INFORMATION QUALITY DIMENSIONS OF FARSI WEB-BASED LEARNING RESOURCES FOR INSTRUCTIONAL USE

FAEGHEH MOHAMMADI GHAZI JAHANI

**A THESIS SUBMITTED IN FULFILMENT OF THE
REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY**

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

UNIVERSITY OF MALAYA

KUALA LUMPUR

November 2014

ABSTRACT

The Ministry of Education Iran, in its fifth educational development plan has prioritized the use of web resources in school connectivity project among Smart Schools. The problem is, Iranian educators' acceptance of using web resources in their classrooms remains low. The quality of the Farsi web-based learning resources (FWBLRs) might be taken into account towards the teachers' motivation to use these resources. This research positions information quality as "information fit for use", which implies that it is relative, as information considered appropriate for one use may not have sufficient attributes for another use. The objective of this study is to identify the perceived quality dimensions of FWBLRs for instructional use. The following questions drive this research: a) Why are teachers motivated to use Farsi web-based learning resources for classroom instruction? b) What are the issues and/or challenges teachers face in terms of assessing the quality of Farsi web-based learning resources for classroom instruction? c) How do teachers address the issues and/or challenges in terms of meeting their instructional information needs? d) What is the teachers' perceived information quality of Farsi web-based learning resources for classroom instruction? To answer the research questions, Eisenhardt's eight-step process approach of "building theory from case study research" has been used in this study as a guide. A single-selected premier secondary smart school in Tehran was chosen as the case setting. The research employs a qualitative approach completed in two phases. Firstly, two focus group interviews were conducted on ten teachers, followed by several face-to-face interviews with five teachers who were recruited from the focus groups. As an additional data, several sessions of face-to-face interviews were conducted with five students who were active web log readers and had the experience collaborating with their teachers to produce customized web content. All participants were

purposively sampled. Findings of the first phase indicate that perceived pedagogical usability of FWBLRs motivates the teachers to use these resources for their classroom teaching. Teachers' are motivated to use FWBLRs for (a) the delivery of instructional materials; and (b) the development of instructional materials. The participants reveal several problems and problem solving strategies associated with content, presentation and accessibility of websites when using FWBLRs for classroom instructions. Fourteen (14) information quality dimensions emerge from the data. Five dimensions are related to motivation addressing pedagogical usability. Six (6) dimensions are related to contents, two dimensions emerge from the presentation category and one (1) dimension is related to accessibility. Educators' perceptions about the quality of web resources might be considered as a critical issue in terms of usage of web resources in the Iranian school context. The information quality dimensions highlighted in this study may be helpful to Iranian teachers, to increase their theoretical understanding and translate this into their professional practice. The understanding will benefit professionals about what elements to consider when designing Farsi educational web sites for credibility. Knowing information quality dimensions may help educators who are in the evaluation process, to select appropriate web-based learning resources for their instructional needs and enables information producers to produce appropriate Farsi information resources compatible to teachers' instructional needs.

ABSTRAK

Judul: Dimensi kualiti maklumat sumber pelajaran berasaskan web Farsi untuk kegunaan Pengajaran.

Kementerian Pelajaran Iran, di dalam pelan pembangunan pendidikan ke lima mengutamakan penggunaan sumber-sumber web di dalam projek gabungan sekolah di kalangan sekolah bestari Iran. Masalahnya, penerimaan golongan pendidik Iran untuk menggunakan sumber-sumber web dalam pengajaran kelas masih rendah. Kualiti sumber pembelajaran berasaskan web Farsi (FWBLRs) berkemungkinan mempengaruhi motivasi guru untuk menggunakan sumber-sumber ini. Kajian ini meletakkan kualiti maklumat sebagai "maklumat bertepatan untuk kegunaan" yang menunjukkan bahawa penggunaan maklumat adalah relatif, kerana maklumat yang dianggap sesuai untuk satu situasi mungkin tidak mempunyai ciri-ciri yang mencukupi untuk kegunaan dalam situasi lain. Objektif kajian ini adalah untuk mengenal pasti petunjuk kualiti FWBLRs bagi tujuan pengajaran. Soalan-soalan berikut memandu kajian ini: (a) Apakah motivasi guru untuk menggunakan sumber pembelajaran berasaskan web Farsi bagi pengajaran bilik darjah? (b) Apakah cabaran-cabaran guru hadapi dalam menilai kualiti sumber pembelajaran berasaskan web Farsi bagi pengajaran bilik darjah? (c) Bagaimana guru-guru menangani cabaran dalam memenuhi keperluan maklumat pengajaran mereka? (d) Apakah persepsi guru-guru terhadap kualiti sumber pelajaran berasaskan web Farsi untuk kegunaan di dalam bilik darjah? Untuk menjawab persoalan kajian ini, proses lapan langkah pendekatan Eisenhardt yang membina teori daripada kajian kes digunakan sebagai panduan. Sebuah sekolah menengah bestari di Tehran telah disampel sebagai kajian kes. Kajian ini menggunakan pendekatan kualitatif di dalam dua fasa. Pertama, dua temubual kumpulan fokus dijalankan ke atas sepuluh orang guru, diikuti oleh temubual bersemuka dengan lima orang guru yang telah dipilih dari kumpulan fokus. Sebagai sumber data

tambahan satu temubual bersemuka telah dijalankan dengan lima pelajar yang merupakan pembaca weblog aktif dan mempunyai pengalaman bekerjasama dengan guru-guru mereka untuk menghasilkan kandungan web yang disesuaikan. Semua peserta kajian disampel secara purposif. Hasil fasa pertama menunjukkan bahawa berdasarkan keperluan mereka guru-guru menggunakan sumber-sumber web Farsi sebagai sumber percuma untuk aktiviti pengajaran dan pembelajaran mereka. Motivasi guru untuk menggunakan FWBLRs adalah bagi (a) penyampaian bahan pengajaran; dan (b) pembangunan bahan pengajaran. Para peserta kajian mendedahkan beberapa masalah dan strategi penyelesaian yang berkaitan dengan kandungan dan konteks dari segi menggunakan FWBLRs untuk pengajaran bilik darjah. Pemahaman teori mengenai dimensi maklumat berkualiti, kriteria amanah dan tujuan penggunaan dimensi diketengahkan dalam kajian ini. Empat belas (14) dimensi kualiti maklumat timbul daripada data. Lima (5) dimensi berkaitan dengan motivasi menangani usabiliti pedagogi, enam (6) dimensi berkaitan dengan kandungan, dua dimensi muncul daripada kategori persembahan manakala satu (1) dimensi berkaitan aksesibiliti maklumat. Persepsi pendidik tentang kualiti sumber web Farsi mungkin dianggap sebagai isu kritikal dari segi penggunaan sumber-sumber web dalam konteks sekolah bestari di Iran. Dimensi kualiti maklumat yang diketengahkan dalam kajian ini boleh membantu guru-guru, dan meningkatkan pemahaman teori mereka yang boleh dipraktikkan. Pemahaman ini memberi manfaat kepada golongan profesional yang ingin mereka bentuk laman web pendidikan Farsi yang kredibel. Mengetahui dimensi maklumat berkualiti boleh membantu para pendidik di dalam proses penilaian untuk mencari sumber pembelajaran berasaskan web Farsi untuk keperluan pengajaran dan membolehkan pembangun maklumat di Iran menghasilkan sumber maklumat Farsi yang serasi dengan keperluan guru untuk pengajaran.

ACKNOWLEDGEMENT

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

Introduction to the Study

1.0. Introduction.

The World Wide Web is becoming an interesting powerful, global, interactive, and dynamic medium for delivering classroom instruction. Compared to traditional information warehouses, the Web is a rich repository, which can provide fast and effortless access to the variety of authentic teaching and learning materials. Unlike traditional information resources that are published following a rigorous peer-review process, the Web environment exampliesa dynamic situations where, ideally everyone can post his/her own-generated content immediately without any restriction. However, the current openness and availability of information providers besides being an advantage at the same time also makes the Web vulnerable to inaccurate, doubtful and out-of-date information. This problem magnifies especially when learners find incorrect or out-of-date materials that are used in instruction. As such, the quality of information on the Web is highly variable.

Current research has placed much emphasis on the completeness, accuracy and consistency of Web information, the dimensions that define information quality. However, the concept of information quality must be examined in context (Foley &Helfert, 2010) and little research has been conducted with respect to examining information quality in context of classroom instruction. In this thesis, the author aims to identify the objective measures that have the potential to improve information quality for educational use, taken with a subjective view and

from the perspective of the educators. The research leads to the development of a set of criteria contributing to improve information quality. This chapter is structured as follows. It begins with the examination of the research background, and follows with an outline of the context of the study and the research problems. Details are then provided on the research purpose, research objectives and research questions. The chapter then provides a brief explanation of the nature of the study, the delimiters, its significance and concludes with the outline of the structure adopted for the remaining chapters of the thesis.

1.1. Background of the Study.

Digital resources have the potential to transform classroom instruction as they offer teachers new ways to engage students in learning, introduce students to scientific inquiry, work in new and exciting ways, and infuse learning with student-focused, equitable pedagogy and practice. Easy and fast access to web-based learning resources (WBLRs) are considered as a critical information resources in K–12 education (Pelgrum, 2001; Hew & Cheung 2013) as these resources, supported with Web 2.0's unique capabilities and students' proclivities in using them, enhance students' exploration of knowledge and their learning (Combes &Valli 2007) as well as influence teaching and learning (Greenhow, Robelia & Hughes, 2009).

The use of web resources has received a great deal of attention in the K-12 education, and due to the increased focus on digital literacy, WBLRs as pedagogical tools are becoming more important in classroom instruction.Previous research revealed that K-12 students' information use and behavior have changed from searching for and using traditional resources to web resources (Murphy & Lebans 2008; Berger 2010; Sadaf, Newby & Ertmer. 2012; Rahimi, Den Berg &Veen. 2013; Morgan 2013). Tomaiuolo's (2005) findings

indicated that students' preference to select and use web resources is depended on their teachers' support as it indicated that the students typically use Web resources that most teachers find acceptable at best. It means that teachers acceptance of web information resources is a pre-requisit to students' use of such resources. However, the educators believed that typically students would use unauthorized web resources (Grimes & Boening, 2001; Minocha 2009). Educators need to assess the quality of information by themselves before making any decision to use such resources, as this allow them to guide students to materials that are useful and appropriate for their academic level. Educators also need to know the interactions and delivery strategies employed in various Web resources in order to develop effective pedagogy in the Web environment (Bush 1996; Hughes 2010; Sadaf, Newby & Ertmer, 2012; Lin & Davis 2012; Hew & Cheung 2013).

Responding to the increasing prevalence of web-based teaching and learning technologies and educators' need to incorporate the use of these resources into classroom instruction, there have been studies in countries such as the United Kingdom's Distributed National Electronic Resource and Learning Object (Currier & Campbell 2002) and United States National Science Digital Library Project (http://www.nsf.gov/funding/education) commissioned to ensure that educational content are of quality and can be made reusable within the virtual learning environment in the Web. However, to date there has been no research reflecting the criteria teachers use, when they evaluate web-based learning resources for classroom instruction and what to expect from such resources, particularly web resources in Farsi language in the Iranian K-12 school context.

1.2. Context of the Study: Using Web-based Resources in Iranian Smart Schools.

Although the World Wide Web has a great potential to provide exciting and interactive teaching-learning environment for the K-12 education, however, the practical use of web-based resources in the classroom remains a big challenge to become mainstream in Iranian school context. To date there are not sufficient types of schools in Iran, except smart schools, that aim to use web-based learning resources for instructional purposes. Smart schools are the only schools in Iran that are initiated with the aim of using web technology for classroom instruction exclusively (Jalali, 2011).

Followed by the approval plan of ICT Association of Education Ministry of Iran and patterned from the Malaysian Model (Attaran, Alias & Siraj 2012), the smart school plan was launched in 2005 with the aim of using web resources in school contexts. As a pilot sample, four (4) high schools in the capital city of Tehran were selected for this experimental project. These schools are: Absal, Nedaye Azadi, Dr. Mosahab and Shohadaye Kargar. A draft was prepared to define the prerequisites of project implementation. The Smart Schools' road map (Jalali, 2011) delineates the following main objectives of smart schools:

a) To supply teachers with the web-based educational materials and methods to meet the needs of a knowledge-based society;

b) To provide a collaborative and interactive teaching–learning environment among teachers and students using web resources; and

c) To develop student-oriented and research–oriented learning practices using web-based learning resources.

According to the Iranian smart schools' road map (Jalali, 2011), in order to provide effective use of web-based learning resources in classroom instruction, the teachers employed in smart schools are expected to be competent in:

a) Finding web-based learning resources;

b) Evaluating and selecting web-based learning resources;

c) Producing electronic content using web resources; and

d) Integrating electronic learning resources into their curriculum.

The teaching-learning materials produced by teachers shall be designed to support the teaching-learning strategies used in smart schools. In doing so the materials shall embrace a number of characteristics as follows:

a) The materials shall be able to foster the students' capability to self-directed learning;

b) The materials shall be presented attractively in order to provoke students' motivation to learn effectively;

c) The materials shall promote individualized as well as collaborative learning; and

d) The materials shall be appropriate for various learning environments ranging from teacher-centered to student-center environments.

The majority of subject matters in Iranian smart schools are taught in the Farsi language and this language is considered as the predominant language for producing electronic teaching–learning materials.

Based on the responsibilities assigned to teachers of smart schools it can be expected that they must be competent users of web resources. Therefore, align with this study's research

objectives, smart school teachers are selected as the participants to answer the research questions of the current study.

1.3 Motivation of the Study.

Having four years of teaching experience using web-based information resources provided me with the idea that web-based learning resources might be an attractive means in order to achieve teaching objectives.

In my opinion the attractiveness of using web resources was due to their unique benefits. One of these benefits was related to the improvement of students' interest in using web resources in classroom instruction. Using web-based learning resources instilled enthusiasm amongst the students, who became interested to follow classroom discussions actively. The other benefit was related to the effortless accessibility and time saving features of obtaining web information resources.

Review of the literature showed that inspite of the advantages provided by web resources Iranian teachers were reluctant to use web information resources in their classroom teaching. This issue provoked my curiosity about the phenomenon. I initiated this researchin order to achieve the aim of the research, which was to identify desirable information quality dimensions that might be sought by the teachers to provide effective use of web-based learning resources. I selected a smart school as the study context of using web resources as it represents an educational centre in Iran that was initiated with the aim of using web-based learning resources for instructional purposes**.**

1.4. Theoretical Lens.

This study adopted a context-dependent nature of information quality in line with the concept of fitness for use or as the theoretical lens in order to answer the research questions. The concept of fitness for use implies that information quality is relative to the use of data with respect to a particular task. This concept emphasizes the importance of taking into consideration the user's (or consumer's) viewpoint of the quality of information because ultimately the user will decide whether he or she will use the information. The study examined the concept "information fit for use by information consumers" developed by Wang and Strong (1996) to explore the information quality in the context of Farsi web-based learning resources (FWBLRs) for instructional use. Contextual aspect takes into account perception of decision makers who use the information (Stvilia et al., 2006, 2008; Watts, Shankaranarayanan & Even, 2009; Helfert& Foley, 2009). Therefore, contextual assessment depends on the requirements and characteristics of the task at hand and characteristics of decision makers such as their experiences. The Farsi teachers involved in this study are the information consumers and decision makers who will determine whether a web resource is fit for use, and the criteria they use for determination may represent the information quality of the resource.

1.5. Problem Statement.

Much evidence now exist that proves that in spite of barriers to change inherent in subject disciplines and teachers' mindsets, change does occur in classrooms, which are technologically rich with WBLRs, when the experience of teaching and learning is intensive, contextual, and relevant to both teachers and learners needs. The significance of using WBLRs are reflected in the Iranian government's Fifth Educational Development Plan connecting a large number of schools in the country to the national Internet networks to

support knowledge sharing and collaboration and to transform teachers' professional practices through professional learning programmes. This plan, with a budget allocation of USD 1.5 million (Media News 26 April 2010), provides the means for teacher-learner collaboration through professional services that advance the sharing of educational content and pedagogy and optimize the use of communications technology, through the utilization and digitization of digital resources. Under this plan, the Ministry of Education will be supported with digital makers' products (*Iran IT Analysis and News*, 5 May 2010) and smart schools training centres, with the objective to develop web-based learning resources to support the school curriculum. In order to achieve such objectives USD 16,093,634.25 budget has been allocated in 2013 to equip smart schools with software, hardware and human resources across the country (*Hayat newspaper*, Sunday 3 march 2013).

WBLRs have the potential to help teachers manage their classroom instructions by using new ways to perform student-oriented and exciting teaching-learning activities, which are different from traditional resources. However, the Webis not designed exclusively for education. In Iran, although it has been the top priority to use web resources in teaching and learning, the limited research shows that Iranian teachers' acceptance to use web resources in the school context remains a big challenge (Najafi, 2006; Hosaini Farhangi, 2006; Shahbaz, Nasr Esfahani & Zamani, 2007; Moradi & Khalili, 2008; Afshari et.al, 2009). The lack of technological skills of teachers in integrating ICT into their curriculum has been reported as the main reason for this challenge (Izadi Yazdanabadi & Mirzaee 2011; Attaran, Alias & Siraj, 2012). Among the barriers teachers face are insufficient technical supports at school and limited access to the Internet (Salehi & Salehi 2012) as well as lack of instruction to help students conduct Internet searches (Fatahi, Dokhtesmati & Saberi 2011), and lack of positive attitude towards studying and teaching in smart schools (Attaran & Siraj 2010). The

aforementioned quantitative studies have addressed Iranian teachers' technological skills and other barriers in terms of using web resources for classroom instructions. However, these studies have not taken into consideration the teachers' skills in accessing and using the information obtained from the WBLRs. Little is known whether inaccessibility and disconnectivity to the web resources, censorship and filtering of the websites by the government have contributed to the teachers' challenges in using WBLRs. There has been no research to date that looks into the desirable information quality dimensions of Farsi (Persian) educational web resources required by teachers.

Inaccurate and low-quality information has been perceived to be a growing problem in online information world (Princeton Survey Research Associates, 2002; Grimes & Bonening , 2001; Lubans 2002; Tanaka , 2010; Braten, Stromso & Salmeron, 2011; Pan &Chiou, 2011; Pattanaphanchai et al., 2013). Assessing information quality of web resources is a challenge in terms of using such resources particularly for education. The quality of the web's contents is a major concern for educators (Kuiper, Volman & Terwel, 2005; Braten, Stromso & Salmeron, 2011; Pattanaphanchai et al., 2013). This concern was mentioned by Hartig and Zhao (2009), who indicated that scientific applications built upon the Web will be of little value if scientists are "skeptical of the quality of data". As the Web does not support learning process as a course in K-12 education (Kuiper, Volman & Terwel, 2005), educators may not use web resources unless they perceive them as credible resources.K-12 educators need to be discerning and have clear ideas of what constitute quality dimensions of Web resources, since not all online resources are equally reliable or valuable. Educators will have doubts about the credibility of Web resources unless they evaluate the web resources themselves (Groening, 2007; Hartig & Zhao, 2009).Careful evaluation of electronic information has long been emphasised by researchers (Fitzgerald 1997; Fritch and Cromwell 2001;Walraven, Brand-

Gruwel & Boshuizen, 2009; Greenhow, Robelia & Hughes, 2009; Kim & Sin, 2011; St Jean et al., 2011; Sadaf, Newby & Ertmer, 2012). Educators need to assess the quality of information by themselves before making any decision to use such resources, as this allow them to guide students to materials that are useful and appropriate for their academic level. They also need to know the interactions and delivery strategies employed in various Web resources in order to develop effective pedagogy in the Web environment.

The use of Web resources in education can be influenced by the quality of the information (Casteleyn et. al, 2009) from the user's perception(Klobas 1995). Whilst there have been various research on identifying thedimensionsof information quality (Morris, Meed & Svensen, 1996; Redmann, 1996; Miller 1996; Wang & Strong, 1996; Davenport, 1997; Helfert & Heinrich, 2003) as well as numerous empirical research on how users perceive quality of specific type of information especially in health (Eysenbach & Köhler, 2002; Gagliardi & Jadad , 2002; Lewis, Chang & Friedman, 2005; Bernstam et al., 2005), and scholarly communication (Kling, & Covi ,1995; Tenopir, 1995;Harnad, 1996; Fuller, 1996; Hersh & Rindfleisch, 2000; Correia & Teixeira, 2005). There has been no accepted standard that suggests the information quality dimensions of WBLRS for K-12 classroom instructions. According to Wang and Strong (1996) the quality of data or information cannot be assessed independent of the people who use the information. As the quality of information has an impact on users' decision-making and their performance, detecting information quality problems and employing strategy for dealing with them should be considered by researchers (Fulller, 1996; Krefting 1991).

Given the emphasis on teachers in Iranian smart schools to be the model for the exemplary use and development of WBLRS, there is a need to conduct context-based studies exploring the information quality issues in adopting web resources that the teachers use in teaching and

learning in Iran. The expected outcome would be the development of a framework for assessing information quality of Farsi web-based resources for K-12 education.The present research aims to understand what constitutes the quality of Farsi WBLRs as perceived by smart school teachers.

1.6. Research Questions.

This study aims to answer the following questions.

a) Why are the Iranian teachers motivated to use Farsi web-based learning resources for classroom instruction?

b) What are the challenges the teachers faced in terms of assessing the quality of Farsi web-based learning resources for classroom instruction?

c) How do Iranian teachers address the challenges in terms of meeting their instructional information needs?

d) What are the teachers' perceptions on the information quality dimensions of Farsi web-based learning resources for classroom instruction?

1.7. Nature of the Study.

Since information quality implies that information considered appropriate for one's use may not have sufficient attributes for another use, the quality of information should be investigated in the context of the people who use the information. This qualitative research adopted the case study approach and used focus groups and face-to-face interviews within the case sample. In order to focus on contextual commonalities among participants, rather than differences (Yin, 2003), as it is typical in case study method, a single smart High school in Tehran, Iran was chosen as the case of study. This research combined multiple data sources

including teachers' focus group interviews, teachers' face to face interviews and students' face to face interviews to establish the validity of findings. To answer the research questions eight-step process of Eisenhardt's approach of "building theory from case study research" has been used in this study as a guideline. The nature of the study is detailed in Chapter 3 of the thesis.

1.8. Delimiters.

Delimiters or boundaries direct the research process as the study determine the research focus and the scope (Creswell, 1994; Baxter & Jack, 2008). In this research two main decisions were made in the preparation of this study. First, the study involved only one secondary smart school and small number of students and teachers, as it is typical in case study research. According to Yin (2003) a case study design should be considered when contextual conditions are taken into account by the researcher as the relevant phenomenon under study. Thereby, this case study sought to recruit participants based on their expertise related to their familiarity with Farsi WLRs rather than focusing on the size of sample population, which is the prevalent practice in quantitative research (Tavakol, Torabi & Zeinaloo, 2009). Therefore, soliciting the right participants to answer the research questions (Malterud, 2001: p.487) requires engaging with the verity of activities associated with using web-based learning resources for instructional aims. A single secondary school in Tehran, Absal Smart School, was selected as the teachers are expected to be familiar with the questions on Internet use and the incorporation on WBLRs in classroom instruction posed during data collection. Also, the context of this study selected web-based learning resources in the Farsi language rather than English language. The reason for this decision was due to the language barriers among Iranian teachers and students as well as the majority of teaching-learning materials in Iranian schools are in Farsi. Thus, it became necessary for the teachers to develop their customized web-based learning resources for their curriculum in Farsi language. This

limitation directs the teachers and students to take into account using Farsi WLRs that are accessible from Farsi educational websites.

1.9. Operational Definition of Terms.

Farsi web-based learning resources (FWBLRs) in this study are defined as a type of instructional material. Instructional materials are used to help transfer information and skills to others. These materials serve as the channel between the teacher and the students in delivering and assimilating the instructions. They may also serve as the motivation to the teaching-learning process. There are many kinds of instructional materials that include textbooks, visual aids such as posters and models, computer programmes, videos, and whose common characteristic is to enhance teaching in a meaningful, interesting way.

Information quality: Information quality in this study is defined as "information fit for use" (Wang and Strong 1996), which implies that it is relative, as information considered appropriate for one's use may not have sufficient attributes for another use.

1.10. Organization of the Thesis.

This thesis is organized into five chapters. Chapter one presents the background of the study, the context in which the research problem is studied, research objectives, and research questions.

Chapter two presents a review of literature relevant to the topic undertaken by the study. It examines various literatures on information quality frameworks and use of web-based learning resources in the school context.

Chapter three presents the research design, method and approach applied for the study. This chapter is divided into three parts. The first part presents methods used for the study, and the second part describes the step by step process of developing the research. This part describes the use of an 'adopted' version of Eisenhardt's roadmap of building theory from case study as a guideline to completing the research process. The last part includes trustworthiness of data, ethical considerations, and cultural issues.

Chapter four reports the research findings based on interviews. Chapter Five concludes the study by giving the summary and discussing the results of the research questions posed in Chapter One.

CHAPTER TWO

Literature Review

2.0. Introduction

This research will help to fill the gaps described earlier in chapter one and address the areas of need identified by researchers in the field. Focusing on the research objectives two main subject areas of the studies have been taken into account during the process of reviewing literature for the current study. These areas are "Web Information Quality" and "Educational Web Resources". Searching under these two phrases within various databases such as *Scopus*, *Library Literature and Information Sciences* full text, *Library & Information Science Abstract (LISA)*, *Web of Science (WoS)* and *Google Scholar* provided some relevant literature for review.

This chapter reviews the literature in four sections. Section 2.1 gives a general view on international perspectives of using world wide web and web-based learning resources (WBLRs) in the school context. Section 2.2 focuses on studies about teachers and students' web use experiences in the broad educational settings in general, and in secondary schools in particular. Section 2.3 presents the studies pertinent to credibility assessment of web resources. Section 2.4 introduces the studies that explore information quality frameworks for web evaluations. Finally Section 2.5 describes the common information quality dimensions of web resources.

2.1. Using the Web and Web-based Learning Resources in the School Context

The popularity of using the world wide web has been transferred to the various areas of life most importantly teaching and learning in schools (Wu and Chen, 2008; Silius, Kailanto, &

Tervakari, 2011; Chen et al., 2012). Due to the technological revolution and advent of Web 2.0 technology, it is expected that both teachers and students would have a tendency towards using web resources.

In general, research on the use of WBLRs for instruction around the world tended to focus on the transformational role of web technology in schools targeting both students and teachers (Stevens, 2007; Cress and Kimmerle, 2008; Ertmer et al., 2009; Kay, Knaack, & Petrarca, 2009; Austin et al. 2010; Silius, Kailanto, & Tervakari, 2011; Abrizah & Zainab, 2011; Gebre, Saroyan, & Bracewell, 2014). The majority of these studies have explored the positive role of Web 2.0 technologies to increase teachers and students' motivations and skills. For example, Gebre, Saroyan & Bracewell (2014) found that students who were more engaged in technology rich classroom activities have positive impact on teachers' conceptions of effective teaching. Abrizah and Zainab (2011) revealed that students' information literacy skills would be enriched using digital resources. Also, students' engagement in collaborative web-based publication encouraged them to be more cautious about the works they create.

There are several studies in the United States that investigate online resources penetration in schools. The results of a survey conducted by the Online Use and Cost Evaluation Program of online publishing initiative at Columbia University indicated that college students used online resources as the main source of research. Likewise, 90 percent of the teachers surveyed also considered online sources as the chosen information for their research (Norman and Wittenberg , 2003 cited in Chen et al. 2012).

Becker (1999 cited in Wu and Chen, 2008) reported on the use of the web, by school teachers and students as an instrumental or complementary resource to create instructional materials or

support teaching activities. In the USA, for example, 68 percent of teachers used the web to find materials related to their lessons, and almost 90 percent of the teachers perceived Internet access as valuable or essential. Likewise, 99 percent of public school teachers in the USA have computers or Internet access in their schools, and 39 percent used computers or the Internet to create instructional materials (National Center for Education Statistics, USA, 2000 cited in Wu and Chen, 2008). Venkatesh, Croteau and Rabah (2014) surveyed 14,283 Canadian students' perceptions about the effectiveness of Web 2.0 use for education. The results showed that web use had positive and significant impact on students' perceptions of course effectiveness.

Web use has increased dramatically over the last few years in developed countries, more than in the developing world (MDG Report 2010 cited in Khan et al., 2012) and this is also true of the adoption and usage of Web 2.0 and web-based learning. Mohamed Zaki et al. (2013) investigated Australian and Malaysian pre-school teachers' beliefs about their comfort with new technology and current use of Internet and digital resources in classroom teaching. The survey results showed that there was similarity in beliefs of both groups of teachers. Both groups have high levels of comfort in using new technology for teaching. Although the study examined teachers' competency and beliefs about using the digital technology in the classroom, the results obtained was more concern about ICT skills rather than web skills. The teachers were more comfortable with computer-based activities such as, using power point and word processing rather than web skills, which involved their competency to search, find, evaluate and use information within the web environment.

In a study, which compared two very different contexts (Cambodia and Japan), Elwood & MacLean (2009) examined students' perception about ICT as well as online resources use for

school work and personal use. They found that Cambodian students typically viewed the new technology as useful tool for school work. However, the study found that although Japanese students have more access to technology and are more proficient in using technological facilities than Cambodian students, they are reluctant to use technological facilities for school works. This means that in order to ensure successful use of web resources for classroom activities, merely access to technological facilities is not sufficient, rather teachers and learners' attitudes must be taken into account.

Several developing countries have adopted web-based technology in their educational systems (Ihmeideh, 2009). For instance, in Lebanon, the Lebanese Minister of Higher Education in 2007, announced that public schools would be equipped with 400 computers and broadband web connectivity in order to encourage use of web-based resources in classroom teaching (Nasser, 2008 cited in Khan et al., 2012). Similarly in Kenya, Wims and Lawler (2008) found that students' exposure to web resources has tangible benefits regarding their use in classroom instruction.

In South Africa, Hennessy, Harrison and Wamakote (2010) found that African teachers believed that using web technology would enhance their professional knowledge and capabilities in very specific ways. According to the participants incorporating the use of web resources in the curriculum helped extend the teachers domain knowledge. Furthermore, it enabled teachers to perform pedagogical practice effectively. This African study revealed that the majority of South African teachers succeeded in using the web for their own development as well as to enhance their students' learning. The most successful uses of web resources in African educational context were strongly grounded in educational and pedagogical principles. These principles addressed teachers, school and the education system. In African schools access to easy-to-access high-quality resources, which was not necessarily the most

expensive, was critical in enhancing web resources use in schools. Also, providing appropriate local professional support would likely increase African teachers' motivation to integrate web-based technology in their curriculum.

In Iranian school, Hadjforush and Oranghi (2004) investigated web usage in schools. The study participants were students, teachers and principals from 13 high schools in Tehran. Data were gathered through multiple sources using a checklist, questionnaire and interviews.. The results indicated that using the Web in schools enhanced collaborative learning process among students. The Iranian study found that 70 percent of teachers strongly confirmed that their students collaborate with them to use Web 2.0 for educational purposes. Web application in the classroom encouraged students to search for resources more effectively. The researchers found that the students used web resources for multiple purposes such as, carrying out classroom assignment, conducting research, preparing scientific reports and translating educational texts. Likewise, students benefited from the web technology by designing their own personal websites to present their publications. The students took the opportunity provided by the web to make their publications and ideas visible globally. Additionally, the Iranian study indicated that unlike traditional teaching learning tools, using the web in schools provided an exclusive opportunity for students and teachers to develop their domain knowledge and increase their information about specific subject areas. Overall, participants were positive about using web resources in classroom learning. Iranian students found using the web effortless and instant access to the Internet, hardware and software have increased their motivation to carry out group-based or individual classroom assignments.

Using a quantitative research approach Shafaipour Motlag (2011) conducted a questionnaire-based survey among the Iranian smart school teachers, randomly selected teachers teaching at smart schools in Iran. .The main purpose of the study was to investigate some efficient

educational strategies for developing teachers' needed skills for effective teaching in the smart schools. The research findings revealed that effectiveness teaching in smart schools requires educational strategies for developing teachers' needed skills. Results showed that the most efficient educational strategies in developing skills for virtual teachers were as follows: student awareness, students' methods of learning, understanding what students need to learn, finding ways of improving students' critical thinking, and finding the tools for involvement in learning. There was a significance relationship between finding the tools for involvement in learning and age service background , student awareness in understanding what the student need for learning and understanding the ways that could help students with regard to critical thinking. The recognition of the teaching – learning tools in virtual system was influenced by students' understanding for learning. The research suggested that teachers who want to teach in smart schools must be aware of effective tools and use them in their teaching.

Focusing on Iranian Smart schools, Motamedi & Piri (2014) conducted a survey among teachers and administrative staff of four top smart schools in Tehran using interviews and questionnaire as the data collection techniques. The main objective of this study was to answer the following research questions:

- What facilities and equipment are required for classes via the Internet?
- What skills are smart schools teachers and staff required to execute distance learning courses and what skills do they have.
- What is the current status of the smart schools facilities?

The results showed that there is significant relationship between hardware and software infrastructure in smart schools and the possibility of establishing distance education. Similarly the findings indicated that there is significant relationship between capability of

teachers and school administrative staff and distance education. Through this study three overall results were obtained as follows:

- Smart Schools do not have the potential functionality and capability for distance education courses.

- It is necessary that the teachers and administrative staff investigate further the distance education following up its implementation at different levels and in different classes.

- With regards to having the potential performance of such work and along with the progress made in this area, it is essential that schools have a systematic plan for the distance education and with the systematic and purposeful stances paving the way to achieve it. On the other hand, observing the positive relationship between the capability of teachers and administrative staff to establish distance education, it is essential that the country's education system authorities act toward holding classes to be able better act in continuing to apply the new teaching model.

In the Malaysian school context, Abrizah and Zainab (2011) found that history teachers have positive attitude towards integrating digital resources in their curriculum. Using digital resources provided an opportunity for teachers to use student-centred teaching method effectively. The teachers believed that using the Internet provided students with the opportunity to adopt self-directed learning.

Although, there is a wealth of literature on the positive perceptions about the Web and the use of online resources in supporting classroom instruction and enhancing teachers' pedagogical skills, (Herrington et al., 2009; Hennessy, Harrison & Wamakote, 2010; Lee & Tsai , 2010) there are other studies that show teachers' reluctance to use web resources in their curriculum.

For example, Ahmad (2014) found that Malaysian science teachers' general familiarity with technology and web resources, and their integration level of technology as well as web resources in classroom science were still below the expected standards. Ahmad reported that school-based and teacher-based inhibitors were the most important barriers to the integration of web technology in classroom teaching. Teachers lacked self-confidence in using web resources in the classroom and this was reported as one of the teacher-based inhibitor, which prevented teachers from effectively using new technology in their teaching activities.

Although the lack of self-confidence and school-based challenges have been reported as important barriers to teachers' use of web resource, there were other reasons. The report by the National Center for Education Statistics in United States (2000) indicated that although the majority of American secondary school teachers have ready access to technology in the classroom, many did not use it effectively for instructions (Gray, Thomas & Lewis, 2010 cited in Kusano et al., 2013). Even teachers who reported being competent and confident in computer-based activities still relied on traditional teacher-centred teaching approach (Prestridge, 2012 cited in Kusano et al., 2013). Therefore, it can be concluded that teachers' uncertainty about the quality of online information might be considered as one of the reasons for unsuccessful use of web-based learning resources in schools (Kuiper, Volman & Terwel, 2005; Braten, Stromso & Salmerón, 2011; Pattanaphanchai, O'Hara & Hall, 2013). Also, the perceptions and experiences of using web resources by teachers and students in school settings seemed to be a less-researched area (Wang & Strong, 1996). Therefore, this study aims to explore the concept of information quality or "Information fit for use" in the context of a smart school in Iran.

