approval, correction and verification. The interviewees were also encouraged to make additions to the transcribed record or change any facts that they deemed were not made in the context during the interview sessions prior to the analyses.

The researcher also reminded the respondents to underline any section in the interview transcripts that were not clear to them. All five of the respondents validated the instruments by going through the transcribed scripts and commenting that it was done in the intended context. They acknowledged this by signing at the bottom of the interview transcripts.

3.5.7 Case Studies

Two case studies were carried out to compare an early and a late adopter who worked in the same teacher training college. The constant comparison method by Glaser and Strauss (1967) was used to present the two cases. This approach is based on the idea that themes represent ways in which texts are either similar or different from each other.

Interview transcripts and data from the open-ended questionnaires as well as from the quantitative surveys were analyzed using a constant comparison method, and sorted into major themes using a combination of categories derived from prior research on Internet integration (Becker and Anderson, 1998; Jacobsen 1998) and from Rogers' (1995) innovation-decision model. The following categories that are based on Rogers'

(1995) innovation-decision model provided a framework for consideration of the individual's experiences in adopting the Internet for teaching and learning:

1. Knowledge: Values, beliefs and characteristics of teacher trainers, as well as needs/problems and degree of innovativeness,

2. Persuasion: Expected outcomes and benefits from integrating Internet technology, as well as perceived characteristics of the innovations such as relative advantage and compatibility with existing teaching methods,

3. Decision: Processes use to attain desired outcomes, and factors influencing the decision to adopt or reject the innovation,

4. Implementation: Specific instructional strategies that support the processes and,

5. Confirmation: Motivators and impediments to integrating Internet technology, as well as descriptions of continued adoption or discontinuance.

The analysis from the quantitative instruments and the open-ended questionnaires as well as from the interview transcripts were also used in combination with the presentation of the two case studies. The gender 'she' was taken to represent the masculine and feminine genders of the respondents to protect the anonymity of the participants in the study.

Thus, a late adopter is presented from the same teacher-training college as the early adopter to investigate how the education lecturers are integrating the Internet technology into the education syllabus. Although there were also late adopters in the other teacher training colleges in the Klang Valley, they were not picked to avoid the environmental influence in the use of the Internet as the teacher trainers in the various teacher-training colleges are using the Internet and its applications differently.

3.5.8 Document Evidence of Internet Integration

Another qualitative method that was used was documents study. Lincoln and Guba (1985) defined a document as "any written or recorded material" not prepared for the purposes of the evaluation or at the request of the inquirer. Documents can be divided into two major categories: public records and personal documents.

Personal documents are first-person account of events and experiences. These "documents of life" include such sources as diaries, portfolios, photographs, artwork, schedules, scrapbooks, poetry and letters to the papers. Personal documents can help the evaluator understand how the participants see the world and what he or she wants to communicate to an audience. And unlike other sources of qualitative data, collecting data from documents requires minimal cooperation from persons within the setting that is being researched (Fetterman, 1989).

The usefulness of existing sources varies depending on whether they are accessible and accurate. In a research project, documents can provide the evaluator with useful information about the culture of the institution and participants involved in the projects. Thus, the study of the documents further added validation to the quantitative and qualitative instruments in the study, as it provided the evidence and extent of Internet incorporation in the teacher-training curriculum.

3.6 Procedures

Four survey instruments namely SICC, IIC, SOCI and GUIQ were administered to the education lecturers in their respective teacher training colleges in the Klang Valley by the researcher herself in the month of January, 2001. The teacher trainers completed filling in all the questionnaires in about forty-five minutes to an hour. Instructions relating to the administration and timing of the instruments were carefully explained by the researcher.

In addition, open-ended questionnaires were distributed to the 28 teacher trainers in the study. The teacher trainers were given two weeks to complete it and in the middle of March, the researcher personally collected the questionnaires. It was at this time of collection of the open-ended questionnaires that the researcher fixed appointments with the education lecturers for the forthcoming interview sessions.

The interviews were carried out in the months of May, June, and July 2001 and all the interviews were audio-recorded. Eleven male and seventeen female education lecturers participated in the interview sessions. Validation of five randomly selected transcribed interview transcripts was carried out in the months of November and December of 2001.

3.7 Data Collection and Analyses

For the quantitative instruments, sixty-nine teacher trainers who are currently teaching the education syllabus in the teacher training colleges were chosen as the sample for this study. However, four of the teacher trainers who teach the education syllabus were not involved in the study at the time of the administration of the quantitative instruments. This was because two of the education lecturers were away on professional development courses and two more were on full-time study leave. Thus, the response return rate for the quantitative instruments was 94.2 percent.

Twenty-eight teacher trainers who were selected by the researcher from the sample also took part in the qualitative part of the study by filling up open-ended questionnaires. Feedbacks from these respondents indicated that they took about thirty to forty-five minutes to complete the open-ended questionnaires. The same twenty-eight respondents also participated in the interview sessions. The interviews basically lasted from 45 minutes to an hour and fifteen minutes.

Five sets of data were collected:

a) survey data from the quantitative instruments

b) data from open-ended questionnaires

c) data from interviews

d) data from case studies

e) personal documents that show evidence of Internet integration

Peterson (1999) advocates choosing appropriate scales for the quantitative instruments as a vital step in shaping the information that is collected. Peterson (1999) also states that the use of the correct scales has been shown to be effective in collecting accurate and reliable data.

By labeling each scale point, all respondents attach the same word to a numerical value. This helps avoid misinterpretation of scale definitions. The scales that perform the best according to current research are those that include a mid-point in the scale. According to Peterson (1999) if there is no midpoint option, respondents often choose a positive response creating positively skewed data. However, each scale has variations, some more reliable than others.

The raw scores from the four questionnaires were used for data analysis. For the SOCI (Appendix C), items were weighed on a priori weight method in the following accordance; 0, 1, 2, - not true of me now, 3, 4, 5 - somewhat true of me now and 6, 7, - very true of me now. The scores are given for positive statements and the reverse is true for negative statements.

For the questionnaires of GUIQ (Appendix D), the implementation of the Likert Scale from strongly disagree to agree was used as follows, namely; 1 - Strongly disagree; 2 - Disagree; 3 - Undecided; 4 - Agree; 5 - Strongly disagree.

For the IIC (Appendix E), the implementation of the following Likert Scale was used for assessing the level of Internet integration among the teacher educators,

namely; 1-Strongly disagree; 2 - Disagree; 3 - Undecided; 4 - Agree; 5 - Strongly disagree. The scores are given for positive statements and the reverse is true for negative statements.

For the SICC (Appendix F), implementation of the following Likert Scale was used for assessing the five levels of Internet competencies: " Zero, no skills", "Low, have some basics", "Moderate high", " High skills", "Expert, can guide others." However, there was no mid-point in this particular scale as it is progressive in nature.