2.2. Teachers and Students Web Use Experiences and Perceptions

Web resources have been conceived as useful materials for teaching and learning in the educational context. Wu and Chen (2008) have outlined some advantages of using web resources in classrooms.

- Using web resources could help teachers to come up with new ideas in terms of providing their own lesson plans.
- Teachers could develop their professional knowledge by using resources found from other teachers' websites, where teachers presented and shared their lesson plans, curricula, and classroom activities.
- Collaborative teaching-learning opportunities provided by Web 2.0 enabled students to enrich their learning experience.

Currently the majority of studies in the educational contexts had focused on using web resources to achieve pedagogical aims. Therefore, there is a need to understand the teachers and students' perceptions and experiences of using web-based learning resources for instructional purposes. The following sections will examine teachers and students' perceptions and experience of using web resources in schools and other educational settings such as colleges and universities. Table 2.1 provides a chronological list of the number of empirical studies related to using web-based learning resources in the educational contexts in various countries. The following sections describe each study in detail.

Table 2.1: Studies on Teachers and Students' Experiences and Perceptions of Using Web-Based Learning Resources

Author (s)	Year	Place	Participants	Reseach Objectives

Herring	2001	USA	Faculty member	Understanding educators' attitudes towards students' use of web resources.
Grimes & Boening	2001	USA	College students & educators	Students real-world use and educators' expectation of students' use of web resources.
Peat et al.	2001	Australia	College students & faculty members	Investigating perception of use on-line information use in classroom.
McDowell	2002	USA	Lecturers	Exploring academic perspectives on use of web resources in teaching and learning.
Chien	2003	Taiwan	Elementary school teachers	Exploring teachers' motivation to use online resources.
Boskic	2003	Canada	Faculty members	Encountered challenges in terms of using web-based learning resources.
Recker et al.	2004	USA	Mathematics' teachers	Investigating teachers' use of digital resources
Wu & Chen	2008	Taiwan	Elementary school teachers	Investigating teachers' searching behaviour.
Julien & Barker	2009	Canada	High school students	Exploring students web use experience & evaluating criteria of web resources
Tahira& Ameen	2009	Pakistan	Faculty members' of Science & Technology	Investigating educators' Information needs & seeking behaviour
Walraven, Brand-Gruwel & Boshuizen	2009	Dutch	School students	Investigating students' web resources' seeking behaviour
Lee & Tsai	2010	Taiwan	Middle school teachers	Exploring teachers self-sufficiency to use web resources
Hadjerrout	2010	Norway	School teachers & students	Investigating perception of use web-based learning resources
Light & Polin	2010	USA	School teachers	Use of Web2.0 use in classroom
Abrizah & Zainab	2011	Malaysia	Secondary school teachers	Investigating teachers perception of integrating digital resources in currculum
Sandhu & Jalandhar	2012	India	Engineering students	Investigating attitudes and experience of use open access web resources
Ahmad	2014	Malaysia	Secondary school teachers	Identfying teachers' perception of barriers to use web & ICT in classroom

In a quantitative study in the US, Herring (2001) investigated educators' attitudes towards their undergraduate students' use of web resources for class-related research. The study sampled 1,129 full-time faculty members in Alabama institutions of higher education employed in both public and private institutions as well as colleges and universities. The findings indicated that the majority of faculty members limit their students' use of the web, and guided students to specific sites, or required students to get permission to use specific sites. More than 83 percent of the faculty would ask their students to use other resources in conjunction with web resources. Although faculty accepted the web as an appropriate tool for their students' research, they did not consider it as a sufficient resource in either quantity or quality of research information available. In addition to that, there were other challenges

highlighted by educators as justification as to why they did not recommend students to use the web as the sole source for their research. This included the organization of web information, students' deficiencies in searching and evaluation skills as well as their inability to think critically and the tendency to plagiarise. They were also doubtful about the credibility, value, accuracy, authority, and reliability of web-based information. In terms of the content quality and accuracy factors of web resources, it appeared that there were variation in the views of teachers in the different disciplines. The faculty of "language and literature" paid lowest attention to accuracy and content reliability of web resources. The science faculty rated significantly higher on accuracy and format factors than did faculty from other disciplines. Overall, there was an explicit emphasis on the use of other resources in addition to web resources. From the findings it can be concluded that the faculty's perception of information quality of web resources would influence their intention to use web resources.

In a case study, Grimes and Boening (2001), tried to understand what college students did and what faculty members expected them to do when using web resources for learning and teaching. Multiple sources were used for data collection. Data were gathered through interviews with students and instructors and using a checklist. Also, the researchers conducted an analysis of the bibliography of each student's research paper to identify the types and quality of sources used. Students' interviews explored their understanding of the quality of resources they have chosen. Instructors' interviews were conducted to learn more about the instructions given to students regarding their required references as well as direction about how to use web resources. The other purposes were to identify the quality of resources that instructors expected students to use, and instructors' judgement of quality of web resources.

Grimes and his colleague (2001), indicated that students were evaluating web resources only superficially. The majority of students used general search engines to locate information for given topics. Students tended to rely on one search engine and they often obtained repeated texts, which did not offer them further information. The students identified the design of website as a credibility feature, and not the author or the content of the resources. All students were reluctant to take advantage of web guides or databases provided by the library.

The teachers' interviews indicated that they gave little guidance to students. The study revealed a gap between instructors' expectation of their students and students' actual performance regarding the use of web resources. The instructors believed that their students absolutely relied on unauthoritative web resources and ignored their directions when evaluating resources. Conversely most of the students believed that they have met their instructors' expectation for finding appropriate resources. Overall, the instructors did not consider web resources as appropriate source for their students' instruction.

The study suggested librarians could help to guide and prevent students from using unauthoritative web resources, by exposing them to high quality and easy-to-access electronic information resources. The study also suggested developing critical thinking skills among students and librarians, so that they could select and use authoritative web resources in their various roles.

In Australia, Peat and her colleagues (2001) used qualitative and quantitative approach to investigate students' and faculty's perceptions of using online information resources and integrating them into the curriculum. College students and laboratory teaching staff participated in this study. Data were gathered using survey, one-to-one interviews with teaching staff and focus group interviews with students.

The study showed that students did not use online information resources because of several reasons as follows:

- Lack of time;

- Unaware about the availability of resources;

- Lack of motivation to use online resources; and

- Accessibility problems.

Among these reasons lack of time and unawareness about the availability of resources appeared to be the most important reasons reported by students. The low use of online resources by students was also reported as the main concern of the educators. To overcome this challenge, the educators believed that students should be provided with sufficient and easy-to-access multimedia-based educational materials, rather than general Internet resources. The study suggested that the provision of online resources would not necessarily generate value-added learning. The likely available mismatch between students' actual needs and the online information products seemed to be the reason why students did not take up the new technology despite their capability to use web facilities.

In a qualitative study in the United States, McDowell (2002) explored academicians' perspectives on the use of web resources in learning and teaching and the practices they adopted. The data was collected through deep interviews with twelve lecturers from various disciplines such as physics, law, modern languages, geography, environmental science, engineering, English, information studies and geology. The findings indicated that the availability of huge number of divergent information resources was conceived as a threat by lecturers and they preferred preventing students from using these resources. They believed that unlike traditional resources, lack of control on the production of web resources provide opportunity for anyone to offer suspicious and misleading information. This would confuse

students who found difficulty in differentiating between valid and biased information. Hence, the stuation would affect the quality of assignments delivered by students, in terms of plagiarism and the legitimate use of Web sources. The study also showed that lecturers did not provide students with instructions on how to evaluate web resources before using them. Mostly, students relied on the websites recommended by their teachers. The study highlights a need for collaboration between librarians as experts of fast changing electronic environment and educators as subject experts to take advantage of web resources for educational purposes.

In Taiwan, Chien (2003 cited in Wu and Chen, 2008) found that Taiwanese school teachers tended to use online resources for the following purposes:

- To create instructional materials;
- To enrich their teaching activities;
- To search for instruction-related materials; and
- To find instructional web sites containing information resources for teaching.

Teachers in Taiwan have heavy teaching workload and they would mainly rely on online materials available on the Internet to support their teaching activities. As a result, the teachers mainly used online resources developed by government agencies, schools, individual school teachers and textbook publishers.

In another study conducted in Canada, Boskic (2003) investigated the challenges faced by educational practitioners, when designing, developing and selecting web-based learning objects. Applying multiple data collection techniques such as interviews, questionnaire and literature review, Boskic explored the criteria used by educators when selecting and evaluating learning objects. She found that "learning goal alignment" was the most important

criterion for selection of web-based learning resources, which required paying particular attention to the context of use. Content validity was identified as the second important criteria, which requires subject knowledge in particular. The study highlighted the importance of collaboration in the design of complex online teaching and learning materials as that brought together various skills and experiences to produce the most valuable web resources.

Recker and his colleagues (2004) in the United States conducted a case study and investigated, mathematics and science teachers' use of digital resources. The findings revealed that teachers preferred web educational resources that provide the following information and items, copyright and contact information, background information, maps, assessment materials, real world examples, table of contents, links to other sites' URLs, site map, age appropriateness, currency of information, relevance to curriculum, clear instruction, grouping a few related web site together, provision of an introductory text, provide links to core standards, filtered information for student use, additional information about type of digital resources, glossary, and created item-level metadata. Likewise, websites providing teachers with features such as organizing activities (e.g. book marking, listing, grouping) and forms and easy to modify templates, appeared to be attractive to teachers. The teachers also indicated the challenges they faced such as obtaining irrelevant information, getting low quality resources that needed major modifications, retrieving very simple or too advanced materials in terms of content and subject matter. Teachers needed to spend time to modify retrieved resources to align then with their lesson plans. Additionally, the large file sizes require big system utility space.

In their study of 30 elementary school teachers' use of web resources in Northern Taiwan, Wu and Chen (2008) investigated the searching behaviour of the teachers in a web site

especially designed for their teaching needs, called "the Learning Fueling Station web site". The researchers used interviews and observation approaches. The study showed that Taiwanese teachers use the Internet before designing their instructional activities. They prefer to use search engines, rather than referring directly to the "instructional materials web sites" available on the net, as they are unsure of finding appropriate materials via these websites. They also found it more convenient to use the search engines. Those who preferred to use the dedicated web sites gave three main reasons for their selection (p. 836):

- to refer to other teachers' materials;

- to acquire up-to-date information; and

- to ascertain the accuracy of their teaching materials.

The study showed that Taiwanese school teachers sought different types of resources on the net. Those teaching science and technology wanted materials related to animals, plants, meterology, earthquakes and astronomy. They also used the Internet to compensate for the deficiencies of classroom situations, when teaching experimental subjects, which required simulations. In such cases, they used photographs and multimedia, for science-related subjects. In the social sciences such as history, teachers used the Internet to complement resources from the textbooks, which contained few relevant materials, especially on the local community and traditional culture. Web resources in this situation added to the attractiveness of the subject and the learning materials used in the classroom.

In terms of types of instructional materials, Taiwanese teachers wanted "source materials" as they made teaching more interesting, and they obtained positive feedback from students. The materials included photographs and video clips. Teachers identified as useful ready-to-use instructional packages, learning sheets, test sheets and evaluation forms, Due to the diversity in the students' level of knowledge and abilities, lesson plans received the least attention

from teachers when searching on the web, as the plans might not match the learning needs and styles of their students.

Wu and Chen (2008) also showed that teachers' satisfaction with the Internet was dependent on the teachers' ability in conducting searches. Some teachers took a long time to find what they were looking for, and tended to visit certain websites, which they were more familiar with in terms of the search interface. According to Ivers (2002 cited in Wu and Chen, 2008), "although schoolteachers regard themselves as "intermediate users" of information technologies, they do not think they have the ability to apply these technologies in their teaching" (p.834). Therefore, although teachers had access to an online learning website containing learning materials for teaching, they did not find it good enough to be used for their teaching as its quantity was insufficient to meet their needs and the materials needed modifications to meet the needs and knowledge base of students.

In Canada a study of high-school students by Julien and her colleague (2009) explored the web use experiences of students and the criteria the students use to evaluate both printed and electronic materials they obtained on the web, and how they gain or gather the evaluation skills they needed for this purpose. The Canadian study showed that the Internet was the most frequently used source of information by the students when they were asked to do a research project for their class project. The students used Google as the key tool both for educational and entertainment purposes. Indeed, the term "Google" was used interchangeable with the Internet. The Internet was popular among the students because they perceived it as a convenient and familiar tool that provided various information sources. Furthermore, they believed that keyword searching feature of search engines make information easily accessible. However, they were unfamiliar with the benefits of "vocabulary control", which could improve their search results.

The findings also revealed that although Wikipedia was recognized as a non trustworthy source of information, it appeared to be one of the most popular sources of information, among Canadian students. Students found Wikipedia as an easy-to-use open source, whose content could be edited easily. When compared to the other websites, some of the participants believed that university web sites were more reputable and reliable than open source websites such as Wikipedia. As a result students used information from these sites for school purposes.

Julien and her colleague (2009) observed that students develop their search skills, when searching for information for their school projects and personal experiences. The Canadian students also prefer keyword searching when using a single search engine. Therefore, they were unaware of the potential strengths and weaknesses of search engines and their application for educational purposes. Relevancy judgment of information was assessed based on the connection (closeness) of the search results with the task questions at hand, which was obtained through skimming the key terms. Likewise, students identified information accuracy by comparing multiple resources for consistency among the retrieved resources. In the Canadian study students' ability in evaluating Internet-based information appeared to be unsophisticated, as they tended to ignore critical evaluation criteria such as, authority, accuracy, objectivity, currency, and coverage when obtaining information.

Tahira and Ameen (2009) conducted a survey and investigated the information needs and seeking behaviour of science and technology teachers in Pakistan. The main objectives of the research were:

- To understand the type of information needs of science and technology teachers;

- To find out the science and technology teachers' choice pattern when meeting their information needs; and

- To understand the impact of on-campus digital developments on participants use of e-resources and printed resources.

The findings from the Pakistani study were as follows.

- Direct access to e-resources played an important role in meeting respondents' information needs.

- Direct and easy access to e-resources slightly decreased the participants' use of traditional libraries.

- General web resources were considered as very important information resources followed by university libraries and digital libraries for seeking relevant information respectively.

- The respondents used traditional and digital resources for various teaching-learning purposes such as updating information, guiding students in their research work, and publishing papers or books.

- The respondents prefer to start their search using general web resources followed by physically going to the library.

- The participants spend more time on searching web sources than print sources.

- The educators needed to attend information literacy workshops, which would enable them make extensive use of all types of information sources, specifically web resources and digital libraries.

Using a qualitative research approach, Walraven and her colleagues (2009) investigated the criteria that the secondary level Dutch students' (23) used when seeking information on the web for the purpose of problem-solving. The needed data was collected by using multiple

methods of data collection, including questionnaire, thinking aloud technique, and focus group discussions. Data was analysed using qualitative data analysis technique. Firstly, the questionnaire was used to collect the knowledge and conceptions of Dutch students about the web. Using "thinking aloud" approach the students were required to complete several tasks by their teachers. Subsequently, the students attended focus group discussions and talked about the criteria they used to find and evaluate information resources on the web.

Walraven et al. (2009) also found that Dutch students did not want to put much effort in finding and evaluating appropriate information on the web. They were more interested in finding the needed information on a particular topic instantly using the search engine. Also, the students did not critically evaluate the search results in terms of their content of information. The students would rely on the title and summary offered on the website in the hit list. Overall, they tended to use general criteria when selecting and evaluating resources rather than use domain oriented criteria.

For the Dutch students, finding information that felt to be connected to the task ("connection to task") at hand and "agrees with more sites" appeared to be the most important criteria for web resource evaluation. The "connection to task" was linked to the usability feature of the information, which meant that the Dutch students searched for useful information that would help them answer their questions. Likewise, the criterion "agrees with more sites" was perceived as a sign representing trustworthiness of information. For example, a single information source, which appeared in various websites were identified as more credible. Related to the credibility issue, the study indicated that critical criteria such as targeted audience, expertise of author, references and related goals were ignored by the students.

However, the students did recognize those criteria as important, while discussing them in the group.

In the Dutch study the language of the resources and writing style (e.g. spelling errors) were reported as the criteria for regarding information as usable. The students asserted that time limitation for completing the task forced them to evaluate resources superficially. They would evaluate information more critically if they were not restricted by time. The study suggested that students must be informed (and be able to recognize) about their evaluation behaviour and made aware about misconceptions when evaluating information. The study suggested enhancing students' evaluation skills to help them deal with the web information resources critically.

In a quantitative study of 558 Taiwanese middle school teachers, Lee and Tsai (2010) developed a framework to explore teachers self efficiency in terms of their technological, pedagogical and content knowledge of web resources, and also to examine teachers' attitudes towards web-based instruction. The framework contained three areas of knowledge.

- The "web general knowledge" measured teacher's confidence in using search engines, downloading pictures, copying text on the web into word documents, connecting to the various relevant websites, and so forth.
- "Web-content knowledge" measured teachers' confidence in their knowledge about the way in which the web and its content can jointly support each other, for example the ability to search for various materials on the web and integrate them into course contents.
- "Web-pedagogy knowledge" assessed teachers' confidence in their knowledge about the availability, components and functions of the web as they are used in educational

context, for example the ability to use the web to enhance students' learning motivation.

The results of the Taiwanese study revealed that teachers suffer from a lack of general knowledge on web-related pedagogy. Although they expressed relatively high level of self-efficacy in terms of their general use of the web, the older teachers were less confident in integrating web-related knowledge into their students' instruction. In contrast, the teachers who were more experienced using the web appeared to be more confident in embedding web technology into their pedagogy. To increase teachers' web based pedagogical knowledge, Lee and Tsai (2010) suggested that teachers be given training courses. Previous researchers have also implicitly emphasized the importance of increasing pedagogical and technological knowledge amongst users of the web.

In a case study carried out in Norway, Hadjerrout (2010) investigated students' and school teachers' perceptions of web-based learning resources, using a framework of critical elements of web-based learning resources design in the school contexts. The study population comprised 65 students and three school teachers from different classes within the same school and three teams of trainee teachers who were designing web resources in collaboration with other teachers.

The topic chosen by the Norwegian teachers was on "information resources", which was used to evaluate the process of the study, and the resources were produced by trainee teachers who participated in the study. Data were collected using two survey questionnaires, one for the students and one for the teachers. The findings revealed that there was a high degree of similarities regarding the perceptions about technical and pedagogical usability amongst the teachers and students. However their perceptions about the role of other learning resources differed. Most students preferred web resources over textbooks, in contrast with teachers who

felt that web resources were not better than textbooks. The Norwegian teachers were typically concerned about educational outcome, which could be achieved through the use of a combination of several different resources. The students were more concerned about the ease of accessing the web resources. Students believed that web resources were easy to understand and use, and took less time than text books to learn the subject matter.

Furthermore, Hadjerrout (2010) also found a positive relationship between technical and pedagogical usability related to aspects such as, interactivity, understandability, added value, motivation, and so forth. There was also a negative relationship between technical and pedagogical usability in terms of collaboration. This might be because web resources with higher technical usability in terms of the design of their content pages and sites were more likely to cause a decline in students' needs to collaborate and use other resources. From the motivational perspective, both students and teachers agreed that web resources are exciting, interactive and instructive. However, teachers expected much more interactivity related to web resources. Although the Norwegian teachers agreed that web resources were aligned with their curriculum, this perception cannot be generalized to all educational web resources available on the web. The web resources used by the teachers were selected by themselves in the various subject areas. This selections indicated that the teachers have undertaken the first phase of quality control before using the resources to produce their learning content.

The Norwegian teachers believed that individual differences affected information users' decisions to select between traditional resources and web resources. Teachers declared that in some cases, web resources failed to address or match the entire knowledge level of students. Furthermore, all teachers liked animations, which made the text covering the subjects easier to be understood by the students.

Some studies investigated respondents' use of a specific application. In the United States, Light and Polin (2010) carried a two-year study and investigated school teachers' uses of web 2.0 tools in the classroom. Data was gathered from individual interviews and observations of 39 school teachers. The main findings of the research were as follows.

- Teachers felt that using web resources allowed them to feel more connected to their students and provided a new way of engaging them in class materials.

- Ease of use was the most important reason chosen by the teachers when deciding to use web resources.

- Web resources provided the teachers with easy and fast communication between students and teachers.

- Using web resources helped foster teachers' professional knowledge.

- Students and teachers found class web logs useful in providing them with the latest resources related to given assignments and scientific class discussions.

- Students found feedbacks provided by comments in web logs useful to improve their scholarly work.

- Teachers perceived that using web resources would foster their professional knowledge.

- Teachers gave more attention to ready-to-use web resources because they can be used easily.

- Teachers indicated that difficulties faced when using digital resources would more likely frustrate and prevent them from continuing to use web resources in classroom teaching.

In Malaysia, Abrizah and Zainab (2011) used the case study approach to investigate secondary school teachers' perceptions about integrating digital resources in their curriculum when covering writing history projects. Data was gathered using two focus group interviews with six history teachers. The main finding of the study indicated the teachers' perceptions when using digital resources in the classroom.

- The teachers have positive attitude towards integrating digital resources in their curriculum.

- The teachers were interested in intergrating diagrams and pictures in texts to better visualize concepts.

- The history teachers believed that their students needed adequate amount of digital resources, which are appropriate with their grade levels.

- The teachers believed that using the Internet supported self-directed learning opportunity for students.

- Students could conveniently have access to digital resources.

- Using digital resources provided teachers with the opportunity to use student-centered teaching approaches effectively.

- In collaborative publishing environment, the students were more careful about the quality of the contents they created because they knew that their work would be read by their peers, teachers and other users.

- The Malaysian students were familiar with Internet and web technology, and would have no difficulties in publishing their works electronically and submitting to a history project reports repository.

- Students used digital resources as pre-requested sources for classroom discussions.

- Using digital resource would help the students to enrich their information literacy skills.

- Teachers could use Internet resources to plan lessons and create resources.

- Professional development is critical to the successful integration of digital resources in instructions and learning. The history teachers expressed frustration about the lack of training opportunities to upgrade their technology skills.

In addition to the perceived advantages of using digital resources for students' instruction, the history teachers in this study highlighted some barriers to effective use of digital resources in the classroom. The teachers revealed that lack of time and inadequate technological skills were the two important obstacles that limited their use of digital resources in the classroom.

In India, Sandhu and Jalandhar (2012), investigated the attitudes and use experiences of 460 Indian engineering students of open access web resources. Open access resources included open access journals, institutional repositories, and self-archived materials on personal websites.

The Indian study revealed that in addition to paid resources, students did use open access web resources to find information about specialized topics. The majority of students considered using both open access web resources and paid resources to obtain information. The students found the open web resources unique and provided them with easy access to the newest scholarly information published in the various fields. The immediate access to the latest scientific papers using RSS feeds in scholarly websites was also acknowledged by the students. However, only 9% of the students agreed that open access web resources would lead to the demise of print journals. Web-based institutional repositories were also identified as a useful alternative to traditional libraries to borrow materials. However, this situation

depended on the support given by their institution in encouraging and supporting the professional to use open access web resources.

In another Malaysian study, Ahmad (2014) surveyed Malaysian secondary school teachers' to find out their perceptions on the barriers to using ICT in the classroom. A total of 151 secondary school science teachers in Kuala Lumpur and Selangor were selected to participate in the survey. Data was gathered using the questionnaire. The results indicated that in general, the science teachers were not unfamiliar with new technology. The teachers claimed that the minimum technology usage was confined to the use of PowerPoint to deliver the contents of their instructions. The teachers indicated that they could use web-based technology and ICT facilities to clarify complex science concepts. However, in practice the teachers did not use web–based resources and ICT in their science classes.

The Malaysian teachers indicated four major barriers that inhibited them from using new technology in the classroom. These barriers were, a)the teachers' lack of self-confidence in using ICT in the classroom; b) negative attitude toward using technology, such as the unwillingness of teachers to use; c) negative beliefs such as using new technology in classroom is time-consuming; and d) lack of school support such as inadequate technological facilities in schools. The results showed that, three of the four main reasons are teacher-level barriers, which stemmed from within the teachers themselves. The study has suggested that in order to empower teachers to use new technology successfully, subject-specific technology training programmes must be provided in schools.

Reviewing the literature in this section revealed that there are some challenges and approaches to provide effective use of web-based learning resources in educational contexts. Some of these challenges address the teachers and students abilities and confidence in using

web resources for educational purposes. Another challenge is the quality of information available on the web, which relates to the issue of trustworthiness. Tables 2.2 and 2.3 summarizes the studies that highlighted the challenges to, and solutions for using of web resources in educational settings.

Table 2.2: Challenges to Using Web Resources in Educational Settings

Challenges	Author (s)
▪ Organization of information on the Web. ▪ Plagiarism. ▪ Students' lack of searching and evaluation skills.	Herring (2001)
▪ Lack of quality control on the web resources. ▪ Difficulty of controlling web use by students, such as copying and pasting practices.	McDowell (2002)
▪ Students' use of general search engines, instead of the library. databases and web guides. ▪ Students' reliance on unauthoritative web resources and ignoring instructors' guidance. ▪ No deep evaluation of information on the web.	Grimes et al. (2001)
▪ Time-consuming to get quality information. ▪ Need for major modifications to align web resources with the syllabus. ▪ Big file size, taking big space on the learning system.	Recker et al. (2004)
▪ The web–discouraged students' use of other resources. ▪ May not meet every individual student's ability in using web resources.	Hadjerrout (2010)
▪ Lack of evaluation skills, or ignoring evaluation phase. ▪ Relying on simple searching, using a single search engine. ▪ Unaware of the potential strengths and weaknesses of search engines. ▪ School projects and personal experience as the main source for developing web-use (IL) skills	Julien et al. (2009)

Table 2.3: Solutions to Using Web Resources in Educational Settings

Solutions	Authors (s)
▪ Limit students to using specific sites only. ▪ Use other resources along with web resources. ▪ Critical thinking for information evaluation.	Herring (2001)
▪ Provide students with information evaluation skills training before using the web. ▪ Rely on lecturers' recommendations. ▪ Collaborate between faculty and librarians for effective use of web resources.	McDowell (2002)
▪ Librarians provide students with high-quality and easy accessible electronic information resources or help them to select web resources ▪ Librarians help to develoe critical thinking skills in students.	Grimes et al. (2001)
▪ Have general knowledge on computers and computer networks. ▪ Know how the Internet is structured. ▪ Know how other teachers have used and are using the Internet	Egnatoff (2003)
▪ Receive adequate training. ▪ Have ready access to technology support. ▪ Equip classrooms with computers and Internet connection, so that teachers would be eager to use computers and link to the internet.	Lanahan (2000)
▪ Take professional development courses to learn how to integrate the Internet resources into their curriculum.	Wells & Lewis (2006)
▪ Collaborate in the design of complex online teaching and learning materials.	Boskic (2003)
▪ Provide teachers with training courses on pedagogical and technological knowledge of web-based learning and teaching	Lee & Tsai (2010)

2.3. Information Quality and Credibility Assessment

The literature reviewed revealed users' worries about the credibility of web resources used in educational contexts. The following sections cover previous studies that identified key credibility issues and acceptable information quality dimensions of web resources.

Previous studies showed two different approaches users used to assess credibility of web resources, which included checklists and critical thinking skills. The checklist approach was similar to the one that librarians used to evaluate printed materials. It included items such as accuracy, authority, objectivity, currency, and coverage (Rieh & Danielson, 2007). The checklist approach included a series of questions designed to help students decide whether the web resource meets the specified needs. However, the checklist approach provided some challenges too (Metzger, Flanagin & Zwarun, 2003; Rieh, 2002; Meola, 2004; Scholz-Crane, 1998). For example, even though a website does not contain contact information, it does not mean that its content is of low quality, because some authors who are well-known but reclusive would naturally be reluctant to give out their e-mail address. Another problem with the application of the checklist model in practice is that it could promote evaluation in a mechanical way, that is, it may not support the higher-level judgment and intuition that we sought to cultivate as part of critical thinking. As highlighted by Scholz-Crane (1998), the sole use of evaluation checklist was inadequate to assist students to evaluate information as it did not involve critical thinking and evaluation skills.

Previous studies found that some users were reluctant to exert much effort and time to use a checklist, when evaluating web resources (Scholz-Crane, 1998; Metzger, Flanagin & Zwarun, 2003; Meola, 2004). Meola (2004), for example, indicated that the checklist could give correct web-site evaluation when the given input was right. The checklist promotes the idea that

students who proceed down the list and successfully check off the questions could mechanically arrive at a determination of quality (Meola, 2004).

The researchers took critical thinking into account when evaluating the credibility of information. For example central processing is a concept, which has been used by Petty and Cacioppo (1986, cited in Freeman & Spyridakis, 2004) inspired by the Elaboration Likelihood Model (ELM). According to this model central processing involves users' conscious cognitive effort to critically assess arguments in the text. Petty and Cacioppo (1986) argued that users apply central processing when evaluating information if they believe that the content of information are authoritative, relevant and able to process the information in a message.

Kapoun (1998) proposed 27 questions or statements to provoke critical thinking and to aid the evaluation of web resources. The statements, which incorporated five (5) criteria (accuracy, authority, objectivity, currency and coverage) served as guidelines for undergraduate students to evaluate web resources for their research. Similar approach was undertaken by Van Fossen and Shiveley (2000). They provided guidelines for social science teachers and students to help them sift and recognize useful and credible information through the plethora of unequal web information resources. Their guidelines provided six user accepted key criteria for evaluating web information resources and considerations given to critical thinking. These criteria were, a) authorship/source, b) objectivity/bias, c) validity of content, d) bibliography/reference links, e) currency, and f) quality of writing. They have also designed 32 questions addressing the criteria.

Based on four years of quantitative research on web credibility, Fogg (2003) developed the prominence-interpretation theory, which posits two aspects of credibility assessment, the

likelihood of an element related to the source or message being noticed when people evaluate credibility (prominence) and the value or meaning assigned to the element based on user's judgment of how the element affected the likelihood of the information being good or bad (interpretation). According to Fogg five factors affected information prominence, including user involvement, information topic, task, experience level, and other individual differences. Three factors affecting interpretation were identified, which included user assumptions, user skills and knowledge, and contextual factors such as the environment in which the assessment is made. Fogg explained how people repeated their evaluative processes, focusing on different web site elements until they were satisfied with their credibility assessments or until other constraints, such as lack of time or skill, stopped them.

Metzger (2007) proposed a hybrid approach to assess credibility. This approach focused on the individual Internet users' motivations and purpose for seeking information online,. For example, users could be taught to use the checklist, when they felt motivated to obtain high-quality, credible information, while the less motivated users could be taught to consider simple heuristics, such as, checking for source or sponsorship information. This makes the critical evaluation skills more focused and less effortful for users to perform in the majority of their searches, and it is more realistic for educators to expect of users.

During an empirical study of website credibility, Ahmad et al. (2010) examined the influence of users' web experience and skills on their credibility judgments. The authors recruited three types of users including novices, intermediate and experts. Their findings indicated that novice users rely solely on structural or surface credibility including aesthetic, links, policy, affiliation, sponsor, domain name, advertisement, and contact number. Intermediate users rated professional looking websites as more credible. They perceived a credible website

would pose good organization of images and text, balanced color schemes and an optimal use of white space and grid formatting. The expert users did not solely rely on the appearance of websites but also considered both structural and message credibility features. For message features they focused on information quality indicators, such as information organization, consistency, currency and language used. Based on experts beliefs bad grammar, spelling mistakes, slang words reduced website credibility. From the aspects of the domain name experts and intermediate users were able to recognize reputable affiliation and organizations as credibility indicators compared to novice users. Website familiarity and past experience of using the website have also impacted on website credibility.

Links located on web sites were scrutinized by experts and intermediates. Links were appreciated by experts because they provided additional information. However, broken links on the other hand were considered as a hindrance to website credibility.

Experts were more careful than novices in perceiving advertisements in websites. Generally, experts viewed advertisements in web pages as negative. Advertisements that are related to the content and supported by reputable organizations are more tolerable from the expert's viewpoints. The underlying motive has been one of the key factors considered by experts in evaluating web sites. Experts believed that websites would lose credibility because of purposeful inspiration.

Lucassen and his colleagues (2011) focused on the impact of individual differences on user's evaluation process and proposed a web credibility assessment model. According to this model judgments related to trustworthy information were influenced by users' characteristics, such as their source experience, domain expertise, and information skills. Applying any of

these three characteristics led to different features of the information being used in trust judgments, namely source, semantic, and surface features. In this model, semantic feature of information represents features that are related to the content, comprising factual accuracy and completeness. Surface features concern issues related to information presentations such as, length of sentences, writing style and references. Source feature indicates features such as authority of websites. Lucassen and his colleagues (2011) found a positive relationship existed between semantic features and domain expertise. Comparing novice participants with domain experts, the study indicated that domain experts no longer notice surface features but were focused on content based features. Conversely, unlike experts, novice participants would typically rely on surface features when making trust judgment and were reluctant to take into account content based features. This, consequently, reduced their motivation to use various information resources. The study showed that people with different information skills could be expected to assess credibility of information differently. Also, novice users with limited domain and information knowledge relied on source experience, which did not require specific knowledge. In conclusion, the researchers suggested that judgment of information trustworthiness could be improved through collaboration of both domain and information experts.

The next section of this chapter focuses on studies that cover information quality frameworks that have been developed to identify key information quality dimensions on the web.

2.4. Information Quality frameworks for Web Evaluation

The Oxford English Dictionary (OED) defines framework as "work done in or with a frame; a structure composed of parts framed together". During the past decades many researchers developed different types of information quality frameworks. Wang and Strong (1996) have classified information quality frameworks according to three approaches, which includes, a) intuitive, b) theoretical, and c) empirical.

According to Wang and Strong (1996) the intuitive approach addressed the researcher's intuition and their experiences in terms of selecting information quality attributes. On the other hand, the theoretical approach of information quality dimensions was part of a broad theory of information relationships and dynamics. Finally, the empirical approach, used the information users' data to identify, which dimensions the users apply for assessing information quality (Wang & Strong, 1996). The following sections will focus on studies related to the empirical approach concerning information fit for use and describe information quality assessment frameworks.

Table 2.4 shows a chronological list of studies covering information quality assessment frameworks of web-based information and services.

Table2.4. List of Studies on the Dimensions Covered by Web Information Quality Assessment Frameworks.

Author(s)	Year	Information quality framework	Categories	Sub-categories/dimensions
Wang & Strong	1996	General websites	Intrinsic, accessibility, contextual, presentational	objectivity, accuracy, believability , reputation, security, access, completeness, amount of data, value-added, relevance, timeliness, ease of understanding, interpretability, concise and consistent representation.
Katerattana kul & Siau	1999	Individual websites	Intrinsic, contextual, representational, accessibility.	Accurate, workable, relevant hyperlinks, provision of the author's information, organization, visual settings, typographical features, consistency, vividness and attractiveness of the webpage, navigational tools.
Liu & Chi	2002	Evaluation of data quality	Data collection quality, data organization quality, data presentation quality, data application quality.	Accuracy, objectivity, trustworthiness, completeness, clarity, reliability, consistency, storage efficiency, retrieval efficiency, navigability, semantic stability, faithfulness, neutrality, interpretability, timeliness, ease of manipulation, privacy, relevancy, appropriate amount of data.
Eppler & Muenzenma yer	2002	Individual websites	Content quality, media quality.	Concise, consistent, accurate, current, timeliness, traceability, interactivity of the webpage, accessibility, security, retrieval speed of the webpage, maintainability, structure, navigation, presentation, timeliness, usability, objectivity' believability, relevance to the task, amount of information.
Chae et al.	2002	Internet services	Connection quality, content quality, contextual quality, interaction quality	
Stvilia	2006	Wikipedia	Intrinsic, relational, contextual, reputational	Authority, intrinsic accuracy, cohesiveness, complexity, semantic consistency, structural consistency, currency, informativeness, natuarility, precision completeness, verifiability, volatility.
Djajadikert, & Triresksani	2006	Academic websites	Information quality,technical adequacy, service ability, Web appearance.	Usefulness, clarity completeness, accuracy, currency , conciseness, search facilities, valid links, Ease of navigation, availability, speed of page loading, personalisation or customisation, interactivity, ease of accessing the site, finding contact information, finding research information, finding general information, finding courses/subjects details, academic policies, attractiveness, proper use of colours, proper use of fonts, proper use of multimedia.
Kargar Bideh	2008	Educational web logs	Subjective score, authority, link popularity, timeliness, latency, maturity,multimedia rate and web log size.	Informativeness, concise, presentation, believability, completeness, objectiveness, accuracy, understandability, received comments, visitors, written comments, comment per entry, internal links, visited links, external links, availability, last update, login, first load time , full load time, age, meta tags.
Helfert & Foley	2009	Context awareness of web information	Syntax, semantics, pragmatic.	Consistent and adequate sentax, syntactical correctness , consistent representation, security, accessibility, objective data definitions, precise data definitions and easy to understand, consistent data value, accuracy (free of error), interpretability, complete data values , believability, reliability, relevance, completeness, timeliness, efficiency, actuality.
Hadjerrout	2010	Web-based learning	Technical usability, pedagogical	Content design, page design, site design, understandability, added value, goal-orientation, time,

| | | resources | usability. | interactivity, multimedia, motivation, differentiation, flexibility , autonomy , collaborative learning, variation |
| | | | | |

Table 2.5: Cont'd

Author(s)	Year	Information quality framework	Categories	Sub-categories/dimensions
Hasan & Abuelrub	2011	Individual successful web sites	Content, design, organization, user-friendly.	Timeliness, relevance, multi-language/culture, variety of presentation, accuracy, objectivity, authority, attractiveness, appropriateness, color, image/sound/video, text, index, mapping, consistency, links, logo, domain, usability, reliability, security, privacy, customization, interactivity
Chen & Tseng	2011	Web-based product reviews	Intrinsic, accessibility, contextual, representational.	Believability, objectivity, reputation, relevance, timeliness, completeness, appropriate amount of information, ease of understanding, concise representation.
Chen et al.	2012	Free online information	Authority	Author/creator's information included, author/creator's credentials, credibility of the website / publisher, reliable information source.
Schaal et al.	2012	Social web	syntactic quality, semantic quality, user-pragmatic quality, information pragmatic quality, process pragmatic quality.	Collaborative content creation (CCC), media provision (MP), metadata generation (MG), social networking (SN).
Rafe & Monfaredzadeh	2012	Medical websites	Content quality, design quality, organization quality, user friendly quality, performance quality, service quality, technical points.	See (p. 61)

Using the empirical approach, Wang and Strong (1996) provided 15 general information quality dimensions grouped under four categories as follows, 1) intrinsic information quality dimension, comprising objectivity, accuracy, believability and reputation, 2) accessibility information quality dimensions, which includes security and access, 3) contextual information quality dimensions, comprising completeness, amount of data, value-added, relevance, timeliness, and 4) presentational information quality dimensions, encompassing ease of understanding, interpretability, concise and consistent representation.

Wang and Strong's framework was a generic and widely applicable framework that can be used within various domains (Eppler & Muenzenmayer, 2002, cited in Chen & Tseng, 2011). Therefore, in web information quality studies, several researchers have adopted Wang and Strong's framework in order to develop specific information quality framework. For example, Katerattanakul and Siau (1999) extended Wang and Strong's (1996) framework to describe four information quality indicators of individual websites. The framework they proposed included four information quality dimensions, intrinsic, contextual, presentational, and accessibility. The main determinant of intrinsic information quality of individual websites was accuracy, specifically accuracy of the content and accuracy of hyperlinks. The accuracy of the contents concerns inaccurate content including grammatical and spelling errors or inaccurate information. The accuracy of hyperlinks addressed the justification of various navigational guides. Therefore, Katerattanakul and Siau (1999) propose that intrinsic information quality of individual Web sites should be evaluated by examining the accuracy criterion, referring to the number of grammatical and spelling errors, relevancy of hyperlinks and availability of broken links on the individual websites. In this framework contextual category included the provision of the author's information and presentational information quality concerns organization, typographical features, consistency, visual settings, vividness and attractiveness of the webpages. Furthermore, accessibility addresses the navigational tools used to access and move around the website.

Again, following Wang and Strong's (1996) framework, Liu and Chi (2002) proposed the evolutional data quality framework. The evaluational framework included four quality categories and these were quality data collection, data organization, data presentation, and data application. The framework conceptualized user-information interaction within two contexts, information production and information use. In this framework data collection

quality included, information quality dimensions such as accuracy, clarity, objectivity, trustworthiness and completeness. On the other hand, organization quality encompassed reliability, consistency, storage efficiency, retrieval efficiency and navigability. Presentation quality included information quality dimensions such as interpretability, faithfulness, neutrality and semantic stability. Furthermore, application quality contained dimensions like ease of manipulation, timeliness, privacy, security, relevancy and appropriate amount of information.

Eppler and Muenzenmayer (2002) developed their information quality framework in the context of assessing the quality of websites. They divided their framework into two quality categories, including media quality and content quality. From the two categories, Eppler and Muenenmayer developed 16 information quality criteria and related indicators. They used server and network monitoring tools, site analyser and user survey as the measurement tools. In their framework the content quality referred to the provision of comprehensive, clear, accurate and applicable information. Media quality focused on the quality of the medium used to deliver the web content. It included criteria such as, convenience, traceability, timeliness, and interactivity of the webpage. In addition other quality criteria that emerged from the result of their study were retrieval speed of the webpage, accessibility, security, and maintainability.

Stvilia (2006) focused on information quality problems and assurance and proposed an information quality (IQ) framework containing 22 dimensions. He classified IQ dimensions into three categories including, intrinsic, relational, and reputational. Intrinsic dimensions measured internal attributes of an information object that were independent of used context. Relational information quality dimensions, on the other hand, measured relationship between

information and aspects related to the usage context. Reputational information quality dimensions referred to context-specific structures and measured the position of information in conjunction with the cultural or specific activity.

Intrinsic IQ category included the following dimensions, accuracy, cohesiveness, complexity, semantic consistency, structural consistency, currency, informativeness, and precision completeness. Relational or contextual category comprised accuracy, accessibility, complexity, naturalness, informativeness, relevance, precision completeness, security, semantic consistency, structural consistency, verifiability, and volatility. Finally reputational IQ embraced authority as an IQ dimension.

Previous researches indicated two case studies, which used both qualitative and quantitative techniques such as, content analysis and meta-analysis to validate the IQ framework. Chae and his colleagues (2002) proposed an IQ framework for assessing the information quality of a mobile Internet service. The model they proposed, modified and extended the four IQ categories proposed by Wang and Strong (1996) and consisted four dimensions. These dimensions were, connection quality, content quality, contextual quality, interaction quality.

Connection quality referred to stable mobile services without interruption of connection. This feature gave users satisfaction because it enabled them to focus on completing their tasks in consistent manner. Content quality on the other hand addressed the intrinsic value and usefulness of the information provided by mobile services. Contextual quality was considered in conjunction with the users' task at hand, that is, users should be able to use the information without time or place restriction. Interaction quality could be achieved by easy and efficient ways of interaction. The authors revealed that all of the dimensions have positive impact on customers' satisfaction and loyalty to mobile Internet information.

An IQ framework for academic websites of New Zealand universities was developed by Djajadikerta and Trireksani (2006). Their framework included 23 dimensions under four categories of IQ used to evaluate academic websites' quality. These categories were, information quality, technical adequacy, service ability and web appearance. Among the four categories, information quality was considered most important as it was related to issues about the content of academic websites. According to this framework information quality category comprised dimensions such as, usefulness, clarity completeness, accuracy, currency and conciseness. Technical adequacy on the other hand, contained dimensions such as search facilities, valid links, ease of navigation, availability, speed of page loading, personalisation or customisation, interactivity and ease of accessing the site. Service ability referred to issues related to finding contact information, research information, general information, courses or subjects details and academic policies. Finally web appearance included the organisation of information, attractiveness, proper use of colours, proper use of fonts, and proper use of multimedia. The results of this study provided important guidelines for the design and evaluation of university Web sites.

In Iran, Kargar Bideh (2008) proposed a framework for evaluating information quality of Farsi Web logs. Based on the theoretical background, the researchers firstly selected information quality dimensions for web logs. Subsequently, they used an experimental approach to derive new dimensions for Farsi web logs. Seven information dimensions emerged from the data related to Farsi web logs. The following sections describe the emerging dimensions and related sub-dimensions.

The first dimension that emerged was "subjective score", which included the sub-dimensions, cohesiveness, informativeness, conciseness, presentation, believability, completeness, objectiveness, accuracy, and understandability.

"Authority" was the second suggested dimension. The sub-dimensions for "authority" were: received comments, visitors, written comments, and comment per entry. According to the researcher although the authority dimension is a common dimension introduced by many information quality frameworks, the relevant sub-dimensions are new for Farsi web logs.

"Link popularity" was identified as the third information quality dimension for Farsi web logs. Sub-dimensions for this dimension comprised internal links, visited links, and external links.

"Timeliness" was identified as the other quality dimension for Farsi web logs. The sub-criteria for this dimension included, availability, last update, and login. It indicated which Web log had more updated and available links.

"Latency" was another dimension. This dimension included sub-dimensions, first load time and full load time.

"Maturity" which was introduced as the other dimension comprised sub-dimensions, age, and Meta tags. Based on "age" dimension the older Web logs have more Meta tags than young Web logs.

Finally, "Multimedia rate" and "Web log size" were the last dimensions, which have been identified for Farsi web logs. Kargar Bideh (2008) indicated that the two dimensions should be considered together because while the extensive use of multimedia elements might increase visuality of Web log, however, the size of these elements may lead to an increase in the size of Web logs and consequently to increase in redundancy of information.

Following the semiotics theory, Helfert and Foley (2009) proposed their context aware information quality framework. The research focused on developing a context-specific

framework by using a large number of information quality dimensions obtained from general information quality frameworks. Then, the researchers classified their framework based on three semiotics levels including, syntax, semantic and pragmatic levels. The syntax level dealt with syntactical concerns and technical context. This basic level included symbols, signals and characters. The semantic level was concerned with real world objects and implies meanings to signals. The pragmatic level addressed quality as perceived by information users and information process.

In this framework, for each of the semiotics level the researchers identified dimensions in association with two quality aspects, and there were quality of design and quality of conformance. The syntax level comprised information quality dimensions such as, consistent and adequate syntax, syntactical correctness, consistent representation, security, and accessibility. The semantic level included the following information quality dimensions: objective data definitions, precise data definitions and easy to understand, consistent data value, accurate (free of error), interpretability, complete data values, believability, and reliability. Finally, the pragmatic level included dimensions such as relevance, completeness, timeliness, efficiency, and actuality.

To ensure the applicability of the framework in information system, the researchers conducted an experiment. The results provided four most relevant dimensions that were applicable to information system. These dimensions were free-of-error, consistency, completeness, and timeliness. In order to measure the selected dimensions the researchers applied AIMQ methodology.

In Norway, Hadjerrout (2010) used the literature and case study approach to develop an information quality framework for web-based learning resources, that could be used in the school context. The framework comprised three main components, which included a) features

of web resources, b) usability criteria and c) context of use related to web-based learning resources. The author has classified the usability criteria of web-based learning resources under two main categories, technical usability and pedagogical usability. Technical usability included the criteria such as content design, page design and site design. pedagogical usability included criteria such as understandability, added value, goal-orientation, timeliness, interactivity, multimedia contents, motivation, differentiation, flexibility, autonomy, and collaborative learning.

Hasan and Abuelrub (2011) developed their website quality framework to identify the indicators that are expected to be included in a successful website. The framework covers four categories including content, design, organization and user friendliness. Each of category contained several indicators. The content quality comprised indicators such as timeliness, relevace, multilanguage/culture, variety of presentation, accuracy and objective authority. The design quality comprises several indicators including, attractiveness, appropriateness, color, image/sound/video, and text. The category, organization included quality idicators related to index, mapping, consistency, links, logo, and domain. Finally, user-friendly category highlighted usability, reliability, security/privacy, customization, and interactive features.

Chen and Tseng (2011) proposed a method for evaluating the information quality of product reviews. To develop their model the researchers have followed Wang and Strong's (1996) information quality framework. They have considered review as an information item and have identified five classes of review quality in their framework. These classes were high-quality, medium-quality, low-quality, duplicates, and spam.

Chen and Tseng considered completeness and timeliness of information as important features of high-quality review. Therefore high-quality reviews should contain a large number of opinions to help readers make decision whether to purchase products.

In the framework, the contents of medium-quality reviews were relevant to the product, but it is not informative enough. Although, such reviews were interesting, they might not influence readers decision making to purchase. Low-quality reviews, on the other hand, provided consumer with insufficient information about the product and duplicate reviews contained redundant contents, which could be plagiarised or repeated content posted by mistake. Finally, spam reviews contained irrelevant information about the product such as information about other brands and services.

Using a hierarchical structure Chen and Tseng also looked at four major constructs of information quality: intrinsic quality, contextual quality, representational quality, and accessibility quality from which the authors further derived nine dimensions and fifty-one features of information quality of review products. The nine emerging dimensions were believability, objectivity, reputation, relevancy, timeliness, completeness, and appropriate amount of information, ease of understanding, and concise representation. A constructed classifier was used to compute quality scores for each dimension. As a result objectivity and appropriate amount of information emerged as the two top effective dimensions. The researchers concluded that overall, all the information quality dimensions, except completeness could be effectively used in evaluating the quality of reviews.

Based on the literature and modification of Kapoun's guidelines, Chen et al. (2012) proposed a framework for evaluating the authority of free online scholarly information. The framework consisted of four main categories. The following section will describe these four categories and the crucial components related to each category.

a) Inclusion of author's or creator's information: This dimension included authors or publishers' names and their institutional affiliations, complete and reliable information about the authors and publishers)

b) Inclusion of author's or creator's credentials: This dimension included author's educational background, their previous experience on a topic, their previous publications on the topic at hand, and the availability of links to the author's web page from other reputable web pages.

 c) Credibility of the website publishers: This dimension included the credibility, authority and expertise of website publishers, availability of introduction to the web pages or home pages, inclusion of targeted audience information, availability of supporting source of website either from individual or institutions, and the availability of links from authors' homepages to other reputable web sites.

d) Reliability of information sources: This dimension included explanation about the source of information available on websites, such as contact information of the author or website, active links to the sources of information, and differentiated information about the authors or publishers and the webmaster.

Schaal and his colleagues (2012) used reviewed literature and website observation to derive a comprehensive list of information quality dimensions related to the social web. The authors examined the presence of information quality criteria within 16 selected web sites among 50 top web-sites in the Netherlands. The researchers applied the grounded theory approach to answer two main research objectives, a) to address content qualities and deficiencies observed in selected websites and b) to identify the methods used to assess the content quality. The study divided information quality criteria derived from the literature into five

categories including, syntactic quality, semantic quality, user-pragmatic quality, information-pragmatic quality, and process- pragmatic quality.

 According to the researchers the syntactic quality would make sure that the stored data conformed to other information such as rules or stored metadata. The semantic quality on the other hand, would ensure that the stored data correspond to the represented external phenomena, for example the set of external phenomena pertinent to the purposes for which the data was stored such as use of the data. Likewise, the user-pragmatic information quality described the degree to which stored data was considered credible and trustworthy by the user. Further more, the information-pragmatic category ensured the usefulness, applicability and understandability of information by the user for the task at hand. Finally, the process-pragmatic category concerned that the stored data could be found and accessed by the user.

Further examination of the categories provided the authors with additional four specific categories pertinent to social web environment. These categories included, a) collaborative content creation, b) media provision, c) metadata generation and d) social networking. Collaborative content creation referred to the content development in co-operation with two or more persons even with different knowledge. Media provision, addressed the provision of information resources such as photos, videos and articles, which could be created by a single user to other users. Metadata generation described the collecting of tags, ratings and opinions about information materials or real-world objects, which made the information available for other users to view. Finally, social networking covered the communication among users and the information about users and their respective relations. Consequently, the researchers have introduced two new information quality dimensions for social web namely enjoyability and conformability. Conformability encompassed information that is free of contradictions with

respect to the current dominant culture. Enjoyability referred to the extent to which the consumption of the information object is regarded as enjoyable.

Using the case study approach Rafe and Monfaredzadeh (2012) developed an information quality framework in order to assess the quality of hospital and medical websites. The study selected three medical websites, UCLA Hospital in the United States, Moolchand hospital web site in India, and Osborne Park Hospital in Australia.

In order to identify quality dimensions for medical websites, using questionnaire the researchers asked three groups of volunteer users, which included doctors, website designers, and everyday users to evaluate each websites using their defined quality metrices. Based on users responses, the researchers developed their proposed framework. The framework comprised 7 main categories and each category has several different metrics. The emerging quality categories are as follows.

Content quality: This category dealt with the information presented in web sites and included dimensions such as authority, relevance, usefulness, timeliness, editing quality, accuracy, comprehensive content, multi-language/culture, impartiality, and variety of presentations.

Design quality: This category was concerned with the visual features of websites' designs. This feature implied that good design could sustain user loyalty to repeatedly visit the website. This category included the following dimensions, appropriateness, attractiveness, sound/video, banner advertisements, colors, and images.

Organization quality: This category comprised logical grouping, categorization or structuring of websites' elements. This features helped users obtain the needed information quickly and navigate within the site easily. This feature would provide users with adequate informative resources while they are in the same website. This feature could be considered as an indicator

of informativness of web site and included dimensions such as links, logical structure, site map, scope, organization, navigation, and logo.

User friendly quality: This category addressed issues related to interactivity of web sites. This feature enabled users regardless of their level of education or experience to obtain the needed information quickly. The category underlined the following dimensions, ease of use, user interface, privacy, satisfaction, customization, interactive features, and personalization.

Performance quality: This category referred to the capability of websites to keep and maintain specific level of performance during visits to the website. This category encompassed the following dimensions: accessibility, speed, responsiveness, usability, availability, novelty, reliability, security, reputation, integrity, changeability, completeness, sufficiency, and consistency.

Service quality: This category focused on dimensions, which were specific to hospital and medical websites, which could not be generalized to other type of websites. This category included many dimensions and some of the important dimensions were, medical information, medical consult, frequently asked questions, E-library, E-medicinal data base, calendar of hospital events, service quality and news groups.

Technical quality: This category contained technical issues that should be considered when implementing websites. The dimensions related to this category included, page structure, programming languages, size and volume of website, mechanism of information retrieving, website ranking in search engines, solution to technical problems and extensibility.

2.5. Common Information Quality Dimensions of Web Resources

This section will describe the most common information quality dimensions identified by the literature reviewed, especially those mentioned in section 2.4 of this chapter and focused on web resources.

Information quality has been described as a "multidimensional concept" in the literature (Rieh, 2000; Stvilia et al., 2006; Kargar Bideh, 2008; Helfert & Foley, 2009), which could be viewed from different perspectives.

Examining some of the previous empirical information quality frameworks (Table 2.4) disclosed that there are at least three main perspectives regarding web information quality assessment. These are "content", "design/presentation", and "accessibility". Each of these categories may include a number of dimensions. Previous studies have identified accuracy as one of the most important quality feature related to the content dimension of web-based information (see Table 2.4).. However, the drawback of these studies was that most of them have viewed the accuracy of content merely from the objective perspective such as typeface issues, whereas the subjective criteria such as unbiased content might be considered as an important point when the user assess the accuracy of information.

Authority is the other content-based information quality dimension, which has been identified by previous studies. The studies viewed authority from the perspective of author's or website reputation. Other quality dimensions identified by other researchers included currency or timeliness and adequate amount of information provided.

The second perspective addressed the presentation quality. From this perspective the successful websites was viewed as being able to present their information using suitable design. Related to this perspective, attractiveness, navigability, proper use of colors as well as

multimedia, concise presentation, links and interactivity were some of the dimensions regarded as pertinent to presentation of web-based information.

Finally, accessibility is the third perspective, which was considered by the majority of the previous studies (Table 2.4). Previous reviewed literature considered accessibility from the technical aspects related to websites' accessibility and security.

In addition to the above mentioned general information quality dimensions, which were commonly found in the majority of studies, two specific information quality dimensions emerged which concerned educational contexts. These dimensions have been introduced in the previous section and included, academic policy (Djajadikerta & Triresksani, 2006) and pedagogical usability (Hadjerrout, 2010). Finding information about "academic policies" on academic websites has been identified as an acceptable dimension for university websites. Furthermore, the second dimension namely, "pedagogical usability" could be measured through goal-orientation and collaborative learning. These dimensions are pertinent to web-based learning resources. Goal-orientation dimension refers to learning utility and meaningfulness of web-based learning resources in line with the curriculum and teaching goals. Furthermore, "collaborative learning" dimension means that the learners could work together in order to achieve common goals and deal with common problems collaboratively.

2.6. Analytical conclusion of the literature the review

The literature review revealed that during past decades there has been a global attention to understand teachers' intention to use web-based learning resources for students' instruction. Many researchers around the world have attempted to examine teachers and students' perception of use web-based resource in various educational environments such as schools or

universities. The majority of these studies have emphasized on the positive attitudes of teachers in terms of integrating web-based learning resources in their curriculum. However most of the studies are related to developed countries. In the case of developing countries such as Iran only a few researchers have examined teachers' attitudes towards using web resources for educational purpose. The majority of these handful quantitative researches have focused on technological aspect of the phenomenon. Likewise among the barriers reported by the previous researches are insufficient technical supports at school and limited access to the Internet as well as lack of instruction to help students conduct Internet searches. Missing from the literature is qualitative data to deeply understand the Iranian teachers' perception about information quality and pedagogical usability of FWBLRs used for classroom instruction. Thus current study attempts to explore teachers' motivations, challenges, approaches and perceived information quality dimensions of FWBLRs for integrating FWBLRs in their classroom teaching.

2.7. Summary of Chapter 2

Wang and Strong's (1996) define information quality as, "information fitness for use". This chapter attempts to identify the key issues related to information quality of web-based information in general, and web-based learning resources in particular. To achieve this aim the chapter reviewed the literature in five sections. Section 2.1 examines international perspectives of using the web in general and web-based learning resources in the school context. Section 2.2 discusses about teachers and students' experiences and perceptions in terms of using web–based learning resources. Section 2.3 describes studies done to assess credibility of web resources. Section 2.4 explores acceptable information quality dimensions introduced by web information quality frameworks. Finally, section 2.5 highlights the most common information

quality dimensions for web resources. In general the reviewed literature provides an overview of motivations, challenges, approaches and acceptable information quality criteria of web resources within the educational context.

With the information presented in this chapter as review of the literature, the following chapter describes the methodology used in this study.

CHAPTER THREE

Research Methodology

3.0. Introduction

This chapter presents the research method and the rationale for choosing qualitative approach to this study. It details the case study of a single school setting as the research design. The chapter also describes Eisenhardt's eight-step process of building theory from case study (Eisenhardt, 1989), that has been used to guide the research process. Although in the current research the purpose of this case-study is not to build theory, however, Eisenhardt's approach has been used as a guideline to direct the research process step by step, and in a systematic way, to answer the research questions. Issues central to this research, such as the recruitment of participants, data collection and analysis, ethical considerations, and the trustworthiness of data are also discussed.

The research was conducted within the author's own culture of origin and therefore, this chapter includes a section regarding cultural issues.

In a view of the research problems described in chapter 1, I intended to address the following research objectives:

a) To explore the motivation of teachers in terms of using Farsi Web-based learning resources for classroom instruction;

b) To understand the information quality challenges encountered by the teachers when they use FWBLRs for classroom instrucation.

c) To understand information quality approaches applied or suggested by the teachers to deal with the challenges.

d) To understand the perceived quality dimensions of Farsi Web-based learning resources for instructional use.

3.1. Research Design: Qualitative Approach and the Case Study

Qualitative research is a research paradigm, which seeks to understand phenomena in context-specific settings, such as "real world setting [where] the researcher does not attempt to manipulate the phenomenon of interest" (Patton, 2001, p. 39). This type of research is taken into account for providing deeper understanding rather than examining surface issues (Johnson, 1995). Related to the characteristics of qualitative research, this research approach is regarded as an appropriate research methodology to the scrutiny of a phenomenon within a specific context, where there is not enough data obtained from previous researches. In order to provide deep understanding of a phenomenon within a specific context, the researcher needs to examine various perceptions and experiences of people, who are engaged with the phenomenon in that context. It entails having close interactions between the researcher and research participants using appropriate data gathering techniques such as deep interviews. In this research, qualitative approach is identified as the most appropriate method to examine the participants' experiences and perceptions about information quality of FWBLRs. To date, there has been no research finding representing various aspects of using FWBLRs to highlight the likely available challenges and approaches related to the use FWBLRs for instructions in Iranian schools.

Qualitative research in the form of a case study can be applied to explore the various aspects of a phenomenon of interest using multiple sources of data and evidence such as through observations and detailed interviews (Glesne , 2010). Related to the specific feature of a case study research, Simons (2009) has emphasized that generating in-depth understanding of a specific topic is the primary purpose of case study research. Thus, as the aim of this study is

to provide an exclusive set of data that might be coming from various sources, qualitative research is considered as an appropriate research strategy in order to examine the current research questions. Likewise, in relation to the case study approach, its exclusive characteristic is that it does not entail the use of particular type of evidence. The data can be obtained using a combination of various data collection techniques and methods (Eisenhardt, 1989; Yin, 1981). This characteristic provides the possibility of bringing out detailed and various perspectives from the viewpoint of the study participants to clarify the phenomenon under study (Tellis, 1997). Yin (1994) believes that this characteristic can be considered as the main strength of a case study research that can facilitates the "development of converging lines of inquiry". (Yin, 1994, p.93)

In addition to the capability of case study research to obtain data from various sources, several researchers have identified some critical reasons for using this approach. The reasons are as follows:

 a) It has empirical approaches for answering the research questions;

 b) It uses narrative to answer the research questions;

 c) It focuses on unit of analysis precisely;

 d) It recognizes the context related to the research questions; and

 e) It offers a degree of triangulation by using multiple sources of data or evidences.

Yin (1989) defines case study as "an empirical enquiry that investigates a contemporary phenomenon within its real life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used". The "contemporary phenomenon" issue referred by Yin differentiates the case study research from the other types of research such as experimental or historical research. In his earlier

book, Yin (1981) discriminates case study from experiments and histories, where experiments separate a phenomenon from its context intentionally, while histories are limited to phenomena of the past, where relevant informants may be unavailable for interviews and relevant events unavailable for direct observation (Yin 1981, p. 59). Yin further elaborates that, case study research could be taken into account by the researchers, whose aim is to answer "how" and "why" questions. So, using case study approach, the current research aims to answer similar questions by obtaining data from real life context. This study will use various data gathering techniques and sources such as focus groups and one-to-one interviews with teachers as well as students, to find answers to the research questions.

Comparing single-case and multiple-case study, Yin (2003) suggests that single-case study is appropriate if the objective of the research is to explore a previously un-researched subject; whereas, multiple-case designs are desirable when the intent of the research is description, theory building, or theory testing. The current research attempts to focus on soliciting research participants based on their expert knowledge of the phenomenon under the study rather than focus on the size of sample population, which is the prevalent practice in quantitative research process (Ryan, 2006; Tavaakol, Torabi and Zeinaloo, 2009). The specific context is a smart school in Iran, which is considered as an appropriate context to achieve the objective of the current study, which attempts to discover unexplored issues related with the use FWBLRs. The qualitative single-case study approach has been identified as the most appropriate research approach to achieve the objectives of the study.

The following section provides a brief description about features of the case study method that made this method appropriate for this study. This is followed by a brief description addressing a number of limitations of using case study in the current research.

3.1.1 Strengths of the case study method in association with the current research

In identifying some of the strengths of case study research as mentioned Section 3.1 of this chapter, one of the inherent characteristics of case studies is that they operate with a severely restricted focus. Such restricted focus facilitates the construction of detailed, in depth understanding of what is to be studied. The theoretical lens of current study emphasises on information fit for use. Using a few most experienced people who are using web-based instructional materials, I aimed to explore the appropriate features of FWBLRs for instructional purpose. Focusing the specific context namely FWBLRs and having deep interaction with a small number of participants from a famous smart school, provided an opportunity for me to examine the research questions and triangulated them with various data sources. Conducting focus group as well as one to one interviews with the teachers from five various disciplines and using the students as a complementary data sources provided adequate amount of data for the topic at hand.

The other strength of case study in general is that this type of research method uses narrative to answer the research questions. In the case of this study, using this feature has enabled me to collect detailed information and deep understanding of the phenomenon from the stories of the participants during iterative interview sessions.

3.1.2 Weakness of case study method in association with current research

In spite of the advantages of using case study method for current research, in terms of providing inclusive set of data, I have encountered two limitations in practice. I detected these limitations during data analysis stage and reporting and summarising of the results.

The first problem was addressing the existence of excessive volume of self-reported data in association with each of research questions. Some of data which emerged from the

participants' reports were unnecessary and irrelevant to the purpose of study. This has somehow led wasting a lot of time in order to sift useful data among the irrelevant ones.

The second problem which I encountered in practice was related to the difficulty of representation of findings which can be rooted in the complexity of writing. Although case studies provided an opportunity to explore various aspects of participants' perceptions and expectations of using FWBLRs; however it was difficult to present exclusive pictures which can embrace all of the aspects of a story.

For instance, writing is predominantly a linear form of communication, with a beginning, middle and end, but much of what case study research reveals is simply not like that. Often, by writing about one aspect of the issue as, for example, in one teacher's story, other aspects of it are unintentionally concealed. There are often several different ways to present the same set of issues, each one of which is subtly different in its approach and emphasis. This situation can make the findings of such research very difficult to summarise.

3.2. Eisenhardt's Approach Used as Guidelines for the Current Research.

This section describes the steps taken by the current research process adopted from Eisnhardt's approach (Eisenhardt, 1989). Although the aim of the current research is not to build theory from case study, Eisenhardt's eight-step process of building theory from case study has been used as a guideline to direct the research process step by step. This section will provide a brief description of Eisenhardt's approach and will be followed by highlighting how the activities will be undertaken in each step of the process.

3.2.1. An Introduction to Eisenhardt's Process.

During past years Eisenhardt's (1998) process of building theory from case study has been used successfully by numerous researchers in various disciplines (Nazari, 2009; Grant & Wall, 2009; Martin, Currie & Finn, 2009; Dobers & Söderholm, 2009). The result of searching on Google scholar indicated that Eisenhardt's paper entitled "Building theories from case study research" has been cited by 21290 sources until early June 2013. Comparing the features of the case study researches Eisenhardt developed her well-known framework describing the process of building theory from case study research (Eisenhardt, 1989).

Eisenhardt (1989) defines eight steps for building theory from case study. The steps are sequenced as follows: (1) defining research questions, (2) selecting case, (3)crafting instrument, (4) entering the field, (5) analyzing data, (6) shaping hypothesis, (7) enfolding literature; and (8) reaching closure. The following paragraphs provide a brief description of each defined steps.

During step 1, as the foundation of a sound research process, Eisendardt emphasizes on the importance of developing appropriate research questions in relationship to the organization undertaken by the study. She believes that good research questions would emerge from the gap identified after examining previous literature by the researcher.

In step 2, she emphasizes the importance of selecting an appropriate population, regardless of the number of selected population, which gives rise to the control of extraneous variation, and helps to define the limits of generalizing the findings.

In step 3, she describes how the researchers can develop appropriate data collection instruments to collect an inclusive set of data, using multiple sources and methods. She suggests that in order to provide an extensive overview to the phenomenon the researchers

might be required to apply triangulation approach, which enables them to discover the various aspects of the topic at hand.

In step 4, Eisenhardt emphasizes on having simultaneous data collection and data analysis processes. According to her, such overlapping task gives flexible opportunity for the researcher to make adjustments during data collection process and enables him/her to probe particular themes, which emerge during these concurrent processes.

Step 5 of Eisenhardt's approach concerns data analysis process. During case analysis process, the study write-ups are examined closely by the researcher to provide an in-depth insight into the phenomenon. Furthermore, she emphasises that coupled with the case analysis is cross-case analysis process through, which the researcher might seek to investigate the pattern, differences and similarities between various cases .

In step 6 of Eisenhardt's approach is shaping hypothesis. In this step, she emphasises on having a clear definition of the study's constructs through an irritative comparison between construct and data obtained from different sources. Furthermore, Eisenhardt suggests that the researcher examines the relationship among constructs supported by the evidences related to each case.

In step 7, Eisenhardt calls for the researchers to conduct a wide-range literature review and compare the findings of the study with the literature, which includes not only confirming but also highlighting conflicting ideas associated with the results of the study. According to Eisenhardt, this type of comparison would enhance the internal validity and generalizability of findings related to the different contexts.

The final step of Eisenhardt's eight-step process concerns the issues related to reaching closure. In this step, Eisenhardt suggests using theoretical saturation technique as a criterion to determine the end of data gathering and data analyzing processes by the researcher.

3.2.2. Eisenhardt's Steps Applied in the Current Study

3.2.2.1. **Step one: Defining the Research Questions**

Defining the research question can be considered as the basis to embark a sound research process. In order to develop appropriate research questions in conjunction with the research objectives, Eisenhardt explains that, it is necessary to ensure that previous researches either does not address the research questions at all or if does so, it is inadequate or untrue (Nazari, 2009: p. 70). Therefore, developing of research questions requires conducting broad literature review and identifying research gaps (Eisenhardt & Graebner, 2007). In this study, in order to define the research questions clearly, the first literature review was conducted to comprehend the information quality of Farsi WBLRs, which makes such resources fit for use in Iranian school context. Reviewing the literature indicates that there are very few researches associated with using web based learning resources in Iranian schools. None of the researches has offered adequate information about the required information quality of FWBLRs in Iranian schools.

Eisenhardt and Graebner (2007) identify two types of research questions, which are "theory-driven" and "phenomenon-driven" research questions. "Theory-driven' research questions are required when extending an existing theory within context. In contrast, when there is lack of plausible existing theory "phenomenon-driven" research questions are used alternatively. Therefore, the researcher can develop the research questions related to the importance of the

phenomenon rather than to the theory. Doing so provides flexibility for the researcher to frame his/her study in the phenomenon (Eisenhardt & Graebner, 2007, p. 26)

Based on the research problem, which affirmed the issues and challenges of using FWBLRs in Iranian schools' context, and the lack of existing theory related to desirable information quality of FWBLRs, adopting phenomenon-driven research question results in the derivation of two central research questions based on the research objectives.

i)   Why are the Iranian teachers motivated to use FWBLRs in classroom instruction? What are the issues they face when finding, selecting and using FWBLRs?

ii)   How do the Iranian teachers evaluate FWBLRs for instructional use? How do they make an assessment of both trustworthiness and expertise to arrive at an overall credibility assessment of FWBLRs?

With these questions in mind, I set out to answer the central research questions of the study, which are as follows.

i)   What are the teachers' motivations to use Farsi web-based learning resources for classroom instruction?

ii)   What are the challenges teachers faced in terms of assessing the quality of Farsi web-based learning resources for classroom instruction?

iii)   How do teachers address the challenges in terms of meeting their instructional information needs?

iv)   What are the teachers' perceptions of the information quality of Farsi web-based learning resources?

3.2.2.2. Step Two: Selection of the Case

Focusing on the objective of the study, which is to explore the information quality of FWBLRs, I was looking for an appropriate case to provide me with the various aspects of the phenomenon under the study. Due to the newness of the research topic in Iran to date, there are only a small number of schools in Iran which are engaged with using web-based learning resources for education effectively. Surfing the web and questioning the number of school teachers and faculty members in Iran, revealed that smart schools might be the best case which could answer the corresponding to the research questions. Evidences indicate that smart schools are the only educational institutions in Iran, which have been initiated to employ new technology in education exclusively (Jalali, 2011).

However, my further probing of the issue indicated that the majority of schools, which are assigned as smart schools are at the primary stages of the project. Also, I was intended to recruit research participants based on their expertise associated with the phenomenon under the study, rather than focusing on the size of sample population, which is the norm in quantitative research (Malterud , 2001; Tavakol, Torabi & Zeinaloo, 2009).

This purposive selection of participants is confirmed by Mintzberg (1979) who emphasizes that, "No matter how small our sample or what our interest is, we have always tried to go into organizations with a well-defined focus to collect specific kinds of data systematically." (p. 58). In order to solicit competent participants, who are knowlegable with the issues related to the research questions, the Vice Chancellor of Information Technology Division in the Ministry of Education Iran suggested Absal High School as a unique case (Yin, 1994), which could enable me to investigate the phenomenon in depth and provide rich description and understanding on the issue (Walsham, 1995).

Absal High School is located in Tehran and has been identified as one of the first and most important smart schools in Iran, pioneering the employment of web technology in education. The teachers in the school have been identified as the key informants compared to other teachers in the other smart schools, and are likely to be the most informative in relation to the issues put forward by the research questions. The participants for interview in this study were selected among the teachers of Absal School in two steps. In the first step, I conducted two focus group interviews with teachers. Each of focus group comprised five teachers in five disciplines. The main aim of focus group discussions was to provide background knowledge underpinning the study, in the one hand, and identifying the key informants for the second step, which involves one to one interview, on the other hand.

The following section provides a brief overview about the characteristics of smart schools, initiation of smart schools in Iran and using web-based learning resources in Iranian smart schools. Finally this section ends up with a brief introduction to Absal High School which has been selected as the single case for this study.

Characteristics of Smart Schools

According to the approval plan of ICT Association of Education Ministry of Iran patterned from the Malaysian Model (Attaran, Alias & Siraj, 2012), the five main goals of smart school initiation are declared as (a) to provide all-round development of the individual, (b) to provide opportunities to enhance individual strengths and abilities, (c) to produce a thinking and technology-literate workforce, (d) to democratize education, and (e) to increase participation of stakeholders (Smart School Conceptual Blueprint YEAR, p.2).

The curriculum, pedagogical process, teaching-learning materials, and assessment models have been identified as the main concepts in the (Smart School Conceptual Blueprint YEAR, p 8). The curriculum of the Smart School emphasizes seven learning areas. They are (1)

language and communication, (2) science and technology, (3) social studies, (4) physical and health development, (5) vocational and personal awareness, (6) practical and creative arts, and (7) values development. (Smart School Conceptual Blueprint, YEAR p.3).

Learning areas represent a very important concept in the Smart Schools. They are designed to help students achieve overall and balanced development with which the goals are aligned. In Smart Schools subjects no longer stand alone. Rather, they are combined into one area in terms of their meanings. In addition, several learning areas may share the same topics or issues. Therefore, integration and unity as well as multi-discipline and inter-discipline are the characteristics in the Smart Schools. In each learning area subjects are taught through the various perspectives of knowledge, skills, values, and language.

Each subject is classified under several levels for students with different learning abilities. Therefore, students may learn at their own pace. An appropriate mix of learning strategies is allowed for students to achieve basic competencies and to promote a holistic development. Thus, student-centred learning turns out to be the basis for designing learning activities.

It seems that in order to guarantee the success of the conceptual model of teaching and learning, the Smart Schools entail effective and efficient management of the resources and processes to support teaching and learning. In this way the success of the Smart Schools depends on the stakeholders, such as teachers, principals, Ministry of Education officers, support staff, and parents. They must be trained professionally in the knowledge, skills, and perceptions necessary to fulfil their roles.

In so doing, information technology can be the facilitator in the process of transforming traditional schools into Smart Schools. In other words, technology is crucial for the success of the Smart Schools. Multimedia courseware, presentation facilities, and e- mail are required in classroom settings, while library/media centres and computer laboratories are the resources

that will facilitate learning and teaching. Technology enables the schools to expand their external resources, such as public and university libraries, companies and industry associations, museums and other archives. Technology also provides a bridge between parents, students, and other members in the community. It makes communication more effective and easy among students, teachers, and parents.

Smart Schools in Iran

Adopting from the Malaysian Model, the smart school plan in Iran was established in 2003 (Attaran, Alias & Siraj, 2012). The oldest smart school was given the title "Shahid aghaee" where the teachers used audio-visual materials for teaching. The founder of this smart school used the experience of the first smart school to establish similar public high schools in Yazd and Ghazvin provinces. However, this school was closed after a while and the plan was also abandoned (Attaran, 2013)

Subsequently, in 2004 as a pilot sample, four (4) high schools selected by the Tehran Education Office for this experimental project. These schools were located in the capital city of Tehran and were as follows: Absal, NedayeAzadi, Dr. Mosahab and Shohadaye Kargar. In this stage a draft was prepared to define the prerequisites of project implementation. (Jalali, 2011).

After three years of pilot project of smarting schools, in 2007 the strategic plan of smart schools was offered and the training of teachers based on this plan started. The ministry of education recruited 100 schools in this plan for smart schools. A total of 50 of these schools were high schools located in different provinces (Omidinia, 2009 cited in Attaran, 2013).

In 2011 the Tehran Education Office published the roadmap of smart schools which not only included the goals of smart schools, but also the way of their establishing and evaluation. In

2011 the Ministry of Education turned some schools in all over Iran to smart schools. Comparing Malaysian and Iranian Smart Schools reveals that although the theoretical models are similar in both countries but there are many differences in implementation due to the differences in infrastructure.(Attaran, 2013)

Currently the Iranian smart schools are faced with a number of challenges in terms of integrating information technology in education. For example, unlike the other types of Iranian schools, smart schools use information technology for monitoring, implementing and evaluating learning process, however there are not exclusive rules to differentiate smart schools' responsibility from the other type of Iranian schools.

Similarly, the Iranian smart schools are not supplied with adequate equipments and technological infrastructure such as (local networks, internet connection, hardware, server, intranet, printer, scanner and so on). Thus the lack of adequate technological resources and facilities is considered as the most important barrier in Iranian smart schools. This barrier is likely to reduce teachers' intention to produce electronic content for their classroom instruction (Attaran, 2013).

Using Web-based Resources in Iranian Smart Schools

The Smart Schools' road map (Jalali, 2011) delineates the following main objectives of smart schools:

a) To supply teachers with the web-based educational materials and methods to meet the needs of a knowledge-based society;

b) To provide a collaborative and interactive teaching–learning environment among teachers and students using web resources; and

c) To develop student-oriented and research–oriented learning practices using web-based learning resources.

According to the Iranian smart schools' road map (Jalali, 2011), in order to provide effective use of web-based learning resources in classroom instruction, the teachers employed in smart schools are expected to be competent in:

a) Finding web-based learning resources;

b) Evaluating and selecting web-based learning resources;

c) Producing electronic content using web resources; and

d) Integrating electronic learning resources into their curriculum.

The teaching-learning materials produced by teachers shall be designed to support the teaching-learning strategies used in smart schools. In doing so the materials shall embrace a number of characteristics as follows:

a) The materials shall be able to foster the students' capability to self-directed learning;

b) The materials shall be presented attractively in order to provoke students' motivation to learn effectively;

c) The materials shall promote individualized as well as collaborative learning; and

d) The materials shall be appropriate for various learning environments ranging from teacher-centered to student-center environments.

The majority of subject matters in Iranian smart schools are taught in the Farsi language and this language is considered as the predominant language for producing electronic teaching–learning materials.

Based on the responsibilities assigned to teachers of smart schools it can be expected that they must be competent users of web resources. Therefore, to align with this study's research objectives, smart school teachers are selected as the participants to answer the research questions of the current study.

Absal High Smart School as a single selected case for this study

Absal high school is located in the northeast of Tehran. It is a well-known smart school established and fully equipped in 2004. Currently, the school includes 21 classes comprising 700 students and 40 teachers. The school is equipped with the following facilities: Electronic library, Multi-media center, Server room, Sport room, computer labs; Physics lab, chemistry lab, biology lab, Electronic content producing rooms.

The majority of the teachers of Absal School hold master degree with more than 20 years of teaching experience. Most of the teachers who are employed in this school have been the top winners of the festival of "Producing Electronic Content", which is held every year across the country. Using the school's website (http://aabsalschool.ir) provides an opportunity for teachers, students, school administrator and parents to follow pedagogical objectives collectively.

3.2.2.3. Step Three: Crafting the Research Instrument and Protocols.

In the "crafting instruments and protocols" stage, Eisenhardt (1989) calls for multiple methods of data collection to triangulate evidence. Likewise triangulation, as a validating procedure, is taken into account by the qualitative researchers who attempt to eliminate bias and guarantee the truthfulness of their own propositions about social phenomena (Golafshani, 2003). In other words, the triangulation combines several data collection methods, or research strategies to illuminate various aspects of the phenomenon under study. This research aims to collect data

using data source triangulation to enhance the validity of findings (Guion, Diehl & McDonald , 2011).

Based on data sources triangulation technique, data can be achieved using various sources such as time, place and person (Denzin & Lincoln, 2005; Guion, Diehl & McDonald , 2011). In line with person-based triangulation, which takes into account the persons' perspectives from which data can be obtained, this research aims to collect data from both teachers and students as the various sources of data. To achieve the aim two data-collection techniques have been used for gathering data including focus group interviews, and one-to-one interviews. Table 3.1 presents the contribution of the two types of data collection methods applied for the study. The process of developing instruments for each stage will be discussed in the following section.

Table 3.1: The Contribution of Data Collection Methods Used in the Study.

Data Collection Method	Contribution to the study
Teachers' focus group interviews.	a) Provides general understanding of basic issues related to the use FWBLRS in smart schools. b) Recruits key informants for the second step of the study.
Teachers' face-to-face interviews.	Provides deep insight into the key issues related to the use of FWBLRS in smart schools.
Students' face-to-face interviews.	Complementary data source provide additional information associated with teachers' use of FWBLRs.

The following section provides a brief description about the basic principles applied for conducting the interviews with the participants. Then it is followed by the sections that describe in detail the process of group and individual interviews.

(a). Data Collection Method

Focusing on the concept of information quality, this research has utilized user self-reported descriptions to identify the information quality dimensions of FWBLRs that might be critical from the teachers' perspectives. Information quality in this study is defined as information fit for use (Wang & Strong, 1996), which implies that it is relative, as information considered appropriate for one's use may not have sufficient attributes for another use.

According to the literature, information quality can be assessed by using some criteria such as goals, needs, conventions, knowledge, norms, rules and technology within a specific context (Stvilia, 2006). In this research, experiences and perceptions of smart school teachers' were examined to understand their goals of use, and their perceived norms of information quality in the context of using FWBLRs for instructional aims. In addition to teachers' perceptions, students' experiences were examined as additional sources of data to enrich the results obtained from the teachers. The student participants of the current study were chosen by their respective teachers as they co-operated with the teachers and assisted them to produce customized electronic content used for classroom instructions.

As the first step, two semi-structured preliminary focus group interviews were conducted. The aim of focus group interviews was to obtain basic information related to the phenomenon undertaken by the study and to identify the key informants who could participate in subsequent one-to-one interviews.

All of the interviews were conducted in the teachers' rooms at Absal High School and were audio recorded. After the interview sessions, all audio files were transcribed verbatim. At the

beginning of all interview sessions, I asked the participants to indicate their demographic information. Thereafter, I described the basic principles of the study as follows:

(i) The aim of interview is not to measure the knowledge of the participants.

(ii) The information of the participants is regarded as private.

(iii)The insights and ideas of the participants are regarded as important.

(iv)Participants are free to skip any questions that they are reluctant to answer.

During discussions, I was open to any opinion provided by participants and uses the opinion to explore further issues related to unclear situations. Tables (3.2- 3.5) represent the demographic information of the participants, and the schedule of times when the interviews were conducted.

The following section represents the process and details of interviews conducted with teachers and student participants.

i. Focus Group Interviews

Two (2) semi structured group interviews were conducted on January 21th and 22th, 2012 recruiting ten (10) Iranian smart high school teachers. The interview session for each groups lasted about three hours. Each participating groups comprised five (5) smart school teachers in the fields of mathematics, chemistry, biology, Farsi literature, and physics. From the overall seven disciplines taught in Absal High School, two disciplines including Arabic language and English language subjects were excluded from this study, as the focus of study was on the web-based information resources in Farsi language. The teachers' average teaching experience was 20 years, and they had, at least five years experience in using web resources. All of them were female. Table 3.2 presents the demographic information of the participants in the focus groups. The teacher participants were introduced to me by the school administrator based on following criteria:

a). They have at least 5 years of experience in using web–based resources;

b). They have interest to apply web resources for classroom activities; and

c). They teach in the following fields; chemistry, physics, mathematics, biology, and Farsi literature.

The focus group interviews were audio recorded. In order to be informed of the required information quality dimensions of web resources, group interview discussions were guided around general questions including participants' needs, goals, problems and actions taken to solve the problems during their interactions with web resources. The major part of the focus group discussions were centred on the information quality problems and information quality problem-solving strategies applied or suggested by the participants. As such, the group interviews focused on the following questions:

a). What are the Farsi web resources/websites you use for teaching? How did you learn about the websites for the first time?

b). How are the qualities of the web resources? What are the problems that you face when using the web resources? What are missing from the websites?

c). If someone asks you about how you choose a particular web resource for a lesson, what would you tell her? What are the qualities that you would be excited about in the websites?

Table 3.2: Demographic Information of the Focus Group Participants

Participants	School Subjects	Academic Qualification	Years of Teaching Experience
Group 1- January 21th 2012 (9.30-12.30) a.m.			
TFG1-Mathematics	Mathematics	Masters degree	19 years
TFG1-Physics	Physics	Bachelor degree	20 years
TFG1-Chemistry	Chemistry	Bachelor degree	22 years
TFG1-Farsi Literature	Farsi Literature	Masters degree	13 years
TFG1-Biology	Biology	Bachelor degree	25 years
Group 2 - January 22st 2012(9.30-12.30) a.m.			
TFG2-Mathematics	Mathematics	Bachelor degree	18 years
TFG2-Physics	Physics	Masters degree	23 years
TFG2-Chemistry	Chemistry	Bachelor degree	27 years
TFG2-Farsi Literature	Farsi Literature	Bachelor degree	16 years
TFG2-Biology	Biology	Bachelor degree	20 years

ii.Face-to-face Interviews with Teachers

From ten (10) teachers who participated in the focus group interviews, five (5) teachers were recruited for one-to-one interviews. Comparing pair of teachers in the same discipline within each group, I selected one volunteer from each discipline who were more interested to participate in the subsequent one-to-one interview. The sample was kept small because of the exploratory nature of the study and I used semi-structured interviews with the teacher participants. The demographic profile of the teacher participants is given in Table 3.3 and the schedule of interview sessions is indicated in Table 3.4. This purposive sampling allowed me to explore various aspects of problems and solutions from the perspectives of teachers from various subject domains. It is in line with the Miles and Huberman (1994) who suggest that multi-case sampling improves the precision, validity, and stability of findings.

One- to- one interview sessions were conducted from February 2012 to September 2012. During this period, discussions between participants and researcher were extended as each participant was interviewed 3-6 times. The iterative interview sessions helped me to deepen my understanding of the participants' perceptions of the phenomenon, and provided me with a rich pool of data. All interviews were tape (audio) recorded.

Table 3.3: Teacher Participants' Profile of the One-to-One Interviews

Participants	School Subjects	Academic Qualification	Years of Teaching Experience
Mathematics	Mathematics	Masters degree	19 years
Physics	Physics	Masters degree	23 years
Chemistry	Chemistry	Bachelor degree	22 years
Farsi Literature	Farsi Literature	Bachelor degree	16 years
Biology	Biology	Bachelor degree	25 years

Table3.4: Frequency, Date, and Duration of Interviews with the Teachers

Teacher Participants	Frequency of Interviews	Date of Interviews	Total Interview Times (Minutes)
Biology	4	(20 February, 26 April, 10 June, 10 September)	360
Chemistry	5	(25 February, 26 April, 16 June, 20 August, 10 September)	450
Physics	6	(25 February, 19 April, 12 June, 20 August, 29 August, 10 September)	540
Farsi Literature	4	(20 February, 21April, 12 June, 12 September)	360
Mathematics	4	(20 February, 21 April, 10 June, 12 September)	360

The teachers' interviews centred on the following questions:

- What is the most important utility of FWBLRs associated with your classroom activities? What are the Farsi educational websites that you use frequently? Which search engines do you use frequently?

- What features of Farsi web-based learning resources/websites might encourage you to use them for teaching?

- How do you evaluate the qualities of existing Farsi Web-based learning resources in your domain?

- What criteria do you use to evaluate web resources before selecting them to use for classroom teaching? How do you trust FWBLRs?

- What are the problems that you might be faced with when you are using the web resources?

- What problem–solving strategies do you apply or suggest when you are faced with a problem**?**

iii. *Face-to-face Interviews with Students.*

To increase the depth of understanding obtained from the phenomenon under study, one-to-one interviews with five students were conducted as an additional data source. The students' interviews were conducted to help triangulate and provide additional information that might be missed by the teacher participants related to the use of web resources.

Each of the student participants of the current research was introduced by the teachers as their assistants, who have collaborated with them to produce customized electronic contents for classroom teaching. The students were interviewed 3-6 times to explore further issues related to unclear situations. In summary, these students shared their experiences in using the FWBLRs. The experiences were fitted into current data. Table 3.5 presents the ffrequency, date and duration of interviews with students.

Table 3.5: Frequency, Date and Duration of Interviews with Students

Student Participants	Frequency of Interview	Date of Interviews	Total Interview Times (Minutes)
Student A	6	(28 February, 26 April, 16 June, 10 July, 20 August, 15 September)	540
Student B	3	(28 February, 26 April, 23 August)	270
Student C	4	(29 February, 26 April, 23 August, 10 September)	360
Student D	5	(20 February, 28 March, 23 August, 29 August, 10 September)	450
Student E	5	(29 February, 26 April, 123 August,10 September, 12 September)	450

The students were asked to reflect on the following questions,

- What is your main reason to use web resources?

- Which educational websites do you use frequently?

- What are the problems that you might be faced with when using the web resources? What is missing from the websites?

- How do you evaluate the quality and quantity of information provided by Farsi educational websites?

- What problem solving strategy do you apply or suggest to use when you might be faced with a problem?

- How do you trust on information?

- How do you search for text or images? Which search engine do you use frequently?

- What suggestion do you have for promoting the usage of web resources in teaching and learning?

3.2.2.4. Step Four: Entering the Field

According to Eisenhardt, frequent overlap between data analysis and data collection is a salient feature of case study research, which can provide flexible data collection procedure for the researchers (Eisenhardt, 1989). In the current research, the process of data collection and data analysis were conducted simultaneously. Therefore, constant interactions with the participants during the analysis of the data provided opportunity for me to explore further issues as well as clarify participants' unclear statements obtained from previous sessions.

In addition to conducting concurrent data collection and data analysis processes Eisenhardt further emphasized on having the freedom to make adjustments during the data collection process. In the current research, I identified an additional data source , when I realized that it would be helpful if the students' viewpoints were taken into account, because the teachers

believed that the students were more enthusiastic about using web resources than their teachers. Thus, it is assumed that students' contribution may highlight further issues related to the phenomenon. To achieve synchronicity of data students' one-to-one interviews were conducted simultaneous with interviews with the teachers.

3.2.2.5. Step Five: Data Analysis.

Data analysis of the current research was accomplished through the following three steps,

(a). Transcribing;

(b). Coding data; and

(c). Memo writing, translating and inter-coder checking.

(a). Transcribing

As the first step of data analysis process the qualitative verbal data recorded from all participants were transcribed in the native Farsi language (Persian). Then, to ensure that the transcriptions successful convey participants' views (Marshal & Rossman, 1995) the transcriptions were sent to the interviewees to confirm the accuracy of their own statements. Lincoln and Guba (1985) described this act as "the most crucial technique for establishing credibility" (p. 314) in a study. After obtaining the participants' confirmation, I undertook coding process, which is described below.

(b) .Coding Data

The data coding was carried out from the beginning stage of the data collection process. Align with Glasser and Strauss's coding strategy (1967), the data coding for this research was undertaken in two steps. The first step involved performing an open coding process, whereby I tried to provide the maximum number of substantive codes by using the words provided by the participants. In order to obtain a rich pool of initial codes, data analysis and data collection were carried out simultaneously. Focusing on the four major themes of the study, including why participants use, what problems were encountered, what quality control criteria were applied and how web resources were evaluated, provided me with the constant flow of data for analysis. All interviews were studied frequently and analyzed concurrently, and all transcripts were coded collectively. This task supplied me with a large number of codes identified through the scrutiny of various opinions of participants.

The second step of coding data focused on the coding process. Similar codes were compared, and merged frequently, providing new codes, which could explain or interprete best the phenomenon. At last selective codes emerged and translated into the English language and together related memos were sent to inter-coder for reliability checking. This iterative process concerning coding, memo writing and translating was performed concurrently in such a way that single codes were compared, and focus codes emerged. The focus codes were modified and translated into English along with their related memos, which were sent to inter-coder in order to obtain her agreement. This procedure was continuously carried out as long as new codes emerged.

(c) Memo Writing, Translating and Inter-coder Checking.

The other part of data analysis procedure involved memo writing and it was concurrently carried out with the second step of the coding process, which included developing selective/focused codes. The concurrent development of selective codes and writing memos

for those codes provided an opportunity for me to bring together similar ideas that emerged from the various transcripts. Memo writing process comprised two steps involving writing and sorting of memos. Firstly, I added my interpretations for each code or category. The codes that emerged were supported by the participants' statements. Giving the codes titles, and locating some of the similar memos under a single relevant code helped me to accelerate the next step, in which all memos under a single title were sorted and used in writing the narrations collectively.

Inter-coder who was expert in the English language and qualitative research checked all codes, related memos and quotes to ensure reliability. After obtaining inter-coder agreement, the final codes and memos emerged.

3.2.2.6. Step Six: Shaping Themes and Concepts

According to Eisenhardt "during the process of shaping hypotheses tentative themes, concepts, and possibly even relationships between variables begin to emerge" (Eisenhardt, 1989: p.541). Eisenhardt described two main steps for this stage including (a) sharpening the constructs, and (b) verifying the relationship between constructs. She divided the first step into two parts including (i) refining the definition of the construct and (ii) building evidence, which measures the construct in each case (Eisenhardt, 1989). According to her, refining the definition of a construct is an iterative process, which is necessary for providing a well-defined construct through constant comparison between data and construct. In addition, the process of building evidence provides strong support for case data by collecting evidences from various sources. In the current research, the step six of Eisenhardt was completed in two stages during the course of study. The following section describes the two main stages in the sixth step, involving assigning categories and verifying relationships between constructs.

In the process of sharpening the constructs I attempted to develop appropriate categories for each of the constructs by constantly going back and forth between data and constructs. While in verifying the relationship between constructs, data interpretation and the relationship between constructs was examined in conjunction with the three first research questions. Thus, perceived information quality dimensions of FWBLRs emerged from the data by taking into account motivations, challenges and approaches.

3.2.2.7. Step Seven: Enfolding Literature

Eisenhardt (1989) advises conducting a broad range of literature review as an essential feature of building theory from case study research. It provides an opportunity for the researcher to examine both similar and conflicting literature with emergent themes. Eisenhardt provides two reasons for the significance of comparing the emergent theory with conflicting literature. The first reason is that comparing the theory with conflicting literature increases the researcher's confidence about the strength of findings and establishes internal validity as well as sharpening the constructs. The second and most important reason is that this task provides an opportunity for the researchers to be more creative in achieving a deeper insight into both the emergent theory and the conflicting literature. Furthermore, Eisenhardt believes that the similarities found in literature, which reflect the similar results within different contexts, ensure the researchers about the generalization of their findings (Eisenhardt, 1989).

The literature review for this study was conducted in two phases. During the first phase, the literature was reviewed with the aim of supporting the research problems, and differentiating it from previous researches, including defining the research questions. The second phase of

the literature review process was carried out after the data analysis stage, which engaged me with studies that highlighted the similarities and differences between findings of the current research and previous researches. It enabled me to explain the phenomenon better based on the particular context. Likewise, during data analysis, in some cases, I reviewed the literature whenever I distinguished that it might give rise to data analysis process.

3.2.2.8. Step Eight: Reaching Closure.

According to Eisenhardt, there are two considerations related to reaching closure. The first issue is related to stopping case addition, and the second issue is about stopping iterating between data and theory. Theoretical saturation, which has been used in the current research, is suggested by Eisenhardt as a key idea in terms of determining the time to reach closure related either to recruiting participants or gathering data.

According to related literature a three up to six groups of participants for focus group interviews are considered enough to reach theoretical saturation. Focus groups typically comprise 7-10 respondents (Krueger & Casey 2009; Strauss & Corbin 1990). To follow these rules of thumb, this study conducted a total number of two (2) group interviews, each having five (5) respondents who came from five different disciplines.

Eisenhardt believes that although it is not common practice among the researchers to identify the end of case collection in advance, "a number between 4 and 10 cases usually works well" (Eisenhardt, 1989: p.545) when selecting participants for the one-to-one interviews. Following this notion, 10 participants were solicited including, five teachers and five students who were assistants to the teachers.

Likewise, in order to develop codes and categories for this research, theoretical saturation has been used as an indicator for determining the end of developing emergent codes and categories. Therefore, theoretical saturation "occurred when gathering more data shed no

further light on the properties of their theoretical categories" (Charmaz, 2008) and data gathering process for this research reached closure. During the one-to-one interview sessions and based on the need to either extend or clarify previous discussions with participants, each participant was interviewed between 3 to 6 times (see table (3.4) and (3.5) until closure was reached.

3.3 Trustworthiness of Data

The terms of validity and reliability which are broadly used in quantitative research, is replaced with trustworthiness in qualitative research (Jennings et al., 2010). This section presents four criteria suggested by Lincoln and Guba (1985) for establishing trustworthiness of data in qualitative studies. These are: credibility, transferability, dependability and conformability.

The following sections will discuss each of these trustworthiness criteria in association with related steps of Eisenhardt's approach in order to obtain trustworthiness of research.

3.3.1 Credibility of the Findings

According to Lincoln and Guba (1985) "credibility is an evaluation of whether or not the research findings represent a credible conceptual interpretation of the data drawn from the participants' perceptions and experiences of the phenomenon undertaken by the study" (p.296). Creswell, Hanson, Plano and Morales (2007) suggest triangulation and members checking and peer checking techniques in order to obtain credibility of qualitative research. In this study credibility is achieved through triangulation of members checking and peer checking. Likewise I used simultaneous data collection and data analysis. This technique has been suggested by Morse et al. (2008) as the other technique used for achieving credibility. In

addition, I also used negative case analysis (Shenton, 2004) to ensure the credibility of findings. The following section provides more detail about the techniques applied in this study to achieve credibility.

3.3.1.1. Triangulation Technique

Triangulation has been defined as the method used by the qualitative researchers to establish the validity of their findings. Applying this method the researchers attempt to analyse their research questions from multiple perspectives (Guion, Diehl & McDonald , 2011).

Patton (1999, p.1193) describes four types of triangulation that contribute to the validation of qualitative analysis as follows; "(1) checking out the consistency of findings generated by different data collection methods, that is, methods triangulation; (2) examining the consistency of different data sources within the same method, that is, triangulation of sources; (3) using multiple analysts to review findings, that is, analyst triangulation; and (4) using multiple perspectives or theories to interpret the data, that is, theory/perspective triangulation" (Patton, 1999: p.1193).

 The current research used step three of Eisenhardt's approach, that is "data source triangulation" to ensure the trustworthiness of findings. In doing so, two types of data sources are used to examine different points of views; teachers' focus group interviews as well as students and teachers' one-to-one interviews, which provided me with an extensive insight into the phenomenon.

3.3.1.2. Members Checking and Peer Checking Techniques.

Lincoln and Guba (1985) and Morse et al. (2002) introduce the techniques of member checking and peer checking as specific verification strategies that can be used to attain trustworthiness of a qualitative research.

This study performed member checking and peer checking to ensure the credibility of the research. These verification techniques provided an opportunity for me to protect the data from any bias. After the data collection stage the participants' viewpoints were subjected to verifications by the participants themselves to ensure the accuracy of the transcribed viewpoints. This was done in step five of the research process, when transcriptions were sent to interviewees to obtain their confirmation. This task provided an opportunity for the interviewees to check and revise their own responses. Likewise, it enabled me to clarify some of the unclear declarations of the participants.

Similarly, peer checking process was performed during the data analysis stage. As the data obtained from interviews was in Farsi, providing an accurately translated data in the English language was necessary. The process of translating the transcriptions was done concurrently with the coding and memo writing stages. Therefore, across an iterative process, codes emerged, and related memos and quotes were translated by the researcher and then, checked and compared with the transcriptions by the inter-coder who was an expert not only in qualitative research but also in English as well as Farsi language.

3.3.1.3. Simultaneous Data Analysis and Data Collection Processes

The nature of qualitative research, which is iterative rather than linear, entails frequent movement between design and implementation. Such going back and forth ensures the researcher about the consistency among question formulation, recruitment, literature, data collection strategies, and analysis. This iterative process motivates the researcher to identify when to continue, stop or modify the research process in order to achieve reliability and validity (Morse et al. 2002).

Morse and his colleagues (2002) identified simultaneous data collection and data analysis process as a technique to provide validity and reliability for the research. According to them,

collecting and analysing data forms a mutual interaction between what is known and what one needs to know at the same time. Therefore, this iterative interaction between data and analysis is critical to obtain reliability and validity. In this study the data obtained from different interviewees were compared incessantly together during a simultaneous process of data gathering and analysis (such as step four: entering the field also refers to the dates identified in Table (3.4 and Table 3.5). The case sometimes led to the repetition of the interview sessions to clarify any ambiguities that have arisen from the previous sessions. Also, through this, sometimes new codes emerged.

3.3.1.4. Negative Case Analysis

Teddlie and Tashakkori (2009) wrote that, "Negative case analysis involves searching for cases that do not fit the expected or established pattern in the qualitative data in an effort to expand or adapt the emerging hypothetical relationships or theory" (p. 340). Several researchers (Lincoln & Guba, 1985; Miles & Huberman, 1994) have recommended this strategy to achieve the credibility of findings in qualitative research. Shenton (2004) described one form of negative case analysis in which the researcher attempts to refine a hypothesis until it addresses all case within the data. To achieve this aim, initial categories can be developed through constant comparisons between data and construct until it is possible to confirm that those constructs do indeed account for all instances of the phenomenon concerned, even if some of the constructs embrace only one instance.

In order to identify perceived information quality dimensions of FWBLRs this research used step six (shaping hypothesis) and step four (entering the field) of Eisenhardt's approach, which involved constant movement between data and constructs by the researcher during data gathering, data analysis and data interpretation stages. This task helped me to identify the acceptable criteria of FWBLRs in association with motivations, challenges and approaches.

3.3.2 Transferability

Transferability in qualitative study is equal to external validity in quantitative approach (Pickard, 2007; Shenton, 2004). Creswell (1994) believes that providing strong descriptions of the context or individuals who participate in the study enables the readers to transfer the data to other context or setting.

Likewise Krefting (1991) and Shenton (2004) believe that detailed description of the sampling procedure is considered as the main technique, which can be applied for achieving transferability in qualitative research.

Shenton (2004) suggested that qualitative researcher should demonstrate how, in terms of contextual data, the case study location compares with other environments. In line with this belief, the other researchers (Cole & Gardner, 1979; Marchonini & Teague, 1987) highlight the importance of the researcher's conveying to the reader the boundaries of the study. It is in line with Baxter and Jack (2008) who believe the case must be bounded to ensure that the study remain reasonable in scope. According to these researchers, binding the case in qualitative case study is similar to selecting sample in a quantitative study (Baxter & Jack, 2008: 547). According to the researchers, "the sample must be appropriate, consisting of participants who best represent or have knowledge of the research topic" (Morse et al. 2002; p.16).

Shenton (2004) suggests that additional information must be considered before making any attempt at transference. The information that could be considered includes the number of participants, the data collection method that are being applied, the number and the length of the data collection sessions, and the time period over which the data was collected.

In the current research, transferability is achieved during step two (selecting the case) and step three (crafting instrument) of Eisenhardt's approach.

3.3.3 Dependability

According to Guba, Diehl and Lincoln (1981cited in Krefting, 1991) the criterion of dependability in a qualitative research, address the consistency of findings, which is equal with reliability in quantitative research (Shenton, 2004). Krefting (1991) suggests that unlike quantitative research, in qualitative research, the research methods are tailored to the research situation, therefore there are no methodological shorthand descriptions. Thus, in the qualitative research it is necessary to describe the exact methods of data gathering, analysis, and interpretation. According to him "such dense description of methods provides information as to how repeatable the study might be or how unique the situation" (Krefting, 1991, p. 221).

Likewise Miles and Huberman (1994) suggest that in order to achieve dependability of qualitative research, the research questions must be defined clearly. Furthermore, in order to achieve dependability directly, detailed description of the research methodology and design were emphasized by the other qualitative researchers (Creswell, 1994; Shenton, 2004; Krefting, 1991). According to these researchers, in so doing enables a future researcher to repeat the work, if not necessarily to obtain the same results.

According to Lincoln and Guba (1985) there is a close relationship between credibility and dependability. They argue that, in practice, a demonstration of the former goes some distance in ensuring the latter. This may be achieved through the use of "overlapping methods" such as the focus group and individual interviews.

In the current research, dependability was achieved in two ways. Firstly, following Lincoln and Guba (1985) using "overlapping method" at the beginning of the study, I conducted two focus group interviews, which was followed by several individual interviews. Secondly, I provided detailed descriptions of the research methodology and design following through Eisenhardt's step one such as defining research questions, steps two and three, data gathering techniques and steps four and five involving data analysis procedures.

3.3.4 Conformability

According to Charmaz (2008) determining the accuracy of the result is the main goal of conformability. This goal could be achieved in association with the raw data of the research and not merely on the interpretation of the researchers. Shenton (2004) suggests some strategies in order to achieve conformability such as triangulation, admission of researchers' beliefs and assumptions, in-depth methodological description, and recognition of shortcomings in the study's methods and their potential effects.

This study has adopted two strategies to obtain conformability, which included triangulation and admission of researchers' beliefs and assumptions.

In terms of triangulation I used informant triangulation by recruiting teachers in various disciplines. Also, students were interviewed as an additional data source. Likewise, focus group and individual interview were used as the other type of data triangulation.

The second strategy used in this study in order to provide conformability, was verbalization of my beliefs and assumptions. Pickard (2007) called this strategy as external audit. In this context external audit employs the auditors to assess the research process by examining the accuracy of the transcriptions and the level of saturation achieved during the data collection process. According to Creswell (2007) auditors provided the researcher with the opportunity

to assess whether the findings and interpretation in the research originates from the raw data of the study. In this instance, an inter-coder who was conversant in both English and Farsi as well as qualitative research checked all of the codes, related memos, and quotes.

3.4. Ethical Considerations

This study applied ethical considerations. Prior to the commencement of data collection, ethics approval was obtained from the Research Vice-Chancellery of the Ministry of Education in Iran and the confidentiality of identity and responses were maintained throughout. The teachers and students in this study were not referred to by their names but but by numbering them for example as M1, P1, B1, C1, FL1. A discussion of ethical issues also took place with the participants (teachers and students) in the presence of the Absal school principal. Before each interview, the participants were assured of confidentiality and were informed that the study would not harm them, or provide any direct benefits to me. They were also informed that they could refuse to answer any question or fully withdraw from the study at any time, without any negative consequences. In this study all participants indicated their willingness to participate and none decided to withdraw. All participants signed a consent form (Appendix). The students returned their consent form through their class teachers.

3.5. Cultural Issues

Previous researches (Song & Parker, 1995; Padfield & Procter, 1996) discussed about a number of issues associated with the cultural commonality and differences between the researcher and research participants that would impact on disclosure of the in-depth interviews. This research regards variables such as gender, language, and occupation of both interviewer and interviewees. Investigating data, findings, and personal experiences revealed

106

that these aspects have no tenable influence on the results of the current research. The explanations are given as follows:

Firstly, no cultural conflict existed as the gender of both researcher and research participants were similar. Both were female, and came from the cultural norms of Iranian educational institutions in pre-university levels that are mono-gender biased. This situation reduced the ethical tensions of interactions with an opposite sex, creating a psychologically safe space for mutual information exchanges.

Secondly, language is an essential aspect of information interaction. This variable does not have any preventive or blocking impact to the results of the current research as both I and my participants speak the Farsi language, which is also the official language of the Iran especially for information exchanges. In this study language misunderstandings was reduced and the analysis of results showed no problem in this regard.

Finally, my academic background and experience in the area of education created a sense of rapport between me and my participants. The interviewees considered me as someone close to them, and therefore, they easily shared their views and perceptions with me.

3.6. Summary of Chapter Three

This chapter presents the research methodology in three parts. The first part describes the research design and data collection method used for the study in order to achieve the research objectives. In the second part, the chapter provides a description of Eisenhardt's approach, which this research uses to direct the research process step by step. Likewise, the second part traces each of the Eisenhardt's steps together with the research objectives. Finally, the last part of this chapter presents some of the techniques applied to achieve the trustworthiness of

data and discusses ethical considerations and cultural issues. The next chapter presents the analysis and results of the study.

CHAPTER FOUR

Data Analysis and Results

4.0. Introduction

This chapter presents the analysis and results from focus group sessions and interviews used in the data gathering process of this study. It attempts to answer the research questions set out in chapter one. Research questions presented in chapter one address teachers' motivations, challenges, and approaches to use Farsi web-based learning resources in classroom instructions and the teachers' perceptions on information quality dimensions of FWBLRs. FWBLRs are defined as a type of instructional material developed in the Farsi language and are used to deliver educational instructions by teachers and students in Iran. They are expected to improve teachers and students motivation in the teaching-learning process in Iranian smart schools. These resources include textual materials (background readings, references), hypertexts, interactive and visual materials (maps, animations, simulations such as virtual laboratories), discussion forums, classroom and laboratory activities, educational web sites, and scientific data. Individuals and institutions across a range of academic, government and non-profit sectors create them, and they can be retrieved using general search engines such as Google. The resources are created to enhance teaching in a meaningful, interesting way.

This chapter is divided into four parts based on the research questions. The first part presents emerging categories and sub-categories related to Iranian teachers' motivations to use FWBLRs. The second part presents categories and sub-categories, which correspond to the challenges faced by the teachers in terms of using FWBLRs for classroom instructions.

The third part presents categories and related sub-categories addressing approaches applied or suggested by teachers in order to deal with the challenges. Finally, what follows elucidates the process of defining terms and developing criteria for evaluating the perceived information quality dimensions, which emerged from the three first research questions. The results described here address the issues related to information quality in the context of using FWBLRs among smart school teachers in Iran for classroom instructions. The following sections detail the research findings.

4.1. Research Question 1: Teachers' Motivation to Use FWBLRs

The first part of the findings attempts to answer the first research question associated with the teachers' motivation to use FWBLRs for classroom instruction. According to the results, which emerged from the interviews, the smart school teachers were in general motivated to use FWBLRs because they believed that technology infusion in the classroom setting could help improve their own teaching, increase students' engagement and accelerate learning. When the interview and focus group data were analysed, their motivations to use FWBLRs were captured in two main groups comprising, (a) the delivery of instructional materials; and (b) the development of instructional materials. Table 4.1 presents the motivational reasons given by the participants related to the use FWBLRs. It indicated that teachers were motivated to use FWBLRS in the delivery of instructional materials due to their (a) desirability, (b) content accessibility, (c) student-centred teaching support, (d) support for multimedia interactivity and (e) making feasible classroom instruction via simulation. Teachers on the other hand, were motivated to use FWBLRs in the development of instructional materials because they could, (a) collaboratively develop resources using social

media, (b) control use for specific needs, (c) use them as supplementary sources for classroom enrichment, and (d) develop their professional knowledge.

Table 4.1: Teachers' Motivations in Using FWBLRs to Deliver and Develop Instructional Materials

Motivations	Aspects	Descriptions
Delivery of instructional materials	Desirability	FWBLRs are worth having or seeking to be used for classroom instructions.
	Content accessibility	Contents of FWBLRs are available or retrievable easily and quickly.
	Student-centred teaching support	FWBLRs support teaching by focusing on students' interests, abilities and learning styles.
	Multimedia interactivity support	The audio-visual attributes of multimedia FWBLRs as stimulus to accelerate students' understanding of subject matter .
	Make feasible classroom instruction via simulation	FWBLRs support the capability to carry out an educational activity practically and effectively.
Development of instructional materials	Collaborative resource development	FWBLRs are developed collaboratively by both teachers and students through web log comments.
	Controlled use	FWBLRs enables the teachers and students to use such resources to meet their specific information needs
	Classroom enrichment	FWBLRs are capable to support the teachers in classroom management and enrichment as well as to conduct classroom projects effectively.
	Professional knowledge development	FWBLRs are capable to enhance users' domain knowledge from a beginner to advance level.

4.1.1. Delivery of Instructional Materials

4.1.1.1. Desirability

In this study, desirability refers to associating FWBLRs with worth, having or seeking to be used for classroom instruction. Teachers saw FWBLRs as useful and pleasing. Various reasons affected the teachers' decision-making to use web-based learning resources in teaching and learning. The results indicated that the desirability of FWBLRs was considered as an important feature of FWBLRs, which provided an opportunity for teachers to deliver instructional materials within educational context. Three main reasons emerged from the interviews related to desirability features, which included, (a) students' eagerness in using web resources; (b) teachers' and students' familiarity with Farsi language; and (c) gaining social acceptance. The following sections describe the motivational reasons that led to the desirability of FWBLRS among teachers.

(a). Students' Eagerness in Using Web Resources.

Discussion with teachers who participated in this study disclosed that the teachers were motivated to use web resources for the simple reason that their students were versatile in using the Internet. They felt that they needed to use it in order to keep themselves updated along with their students' interests and improve rapport with their students. In the following sections, verbatim quotes of the teachers are identified by the subject they teach and given as evidence to support issues being discussed. A teacher indicated,

> "*To be updated and to get along with my students is my major reason for using the web resources. Because of students' familiarity with "Face book" or "Google reader" it reminds me that I should know about these web services like my students.*

Using the Internet helps me achieve this goal easily". (Mathematics, Interview, 20 February 2012)

Regarding the desirability of web resources for students, one of the teachers noted,

> *"Students use web sources more than we (teachers) do, they love the Internet so much. They surf the Net, and come across different materials that we are not familiar with. We need to know what are the materials we can actually use [to teach] as web resources"*. (Biology, Interview, 20 February 2012) .

One teacher compared teachers with students, highlighting that their students belong to the Net generation and gave the following comments,

> "*When four out of five students want to use the Internet for lessons, as teachers we need to tag on. They belong to the Net generation, they surf the Web around 6 hours a day, to study, to play.. while, we teachers use it for only a little time for this reason"*. (Farsi literature, Interview, 20 February 2012).

The same teacher continues,

> *"The students are keen users of the computer, and are so used to it but for me I have to force myself [to use the computer].. I am forced to use it to fulfill my teaching responsibility"*. (Farsi literature, 20 February 2012)

Similarly, the Mathematics teacher remarked,

> *"You want to have a good relationship with your students. Keep yourself updated! Our students are updated. They are more enthusiastic to use new technology such. as the Web than their teachers, although they usually use the Web for entertainment"*. (Mathematics, Interview, 21April 2012).

(b). Teachers and Students Familiarity with the Farsi Language

The medium of instruction for the five subjects taught by the teachers in this study is Farsi, and it is expected that the teachers and students in the selected smart school are accustomed to the Farsi language than other languages such as English and Arabic. The participants in this study indicated being more competent in using contents in the Farsi language rather than in the English Language. The chemistry teacher illustrated this in the following verbatim statement,

> *"I'm not good in English language, and usually, I cannot understand English texts well. But I can understand the Farsi texts in such a way that I can even remember the page number of a particular paragraph in a book that I have read"*. (Chemistry, Interview, 16 June 2012).

Similarly, addressing students' weakness in comprehending English texts, another teacher stated,

> *"My students are not good in English, so I prefer to use Farsi web resources. Understanding the Farsi contents is more convenient for them compared with English, they are more comfortable with Farsi contents"*. (Physics, Interview, 25 February 2012)

(c). Gaining Social Acceptance.

The teacher participants of the current study believed that using the Web enabled them to be considered as valued, supported and respected teacher from their students' perspective. The teachers felt they can benefit from maintaining friendly relationship with their students to increase their willingness to cooperate in the classroom learning. One of the participants disclosed this belief in the following statement,

"When students talk about web technology and I join them, it surprises them because they see me as a web user, just like themselves. This improves relationship between us, and encourages my students to follow classroom discussion actively". (Mathematics, Interview, 10 June 2012).

4.1.1.2. Content accessibility

In this study, content accessibility is the extent to which the contents of FWBLRs are available or retrievable easily and quickly. It seems that the effortless access to the FWBLRs would influence the effective use of such resources. The participants of the current research believed that there are various types of FWBLRs that could be obtained from the web easily and quickly. The following sections present some of the issues related to perceived content accessibility features of FWBLRs which encouraged teachers and students of Iranian smart schools to use such resources.

(a). Quick and Free of Charge Access to FWBLRs

One participant voiced his opinion about the importance of using web-based technology to provide suitable access to digital learning resources,

"Internet and the Web provide us with an excellent opportunity to gain full access to rare and inaccessible books". (Farsi literature, Interview, 21 March 2012).

Furthermore, easy access to numerous free of charge reference books, was considered as an advantage of using Farsi web resources by participants. The following statement confirmed the popularity and cost effectiveness of web-based information resources,

"The Web offers tremendous advantages as it saves cost. For example, it enables students to download and use so many expensive reference books such as the "Moein dictionary", free of charge". (Farsi literature, Interview, 21 March 2012).

Similarly, related to the importance of access to free web resources, one of the participants in the focus group commented as follows,

"There are so many valuable books on the web that you can obtain free of charge. For me, this is an excellent feature which encourages everyone to use web-based materials". (Biology, FG1, 21 January 2012).

(b). Multi-user Accessibility of FWBLRs

In addition to financial benefits from using free of charge web resources, the multi-users feature of web resources was also acclaimed by the participants of this research. Interview with teachers revealed that unlike single-users printed materials, multi-users web resources provided equal opportunity for everyone to access information resources simultaneously. One of the participants declared as follows,

"I enjoy when web-based information resources can be read by multiple users at the same time. Whereas, if you seek the printed information resources in a library, you may not find what you need". (Chemistry, Interview, 20 August 2012*).*

According to the participants, in some instances teachers were encouraged to use easily accessible web resources as opposed to printed source to deal with time constraints associated with classroom teaching. One of the participants commented as follows on this matter,

"Sometimes we need additional information resources as supplementary sources for text books..Issues related to limited physical accessibility of printed books and time

limitation on the one hand, and our instant information needs on the other hand, led

us to use web-based learning resources". (Biology, Interview, 26 April 2012)

4.1.1.3. Student-centred Teaching

In this study, student-centred teaching is defined as teaching that focus on students' interests, abilities and learning styles. The teachers indicated that they follow their students' interest and skills to provide quick and enjoyable learning. The teachers revealed that they used FWBLRs in classroom teaching for two reasons. The first reason is that the teachers considered students as web users, who were interested in interacting with the Web to promote their knowledge using web resources. The teachers believed that the new generation of students would pay more attention to web-based instructional materials and Internet services than to their teachers.

According to the teachers, students surfed the web and used web-based services and resources more than their teachers. This issue led teachers to incorporate web resources in students' instruction. The teachers believed that in comparison with traditional resources, using web resources would increase students' motivation to learn quickly and effectively. This belief is reflected in the following statement from a teacher participant,

> *"Students like web resources so much. They belong to the net generation who*
>
> *surfs the web around 6 hours a day, whereas we teachers use it only for a little*
>
> *time. So, this issue encourages us to use web-based resources to fulfill the*
>
> *educational aims effectively".* (Farsi literature, Interview, 12 June 2012).

The second reason, which encouraged teachers to use FWBLRs for student instruction was their students' ability to understand the content written in Farsi rather than English

language. As the teachers asserted, students could understand Farsi texts more and have poor English language skills. The chemistry teacher in this case noted as follows,

"My students are not good in the English language. While they are used to Farsi texts it is difficult for them to understand English content. Because of this situation, I prefer to use Farsi web resources in my classroom teaching". (Chemistry, Interview, 10 September 2012).

Thus, students' interests to use web resources and their familiarity with the Farsi language were the motivations that triggered the teachers to perform student -centered teaching through using FWBLRs.

4.1.1.4. Multimedia Interactivity

Providing convenient exchange of educational concepts between teacher and learner might be considered as desirable feature of information resources. This exchange could be achieved with human's multiple senses. The results of this research revealed that audio-visual stimulus provided by multimedia resources were appreciated by the users of web resources. This is because such resources provided pleasant opportunity of utilizing multiple human senses, in which learners could learn quickly.

A biology teacher explained the significance of multimedia facility in enhancing the learning outcome, compared with traditional learning resources,

"Imagine if I want to teach the function of the heart to my students. If I only use texts without motion stimulus, I cannot relay the concepts effectively. However, when I attach an audio-video clip the learning outcome will be improved. The old saying that "a picture is worth a thousand words" indicates that certainly web

resources are capable of promoting the learning outcome by providing multi-media

stimulus". (Biology, Interview, 10 June 2012).

One chemistry teacher commented on the importance of using audio-visual attributes of web resources in enhancing learning outcome,

"Using animation and images beside written texts will improve students' learning.

Unlike text books that contain words with no colourful images, multimedia based

web learning resources enhances students' understanding of the subject matter

through audio-visual attributes that are integrated within the texts". (Chemistry,

Interview, 20 August 2012).

According to the participants, unlike the static images of textbooks, multimedia based dynamic pictures associated with printed texts are capable of transmiting learning concepts quickly from the teacher to the learner. The following teacher voiced out this belief,

"I use web animations as an alternative to static pictures in textbooks. Unlike

traditional teaching methods such as oral explanation by teachers in the classroom

and showing some printed pictures to student, animations provide an interactive

learning environment. For example, moving pictures help learners to observe a

dynamic picture of an electromechanical generator. It makes it possible for students

*to understand the function of the generato*r". (Physics, Interview, 19 April 2012)

It appears that Farsi educational web sites that were frequented were those that employ multimedia components such as colorful images and sounds than just texts. A participant indicated this observation,

"I like those websites that provide multimedia attributes beside texts, as I believe

that multi-media attributes help increase students' understanding of a subject

matter. Preferably I attach a lot of images to a short text to produce slides for my classroom teaching". (Chemistry, FG2, 22 January 2012)

4.1.1.5. Make Feasible Classroom Instruction via Simulation

Feasibility in this research is defined as the capability of FWBLRs to do or carry out an educational activity practically and effectively. The results of the current research revealed that the teachers were motivated to use web-based learning resources because such resources allowed the practical simulation of teaching-learning activities. Participants indicated that, using simulation increased the teacher's ability to deal with the challenges associated with real-world teaching-learning environments. The learner in this study could also learn easily as simulation could take the form of "virtual Laboratories".

According to the focus group's discussion, it is the common practice among teachers in smart schools to use virtual laboratories. One member of a group asserted that,

"Usually teachers in smart schools use the virtual labs to deal with some shortages of laboratory's instruments, materials and physical space". (Physics, FG1, 21 January 2012)

Another chemistry teacher emphasized the advantages of virtual environment in handling scientific experiments,

"There were some chemical tests that we could not do in physical labs in the past, but now virtual laboratories provide this opportunity for us". (Chemistry, Interview, 10 September 2012)

The participants also encountered a number of challenges related to the physical environments such as limited access to equipments and inadequate physical space in the

laboratories to carry out chemical experiments. Other challenges faced were costly chemical materials and the anxiety associated with the risks of working with harmful chemicals. To deal with such challenges, teachers have started to consider the use of virtual laboratories. Such belief was reflected in the following statement by a chemistry teacher,

"There are so many chemical experiments that students have to conduct, and they have to complete them in 90 minutes which is quite impossible! Moreover, I have to oversee more than 30 students to make sure all experiments work well. Sometimes, it is impossible to do the whole tests in the physical laboratory". (Chemistry, Interview, 16 June 2012)

Related to this issue another chemistry teacher said this during a focus group's discussion,

"We have limited lab equipment and chemical stocks...it will be such a waste if experiments do not work, and they have to repeat them since some of these [sic] are very expensive". (Chemistry, FG1, 21 January 2012)

Addressing the safety issues in physical laboratories, a chemistry teacher noted,

"We are worried about students' safety as they are inexperienced, and vulnerable to make mistake while working with harmful chemical materials. Hence, using virtual laboratories enable students to carry out chemical tests in a more practical manner in the virtual environments". (Chemistry, Interview, 10 September 2012)

4.1.2. Development of Instructional Materials

4.1.2.1. Collaborative Resource Development

In this study, collaborative resources development is defined in association with the comments found in web logs as a type of FWBLRs used by the teachers and students to develop their scholarly products shared with peers and other students. Although the social media is considered as a tool for entertainment and pleasure, currently its use is rapidly growing in the educational sectors (Seaman & Tinti-kane, 2013). It seems that scholarly communication plays an essential role in producing and developing high-quality instructional resources.

Based on the findings of the current research, the two most important web 2.0 communication tools used in smart schools to support collaborative resource development were, (a) web logs' comments and (b) discussion forums. The results of this study indicated that by making use of these tools, the teachers and students could exchange their thoughts and develop their scientific products through interaction with other people.

(a) Comments from Web logs

According to the teacher participants, using personal as well as classroom web logs brought students together within a friendly environment, where they could share their writing materials and contribute to the development of the content of pedagogical knowledge on a specific subject. The teachers believed that web logs equip students with knowledge. The students became enthusiastic learners and were motivated to improve their scientific knowledge through communication with the other learners. Related to this advantage, one teacher opined,

"We have a classroom web log where students put their new poems and research papers. Their classmates add their comments on those poems and papers, thus, providing an opportunity for the students to improve their works after reading the comments". (Farsi literature, Interview, 12 September 2012*)*

According to the Farsi literature teacher, students were receptive to the comments from visitors of their personal web logs by the following comments,

" A number of my students are active web loggers who are interested in checking the comments from visitors. Also they read their friend's web log contents and also add their own comments". (Farsi Literature, Focus Group 2, 22 January 2012**)**

It appears that if teachers and students knew that their comments were being read by other people, it encouraged them to be more careful about the quality of the content they created. This situation provided an excellent opportunity in terms of collaborative development of high-quality educational information resources, as one Farsi literature teacher said,

"....seeing the numerous comments on my blog content indicates that it has being visited by other people and this encourages me to be more responsible when writing my materials" (*Farsi literature, Interview, 12 June 2012*)

(b) Discussion Forums on Educational Web Sites

The participants claimed they benefited from interaction with other teachers via discussion forums. Discussion forums are virtual places on the web that teachers can share their ideas about their professional tasks. A Mathematics teacher gave this comments related to the advantages of discussion forums used for instructional purposes.

"The discussion forum at ROSHD's website provides an opportunity for teachers to share their own perspectives about the questions for the final exams and how to analyze them. It acts as a question bank that brings teachers together to share their ideas". (Mathematics, Interview, 20 February 2012)

According to the teachers, interaction with other teachers and sharing their ideas within a discussion forum helped deepen their domain knowledge. The teachers believed that, assembling subject experts to share their viewpoints within a virtual space helped them to collectively explore various aspects of a subject matter. The following statement by a participant reflected this belief,

"Discussion forums of educational websites are very interesting for me, as in some cases, they highlight various aspects of a subject matter obtained from other teachers' perspectives, which I may have not have thought of before". (Mathematics, Interview, 10 June)

4.1.2.2. Controlled Use

Controlled use in this study is defined as the feature of FWBLRs, which enables the users to recruit resources to meet their specific information needs. The result of this study indicated that web-based learning resources in Farsi language were well-liked by the smart school teachers because the teachers believed that such resources allowed them to develop their needed information resources in three ways, namely, (a) customizing existing FWBLRs, (b) developing current contents, and (c) extending the scope of learning using hyperlinks. The following sections provide a brief description of each component.

(a). Customizing Existing FWBLRs

According to the Iranian smart school policy, teachers who are employed in such schools are strongly encouraged to produce their own customized electronic content to support their classroom teaching. To enable this, a number of activities such as short workshops are provided by the smart school administrators. The aim is to prepare teachers to produce electronic content using professional software. However, to be competent producers of electronic contents short courses are not enough. A teacher made the following claim,

"In terms of producing electronic content, we are merely provided with very basic principles without enough instructions to enable us to use relevant software to produce appropriate electronic content. So, in practice, we are faced with so many problems even in doing a simple task". (Farsi literature, Interview, 12 September 2012)

Findings of this study indicated that teachers used easily manageable FWBLRs to deal with their inability to use professional software to produce customized electronic content. As one participant affirmed,

"We are not computer experts in using various specific software to produce electronic content; therefore, rather than using professional software, we take readily available web resources from various Farsi websites and customize them for our own use". (Chemistry, Interview, 20 August 2012)

During a focus group discussion one participant remarked,

"Although we don't have enough skill to use professional software such as flash to produce electronic content; however, we can use web resources, which are readily available for us". (Mathematics, FG1, 21 January 2012)

(b). Development of Current Contents

Information resources that are current in contents is an important issue in teaching-learning activities because the information from older sources could be outdated, inaccurate, or disproven. Contents which are current is particularly important in fields that are dynamic and advances rapidly such as science, technology, or medicine. The issue of currency is of concern to the science teachers, who are more cautious about timeliness of information than the other fields such as Farsi literature.

In this study the science teachers in smart schools used the FWBLRs to update old information found in printed text-books.

A biology teacher asserted that,

> *"You know, biology is a dynamic field that is developed by adding new information resources. However the content of our text books are from ten years ago. Sometimes students come to me and ask some questions about the new topics not available in text books. To answer those questions, I use current web based learning resources in Farsi".* (Biology, Interview, 10 September 2012)

A physics teacher in a focus group voiced his observations related to the importance of providing updated information for students' instruction,

> *"When we want to produce electronic content for our classroom teaching, we need to supply our students with the latest information related to the topic at hand. Therefore, I think that web resources are useful materials in this context".*
> (Physics, Focus Group2, 22 January 2012).

(c). Extending the Scope of Learning Using Hyperlinks

According to the participants web-based resources can manage the cycle of knowledge through hyperlinks. Unlike printed books, hyperlinks are capable of extending the scope of learning within a specific subject area instantly.

Such belief was reflected in the following comment by the Mathematics teacher

> *"Online resources are useful as they can be linked to each other using hyperlinks instantly, the feature that you can't find within the printed books. Even if you want to link printed information to each other, you have to use footnotes or appendixes, however in the case of web resources, they are linked to each other, and provide your needed information needs simultaneously".*
> (Mathematics, Interview,12 September 2012)

4.1.2.3. Classroom Enrichment.

The results obtained from the interviews indicated that FWBLRs were considered as a useful tool to enrich classroom activities through collaboration. FWBLRs could be used by the teachers to enhance their professional skills related to classroom management. Also, using such resources enabled the teachers to conduct research projects in collaboration with their students who could act as their research assistants. The following sections describe how teachers used these resources to enrich classroom activities.

(a). Classroom Discussions.

Teachers in this study used web information resources as supplementary sources to support their classroom discussions. This approach of using web resources enhanced the transfer of educational concepts from the teachers to the students. According to the teachers, the unique nature of some subject matter necessitated the use of both traditional and new educational resources. A successful classroom teaching requires teachers to primarily explain about the subject matter during classroom sessions. Afterward, students were referred to web resources to complete the classroom discussions.

In this case, a physics' teacher noted ,

> *"I believe that, for the successful classroom teaching, the collaboration of traditional resources and web resources is necessary. Thus, doing so, it is necessary that firstly, the teacher provide some basic clarification about the subject, in her own words, to the class, and then refers the students to relevant web resource to get more information. On the whole, I consider web resources as supplementary sources rather than the absolute information resources"*. (Physics, Interview, 12 June 2012).

Similarly, the biology teacher noted,

> *"As a tool, the web is useful as a preliminary educational source. Sometimes we introduce a number of websites related to future classroom discussion to students, and ask them to read the information resources obtained from those websites before attending the classroom"*. (Biology, Interview, 20 February 2012)

(b). Collaborative Research Projects

Interviews with students revealed that they used web-based learning resources as supplementary sources to carry out research projects in collaboration with their teachers.

> *"In order to help my chemistry teacher to develop her research papers related to poison gas, usually I search Farsi educational websites such as Roshd and Tebyan*"*. (Student B, Interview, 28 February, 2012)

According to the findings of this research, the teachers consider web-based learning resources as useful to conduct group research project. A physics teacher remarked,

> *"In doing group projects, sometimes I give some topics for each group and recommend them to use web-based learning resources"*. (Physics, FG2, 22 January 2012)

(c). Learning Classroom Management from Peers.

People can develop their professional skills when they share with other people who have common concerns and responsibilities. According to the teacher participants, they might be involved with a variety of teaching issues in classroom management. So, reading relevant texts from their colleagues' web sites/logs, which offered their strategies in similar situations, led teachers to have an insight about their colleagues' classroom management techniques. The following statement from a participant confirms this belief,

> *"Sometimes when I surf the web, I find some useful reading materials related to teachers' previous experience and they revealed this in their personal web sites/logs. So, reading such resources help me and provide me with new ideas related to my classroom management. For example, once, after reading a text from a web log, I came up with a new idea about writing my reflections if the*

students in classroom ask questions, which I do not know the answers".

(Chemistry, Interview, 25 February, 2012)

4.1.2.4. Professional Knowledge Development

The results from this study showed the were occasions when the smart school teachers used web resource to develop their knowledge about a subject matter at various levels. The participants imagined the web as a powerful information repository, that give access to primary and advance level knowledge, and where everybody could benefit from its holdings to enhance their knowledge. Considering these advantages a teacher participant stated as follows,

> *"You know, the web is similar to a shopping center with various goods. So, everyone can buy goods based on his/her needs and funds. Similarly, in the world of the web the information consumers can get their needed information from the pool of existing information resources regardless of their level of knowledge and information needs".* (Physics, Interview, 12 June 2012)

According to the participants, occasionally, web-based learning resources were used to develop knowledge from scratch. One participant noted,

> *"Sometimes I use web resources to increase my basic knowledge about a new topic which I have no background knowledge about".* (*Physics, Interview, 12 June 2012*)

Furthermore, the results indicated that web-based learning resources could provide answers to students' questions that teachers have no information about.

"Sometimes I use web resources to answer the students' questions related to topics that I have never heard of previously". (Biology, Interview, 10 June 2012)

4. 2. Research Question 2: Challenges in Addressing the Quality of FWBLRs

The second question of this research attempted to explore the information quality challenges that Iranian smart school teachers and students faced when they used FWBLRs. Three types of information quality challenges associated with FWBLRs emerged from the results of the current research. These challenges were; (a) challenges related to content, (b) challenges related to presentation, and (c) challenges related to accessibility.

Subsequently, each of these categories are divided into a number of sub-categories, and discussed in the following sections.

4.2.1. Challenges Related to the Content of FWBLRs

Although the web provides a huge number of divergent information resources, the openness, and the possibility of editing and publishing these resources have reduced users' trust in web-based information. As a result, this issue have raised concerns about the fitness and quality of web-based learning resources.

The results of this study indicated that there were three main categories of challenges related to the content of FWBLRs; (a) their content trustworthiness; (b) content comprehensiveness; and (c) content informativeness. The following section details these challenges that emerged from teachers' focus group discussions and face-to-face interviews with teachers and students.

4.2.1.1 Challenges Related to Content Trustworthiness

In the current study, "trustworthiness" refers to users' ability to trust and confide in the resources. Content trustworthiness of FWBLRs address challenges associated with three aspects:

(a) Inaccurate content: Accuracy in this research refers to having accurate and free of error content.

(b) Unauthorized content: Authority in this research refers to the required domain competency of authors to produce trustworthy information resources.

(c) Out- of -date content: Currency in this study refers to being up-dated regarding the last modification date for revised information resources or the creation dated for firstly posted web resources.

The following details each of the above mentioned challenges.

(a). Inaccurate Content of FWBLRs.

Findings of this study revealed that there are two types of accuracy challenges related to the content of FWBLRs: Factual inaccuracy and stylistic inaccuracy. The following sections describe these two types of accuracy challenges.

(i). Factual Inaccuracy

In this study factual inaccuracy refers to the inaccurate content, which presented conflicting facts between FWBLRs and other type of information resources. Accuracy of information can be considered as a critical feature in terms of instilling users' trust in the information. Accuracy is an important property particularly in some disciplines such as medicine and science.

Despite the advantages of new technology, which makes information available to everyone, often open-to-edit contents and freely published web resources are likely to generate information quality problems. In such an open publishing environment, inaccurate contents can be posted into the web by any author with no restrictions. This concern with the open-to-edit content of Farsi "Wikipedia", was voiced out by a student,

> *"As you know because Farsi Wikipedia is a free encyclopedia that everyone can edit and revise its content, so you might frequently find inaccurate information concerning content or writing errors".* (Student C, Interview, 29 February 2012*)*

Unlike the traditional information resources, which underwent peer-review process before publication took place, there was no authoritative organization that controlled the publication process on the web environment. The participants in this study confirmed that the lack of quality control on web-based publication provided an opportunity for authors to publish their works without passing through the peer review process.

This uncontrolled publication situation could result in conflicting contents on a single topic in comparison with the other types of peer-reviewed information resources (such as scholarly journals or printed books). This contrast created doubts in users especially when they needed to make decisions about the accuracy of information available from two types of information resources.

A biology teacher gave the following comment, which explained the problems,

> *"Sometimes my students come to me, and say that they have encountered conflicting contents about the same subject matter in FWBLRs, printed textbooks, or journal articles. This confuses them, and they become undecided about which of the resources might be true".* (Biology, Interview, 26 April 2012)

Similarly another chemistry teacher reflected her belief about this issue,

"In comparison with web resources, printed books, or journals, the contents of some web resources of Farsi educational web sites are not trustworthy. I think there are inaccurate resources, which are posted on the web by unskilled persons", (Chemistry, Interview, 26 April 2012)

(ii). Stylistics Inaccuracy.

In literature and writing, stylistic elements refer to the use of any variety of techniques to give an auxiliary meaning, idea, or feeling to the literal or written. In the current study stylistics inaccuracy refers to writing deficiencies addressing typeface, grammatical or translational errors. According to the participants, problems related to stylistics inaccuracy might be rooted in author's inadequate knowledge of phrases and words to generate original content or, translations. Based on the findings, low-quality content with stylistic errors are likely to reduce teachers and students trust in FWBLRs. Stylistic deficiencies in the current research concern two aspects, i) misspelling or grammatical errors, and ii) non-literal translation.

i). Misspelling or grammatical errors refers to well-written texts, which include a little misspelling, grammatical or translational errors, which affected readers' trust and affected their intention to use such resources. Despite the significance of well-written information resources, the results of this study showed that participants did not consider FWBLRs as trustworthy resources. They believed that, occasionally, Farsi learning texts on the web suffer from misspelling and grammatical errors. This situation reduced users' trust in FWBLRs, and made such resources unsuitable for use. The following statement reflected this belief,

"Unfortunately, I find so many writing errors including misspellings, as well as translating errors among Farsi web resources that make me stay away from them". (Physics, Interview, 19 April 2012)

According to this physics teacher, the problem was rooted in the ignorance of creators to use standard resources to produce their own web information resources.

"I think that the authors of Farsi educational web resources do not check their own generated resources with core standard reference sources such as thesaurus or dictionaries related with their subject area". (Physics, Interview, 20 August 2012)

Similarly, related to this issue another teacher noted as follow,

"...It seems that the authors of FWBLRs don't check their use of technical words and phrases from specialized dictionaries and glossaries when they develop their own professional texts". (Chemistry, Interview, 26 April 2012)

One of the students commented as follows,

"When I surf Farsi websites while doing my class assignments, frequently, I am faced with inaccurate educational texts, that includes too many misspelling or grammatical errors. Although the text might provide useful information, this issue can reduce the reliability of the resources". (Student E, Interview, 26 April 2012*)*

ii). Non-literal translation refers to free translation in this study, that is translations which is not checked against core standard language tools. The results of this study showed, that different translating styles caused trustworthiness challenges because of inaccurate content of FWBLRs. According to the participants, every translator of web resources used his/her

words and phrases without checking those words and phrases against core standard reference resources. A physics teacher commented,

*"Every translator has his/her own style when providing Farsi versions of an English text, which can vary from person to person. It seems that the authors do not check their own developed texts with standard sources". (*Physics, FG1, 21 January 2012)

According to the participants, this issue might be rooted in the authors' incompetency regarding the domain knowledge. One of the teachers gave this comment,

"I think that some of those people who translate, and post biological texts into the web, are not subject experts. Therefore, they are not familiar with technical words, which are common in Biology. As they use word for word technique for translation, they produce low-quality and inexact texts". (Biology, Interview, 10 September 2012)

(b). Unauthorized FWBLRs

The second sub-category under trustworthiness challenges is related to authority, such as the required domain knowledge and competency of author to produce trustworthy information resources. Interviews with smart school teachers and students revealed that the reputation of creators of information resources might influence user's perception of the trustworthiness of those resources. One participant gave the following statement,

"To trust in online information resources, it is necessary to know the authors. I'm so cautious about this issue. For example, once, when I was surfing the web to do my chemistry assignment, I visited a teacher's weblogs or the web log of faculty members whom I know by name. I don't trust the web resources that are

produced by unknown authors or organizations". (Student B, Interview, 23 August 2012)

It appears that the academic titles of authors such as Doctor or Professor would increase user's trust in information. One participant commented on this issue,

"When I'm going to evaluate online resources, usually I check the title of the creator first. I trust in the information, which is produced or translated by authors holding a Ph.D or Masters degree". (Student D, Interview, 20 February 2012)

Similarly a Mathematics teacher said,

"It is important for me to know the academic level of an author. It indicates his or her competency to produce subject-specific high-quality materials". (Mathematics, FG1,21 January 2012)

In spite of the importance of creators' reputation associated with the users' trust in web-based information, participants in the current study appear not to be satisfied with these resources. One of the teacher participants revealed this belief,

"Sometimes, when I surf the web, I come across low quality learning resources in Farsi websites. The majority of such resources either, do not offer the authors' name and his/her major, or written by an unknown name. So, although you can take a brief look at that information, however, you can never trust the content". (Mathematics, Interview,12 September 2012)

According to the participants, occasionally, FWBLRs were used by the authors to advertise or express themselves. A chemistry teacher commented on this issue,

"*Actually some of the Farsi educational web resources are not of high quality; and therefore are not trustworthy. You know, usually such low-quality resources are posted into the web by unknown authors just because they want to be visible on the web environment*". (Chemistry, Interview, 26 April 2012)".

Talking about her domain, a physics teacher complained of low-quality FWBLRs posted in the web by unknown authors,

"*Once, when I was searching the web to find information about "nuclear energy" to develop a research paper, I came across low-quality Farsi texts related to my topic. I think that, although the authors of such resources may know physics to some extent, but they are not physics teachers*". (Physics, Interview, 10 September 2012*)*

(c). Out- of- date or Undated FWBLRs

Current information in this research is defined as information that are updated and indicated the last modification date of the revised information resources, or the creation date of the first posted web resources. The interviews with smart school teachers and students revealed that they expected the FWLRs to provide current and updated information in order to meet their classroom needs. The following comment of a biology teacher reflected this belief,

"*Information offered in our textbooks are contents related to almost ten years ago. Therefore, sometimes students come to me and ask new questions related to new topics. If I cannot find answers from the textbooks, I will refer to the Web*". (Biology, Interview, 20 February 2012)

Similarly, a Farsi literature teacher gave this comment,

"I think that unlike out of date printed books taught for many years in schools, web information resources can provide the latest information in any subject area". (Farsi literature, Interview, 12 September 2012)

However, despite the perceptions about the currency of web-based resources, in reality participants blamed FWBLRs for presenting out-of-date or undated information,

"The majority of information resources that we obtain from the Farsi websites are either out of date or don't indicate the last update. Even, some of sites don't provide the date at all". (Student D, Interview, 20 February 2012)

Likewise, regarding the challenge of being current participants in this study criticized the FWBLRs for being out dated. The following statement from a chemistry teacher supported this claim,

"When I ask my students to do a research, I can say with no doubt that 95 percent of them immediately go to the Farsi Wikipedia, which presents old and out of date information. Even, its pictures are related to those taken maybe about five years ago". (Chemistry, Interview, 25 February 2012)

4.2.1.2. Challenges Related to Content Incomprehensiveness

Comprehensiveness, in this study, refers to FWBLRs' ability to be understood based on the users' background knowledge and grade level. Findings indicated that the users' judgment about the comprehensiveness of FWBLRs would be influenced by the level of domain knowledge they cover. In this case, the users' perception of comprehensiveness of content might be influenced by their grade level, their previous domain knowledge, and experiences.

The results of this research showed that users understood the concepts offered in a single text if it was consistent with their domain knowledge background. An indication of the grade level of target audience would save the time and efforts of users of the various FWBLRs to find the information they needed in the web quickly. Interviews with participants revealed that FWBLRs have not been successful in informing users about the appropriateness of resources that matched with their level of knowledge, that is, advanced or elementary. A student participant remarked,

"The grade level of the majority of Farsi web resources is not clear. So when you find a web text in your subject area, you cannot recognize its usefulness at a glance until you read it completely". (Student E, interview, 10 September 2012)

This issue was also pointed by another student,

"Once, when I was surfing Farsi websites to find some information resources on quantum physics, I was repeatedly faced with various texts, some simple, some complex. This is because the authors did not indicate the target audience, it was not clear who can use the information effectively". (Student C, Interview, 26 April 2012*)*

Similarly, related to the issue of comprehensiveness, a teacher participant disclosed her opinion,

 "It would be good if all the educational sources in the web were categorized based on the literacy level of readers. In such a case, it would be possible to find the necessary and useful sources for students, without wasting time". (Mathematics, FG1, 21January 2012).

4.2.1.3. Challenges Related to Content Informativeness

The third category of content-based challenges in terms of using FWBLRs is related to informativeness. Informativeness in this research refers to the capability of FWBLRs to provide users with enough new information with no redundancy. Findings indicated that FWBLRs have been criticized for providing users with redundant and duplicate texts and images.

The results of this study showed that due to the common copy and paste practice observed on various websites, users of FWBLRs were disappointed with redundant texts. A Mathematics teacher gave this comment,

> *"It has happened so many times that when I surf the Farsi educational websites, I was faced with the same information materials. Though Google provides so many links to various websites in practice, the results are repeated as authors copy information from each other without further information".* (Mathematics, Interview, 21April 2012*)*

A biology teacher interviewed claimed that the duplication of information waste a lot of their time when browsing.

> *"Frequently, after spending a lot of time browsing for information; finally I end up with the same information presented by different websites".* (Biology, Interview, 26 April 2012)

Similarly, the redundancy of FWBLRs has been criticised by the student participants of this research. A student participant reflected,

> *"When you surf various web sites, you may find a single text repeated more than ten times, It means that the majority of website managers copy and paste the*

information from other websites with making any changes". (Student A,
Interview, 28 February 2012)

Another student disclosed her idea as follows,

*"There are repetitive information materials on the various Farsi educational
websites, in such way that, if a website presents a text including misspelled words,
it is repeated in the other website exactly with no correction or minor changes"*.
(Student B, Interview, 23 August 2012 *)*

The teachers in the focus group interviews also highlighted this issue. Two teacher
participants in focus group discussions claimed as follows,

*"During web surfing I was frequently faced with a lot of repeated Farsi
educational resources, which offered no new information"*. (Mathematics, FG 2,
22 January 2012)

"*Although Farsi educational websites can present various contents concerning a
specific subject area, however, the information provided are repeated resources
taken from the other websites"*. *(*Chemistry, FG1, 21 January 2012)

The results also showed the redundancy problem involving not only text but also images
obtained from various Farsi educational websites. One student participants commented as
follows,

"*Existing web images are limited and are the same as the images found in text
books that have been scanned and transferred into the web"*. (Student B, Interview,
23 August 2012)

The participants in this study also pointed out the inadequate amount of FWBLRs in the various disciplines, regarding this issue, a chemistry teacher criticized the shortage of resource in her domain. She reflected her belief in the following statement,

"The major problem for us is the inadequacy of Farsi web resources in chemistry. Only a few websites offer such resources and the majority of those materials are repeated". (Chemistry, Interview, 26 April 2012)

In another part of her discussion, the chemistry teacher linked the problem to the lack of Farsi equivalent of English language web-based learning resources,

*"Chemistry web information resources, particularly those related to virtual laboratory are in English, without Farsi version. You know it is too difficult for me to understand the English texts". (*Chemistry, Interview, 26 April 2012)

However, there appears to be different ideas about the shortage of resources in various subject areas covered by this study. This variation was indicated when comparisons were made between the arguments provided by teachers from various domains. For example, though resource shortage afflicted some of the subject areas such as chemistry and Mathematics, it is not the same for resources in the Farsi literature. A teacher provided the following comments,

"There are so many literary websites in the Farsi language. You can find everything about Farsi literature in the web. In fact, existing web resources can meet all of our information needs". (Farsi literature, Interview, 12 June 2012)

Participants in this study also highlighted the redundant or inadequate as well as out of date images found on Farsi websites. There was little effort in producing original web-based images. More often, web images were scanned from printed images of text books. A student gave the following statements, which reflected her perception,

"Existing web images are limited and are the same as the images found in text books that have been scanned and transferred into the web sites". (Student B, Interview, 26 April 2012)

Related to repeated images found in various websites, a teacher participant declared as follows,

"Sometimes when I am looking for images in order to paste them into my customized content, I am faced with so many redundant pictures in my subject, presented by various Farsi websites". (Chemistry, Interview, 26 April 2012)

4.2.2. Challenges Related to Presentation of FWBLRs

The second type of challenges in terms of using FWBLRs is related to their presentation. In this study, the researcher discusses the presentation challenges of FWBLRs from the layout perspective. According to the participants, consistent layout refers to the quality of web pages that present only the information relevant to the topic at hand (Small, 1997).

Consistent layout, which presents only information related to the topic was acclaimed by the participants of the current study. The results showed, the teachers were displeased with the inconsistent layouts of Farsi educational websites. These websites combined relevant and

irrelevant information within a single web page and distracted users' focus from the topic they were researching on. Two types of distracting layouts have been identified by the participants of the current research. The first type addressed the layouts that provided numerous hyperlinks within a single text. The second type addressed the layouts, which presented irrelevant banner advertisements (from now on referred to as ads) next to scientific texts. The following sections describe the details of both types of distracting layouts.

4.2.2.1.**Distracting Layout Due to Overused Hyperlinks.**

According to the participants although using external resources provided by hyperlinks might enhance learner's understanding of an educational text, overuse of hyperlinks may misled learners and keep them away from focusing on the topic at hand. A participant gave the following statement,

"I have seen Farsi educational texts, which include so many hyperlinks. In some cases, I noted that there are almost 10-12 Hyperlinks for each page. I think this type of resources distract learners from focusing on the main subject matter. Therefore, I think that it is better to have a balance between the numbers of hyperlinks and the size of content". (Farsi literature, Interview, 20 February 2012)

Likewise, according to the participants, such web pages cannot be used for producing customized content independently. The participants believed that although educational text including hyperlinks might enhance the scope of subject matter, however using such texts for producing customized content, can lead to the lost of the independency of the original resource. The following comment from a participant reflects this belief,

"Hyperlinks attach information resources together, so you cannot put the original text into your customized content independent of related reference links". (Mathematics, Interview, 10 June 2012)

4.2.2.2. Distracting Layout Due to Combined Ads and Scientific Texts on a Single Page.

According to the participants, irrelevant banner ads that were embedded into the scientific web pages, decreased student's concentration and distracted them from the scientific text. The teachers believed that such layouts were created by unskilled persons without taking to account pedagogical objectives. Such belief is reflected in the statements from the following teachers.

"Suppose the student is reading a scientific text on the screen. Showing an irrelevant motivator to her, which has nothing to do with the text, makes her lose concerntration; although they may be nice or interesting. Actually, I think that this type of educational web pages is not designed based on pedagogical purposes and the designers are not educators". (Physics, Interview, 25 February 2012)

Regarding this distracting issue, another teacher commented,

"For example, you can see a hair colour advertisement next to a physics text about quantum, what is the relevance? These irrelevant ads distract my students' focus on the subject matter". (Physics, Interview, 29 August 2012)

Furthermore, the teachers believed in some cases that the ads presented bias images that are in conflict with beliefs of the society. One Farsi literature teacher said,

"Irrelevant ads are unexpected blocks. You know some of them are changed every day, and sometimes broadcast images and writings which are not acceptable from our religious and cultural perspectives. Thus, seeing them, students get distracted and misled". (Farsi literature, Interview, 20 February 2012)

4.2.3. Challenges Related to the Accessibility of FWBLRs

The third type of the main category of challenges, after content and presentation, is accessibility related to using FWBLRs. Accessibility in this research refers to the characteristics of FWBLRs associated with being at hand when needed. The results from this study indicated that there are two types of challenges related to accessibility of FWBLRs: (a) Broken links, and (b) Websites' licensing issues. The following section describe each category of challenges.

4.2.3.1. Accessibility Challenges Due to Broken Links.

The first category of accessibility challenge is related to broken links. Findings of this research revealed that, users expected their information needs to be met instantly by online information resources using hyperlinks.

Regarding this, one of the participants reflected her perception as follows,

> *"Online resources are useful as they can be linked to each other using hyperlinks instantly; the feature that you can't find within the printed books. Even, if you want to link printed information to each other, you have to use footnotes or appendix, However in the case of web resources, they are linked to each other instantly and meet your information needs simultaneously".* (Mathematics, Interview, 10 June 2012)

However, broken links might be considered as a barrier to immediate access to information for users. The findings of this study indicated that FWBLRs were blamed fr offering broken links, which frustrated users frequently. One of the students indicated her perception on this issue as follows,

"For me, broken links are a problem in terms of using Farsi educational resources. You know, when I encounter such annoying situations, I get too disappointed". (Student E, Interview, 10 September 2012)

Likewise, broken links within Farsi wikipedia's articles also frustrated a biology teacher, who gave the following comments,

"The red color highlighted links which you can see within Farsi Wikipedia's articles are signs which remind you that these links are not active, and therefore no more information might be available". (Biology, Interview, 10 June 2012)

Similarly, the following statement from another participant confirmed this challenge,

"I remember that a few weeks ago, when I was searching for information to complete my thermodynamics assignment, I was faced with broken links to the extent that it made me nervous". (Student C, Interview, 23 August 2012*)*

4.2.3.2. Accessibility Challenges Due to Websites Licensing Issues

Based on the findings of this study and inspite of the teachers perception about the unlimited access to the numerous FWBLRs to encourage the use FWBLRs, in practice the teachers were frustrated by web sites' licensing policy. According to the participants, the majority of Farsi educational web sites restricted access to the information resources to only registered members. A teacher participant noted as follows,

"*Many educational Farsi websites are accessible only to their members. Though they may include high-quality information resources related to the topic at hand, in practice, only their members are allowed to access the full text of resources. As you*

see, this is a problem in terms of using Farsi web resources". (Farsi literature, Interview, 12 Sep. 2012*)*

Addressing the account requirement for logging to a number of Farsi educational web sites, another participant claimed as follows,

"*Actually one of the barriers, which prevent us from convenient use of Farsi educational web sites is that the majority of useful websites are accessible only to their members".* (Mathematics, Interview, 12 Sep. 2012)

4.3. Research Question 3: Approaches to Address Information Quality Challenges

This section reports on the approaches practised or recommended by the study participants in dealing with information quality challenges during their use of FWBLRs. The various approaches are presented corresponding to challenges they are associated with, such as content, presentation and accessibility challenges.

4.3.1. Approaches to Challenges Related to Content

4.3.1.1. Addressing the Challenges to Trustworthiness

The results for the second research question revealed that there were three types of challenge related to content trustworthiness of FWBLRs, (a) accuracy, (b) authority and (c) currency of content. Discussion with participants indicated that rationale for all of trustworthiness challenges were connected indirectly with the uncontrolled web-based publishing environment. According to the participants there was no authorized organization that controlled web-based publication in Iran. This issue provided an incredible environment wherein information resources could be produced, revised or exchanged with no systematic

procedure. The subsequent sections describe the approaches related to trustworthiness challenges.

(a). Addressing Inaccurate Content

(i). Conflicting Facts: Teaching Students to Critically Evaluate FWBLRs.

As mentioned previously, incorrect contents, which resulted from uncontrolled web-based publishing environment, made the information consumers doubtful about the trustworthiness of information conveyed throughout FWBLRs. To deal with this problem, a biology teacher who disclosed this issue as a challenge, provided the following solution,

> *"At first I ask my students to examine the reference list of information resources, which they retrieved from the web. So, if they could ensure that it was supported by appropriate credible resources such as journal articles, they can trust the web information. Otherwise, they should refrain from using such resources".* (Biology, Interview, 26 April 2012)

Similarly, another teacher revealed the solution, which she used as follows,

> *"Sometimes, in my class, I teach my students how to evaluate web resources before making decision whether to use these resources. I emphasized that they should not rely on web-based resources unless they are sure about the credibility of content".* (Mathematics, Interview, 21April 2012)

The teachers in the smart schools appear to pay more attention to use readily evaluated information resources even though they are printed resources to ensure the trustworthiness of information.

A biology teacher offered this perception,

"You know, unlike online information, printed resources goes through a long term peer-review process before being accessible for everyone. Therefore, as those information resources have been examined by the experts in advance, you can be confident about the quality of their content without a need to evaluate them by yourself". (Biology, Interview, 26 April 2012)

(ii). Stylistic Errors: Teaching Students Academic Writing.

Well-written web-based learning materials have been acknowledged by the participants of the current study. The teachers believed that, in order to produce well-written web-based resources, the practice should be taught from the school stage. In doing so, the students were provided with academic writing skills.

This was articulated by a physics teacher who said,

" I think that from the school stage we shall do our best to train competent future authors, who are careful about producing high-quality web-based educational resources. The students must learn academic writing styles". (Physics, Interview, 19 April 2012)

Regarding the importance of producing accurate Farsi web-based learning content, another teacher commented as follows,

"The authors of FWBLRs should be careful about their writings. When they produce, or translate writing materials, they should refer to standard resources such as thesauruses or dictionaries". (Farsi literature, Interview, 12 June 2012)

(b). Addressing Unauthorized FWBLRs

Finding of this research indicated that occasionally the participants trusted the content of FWBLRs based on the reputation of the author/creator. In the situation where the author(s) details were missing, the teachers suggested two strategies to tackle the problems.

(i). Evaluate the Reputation of the Publisher of FWBLRs

The results of this research indicated that the reputation of author(s) could be gauged by examining the reputation of their supporting organization. From this perspective, trusted author(s) are supported by authoritative organizations such as, government or educational websites that published the authors' resources. A Mathematics teacher pointed out,

> *"I evaluate the trustworthiness of information provided by unknown authors through the representing website. So, usually, I put trust in the websites with .edu domain name"*. (Mathematics, Interview,12 September 2012)

Likewise, referring to a specific website in her field, a physic teacher indicated,

> *"There are a number of well-known websites, which offer valuable information resources in my teaching field. For example "Ghazvin research center's site" is one of them, which I frequently refer to its those resources that are related to virtual physics' laboratory"*. (Physics, Interview, 29 August 2012)

Similarly, regarding the importance of trustworthiness of supporting web site as an indicator of the reputation of author(s), another teacher commented as follows,

> *"In the case of missing information about an author, I trust the information resources based on the reputation of website that publish web-based learning materials. You know, I believe that trustworthy educational websites provide*

information produced by experts in that subject. Personally, I trust those websites

that have .edu domain name". (Biology, Interview, 20 February 2012*)*

(ii). Ignoring Unauthorized FWBLRs

Based on the finding, the other strategy applied by the participants to deal with challenges related to authority is ignoring unauthorized content. The following statement confirms this claim,

> *"If the information resources which I retrieve from Farsi educational websites*
>
> *are produced by unknown authors, I prefer to ignore them, and search for the*
>
> *other resources that include the author's details".* (Chemistry, Interview, 20
>
> August 2012*)*

Similarly, regarding this matter, another participant asserted as follows,

> *"In order to select reliable resources among a lot of search results, I check the*
>
> *author's details first. So if I could not find information about the author I would*
>
> *leave the page and check the other results".* (Mathematics, Interview,12
>
> September 2012)

From the findings of this study it appears that science teachers were more cautious about the authority of FWBLRs than teachers from the other disciplines such as Farsi literature.

(c) .Addressing Out of Date or Undated FWBLRs

The interview with participants indicated that the teachers and students made decisions about using dated information based on the task at hand. For example, sometimes information was needed to find the latest information to urgently write a research paper. At other times, the information may be required to meet basic information needs regardless of the time significance. Therefore, related to this, the participants suggested two different

strategies, by ignoring the date of publication, and using the information if the date is not critical; and, leaving the undated or out-of-date information, and searching for alternative resources.

A physics teacher gave the following perception,

"Actually, based on my information needs and the nature of the task at hand, I make decision to select or reject out of date or undated information resources. If I need to follow the latest news, for example in astrophysics, I prefer to leave old resources, and find more current ones. Otherwise, I ignore the date and use any useful resource related to the topic at hand". (Physics, Interview, 20 August 2012*)*

A biology teacher disclosed her strategy in this case as follows,

"I select and use information resources depending on my information needs and my purpose. For example, when I'm going to inform my students about the recent advances in cellular genetics, I check the latest date. However, it is not important for me when I want to obtain some information, for example, about diet and losing weight". (Biology, Interview, 10 September 2012*)*

(d). Addressing the Challenges of Incomprehensiveness

(i). Determine the Target Audience.

 Incomprehensive content has been identified by the participants of the current study as one of the content-based challenges. The results of this study showed that the understandability of the content of FWBLRs might be affected by the level of user's domain knowledge. Non-

targeted content in this research refers to the content that does not determine their potential audience. The participants in this study have declared that, non-targeted contents user's time in sifting useful information based on their level of domain knowledge.

Participants in this study suggested indicating the grade level of targeted audience on the top of web pages to help save users time. The following statement reflected the opinion of a student,

> *"For me, the educational websites should indicate their target users from elementary to advanced level. The grade level of users must be shown on the top of web pages. It helps the user to make quick decision to select or reject retrieved information"*. (Student C, Interview, 10 September 2012)

The participants felt that indicating the targeted audience in content pages was useful because it allowed users to self-paced themselves in handling learning resources. The participants believed that resources that indicated their target audiences were useful as students could retrieve and use these resources independent of their teachers' comments.

> *"Sometimes my students obtain some FWBLRs, which they cannot understand because the information was beyond the comprehension of their grade level. So, they come to me and ask some questions about the text. In such cases, I have to clarify the content in my own simple words"*. (Physics, Interview, 10 September 2012)

(e). Addressing the Challenge of Informativeness

The participants of this study believed that, numerous redundant copy and paste of FWBLRs created information quality problems for the users. Teachers and students of smart schools

have expected the FWBLRs to equip them with numerous useful texts, images, examination questions, examples, and so forth related to the topic at hand. However, in practice, such resources often failed to meet the user's needs. To tackle this challenge, the participants suggested two strategies.

(i) Translate Web-based Educational Texts from Other Languages into Farsi.

The participants of this study have suggested translating non-Farsi educational resources to Farsi to deal with the information challenges of using FWBLRs. A chemistry teacher claimed as follows,

> *"I wished a lot that I could translate English web resources into Farsi, and could make them accessible through Websites". (Chemistry, Interview, 25 February 2012)*

Similarly, a biology teacher noted,

> *"It would be wonderful if we could translate high-quality web-based learning resources from the other languages into Farsi, and add it into the holding of Farsi learning resources available on the websites". (Biology, Interview, 26 April 2012)*

(ii). Use or Add Traditional Resources as a Backup Resource

Interview results indicated that when the users of FWBLRs failed to obtain enough useful materials, they took into account alternative information resources such as printed books. The following comment from a teacher participant reflected this approach,

> *"When I ask my students to do a class assignment, sometimes they come to me and complain that they cannot find enough web resources related to the topic at*

hand. As a solution, I recommend them to use the library resources". (Physics, Interview, 19 April 2012)

Likewise, another biology teacher reflected as follows,

"I remember that, once, I could not find adequate pictures that I needed to produce electronic content of animal anatomy on the web. So, I referred the students to the library and found a useful printed animal anatomy atlas. It included all of my needed pictures. So, I scanned those pictures, and attached them into my produced content". (Biology, Interview, 26 April 2012)

4.3.2. Approaches Used to Challenges Related to Presentation

Teachers in this study practiced the following two approaches to address the challenges related to the presentation of FWBLRS

4.3.2.1. Keeping Loyal to the Webpage that includes too many Hyperlinks

To deal with the problem of over use of hyperlinks in a single page, which is likely to mislead users from the main subject, the teachers recommended the students to be loyal to the visited web pages. The following statement from a teacher indicated the strategy she used,

"In order to keep my students away from being distraction by too many hyperlinks, I recommended them to ignore the hyperlinks, and focus on the webpage without following the links". (Farsi literature, Interview, 20 February 2012)

4.3.2.2. Referring Students to Selected Websites.

The teachers in this study referred their students to selected websites in order to handle distracting layouts due to irrelevant banner ads. The result of interviews indicated that the teachers referred their students to specific websites, which they have selected themselves. The teachers selected and suggested those websites, which are in line with their perspectives, beliefs, and cultural norms. The following statement from a teacher reflected this strategy,

> *"We shall do our best to refer to the websites that are suitable for our educational contexts and cultural beliefs. We prefer to suggest, which sites or web logs students should visit. We may have more useful web sites, but you know we don't have that freedom, for example at school to use them".* (Farsi literature, Interview, 20 February 2012)

4.3.3. Approaches Used to Challenge Issues Related to Accessibility

Concerning accessibility challenges, two main categories of challenges emerged from the analysed data namely, websites' licensing issues and broken links.

4.3.3.1. Website Licensing.

In relation to the website licensing issues, teachers confessed sharing account information as a strategy used to deal with this challenge. The occasional users of FWBLRs in this study were often frustrated by the inaccessible websites, which were available only for their members. As one participant revealed, when she came across websites, which required a

username and password, she would use the information, which she shared with her colleagues,

> *"Some of my colleagues are members of a number of scholarly websites like "Noor magazine website". When I want to use these websites, I login using my colleagues' account".* (Farsi literature, Interview, 12 September 2012)

4.3.3.2. Broken Links.

To deal with broken links, teachers reported having no choice but to simply leave the inactive WebPages in the hope of finding alternative accessible resources in their subsequent search process. One of the participants in this case informed the researcher as follows,

> *"During my search, using Google or Yahoo, sometimes I am faced with broken links. So, in such frustrating situations, I prefer to leave the page and search for other active web pages".* (Biology, Interview, 10 June 2012)

According to the results, teachers were encouraged to use web resources because of the perceived instant accessibility of such resources compared to traditional resources. However, this motivation was hindered by broken links on the websites. To tackle this problem, some participants acknowledged that they prefer to use traditional resources rather than web resources. A participant voiced this assertion,

> *"For me, although web resources are able to meet our needs instantly, but most of the time, inactive links are barriers. You know, when I am faced with such annoying situation, I prefer to replace web-based resources with printed ones".*
> (Chemistry, FG2, 22 January 2012)

4.4 Research Question 4: Teachers' Perceived Information Quality of FWBLRs for Classroom Instruction.

The definition of information quality is associated with "fitness for use" as the theoretical lens. This research identified teacher-accepted information quality dimensions of FWBLRs. Based on the research questions addressing motivations, challenges and approaches of using FWBLRs in the classroom, 14 dimensions associated with information quality emerged from the findings. These 14 information quality dimensions are grouped into four main aspects namely, (a) pedagogical usability (5 dimensions), (b) content (6 dimensions), (c) presentation (1 dimension) and, (d) accessibility (2 dimensions) that support teaching and learning.

The criteria that influence the information quality of WBLRs are summarized in Table 4.2. The following sub-sections describe the issues related to information quality dimensions.

4.4.1 Information Quality Dimensions of FWBLRs Related to Pedagogical Usability

This section described the perceptions of Iranian smart school teachers on FWBLRs as useful materials that could support their instructional responsibility in two main ways, the delivery and development of instructional materials. Five (5) pedagogical usable information quality dimensions emerged from the data. The following sections describe information quality dimensions related to pedagogical usability of FWBLRs.

Table 4.2: Information Quality Criteria of Using FWBLRs for Teaching and Learning.

	Information Quality Criterion	Characteristics
1	Student engagement	FWBLRs are capable of capturing students' interests and motivation to follow through the learning process voluntarily.
2	Content Accessibility	Numerous contents of FWBLRs are available and quickly accessible.
3	Multimedia interactivity	Multimedia attributes of FWBLRs facilitate the delivery of instructions between teachers and students.
4	Collaborative resource development	Students and teachers could work together to reach a common goal, giving both of them a sense of how FWBLRs could be developed in collaboration.
5	Reusability	FWBLRs can be re-used in various contexts and has the capability to meet various information needs.
6	Factual accuracy	The contents of FWBLRs are expected to be Trustworthy and present credible information.
7	Stylistic accuracy	The contents of FWBLRs are expected to be well-written and free of spelling or grammatical errors.
8	Authority	FWBLRs must be produced and supported by well-known and expert authors or organizations.
9	Currency	FWBLRs should include the last up-date of information on their websites.
10	Target audience	The grade level of users of FWBLRs should be determined.
11	Adequacy	FWBLRs should provide enough amounts of contents.
12	Selective exposure	FWBLRs should present only the information, which is related to the topic at hand.
13	Active links	The reference hyperlinks provided by FWBLRs should be active and accessible.
14	Website accessibility	The web sites, which include FWBLRs should provide free access to their holdings.

4.4.1.1. Student Engagement

In this research, student engagement refers to the ability of FWBLRs to capture students' interest and motivation to follow the learning process voluntarily. The results from interviews with teachers indicated that adopting student-centered teaching method helped teachers to sustain students' interests in the learning process. The teachers claimed that, their students were eager to use web resources, and they would typically surf the web more than their teachers. The teachers referred to their students as belonging to the "web generation", and would readily accept web technology as an integrated part of their life. Also, the teachers believed that their familiarity with web resources would enhance teachers' social acceptance by students. In doing so, the student would enthusiastically be engaged with classroom teaching-learning activities through the utilization of FWBLRs.

Similarly, from the student-centred teaching perspective, the lack of English language skill amongst students and students' familiarity with Farsi language, influenced the teachers to capture students' motivation to use Farsi resources. According to the teachers, as the students understood Farsi language, using FWBLRs allowed the students to learn concepts quickly and effectively. Therefore, from pedagogical perspective, "Student Engagement" has been identified as an information quality dimension of FWBLRs.

4.4.1.2. Content Accessibility

In this study, content accessibility is the extent to which the contents of FWBLRs are quickly accessible and available. The participants of the current research believed that in comparison with web resources and traditional sources, the verity of FWBLRs can be obtained from the websites quickly and free of charge. Likewise, the participants also

acknowledged the multi–user accessibility feature of FWBLRs. According to the participants, simultaneous access to a single information resource removed the accessibility barriers, which might be encountered by users of traditional resources. For example, the lack of adequate copies of an information resource can be considered as a barrier when using traditional library resources. This barrier is removed when using multi-user web-based learning resources. Furthermore, quick access to a number of scarce information resources, which can be obtained from the web, is the other reason why teachers and students use FWBLRs. The respondents of the current study revealed that the accessibility of web based learning resources in the Farsi language helped save their time, and meet their classroom teaching and learning requirements. In conclusion, this study suggested that "content accessibility" was an information quality dimension of FWBLRs.

4.4.1.3. Multimedia Interactivity

Students' engagement with their learning process through the use of FWBLRs was reported as a motivation to use by the participants of the current study. According to the teachers, their students were eager to use web resources, and surfed the web more than them. The teachers considered their students as belonging to the web generation, and were keen users of web technology. Understanding this situation, the teachers attempted to engage their students' learning processes via using FWBLRS. The engagement encouraged their students to be active classroom participants and pursue their learning objectives enthusiastically. In this context, the teachers attempted to utilize multimedia attributes of FWBLRs as a motivator to enhance students' learning. The teachers believed that the students' learning outcome will be enhanced if they understand concepts fluently through fun. Using interactive multi-media in instructions, the teachers took into account the involvement of human senses to deliver learning of concepts.

Related to this, incorporating dynamic multimedia into static textual learning materials helped make information more attractive and understandable to the students. As the results of the current research indicated, Farsi educational websites that included numerous multimedia-based learning resources were visited more than those websites, which only provided text-based information resources. Therefore, considering the importance of multi-media attributes to provide enjoyable learning, "multi-media interactivity" is suggested by this study as another information quality dimension of FWBLRs.

4.4.1.4. Collaborative Resource Development

In this study, collaborative resource development refers to the situation in which students and teachers develop educational resources, such as the writings or thinking together, and consequently, learning from each other. Collaborative learning activities included collaborative writing, group projects, joint problem solving and other activities. Unlike individual learning, people engaged in collaborative learning take advantage of other team member's resources and skills. This could be obtained by monitoring one another's work, asking each other for information, or evaluating one another's ideas. In order to achieve collaborative learning objectives, social media is likely to be used by the people engaged with collaborative learning activities.

The results of the current study indicated that FWBLRs were used collaboratively by the students and teachers to develop their writing materials, and to obtain feedbacks from web logs. The teachers and students of smart schools used the comments found in web logs and discussion forums to develop their scientific resources and thoughts and to share the comments and discussions with each other. The teachers in the current study believed that

sharing comments found in web logs provided their students, with the incentive to improve their writing materials and scientific products. They viewed the comments on web logs as a platform to improve their students' writings and helped produce high quality web-based resources. In this context, as the teachers asserted the students would share their writing, such as poems and research papers, with their teachers and friends, and sought feedback to improve their works. Thus, FWBLRs are expected to promote closer relationship among peers and other peoples who are engaged with the same learning environment.

Interview results showed that, resource development using social-media was considered more by Farsi literature teachers than the science teachers, who participated in the current study. Collaboratively developed resources based on feedback and peer comments were identified by participants as important in helping them produce high quality learning materials. Therefore, "collaborative resource development "has been identified as the other information quality dimension for FWBLRs.

4.4.1.5. Reusability

Reusability in this research is defined as an attribute of FWBLRs, which enables users to reuse resources in various contexts. Distributed National Electronic and Learning Objects (DNER&LO) classify resources' reusability under the following categories: generic, interdisciplinary, subject specific and resource specific (Currier & Campbell, 2002). Generic reusability, refers the ability of web resources to be reused in any subject field or discipline. Likewise, interdisciplinary reusability indicates that resources are applicable for teaching and learning in more than one discipline or subject. Subject specific reusable resource refers to those resources that have been designed only for a specific subject or discipline. Finally, resource specific reusability indicates resources designed to be used with a specific resource.

In the current research, participants regarded FWBLRs as having the capability to be used in all five disciplines undertaken by this study. The teachers of the various disciplines revealed, they are motivated to use web resource because they perceive that there were a variety of FWBLRs in their teaching fields that could be contextualized, re-used and aligned with their pedagogical objectives.

The teachers perceived that, one of the advantages of FWBLRs is their capability to be used for producing customized electronic content for classroom teaching. According to the result of this study, time constrains of teachers in smart school, on the one hand, and their inadequate computer skills, on the other hand, raised challenges associated with producing customized electronic content for classroom teaching. To tackle this challenge, the teachers reportedly customize readily available FWBLRs based on their specific needs, and embeded them in their instructional content. Thus, FWBLRs could be derived from original context, and be re-used in a new context. This saved the teachers time and effort and helped them carry out their teaching processes with ease and effectively.

In conclusion, this study suggests that the "re-usability" of FWBLRs, is an information quality dimension for FWBLRs.

4.4.2 Information Quality Dimensions of FWBLRs Related to Content

Findings of this study identified six (6) content-based information quality dimensions, which emerged from the three main categories of trustworthiness, comprehensiveness and informativeness of content. The following sections describe the content-based information quality dimensions.

4.4.2.1. Factual Accuracy

Factual accuracy addresses the credibility of the content of FWBLRs (Lucassen & Schraagen, 2011; Newmark, 2003). Findings of this study revealed that the teachers were motivated to use FWBLRs because they perceived advantages such as easy access to the numerous resources. However, in reality, conflicting contents of a single topic obtained by the users of FWBLRs was a barrier to the effective utility of web resources.

To deal with the challenge of factual accuracy the teachers suggested critical evaluation of resources. In this case, teachers recommended their students to be sure about the availability of adequate reliable reference list.

4.4.2.2. Stylistic Accuracy.

In addition to factual accuracy, stylistic accuracy has been identified as the other trustworthiness challenge related to content. Stylistic accuracy addresses the writing issue of FWBLRs such as spelling, grammatical, or translation (Lucassen & Schraagen, 2011; Newmark, 2003). The participants of current study believed that in order to deal with stylistic deficiencies of FWBLRs, the schools should train expert authors who could monitor the accuracy of content developed by them. In this context, the participants claimed that all authors should use core standard resources to develop his/her own professional texts.

This finding confirms the finding of early trustworthiness research conducted by Holand and Weiss (1995), who found that trustworthiness of resource significantly affects the acceptance of the message and changes in opinion. Overall, in this research, factual accuracy and stylistic accuracy have been identified as information quality dimensions of FWBLRs.

4.4.2.3. Authority

Authority refers to the required domain knowledge and the reputation of an author to produce trustworthy information resources. Author's reputation is considered as a critical criterion in terms of user's perception on the trustworthiness of information they create. The results of this study showed, that the majority of FWBLRs have failed to earn their users' trust. The respondents indicated that an author's reputation could be determined by certain indicators such as his/her academic or professional qualifications (Dr., Professor) and so forth.

The participants claimed that the majority of FWBLRs' authors were either unknown, or did not indicate their details on websites. In such challenging situations, the evaluation of trustworthiness could be based on the organization supporting the authors. For example, the website, which published authors' papers, or provided links to authors' web pages, could indicate the reputation of the authors. The results indicated that participants trust authors who were supported by well-known educational organizations such as the Ministry of Education, Iran, or, ROSHD National Network.

Therefore the authority of authors' reputation in this study has been identified as an important information quality dimension of FWBLRs.

4.4.2.4. Currency

Currency in this research, is defined as being up-to-date in accordance with the last modification date of the revised information resources, or the creation date of the first posted web resources. One of the reasons that motivated participants to use the FWLRs was to obtain current and up-to-date information. However, in reality the teachers were often frustrated by out dated or, undated educational materials retrieved from various websites.

To cope with this frustration and focusing on the type of information needed at a specific time, the respondents decided to select or reject the information sources that are not current. Further discussion with teachers revealed that if the date is not a critical issue in terms of meeting their information needs, the teachers would disregard the information date and select to use the information. Otherwise, they would leave the undated or out of date resources and went on to find alternative resources.

The study also found differences in the perceptions of teachers from different disciplines. The science teachers, who were the majority of users of FWBLRs, were more particular about the timeliness of information than Farsi language teachers. Therefore, in this study currency has been identified as the other information quality dimension for FWBLRs.

4.4.2.5. Target audience

The result of the first research question, addressed teachers' motivations in using FWBLRs indicated that the Iranian smart school teachers were motivated to use FWBLRs as they perceived that FWBLRs could foster users' domain knowledge from elementary to advance levels. The teachers considered the web as a rich information repository, which helped

develop users professional knowledge at the various grade levels and allowed them to manage self-paced learning process.

The participants in this study indicated that the easy and quick access to the variety of FWBLRs motivated them to use the resources. However, in reality, the handling of such resources and the untargeted users information posted a challenge to meet users' information needs. According to the participants, most FWBLRs did not indicate their targeted audience and were often considered as incomprehensive from the user's perspective. Furthermore, the participants also reported, untargeted user contents wasted a lot of their perusal time. These untargeted user information forced users to examine all of the retrieved contents before finally selecting on the appropriate resources that were suited for their grade level.

With regard to incomprehensiveness challenge, contents which provided targeted user information are likely to save users, time and provide self-paced learning opportunity for learners. Contents with targeted user information enabled learners to obtain their needed information independent of the suggested information resources from teachers.

In view of the benefits to users of FWBLRs, the respondents of the current study have suggested that the authors of FWBLRs should provide their target audience information on top of the web pages they created. In doing so enabled users of FWBLRs to deal with the incomprehensiveness challenges of content. Therefore, the findings of this study suggest "**t**arget audience" as an information quality dimension for FWBLRs.

4.4.2.6. Adequacy

Adequacy in this research refers to providing enough and additional informational resources. The findings of this research showed that, in the case of student-centred teaching approach, students' engagement with the learning process using FWBLRs encouraged teachers to use such resources for students' instruction.

The teacher participants believed that students' familiarity with the Farsi language, and their understanding of the educational texts written in Farsi, would enthusiastically engage them with classroom learning activates. Likewise, the other reason behind teachers' motivation to use FWBLRs for classroom instruction was their expectation of the availability of an adequate number of FWBLRs, targeted to the various grade levels.

While the teachers expected that each of the educational contents obtained from Farsi websites should equip them with additional information different from previously retrieved ones, in reality, the majority of FWBLRs were duplicated copies of information found on other websites.

To deal with this challenge, the teachers suggested their peers to translate educational texts from other languages, such as from English to Farsi. This initiative would help increase the amount of Farsi web-based educational materials. The English resources could be translated and offered at the various Iranian educational websites. However, as a temporary solution to tackle the problem of resource shortage, participants in this study opted to use traditional information resources. Considering the importance of the adequacy of FWBLRs from the users' perspective, the findings of this study suggest "adequacy" as the other information quality dimension for FWBLRs.

4.4.3 Information Quality Dimension of FWBLRs related to Presentation

4.4.3.1. Selective exposure.

Selective exposure has been identified as the only information quality dimension associated with web design and layout. The selective exposure theory is a concept in media and communication research (D'Alessio & Allen. 2007; Frey & Wicklund, 1978; Freedman & Sears, 1965 ;Katz, 1968) that refers to people's tendency to select specific aspects of exposed information based on their perspectives, beliefs, attitudes, and decisions.

"The selective exposure concept emphasizes the active role of the individual in the selection of media content, which leads people to seek information consonant with their beliefs and to avoid challenging information" (Freedman & Sears. 1965).

The findings of the current research indicated that in addition to trustworthiness of content, credibility of web page presenting the content was perceived as an important criterion in the effective use of FWBLRs in educational context. The smart school teachers believed that using FWBLRs in the classroom exposed them to inconsistent layout, including either irrelevant banner advertisements, or too many hyperlinks within a single page, which distracted students' attention from the text and decreased user's trust in the information resources. Therefore, the teachers expected the FWBLRs to be presented with consistent and clear layout. In this study, the consistent layout refers to the layout that only includes related information to a topic searched in order to keep the user's focus on the text.

Referring to the approaches used, participants in this study appear to trust information presented based on a number of criteria such as, the user's previous experience of the website, and common social and cultural beliefs taken into account by the website managers

associated with use context. The teachers believed that in order to meet their specific information needs using FWBLRs, these resources must be tailored with dominant pedagogical, cultural, and social norms of the use context. Therefore, participants tended to refer their students to a number of specific websites align with these considerations "selective exposure" is suggested by this research as the other information quality dimension for FWBLRs.

4.4.4 Information Quality Dimensions of FWBLRs Related to Accessibility

Accessibility in this study is the extent to which the FWBLRs are available, or easily and quickly accessible. Considering the motivations, challenges and approaches related to accessibility issues, this study suggests two perceived accessibility of information quality dimensions of FWBLRs including, a) active hyperlinks and b) website accessibility. The following sections describe these dimensions.

4.4.4.1. Active Links

According to the results of the first research question, web resources are likely to be used more than traditional resources because of two main motivations, which include hyperlink and multi-user accessibility.

The respondents of the current research identified these two exclusive features of web-based information compared to web-based information resources. The teachers believed that, unlike traditional resources, quick access to online resources enabled them to meet their information needs immediately, and saved their time.

However, additional discussion with participants revealed that, inspite of their eagerness to use web resources, in reality; they came across some frustrating situations. In this case, broken links, encountered by the users has been reported as a barrier in effective use of FWBLRs. The teachers revealed, broken links frustrate them, and reduced their motivation to use web-based resources for students' instructions. To deal with such situation, the teachers suggested two strategies as follows.

Firstly, teachers were suggested to leave inactive pages, when they encounter broken links, and to search only for active pages. Secondly, teachers considered using printed resources when faced with broken links even though priority was given to web resources.

Therefore, in order to effectively use FWBLRs, teachers were encouraged to refer to only active hyperlinks to meet their instant information need. Related to this matter, "active links" has been suggested by this research as an information quality dimension of FWBLRs.

4.4.4. 2. Website Accessibility

Teachers' perceptions of the ease of use and free access to the numerous FWBLRs in various subject matters and grade levels have motivated both teachers and students in smart school to use these resources to deliver and develop the instructional materials.

The results of the current research showed that FWBLRs were admired by the teachers of smart school because of the capability of such resources to support their instructional materials need without wasting their time and money. The teachers believed that unlike the traditional libraries, using web-based learning resources saved the users from the hardship of physical distance or the unavailability of the printed sources in traditional libraries.

Another finding of this study identified the licensing issue of Farsi educational websites as a barrier to the free and effortless access to the information resource. The teachers have

revealed that, when faced with the Farsi websites, which can be accessed only by their members, they became frustrated and their motivation to use FWBLRs for educational purposes was reduced. Further discussion with the participants disclosed that the teachers attempted to access such websites by sharing accounts with their members. According to the results, the Farsi educational websites, which provide FWBLRs, are expected to be accessed by the users without any restriction. Therefore, "Web site accessibility" has been suggested by this research as an information quality dimension related to FWBLRs.

4.5 Summary of Chapter Four

Chapter 4 presents an analysis of the qualitative-based study examining Iranian teachers' motivation, information quality challenges and approaches to address the challenges in an effort to ascertain the information quality dimensions of FWBLRs to be used in the classroom. The teachers were motivated to incorporate web resources in their teaching for two main reasons: for the delivery of instructional materials, and for the development of instructional materials. Findings indicated that the teachers faced problems related to the content quality of FWBLRs. However, they developed strategies to solve the challenges to guarantee their confidence that the web resources met specific information quality requirements. The study highlights fourteen dimensions associated with information quality, namely student engagement, content accessibility, multi-media interactivity, collaborative resource development, reusability, factual accuracy, stylistic accuracy, authority, currency, targeted audience, adequacy, selective exposure, active links, and web site accessibility; and has identified the past studies that have been associating with these dimensions (Table 4.3) that are further discussed in Chapter Five. Five quality dimensions contribute to pedagogical usability aspect that might potentially affect the teaching and learning processes in the smart schools. Another six quality dimensions contributed to the content that might discourage

Iranian secondary school educators' continuance intent to use web-based learning resources for classroom use. One dimension addresses the quality of the presentation of information. Two dimensions relate to the accessibility of FWBLRs. The next chapter summarizes the main findings of this research and presents a discussion of the results for each research question posed, as well and draw conclusion from the results.

Table. 4.3: Supporting literature for the information quality dimensions emerged from the data of current study

IQ Dimensions	Supporting Literature
Student Engagement	Bland et al., 1979; Recker, Dorward & Nelson, 2004; Wu, Chen & Hsieh, 2005; Kay, Knaack & Petrarca, 2009; Afshari, et al., 2009; Light & Polin, 2010; Abrizah & Zainab, 2011; Silius, Kailanto & Tervakari, 2011
Content Accessibility	Recker, Dorward & Nelson, 2004; Wu & Huang, 2005; Wu &Chen, 2008; Kay, Knaack & Petrarca, 2009; Light & Polin, 2010
Multimedia interactivity	Peat et al, 2001; Neo, Neo & Yap, 2008; Hadjarout, 2010; Abrizah and Zainab , 2011
Collaborative Resource Development	Neo, Neo and Yap, 2008; Herrington et al., 2009; Austin et al., 2010; Light and Polin , 2010; Silius, Kailanto &Tervakari, 2011; Abrizah & Zainab , 2011; Attaran, Alias and Siraj , 2012; Kusano et al., 2013
Re-usability	Eifler, Greene & Carroll, 2001; Wepner, Ziomek, & Tao, 2003; Wu & Chen, 2008; Wu and Chen , 2008
Factual Accuracy	Herring, 2001; Scholz-Crane, 1998; Kapoun, 1998; Julien & Barker, 2009; Kay, Knaack and Petrarca , 2009; Metzger & Flanagin, 2013
Stylistic Accuracy	Katerattanakul and Siau, 1999; Walraven, Brand-Gruwe and Boshuizen , 2009; Lucassen & Schraagen , 2011;
Authority	Kapoun, 1998; Alexander and Tate, 1999; Katerattananakul & Siau, 1999; Rieh, 2000; Stivilia et al., 2006; Hasan & Abuelrub, 2011; Chen et al., 2012
Currency	Van Fossen & Shiveley, 1999; Recker, Dorward & Nelson, 2004; Rieh & Danielson, 2007; Ahmad et al., 2010
Target Audience	Peat et al., 2001; Recker, Dorward and Nelson, 2004;
Adequacy	Recker, Dorward & Nelson, 2004; Wu & Chen , 2008; Abrizah & Zainab,

	2011
Selective Exposure	Wu and Chen, 2008; Andrew, 2011; Messing & Westwood , 2012; Arunrangsiwed , 2014
Active Links	Kapoun , 1998; Katerattanakul & Siau , 1999; Wu & Chen, 2008; Ahmad et al. , 2010; Hasan &AbueIrub, 2011; Chen et al., 2012
Website Accessibility	Peat et al., 2001; Aguolu &Aguolu , 2002; Boshuizen , 2009; Adeoye & Popoola , 2011

CHAPTER FIVE

Discussions and Conclusions

5.0. Introduction

The present study aims to explore the Iranian teachers' motivation and information quality challenges they face when using FWBLRs. The study also aims to understand the teachers' perceptions on the information quality dimensions of these learning resources for instructional use. The objectives are presented in the following research questions:

a) Why are the Iranian teachers motivated to use Farsi web-based learning resources for classroom instruction?

b) What are the challenges the teachers faced in terms of assessing the quality of Farsi web-based learning resources for classroom instruction?

c) How do Iranian teachers address the challenges in terms of meeting their instructional information needs?

d) What are the teachers' perceptions of the information quality of Farsi web-based learning resources for classroom instruction?

To address these research questions, the study adopted a context-dependent approach in dealing with information quality issues in line with the concept of fitness for use as the theoretical lens (Chapter 1). The study also used focus groups and interviews to gather data (Chapter 3) on teachers' motivation, issues and information quality challenges of using FWBLRs. The findings present some insights into how teachers perceived the information quality dimensions of FWBLRs (Chapter 4). This final chapter integrates and discusses each of the emerging information quality dimensions, which address motivations, challenges and approaches in terms of using FWBLRs for instructional use within the

context of other developments in information quality of web resources. This chapter will highlight and discuss the contributions of the study to existing knowledge about information quality of web resources as well as considers the implications of the study at both theoretical and practical levels. Finally, the limitations of this study are discussed, along with possible directions for future research.

5.1. Answering the Research Questions

5.1.1. Research Question 1: Teachers' Motivation to Use FWBLRs

This study found that the teacher's perceived pedagogical usability of FWBLRs drove them to use these resources for instructional purposes. The study grouped teachers' motivations to use FWBLRs in two types, (a) the delivery of instructional materials; and (b) the development of instructional materials. Figure 5.1 illustrates that teachers were motivated to use FWBLRs in the delivery of instructional materials due to their (a) desirability, (b) content accessibility, (c) student-centred teaching, (d) interactivity and (e) feasibility of classroom instruction via simulation. Teachers were motivated to use FWBLRs when developing instructional materials because of their following characteristics, (a) they support collaborative resource development through the use of social media, (b) their controllability, (c) they enriched classroom instructions when used as supplementary sources, and (d) they enhanced professional knowledge development.

The result of this study showed that the teachers attempted to use FWBLRs to develop their professional knowledge and skills in several ways. Firstly using FWBLRs enabled the sharing of their teaching experience with their colleagues. Secondly, they could motivate students to learn and establish a student-centred learning environment so that

learning could be transferred to the students quickly. Furthermore, using various FWBLRs enable the teachers to use hyperlinks to extend and update their own domain knowledge.
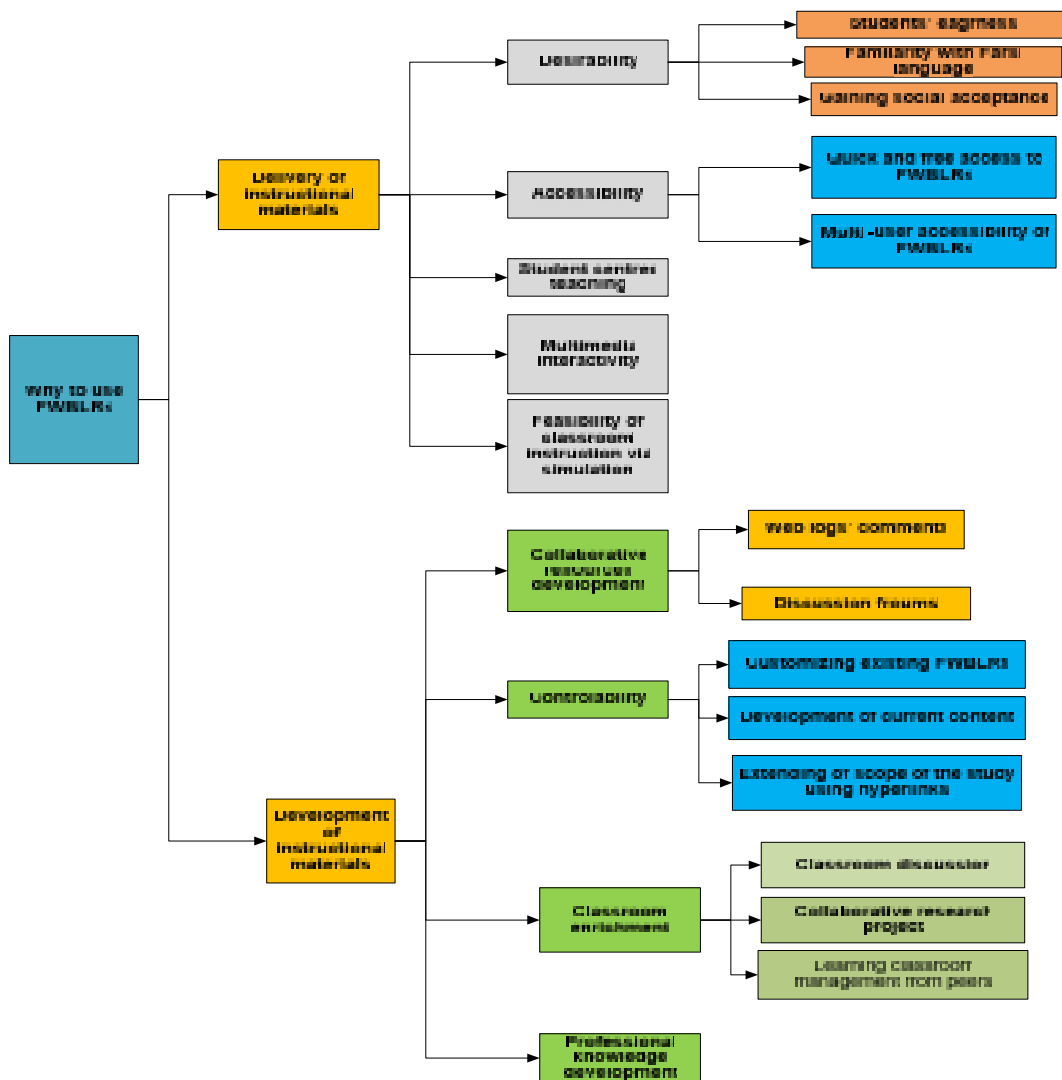
Figure 5.1:Teachers' Motivation to Use FWBLRs to Deliver and Development

Instructional Materials

Furthermore, the availability of ready-to-use FWBLRs provided an opportunity for the teachers to embed such resources into their own generated content without the need to spend a lot of time or having adequate computer skills..

Gaining the benefits of using virtual laboratory was reported by the science teachers as a useful feature of FWBLRs that motivated teachers to use web resources. The teachers

claimed that using virtual laboratories enabled them to teach beyond the real world situations. Using web log comments and discussion forums provided an exclusive opportunity for students and teachers to enhance the quality of their self-authored content through collaboration. According to the findings of this study the FWBLRs enabled teachers to engage with effective pedagogical practice. Other researchers acknowledged the usefulness of web resources and social media services in the educational context. For example, Silius, Kailanto and Tervakari (2011) believed that the "Utilization of social media services for educational purposes has become increasingly popular. Social media enhanced learning systems allow students to participate in educational online communities by creating, manipulating and sharing content online, communicating and exchanging opinions, connecting with each other" (p.21). Such capabilities triggered the perceptions of teachers about the usefulness of social media for students' instruction. Previous studies has shown the active use of social media in teaching, and this use has grown more than 21% from 2012 to 2013 (Seaman & Tinti-Kane, 2013)

In summary, the results of this study show that pedagogical usability of FWBLRs is the top motivator directing teachers towards using FWBLRs.

5.1.2. Research Question 2 and 3: Challenges and Approaches Faced When Using FWBLRs

This section provides a brief discussion for research questions two and three corresponding with problems faced and problem solving strategies applied or suggested by the participants in terms of using FWBLRs for students' instructions.

Section 5.1.1 of this chapter highlighted the participants' motivations for using FWBLRs for education. However, despite such motivations, the results from the interviews showed that occasionally the teachers came across challenges during actual use of FWBLRs. These challenges discouraged and reduced teachers and students' trust in and motivation to use FWBLRs. The teachers in this study tackled the challenges of information quality by adopting certain strategies. Table 5.1 indicates the number of challenges encountered and the related approaches applied by the participants using FWBLRs.

Table 5.1: Challenges Encountered and Approaches Used when Using FWBLRs

Challenges	Approaches	
Inaccurate content	Factual inaccuracy	Teaching students critically about the evolution of FWBLRs.
	Stylistics inaccuracy	Teaching students about academic writing using core standard resources.
Unauthorized content	Evaluating the reputation of publisher of FWBLRs	
	Leaving the retrieved homepage and searching for other FWBLRs.	
Out- of- date content	Ignoring the date and use the information if the date is not critical.	
	Leaving undated or out-of-date information and searching for alternative updated resources.	
Incomprehensive content	Informing about the target audience on the top of web pages.	
Redundant texts or images	Translating web-based educational texts from other languages into Farsi language.	
	Using substitute traditional resources rather than web resources.	
Distracting layout due to too many hyperlinks	Teaching students to remain loyal to a web page.	
Distracting layout due to irrelevant banner ads	Referring students to selected websites.	
Accessibility challenges due to broken links	Leaving the inactive web pages and searching for alternative accessible resources during subsequent search process.	
Accessibility challenges due to Websites' licensing issues	Sharing access account with colleagues.	

Based on Table 5.1 the probable challenges teachers faced addressed three main areas: content, presentation and accessibility of FWBLRs. Content-based challenge such as authority or accuracy was likely to provide trustworthiness problems. Besides problems related to comprehensiveness and informativeness, the teachers also faced trustworthiness challenges. This occur because the credibility, quantity and quality of content of web resources may be questioned by the users. In general, each challenge addressing content, presentation and content could raise problems on information quality and reduced the utility of FWBLRs.

Further discussion with respondents revealed that individual skills and contextual policies could influence the use FWBLRs in schools. It appears that unskilled or biased authors could be responsible for creating low-quality FWBLRs, which users could not trust. Also, inappropriate presentation of information on websites as well as their limited accessibility would decrease users' intention to use the FWBLRs. Another important feature that contributed to producers and publishers competency in searching, evaluating, selecting and using FWBLRs was the level of users' information literacy skills.

Likewise, related to the use context, it appears that prevalent educational policies, social and cultural beliefs in schools could affect the condition of the use of FWBLRs.

5.1.3 Research Question 4: Perceived Information Quality Dimensions

Comparing the findings of the first three research questions, the result of the last question provided an overall of 14 perceived information quality dimensions of FWBLRs. Five of these dimensions contributed to pedagogical usability aspect. Six dimensions contributed to the content. One was related to presentation and two dimensions were related to the

accessibility of web sites. Figure 5.2 summarises the information quality dimensions of FWBLRs, which emerged in conjunction with four categories including, pedagogical usability, content, presentation and accessibility.
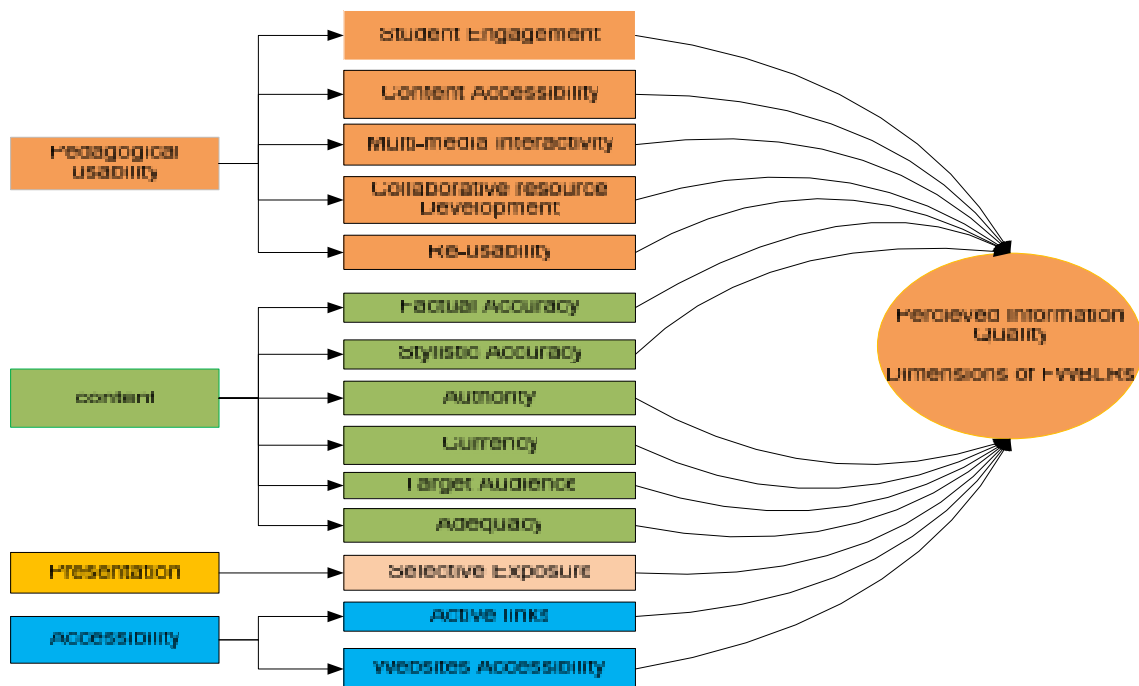
Figure 5.2: Perceived Information Quality Dimensions of FWBLRs

The following sections describe each of the emerging dimensions within the context of other developments in web information quality research.

5.1.3.1. Student Engagement

One of the teachers' motivation to use FWBLRs was identified as being able to focus on student-centered teaching approach, which involved students' engagement with the learning process using web-based technology. The teachers perceived that web resources have the potential to capture students' interests to be active in the learning process, because the students preferred such resources and were keen users. Several researchers

(Bland et al., 1979; Recker, Dorward & Nelson, 2004; Wu, Chen & Hsieh, 2005; Kay, Knaack & Petrarca, 2009; Afshari, et al., 2009; Light & Polin, 2010; Abrizah & Zainab, 2011; Silius, Kailanto & Tervakari, 2011) have confirmed that using digital resources provided an opportunity to engage students with the learning process and establish an effective student-centered teaching-learning environment.

Similar to the teachers who participated in the current study, the teacher participants of previous researches (Light & Polin, 2010; Silius, Kailanto & Tervakari, 2011) also believed that using web resources allow them to feel more connected to their students and provide a new way of engaging them in classroom learning.

Also, the other research findings indicated that capturing the students' motivation to the topic was one of the main reasons why teachers use web resources (Kay, Knaack & Petrarca, 2009). The participants of this research claimed that their students' performances increased significantly (almost by 40%) when they use web resources in conjunction with a variety of teaching strategies.

Students' engagement has been identified as an indicator of quality in post secondary education (Sheard, Carbone & Hurst, 2010 cited in Gebre, Saroyan & Bracewell, 2014). Gebre, Saroyan and Bracewell (2014) identified four dimensions of student engagement. These were, cognitive and applied engagement, social engagement, reflective engagement and goal clarity. The results indicated that students' cognitive and applied engagement and social engagement were significantly related to educators' conceptions of effective teaching.

Although the majority of previous researches confirmed the capability of web-based learning resources to enhance students learning outcome, none of these researches have identified student engagement as an information quality dimension for web-based learning

resources in a school context. This research suggests that student engagement is an information quality dimension of FWBLRs.

5.1.3.2. Content Accessibility

The result of this study revealed that the teachers defined content accessibility as the availability of numerous free of charge learning resources, which can be quickly retrieved from the web. The participants believed that easy and free access to large number of ready-to-use FWBLRs would save time and money of the teachers and students.

The teachers perceived that they can quickly search, find and attach readily available texts, tables, pictures and audio-video clips into their customized content without the need to be adequate computer skills. Also, they believed that referring and sharing resources with the other teachers such as, lesson plans could help them develop new ideas related to their teaching activaties. Therefore, using such resources provided the teachers with the opportunity to develop their professional knowledge and skills in a short time. Furthermore, quick access to numerous web resources would solve the accessibility barriers of using traditional sources.

Consistent with this findings, the other researchers (Recker, Dorward & Nelson, 2004; Wu & Huang, 2005; Wu &Chen, 2008; Kay, Knaack & Petrarca, 2009; Light & Polin, 2010) found that quick access to web-based learning resources would save the teachers' time and help them to invest on improving pedagogical efforts rather than technological issues. Likewise, previous information quality frameworks have identified accessibility as a quality indicator of web resources (Van Zeist & Hendricks, 1996; Dedeke, 2000).

In this study, content accessibility has been suggested as an information quality dimension for FWBLRs in view of the advantages provided by easy access to the content of educational web resources.

5.1.3.3. Multi-media Interactivity

Using multimedia-based learning resources is likely to accelerate the learning process effectively. Neo, Neo and Yap (2008) revealed that using multimedia stimulus provided an opportunity for students to be active participants in the learning process. Also, the findings indicated that students' learning would be better if pictures are attached to the text. Multimedia elements helped students visualise key concepts and understand key points in the content. This method of interactive learning enhanced and increased their understanding of the subject domain and engaged them actively in their learning process (Neo, Neo & Yap, 2008).

Previous researchers also highlighted that teachers liked animations, which made students easily understood a subject (Hadjarout 2010). Abrizah and Zainab (2011) revealed that history teachers were interested in the inclusion of diagrams and pictures to texts because of their visual appeal. Peat et al, (2001) found that students would be encouraged to use web resources if the resources included sufficient amount of multimedia-based educational materials. The above findings echoed the belief of participants in this study, who advocated the old saying,

 "A picture is worth a thousand words". (Biology, Interview, 10 June 2012*)*

Kay, Knack and Petrarca (2009) found that the multimedia stimulus was the second top reason after ease of use, which motivated teachers' to use web resources in the classroom.

Likewise, according to Peat and her colleagues (2001), easy access to adequate multimedia-based resources was required in order to motivate students to use web resources. Therefore, this study suggests that multimedia interactivity is an information quality indicator of FWBLRs.

5.1.3.4. Collaborative Resources Development

According to Austin and his colleagues "a collaborative approach places much of the responsibility for learning on the pupil; knowledge is socially constructed and is facilitated by peer interaction, authentic assessment and cooperation"(Austin et al., 2010:p. 328). Pynoo and others (2012) found that teachers could improve their self-authored materials by sharing ideas with others through peer review.

This study found that collaborative resources development was discussed in conjunction with developing content using feedback from peers. Participants described comments from web logs and discussion forums as useful tools to enhance not only the quality of self-authored content but also the domain knowledge of the users.

The teacher participants revealed that getting feedback from peers helped both students and teachers to produce better quality and trusted resources. This finding is consistent with other research findings. Neo, Neo and Yap (2008) for example found that students used the comments from web logs to improve each other's self-authored contents. They saw the comments of their teachers and friends as being useful to the process of enhancing the quality of created resources.

Likewise, Light and Polin (2010) observed that the students and teachers used class blogs in order to obtain the latest resources about assignments and communicated with friends and teachers to discuss about the work in which they were engaged in. Kusano and others (2013) suggested that the use of web blogs for peer feedback helped improve elementary

student's writing quality. Silius, Kailanto and Tervakari (2011) suggested that interaction and collaboration between students through social media gave them a sense of belonging to their peer group and encouraged them to be active members.

In the context of Iranian smart schools, Attaran, Alias and Siraj (2012) found that stronger connections between the students could be promoted through group projects using web log comments. In this case the students could communicate with each other through jointly developed classroom web logs. The researchers found that the students were more likely to use web logs to communicate with each other than their teachers (Attaran, Alias & Siraj, 2012).

Previous literature showed that getting feedback from peers would likely enhance professional knowledge and help both the students and teachers to produce high-quality and trusted resources. Herrington and others (2009), found that students learning would be enhanced when they collaborate with peers to exchanges ideas and provide and receive feedbacks. These researchers found that the students would be cautious about the content they created if they felt that their works were constantly evaluated. (Herrington et al., 2009). Similar result was obtained by Abrizah & Zainab (2011) who found that the students creating history reports would be more careful about the quality of self-authored content if they know that their work would be read by the others. Also, the participants in the current study echoed these findings. One teacher claimed,

> *"....seeing the numerous comments on my blog content, which indicates that it has being visited by other people encourages me to be more responsible for my writing materials".* (Farsi literature, Interview, 12 June 2012)

In summary, high quality FWBLRs can be developed using feedbacks through collaboration with peers. This study suggests that collaborative resources development is an information quality dimension.

5.1.3.5. Re-usability

The Distributed National Electronic and Learning Objects (DNER&LO) described generic reusability of web-based learning resources as the ability of such resources to be reused in any subject field or discipline (Currier & Campbell, 2002). In agreement with this description the result of the current research showed that FWBLRs were re-used in all five disciplines covered by this study (chemistry, physics, biology, Farsi literature, Mathematics). The smart school teachers saw FWBLRs as useful resources that could be easily contextualized and re-used. The results of the interviews showed that teachers were motivated to use ready-to-use FWBLRs, when they were faced with two main challenges. These challenges included the lack of time and inadequate computer skills amongst teachers when producing their customized electronic content.

According to Wu and Chen (2008) most school teachers in Taiwan did not have the time to design their own instructional materials, and so they found resources developed by other teachers very helpful of which they could then make appropriate modifications. Similarly, Light & Polin (2010) found that ease of use of readily available web resources was the main reason why students and teacher participants in their study used them. Their participants indicated that annoying situations which have arisen in association with using web-based learning resources frustrated and prevented them from using such resources.

Likewise in line with this research's findings, other researchers have confirmed the time-saving benefit of using web resources (Eifler, Greene & Carroll, 2001; Wepner, Ziomek, & Tao, 2003; Wu & Chen, 2008).

Participants from this study as well as the participants of previous researches believed that they were capable of locating and using readily available web resources in their work even though they have limited technological skills (Eifler, Greene & Carroll, 2001; Thompson, Schmidt & Davis, 2003).

Thus regarding the benefits that can be obtained from using readily available FWBLRs, this study suggests reusability as the other information quality dimension for FWBLRs.

5.1.3.6. Factual Accuracy

Accuracy in this research refers to having accurate and free of error content. Findings of this study identified two types of accuracy challenges related to the use of FWBLRs including, factual inaccuracy and stylistic inaccuracy. Both types of accuracy problems are likely to reduce the users' trust of information resources. Factual accuracy in this study addresses the trustworthiness and credibility of contents of FWBLRs .

According to the participants, they faced problems when the contents of web-based resources in a single topic were found to be in contrast with the content of other resources such as peer-reviewed traditional resources. This situation lessens the incredibility of web-base resources from the users' perspective. Focusing on credibility judgement, Metzger and Flanagin (2013) suggested that in order to ensure the credibility of an information resource, people typically apply consistency heuristic strategy, which involved checking to see if the information across the different sources were consistent.

The results from interviews with the participants indicated that there were variations in the views of teachers in the different disciplines regarding factual accuracy challenges. The science teachers paid more attention to the accuracy of the content of learning resources than teachers teaching Farsi literature. This finding is consistent with the finding by Herring (2001) who found that science teachers were more cautious about the accuracy of content than "language and literature" teachers.

Reviewing the literature indicated that there are various perspectives regarding the accuracy of web-based learning resources. Kay, Knaack and Petrarca (2009) revealed that the teachers they studied were cautious when using web resources to teach or explore new concepts. The teachers rarely used web resources to teach new concepts but readily used them to teach previously taught concepts because they have to spend a considerable amount of time to evaluate unknown web resources before use. Other researchers such as Wu and Chen (2008) found that the teachers in their study perceived web resources as trusted resources, which could be used as a reference to evaluate the accuracy of the other type of information. The teachers used the web resources to verify that the information contained in students' assignments were accurate.

In this study, the teacher who participated suggested critically evaluating web-based learning resources before using FWBLR. Hence, using critical thinking skills would help the students to accurately verify the quality of web resources when they are looking for web-based learning resources. Similarly, many researchers have emphasized the critical evaluation of web-based learning resources to ensure the accuracy of web created content (Scholz-Crane, 1998; Kapoun, 1998; Herring, 2001; Julien & Barker, 2009; Metzger & Flanagin, 2013).

Therefore, considering the importance of accuracy of content as a critical characteristic related to web-based learning resources, in this study factual accuracy emerged as an information quality dimension of FWBLRs.

5.1.3.7. Stylistic Accuracy

Stylistics accuracy in the current research refers to well-written content without typeface, grammatical or translational errors. According to the participants the majority of FWBLRs were written with erroneous information. This issue is likely to frustrate and reduce users' trust towards the information.

According to the teachers, stylistics challenges occur when authors develop web contents. Some authors of FWBLRs were reluctant to follow standard practices or techniques when generating or translating their self-authored content. The lack of quality control and restrictions of web-based resource production tended to give rise to authors who were unskilled. The unskilled authors resulted in wide spread production and distribution of low-quality contents across the web environment. As a solution, the teachers have highlighted the role of competent authors in terms of producing high-quality FWBLRs.

In the case of FWBLRs the accuracy of scientific information resources is more critical than the accuracy of the literary information. The accuracy issues was highlighted during the interview sessions by science teachers, while teachers who taught Farsi literature were neutral regarding this issue. Previous researches such as that of Walraven, Brand-Gruwe and Boshuizen (2009) indicated that the language of the resources, writing style and grammatical errors (e.g. spelling errors) were factors that determine the information as usable.

Lucassen and Schraagen (2011) described surface accuracy of information in association with certain elements such as length of sentences and writing style, which might affect users' perceptions of the trustworthiness of information. Katerattanakul and Siau (1999) proposed that intrinsic information quality of individual Web sites should be determined by examining the accuracy criterion. In this way the number of grammatical and spelling errors could be taken into account during the evaluation process. In terms of trustworthiness of FWBLRs, stylistic accuracy has been identified as an information quality dimension of these resources.

5.1.3.8. Authority

Authority in this study refers to the required domain competency of authors to produce trustworthy information resources. The result of this study revealed that the reputation of authors/publishers of FWBLRs have affected users trust of the information. The results showed that the FWBLRs that were not supported by authoritative sources such as being produced by well-known author or publisher could not be trusted from the teachers and students' viewpoints. Therefore, high-quality information resources are those that instill users' confidence in terms of the credibility of the supporting source. Addressing reputation heuristic, Metzger and Flanagin (2013) suggested that when people were familiar with the author or publisher of sources of information, they would more likely trust the information.

Previous studies on information quality frameworks suggested authority as a quality dimension/indicator of web-based information resources (Kapoun, 1998; Katerattananakul & Siau, 1999; Rieh, 2000; Stivilia et al., 2006; Hasan & Abuelrub, 2011; Chen et al., 2012)

Alexander and Tate (1999) believed that the authority of an information resource is linked to the author's competency in the subject area. Similarly, in this research, authority has been viewed from the perspectives of the domain knowledge of the creators of FWBLRs. The participants perceived that the authoritativeness of FWBLRs was determined by the well known and expert authors or organizations that produced and supported them. The reputation of the creator of information resource has been emphasized by previous research (Chen et al., 2012).

According to Tseng and Fogg (1999) cited in Eastin, Yang and Nathanson (2006) reputed credibility is a feature of a trustworthy information resource. Therefore, authors who possess titles such as "Dr." contributed to the credibility of an information resource. Interestingly, the participants of the current research also consider the title of authors such as "Dr." as a criterion that indicated the credibility of information (Student D, Interview, 20 Feb. 2012). Therefore, FWBLRs produced from educational organizations' websites are more credible than those which are supported by personal websites/web logs. Most of the teachers and students at the smart school evaluated the trustworthiness of websites based on their .edu or .gov domain extensions.

Previous studies also reported similar findings (Ahmad et al, 2010; Chen et al., 2012) and found that online resources with the domain names .gov, .org and .int received the highest rating in terms of their authority performance from the users' perspectives. Likewise, Rieh (2002) observed that the web users gave high authority rating to web resources produced by academic and government institutions, and low authority rating to commercial web sites. In the case of FWBLRs this study suggests authority as an information quality dimension of FWBLRs.

5.1.3.9. Currency

Up-dated scientific information particularly those in specific subject areas such as science and medicine play a critical role in instilling users' trust to information. The result of interviews with participants in the current study confirmed the significance of timeliness of learning resources used for students' instruction.

Also, other study such as Sundar (2008) has identified timeliness of information as one of the critical component of content quality of digital media. Several researchers have suggested currency or timeliness as an information quality dimension/indicator in their frameworks (Van Fossen & Shiveley, 1999; Recker, Dorward & Nelson, 2004; Rieh & Danielson, 2007; Ahmad et al., 2010).

The current study found conflicting views between the science and Farsi literature teachers' beliefs regarding the currency of web-based learning resources in their respective domains. While teachers who taught Farsi literature claimed that there were huge number of up-to-date information resources in Farsi literature, in contrast the science teachers reported being unsatisfied with out-of-date information resources in their subject area. This was particularly true among chemistry and biology teachers who highlighted this challenge more than the Mathematics and physics teachers.

In other parts of the world such as in Pakistan, Tahira and Ameen (2009) found that science and technology teachers used web resources to up-date the information on topics they were teaching. It could be because the teachers in Pakistan used more information resources in the English language. As there are larger pools of learning resources in the English language, out dated resources was less of a problem amongst Pakistani teachers. The participants in the current research also confirmed the largeness of resources in the English language and fewer current resources in Farsi that might be useful for their

students. Based on the significance of currency of web–based information for students'
instruction, currency has been identified as an information quality dimension for
FWBLRs.

5.1.3.10. Target Audience

The participants of the current study indicated being influenced by the comprehensiveness
of contents to perceive an information resource as useful. In this study comprehensiveness
is described as a quality of FWBLRs. Comprehensive content refers to the degree of
understandability of content in association with the previous experience and knowledge of
users about the topic at hand.

The participants of the current study indicated being dissatisfied with FWBLRs, which did
not indicate their specific target audience. Participants disclosed that, because they use
general search engines to obtain information resources during a simple keyword search,
they obtained a huge number of information resources. Some of these resources were
found to be more suitable for university students rather than for school pupils. This
situation forced the teachers and students to spend a great deal of time sifting for useful
resources through the huge number of search results they obtained.

Related to the importance of comprehensiveness of content, Wu and Chen (2008) found
that the teachers they studied did not directly use the learning materials obtained from the
web in their classroom teaching. They would first modify the contents to make them
suitable for their students. The participants of this research also revealed that the teachers
revised textual materials and made minor changes to pictures and video clips before
referring them to their students.

Findings from other research (Peat et al., 2001) revealed that provision of online resources
would not necessarily generate value-added learning. Therefore, the probability of

mismatch between students' actual needs and online information products is likely to reduce their intention to use the digital resources.

Recker, Dorward and Nelson (2004) identified age appropriateness as one of the desirable attribute for web-based educational resources. Similarly, grade level was identified as a necessary meta-data component of MERLOT. Also, target audience was also mentioned and found to be one of the widely used Dublin core metadata component. In the current study participants regarded the inclusion of information about targeted users was important and therefore suggested as the another information quality dimension of FWBLRs.

5.1.3.11. Adequacy

Informativeness of content has been highlighted by the respondents of the current study as an important criterion when evaluating web-based learning resources used for instructional purposes. The participants considered informativeness of FWBLRs in conjunction with the adequate amount of information. Adequacy in this study refers to a desirable attribute of FWBLRs in terms of the capability of these resources to provide enough and additional informational resources without being redundant.

Other researches, which identified the importance of adequate amount of information as an information quality dimension included, Wang and Strong (1996), Liu and Chi (2002), Chae et al. (2002) and Chen and Tseng (2011).

According to the participants of the current research, although they might obtain sufficient amount of FWBLRs, in reality the majority of the resources were not tailored for school pupils' needs. This finding echoes the previous finding by Abrizah and Zainab (2011) who reported that history teachers needed adequate amount of digital resources, which are

suitable for their curriculum. The participants of this research also believed that the majority of information resources obtained from digital libraries were more appropriate for the students in higher education.

Similarly, Wu and Chen (2008) reported that their respondents needed more web–based learning resources related to science and technology and social studies. The current study found differences in the perceptions of the adequacy of FWBLRs amongst science teachers compared to teachers teaching Farsi literature. The Farsi literature teachers were surprised by the easy access to numerous types of FWBLRs in their subject area. Conversely, the science teachers especially those teaching chemistry and physics revealed the shortage of FWBLRs in their subject area. Furthermore, the results showed the challenges they faced when they found numerous duplications as a result of the copy and paste practice, which is prevalent among Farsi educational websites. The participants claimed that, the majority of FWBLR websites presented redundant copies of each other's information without adding new or useful information.

Considering the significance of adequate amount of informative resources, adequacy has been identified as the other information quality dimension of FWBLRs.

5.1.3.12. Selective Exposure

"Selective exposure" has been suggested by this study as an information quality dimension of FWBLRs in conjunction with the theory of "selective exposure". The selective exposure theory is a concept in media and communication research (Freedman & Sears, 1965; Katz, 1968; Frey & Wicklund,1978; D'Alessio & Allen. 2007) that refers to people's tendency to select specific aspects of exposed information based on their perspectives, beliefs, attitudes, and decisions..

It appears that selection of information from the web, as a frequently-used media, would be influenced by the cultural and social beliefs of its users. The result of the current research showed that consistent layout was a desirable feature of educational websites from the user's perspective. The consistent layout refers to the layout that only includes related information to the topic purposely designed to sustain the user's focus on the text being read. The teachers observed that inconsistent and distracting web pages presenting Farsi educational websites posted challenges in classroom teaching. To deal with this challenge the teachers suggested referring students to specific websites to keep their students away from unacceptable websites. Herring (2001) echoed this finding and indicated that the majority of educators in their study limited their students' use of websites and referred their students to specific web sites themselves.

In line with this finding, previous research conducted in the United States by Walker et al. (2004) described information filtering as an approach, which could support the discovery of educational resources in a way that is sensitive to the context of users. McDowell (2002) indicated that ,most American students rely on the websites recommended by their teachers. In Malaysia, Abrizah and Zainab (2011) also found that history teachers suggested specific websites to their students in order to help them find useful information.

Although "selective exposure" has been taken into account by researchers, such as Andrew (2011), Messing and Westwood (2012) and, Arunrangsiwed (2014), none of them identified this concept as a quality dimension for web-based learning resources. This study therefore suggests selective exposure as an information quality dimension for FWBLRs.

5.1.3.13. Active Links

The participants of the current study acknowledged the existence of hyperlinks in web-based learning resources and they believed that using such facilities could enhance their domain knowledge. Participants perceived that hyperlinks enabled them to obtain further information related to a topic being studied and saved their time in two ways. Firstly, hyperlinks linked related resources on the same topic together and users do not have to spend time searching for relevant resources. Clicking on the readily available links would provide them with their needed information instantly. Secondly, hyperlinks provided access to information resources immediately without needing to make physical visits to the library.

However, respondents indicated that sometimes hyperlinks provided broken links and this feature posted as a barrier towards immediate access to needed information. Participants claimed being frustrated by frequent broken links during their search process. Previous researches such as Kapoun (1998), Katerattanakul and Siau (1999), Wu and Chen (2008), Ahmad et al. (2010), Hasan and AbueIrub (2011), Chen et al. (2012) have identified "active links" as an attribute of web resources. Therefore, with regard to the significance of "active links" to meet users' instant need to information it has been suggested by this study as an information quality dimension for FWBLRs.

5.1.3.14. Web Site Accessibility

The capability of media to provide users with easy and free access to scientific information would increase the effective use of information. Previous research found that direct access to web resources decreased teachers' use of traditional libraries moderately (Tahira & Ameen, 2009).

Adeoye & Popoola (2011) believed that "the more accessible information sources are, the more likely they are to be used"(p.6). According to these authors readers are likely to use those information sources that could be obtained with little effort. Walraven, Brand-Gruwe and Boshuizen (2009) observed that students tended to use needed information provided by the first search engine they used in the search process. However, if the online resources could not be easily accessed, students would be reluctant to use them. (Peat et al., 2001). As indicated by Aguolu and Aguolu (2002) and Adeoye and Popoola (2011) the availability of an information source did not necessarily means that it was accessible.

The participants of this study became frustrated by the number of educational websites, which included their needed information resources, but provided access only to registered members. To deal with this problem they shared access accounts with their colleagues or friends who were members of targeted websites. This finding is similar to the results obtained by Light and Polin (2010) who found that easy access to websites influenced the teachers' motivation to use web resources in the classroom. The participants of this study revealed that they referred students to those websites that could be accessed easily and asked students to avoid websites, which requires password. Considering the impact of accessibility of websites for the utilization of information, "web site accessibility" has been identified as an Information quality dimension of FWBLRs.

5.2. Conclusion

The results of the current research indicated that teachers of smart schools were motivated to use FWBLRs because they perceived that such resources could help them to carry out their pedagogical responsibilities effectively. This finding echoes the finding of Abrizah and Zainab (2011) who indicated that the most important reason that made Malaysian history teachers use digital resources was because they perceived the web resources to be

relevant and significant to their curriculum. The researchers concluded that, teachers would not use digital resources to teach their students if they did not find such resources to be of educational value and relevant. Tahira and Ameen (2009) revealed that the teachers in Pakistan considered online resources as very important to meet both their academic and non-academic information needs..

In the case of FWBLRs the result of the current research indicated that smart school teachers were encouraged to use FWBLRs because they perceived the pedagogical usability of such resources. However, in order to provide effective use of FWBLRs in the Iranian school context, a number of considerations were necessary such as, use in context and stakeholders of FWBLRs. The following sections described these issues.

5.2.1. Utility of FWBLRs in Association with Use Context.

The results of the current research revealed that despite the huge benefits obtained when using FWBLRs in classroom teaching, in reality, Iranian smart schools still gave priority to using traditional resources before the FWBLRs. According to the participants the reliability of information resources and users' trust in the content of web resources would be influenced by the contextual policies. A biology teacher claimed that teachers in smart schools rely on textbooks more than web resources even when the content of web resources might be more credible (Biology, Interview, 20 Feb. 2012). She (biology teacher) said that the students' assessment policy requires the teachers to prepare the final examination questions using only the textbooks. Likewise, the universities' entrance's (konkoor) examination questions were also prepared based on traditional resources. These policies made the teachers rely on traditional resources more than on FWBLRs.

Attaran, Alias and Siraj (2012) in their study found that typically in Iranian smart schools, the use of traditional resources were given priority before web resources. The governing

policy in schools determined the prevalent students' assessment method in Iranian educational context. Their findings suggest that, although the level of mastery over ICT is acceptable among smart school teachers, yet a decline in commitment to ICT use was observed,and this stemmed from discouraging policies.

The finding of previous research by Silius, Kailanto and Tervakari (2011) reported that college students in Finland did not perceive reliability and content quality criteria as an important feature when they evaluate social media contents. The authors believed that the reason for such perceptions might be grounded in the learning culture of an organization. As the students were not encouraged by their school to share their self-authored content with the other students and teachers, they were therefore not cautious about the reliability of information. In Finland the students' outcome assessment method requires the students to submit their self-authored content only to their teachers.

For the successful integration of FWBLRs in classroom teaching, more attention needs to be given for its application in the educational context. In this way it is possible to give equal value to FWBLRs as well as to traditional resources. This attention makes possible the consideration of web resources as core learning resources in schools, that can be used for students' instruction.

5.2.2. Utility of FWBLRs in Association with Stakeholders

The second consideration in terms of establishing effective use of FWBLRs addresses stakeholders' competency to produce, provide, select and use FWBLRs. Although the teachers in this study might be aware of the desirable features of web-based learning resources, they were often faced with challenges that reduced their motivation to use FWBLRs for classroom teaching. The challenges encompass various aspects such as, content trustworthiness, content comprehensiveness, inconsistent presentation and

accessibility problems. For example, related to the content-based challenges, the volatility of web environment is likely to provide the trustworthiness problems (Metzger, Flanagin & Zwarun, 2003; Mansurian, 2004; Stivilia et al., 2006; Rieh & Danielson, 2007; Metzger, Flanagin & Zwarun, 2013; Pattanaphanchai, O'Hara & Hall, 2013). The uncontrolled web-based publishing environment, where every biased or unskilled author could post low quality information would reduce users' trust in web information resources. The collaboration of several groups of stakeholders was required in order to obtain an effective outcome in terms of using FWBLRs that are distributed in an uncontrolled environment. Such collaboration could be established among authors/creators, publishers, and users of FWBLRs, who should pay more attention to producing trustworthy information resources. The publishers of FWBLRs should also concentrate on providing suitable presentation and consistent layout of FWBLRs. Also, the owners of educational Website/Web logs are expected to provide teachers and students who are interested to use FWBLRs with easy and effortless access to information.

Finally, the successful use of FWBLRs entails information literate users. Information literate encompasses competency in searching, evaluating, selecting and using of FWBLRs. For example, users are expected to have the required skills such as performing suitable search strategy to achieve the desirable results. Mansurian (2004) suggested that Web searching is the most common application among all types of web–based applications. In order to perform successful searches, the users' should be familiar with searching tools and strategies. The evidence from a previous study by Walraven, Brand-Gruwe and Boshuizen (2009) showed that during the search process, users were interested in finding the information they needed instantly using popular search engines. Similarly, Wu and Chen (2008) found that teachers they studied used general search engines as their

first priority because they saw them as a convenient tool to obtain web-based learning resources. This finding is similar with the finding of the current study.

 Similar to the findings above, participants of the current research reported that they use Google to conveniently search for the information they need. The participants also reported using general search engines, which often provided them with irrelevant search results. This situation became a problem as they would waste a lot of time sifting for useful information. Therefore, to get useful information and to save time, the teachers and students should be familiar with search strategies, that is, they should be information literate. Information literacy (IL) amongst teachers and students who use FWBLRs is important for two reasons. Firstly, IL helps them to successfully perform the search process, which would supply them with relevant search results. Secondly, by using IL skills, the teachers and students could evaluate and select the most appropriate and reliable materials among the numerous FWBLRs retrieved.

5.3 Implications

5.3.1 Implications of the Research

This study contributes to information quality studies. Although, there are a huge body of literature related to information quality frameworks on the Web, the majority have identified general information quality dimensions such as, objectivity, accuracy, authority and so on. No studies have identified information quality of Farsi web-based learning resources. Therefore, the information quality dimensions emerging from the result of the current study contributes in meeting the empirical gap of information quality dimensions of Farsi web-based learning resources.

This study also contributes to educational pedagogical strategies for classroom technological instructions. According to Gebre, Saroyan and Bracewel (2014), teachers' development programmes in terms of technology integration need to go beyond developing technological capability of educators and holistically address their conceptual, pedagogical, and technological dilemmas. This study examined teachers and students' perception and experience when using FWBLRs. Therefore, the pedagogical usability dimensions emerging from the interviews may contribute to meeting the gap of the literature related to teachers and students' perceptions of the usefulness of web-based learning resources for classroom instruction and teachers professional development.

5.3.2 Implications for Practice

Stakeholders of FWBLRs could apply the results of this study and be more confident in terms of providing suitable learning web resources. The stakeholders are school librarians, information producers, educational website designers and school managers.

5.3.2.1. School Librarians

School librarians who are engaged with searching, evaluating and selecting web information resources and including these resources into their library holdings can benefit from the results of this study. Using the teacher-accepted criteria, which emerged from the results of this study enables the Iranian librarians to select information resources based on actual user needs.

5.3.2.2. Information Producers

The awareness about user accepted criteria, which emerged from the results of this study enables information producers to produce appropriate information resources compatible to the educational needs of Iranian students. Therefore, the criteria have highlighted the wide range of uses of web-based learning resources and would help accelerate knowledge

development amongst both Iranian teachers and students about using new technology in classroom learning.

Educational website designers

This study also indicate issues related to suitable visual design practices of websites, which could be considered by website designers to sustain Iranian teachers and students loyalty to web pages. Focusing on user-accepted features of websites enable educational website's designers to produce attractive layout, which could improve teaching-learning process using appropriate design.

Effective use of ICT in school environment requires not only equipments but also enthusiastic users. Being in harmony with technological changes entails a systematic review done by school managers to identify the impact of existing ICT provision and practices on staff satisfaction, confidence and competencies. School managers could use the results from this study to identify not only teachers' current technological but also training and emotional needs for integrating ICT in classroom teaching-learning activities effectively

5.4 Limitations of the Study

This section reports the key limitations of the study. The first limitation is that as is the usual practice in case study method, the study has only solicited a small number of teachers and students from a single smart school. The reason behind this is that, "the purpose of the case study methodology is to delve deeply into areas in which hypotheses are unclear, and to focus on contextual commonalities among participants, rather than differences" (Recker, Dorward, & Nelson, 2004: p. 101, citing Johnson, 1997 and Yin, 2003). Therefore, a small sample size would describe a particular situation of a single context and cannot be generalized.

The second limitation is related to the data collection method. This study has only employed focus group and face-to-face interviews as the key data collection method. As a result in the case of interview setting, although the conversation might be rich, it could not infer individuals' beliefs (Recker, Dorward, & Nelson, 2004).

5.5 Direction for Future Research

According to Mansurian (2004) using general search engines might frustrate or encourage the user, who needed quick and easy access to relevant information. Hence, during a search process, users might either be surprised with the quick and easy access to needed information, or, they might be frustrated with retrieving an extensive list of irrelevant search results. In the later case, users are forced to spend time sifting through the resources to get the relevant information, which are aligned with their actual information needs This behaviour is also indicated by the participants in the current study. The respondents of this study use general search engine such as Google to meet their instant information needs. This is due to their perceptions that the general search engines are capable of providing them with needed information instantly. However, in actual situations they often encountered frustrating situations, as the participants claimed being swarmed with irrelevant information resources during a simple keyword search. Therefore, to get to the relevant information compatible to their needs require the allocation of substantial amount of time to sift through the information. Two main reasons caused this situation. The first reason is related to the tendency of search engines to return a large number of irrelevant results. The second reason is related to the inadequate search skills of users. However, because the focus of this study was not on the information seeking behavior of the participants, the results did not provide adequate data regarding this issue. Future studies

could be undertaken to explore the Iranian teachers and students' information seeking behaviour in association with searching and retrieving of FWBLRs.

REFERENCES

Abrizah, A., & Zainab, A. N. (2011). Digital libraries in the classroom: Secondary school teachers' conception. *Journal of Librarianship and Information Science*, *43*(4), 224-236.

Adeoye, M. O., & Popoola, S. O. (2011). Teaching effectiveness, availability, accessibility, and use of library and information resources among teaching staff of schools of nursing in Osun and Oyo State, Nigeria. *Library Philosophy and Practice (e-Journal).* Paper 525. Retrieved 11 June, 2013, from http://digitalcommons.unl.edu/libphilprac/525.

Afshari, M., Bakar, K. A., Luan, W. S., Samah, B. A., & Fooi, F. S. (2009). Factors affecting teachers' use of information and communication technology. *International Journal of Instruction*, *2*(1), 77-104.

Ahmad, R., Komlodi, A., Wang, J., & Hercegfi, K. (2010). The impact of user experience levels on web credibility judgments. *Proceedings of the American Society for Information Science and Technology*, *47*(1), 1-4.

Ahmad, T. B. T. (2014). Between school factors and teacher factors: What inhibits Malaysian science teachers from using ICT?, *The Malaysian Online Journal of Educational Technology*. *2*(1). Retrieved March 3, 2014, from http://mojet.net/volume.php?volume=2&issue=1.

Alexander, J. E., & Tate, M. A. (1999). *Web wisdom: How to evaluate and create information quality on the web*. Mahwah: Lawrence Erlbaum Associates.

Andrew J. W. (2011) A meta-analytical review of selective exposure to and the enjoyment of media violence. *Journal of Broadcasting & Electronic Media*, 55(2), 232-250, DOI: 10.1080/08838151.2011.570826.

Arunrangsiwed, P. (2014). The documentary analysis of meta-analysis research in violence of media. *International Journal of Social, Human Science and Engineering*, *8* (1), 77-80.

Attaran, M. (2013). Smart School. *Iranian Encyclopaedia of curriculum studies*. Retrieved 17 October 2014 from: http://www.daneshnamehicsa.ir/userfiles/file/article/17-5-2-%D9%85%D8%AF%D8%B1%D8%B3%D9%87%20%D9%87%D9%88%D8%B4%D9%85%D9%86%D8%AF-30101391.pdf

Attaran, M., Alias, N., Siraj, S. (2012). Learning culture in a smart school: A case study. *Procedia - Social and Behavioral Sciences*, *64*, 417 – 423.

Attaran, M., & Siraj, S. (2010). Smart school: Toward better performance. Working Paper at *International Educational Technology Conference (IETC 2010).* Istanbul University, Istanbul, urkey. Retrieved 12 January, 2013, from http://www.iet-c.net.

Austin, R., Smyth, J., Rickard, A., Quirk-Bolt, N., & Metcalfe, N. (2010). Collaborative digital learning in schools: Teacher perceptions of purpose and effectiveness. *Technology, Pedagogy and Education*, *19*(3), 327-343.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, *13*(4), 544-559. Retrieved 19 April, 2010, from: http://www.nova.edu/ssss/QR/QR13-4/baxter.pdf.

Becker, H.J. (1999), "Internet use by teachers: conditions of professional use and teacher-directed student use". Retrieved 20 January, 2011, from www.crito.uci.edu/TLC/FINDINGS/internet-use/startpage.htm.

Belden, N., & Russonello, J. (1996), Teachers favor Internet use in classrooms, *Reading Today 14*(4): 29.

Berger, P. (2010). Student inquiry and Web 2.0. *School Library Monthly, 26*(5), 14-17.

Bernstam, E. V., Shelton, D. M., Walji, M., & Meric-Bernstam, F. (2005). Instruments to assess the quality of health information on the World Wide Web: what can our patients actually use? *International Journal of Medical Informatics*, *74*(1), 13-19.

Bland, E., Sabatino, D. A., Sedlak, R., & Sternberg, L. (1979). Availability, usability, and desirability of instructional materials and media for minority handicapped students. *The Journal of Special Education*, *13*(2), 157-167.

Boskic, N. (2003). *Faculty assessment of the quality and reusability of learning objects* (Doctoral dissertation, Athabasca University), Athabasca, Canada.

Brady, L. (2004) . The role of interactivity in web-based educational material. *Usability news* , *6*(2). Online at: http://psychology.wichita.edu/surl/usabilitynews/62/interactivity.asp.

Braten, I., Stromso, H. I., & Salmerón, L. (2011). Trust and mistrust when students read multiple information sources about climate change. *Learning and Instruction, 21*(2), 180-192.

Bush, M. D. (1996). Language learning via the Web, *Symposium of the Computer Aided Language Instruction Consortium,* Albuquerque, NM, 29 May 1996. Retrieved 15 September, 2010, from http://moliere.byu.edu/digital/calico/calico96.html.

Casteleyn,S., Daniel, F., Dolog, P., & Matera, M. (2009). Quality Assessment. *Engineering Web Applications*, Berlin: Springer 255-292.

Chae, M., Kim, J., Kim, H., & Ryu, H. (2002). Information quality for mobile Internet services: a theoretical model with empirical validation. *Electronic Markets*, *12*(1), 38-46.

Charmaz, K. (2008). Grounded theory as an emergent method. *Handbook of emergent methods*, 155-170.

Chen, C., Yu, Y., Tang, Q., Chiu, K., Rao, Y., Huang, X., & Sun, K. (2012). Assessing the authority of free online scholarly information. *Scientometrics*, *90*(2), 543-560

Chen, C. C., & Tseng, Y. D. (2011). Quality evaluation of product reviews using an information quality framework. *Decision Support Systems*, *50*(4), 755-768.

Chen, L., Wang, N., & Qiao, A. (2009). K12 online school practice in China, *Campus-Wide Information Systems, 26*(2), 137-144.

Chen, S. C. (2008). Elementary school teachers' use of instructional materials on the web. *The Electronic Library*, *26*(6), 833-843.

Chien, C. W. (2003), Elementary schoolteachers' information behavior on the Internet. Unpublished Master's thesis, National Taiwan University, Taipei.

Cole, J., Gardner, K., Lunzer, E., & Gardner, K. (1979). Topic work with first-year secondary pupils. *The effective use of reading*, London: Heinemann,167-192.

Combes, B., & Valli, R. (2007). The future of learning objects in educational programs. In Keith Harman & Alex Koohang (Eds.). *Learning Objects 4: Applications, implications & future directions*, London: Informing Science Press, 423-462.

Correia, A. M. R., & Teixeira, J. C. (2005). Reforming scholarly publishing and knowledge communication: From the advent of the scholarly journal to the challenges of open access. *Online Information Review*, *29*(4), 349-364.

Cress, U., & Kimmerle, J. (2008). A systemic and cognitive view on collaborative knowledge building with wikis. *Computer-Supported Collaborative Learning*, 3, 105–122.

Creswell, J. W. (1994). *Research Design Qualitative and Quantitative Approaches.* Thousand , Oaks CA.: Sage Publication.

Creswell, J. W., Hanson, W. E., Plano, V. L. C., & Morales, A. (2007). Qualitative research designs selection and implementation. *The Counseling Psychologist*, *35*(2), 236-264.

Currier, S. & Campbell, L.M. (2002). Evaluating learning resources for reusability: The DNER and learning objects study. In A. Williamson, et al, (Eds), *Winds of change in the sea of learning: Proceedings of the 19th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE),* 8-11 December 2002. Volume 1, Auckland, N.Z.: UNITEC.

D'Alessio, D. & Allen, M. (2007). The selective exposure hypothesis and media choice processes. *Mass media effects research: Advances through meta-analysis.* Mahwah, NJ: Erlbaum, 103-118.

Davenport, T. (1997). *Information Ecology: Mastering the Information and Knowledge Environment,* Oxford: Oxford University Press, 1997.

Dedeke, A. (2000). A conceptual framework for developing quality measures for information systems. *Proceedings of 5th International Conference on Information Quality (IQ 2000)*, Cambridge, MA, 126–128.

Denzin, N. K., & Lincoln, Y. S. (2005). *The SAGE handbook of qualitative research*. Thousand Oaks, CA: Sage.

Djajadikerta, H., & Triresksani, T. (2006). Measuring university web site quality: A development of a user-perceived instrument and its initial implementation to websites of accounting departments in New Zealand's universities. *School of Accounting, Finance and Economics & FIMARC Working Paper Series*, 1-23.

Dobers, P., & Söderholm, A. (2009). Translation and inscription in development projects: Understanding environmental and health care-related organizational change. *Journal of Organizational Change Management*, *22*(5), 480-493.

Eastin, M. S., Yang, M. S., & Nathanson, A. I. (2006). Children of the net: An empirical exploration into the evaluation of Internet content. *Journal of Broadcasting & Electronic Media*, *50*(2), 211-230.

Egnatoff, W. (2003). Preparing teachers for effective and wise use of the internet in schools, Retrieved 11 May, 2013, from http://educ.queensu.ca/,egnatoff/papers/INET_96.html.

Eifler, K. Greene, T., & Carroll, J. (2001). Walking the talk is tough: From a single technology course to infusion. *The Educational Forum*, *65*(4), 366-375.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management*

Review,*14*(4), 532–550. Retrieved 29 April, 2010, from:

http://intranet.catie.ac.cr/intranet/posgrado/Met%20Cual%20Inv%20accion/Semana%20

3/Eisenhardt,%20K.%20Building%20Theories%20from%20Case%20Study%20Researc

h.pdf.

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: opportunities and

challenges. *Academy of Management Journal*, *50*(1), 25-32.

Elwood, J., & MacLean, G. (2009). ICT usage and student perceptions in Cambodia and

Japan. *International Journal of Emerging Technologies & Society*, *7*(2), 65-82.

Eppler, M., & Muenzenmayer, P. (2002). Measuring information quality in the web context: A

survey of state-of-the-art instruments and an application methodology. Proceedings of

7th International Conference on Information Quality (ILIQ-02) 187- 196. Retrieved 27

October, 2011, from

http://mitiq.mit.edu/ICIQ/Documents/IQ%20Conference%202002/Papers/MeasureInfoQ

ualityinTheWebContext.pdf.

Ertmer, P. A., Glazewski, K. D., Jones, D., Ottenbreit-Leftwich, A., Goktas, Y., Collins, K., &

Kocaman, A. (2009). Facilitating technology-enhanced problem-based learning (PBL) in

the middle school classroom: An examination of how and why teachers adapt. *Journal of

Interactive Learning Research, 20*(1), 35-54.

Eysenbach, G., & Köhler, C. (2002). How do consumers search for and appraise health

information on the world wide web? Qualitative study using focus groups, usability tests,

and in-depth interviews. *BMJ: British Medical Journal*, *324*(7337), 573.

Fatahi, S.R., Dokhtesmati, M., & Saberi, M. (2011). A survey of Internet searching skills among

intermediate school students: How librarians can help. In *Proceeding of 11th*

International Symposium for Information Science (ISI2011), University of Hildesheim, Hildesheim, Germany, 9-11 March 2011.

Fitzgerald, M. A. (1997). Misinformation on the Internet: Applying evaluation skills to online information. *Emergency Librarian, 24*(3), 9-14.

Fogg, B. J. (2003). Prominence-interpretation theory: Explaining how people assess credibility Online. *CHI '03 Extended Abstracts on Human Factors in Computing Systems*, 722–723.

Foley, O., & Helfert, M. (2010). Information quality and accessibility, In, *Innovations and Advances in Computer Science and Engineering*, Springer, Netherlands, 477-481. Retrieved 11 February, 2013, from http://link.springer.com/chapter/10.1007%2F978-90-481-3658-2_84#page-1

Freedman, J. L., & Sears, D. O. (1965). Selective exposure. In *Advances in experimental social psychology*. Vol. 2. Edited by Leonard Berkowitz, 58–98. San Diego, CA: Academic Press.

Freeman, K. S., & and Spyridakis, J. H. (2004). An examination of factors that affect the credibility of online health information. *Technical Communication, 51*(2), 239-263.

Frey, D., & Wicklund, R. A. (1978). A clarification of selective exposure: The impact of choice. *Journal of Experimental Social Psychology 14*,132–139

Fritch, J. W., & Cromwell, R. L. (2001). Evaluating Internet resources: Identity, affiliation, and cognitive authority in a networked world. *Journal of the American Society for Information Science and Technology 52* (6): 499–507.

Fuller, S. (1996). *Scholarly publishing: the electronic frontier* (p. xv). R. P. Peek, & G. B. Newby (Eds.). Cambridge, Mass.: MIT Press.

Gagliardi, A., & Jadad, A. R. (2002). Examination of instruments used to rate quality of health information on the internet: chronicle of a voyage with an unclear destination. *BMJ: British Medical Journal*, *324*(7337), 569-573.

Gebre, E., Saroyan, A., & Bracewell, R. (2014). Students' engagement in technology rich classrooms and its relationship to professors' conceptions of effective teaching. *British Journal of Educational Technology*, *45*(1), 83-96.

Glaser, B.G., & Strauss, A.L. (1967). *The discovery of grounded theory: Strategies for qualitative research.* Chicago: Aldine Publishing. Retrieved 2 March, 2010, from http://faculty.babson.edu/krollag/org_site/craft_articles/glaser_strauss.html.

Glesne, C. (2010). *Becoming Qualitative Researchers: An Introduction*. Pearson, Cambridge.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report, 8*(4), 597-606.

Grant, A. M., & Wall, T. D. (2009). The neglected science and art of quasi-experimentation why-to, when-to, and how-to advice for organizational researchers. *Organizational Research Methods*, *12*(4), 653-686.

Gray, L., Thomas, N., & Lewis, L. (2010). Teachers' use of educational technology in U.S. public schools: 2009. Washington DC : National Center for Education Statistics. Institute of Education Science, U.S. Department of Education.

Greenhow, C., Robelia, B., & Hughes, J. E. (2009). Learning, teaching, and scholarship in a digital age Web 2.0 and classroom research: What path should we take now? *Educational Researcher*, *38*(4), 246-259.

Grimes, D. J., & Boening, C. H. (2001). Worries with the web: A look at student use of web resources. *College & Research Libraries*, *62*(1), 11-22.

Groening, T. (2007). Educators warn students: Be wary of web. *McClatchy - Tribune Business News*. Retrieved 23 May, 2011, from http://search.proquest.com/docview/463313594?accountid=28930.

Guba, E. G., & Lincoln, Y. S. (1985). *Naturalistic inquiry*. Vol. 75. Thousand Oaks, CA: Sage Publications.

Guion, L. A., Diehl, D. C., & McDonald, D. (2011). Triangulation: Establishing the validity of qualitative studies. Florida: Institute of Food and Agricultural Sciences, University of Florida. Publication FCS6014. Retrieved 13 July, 2013, from https://edis.ifas.ufl.edu/pdffiles/FY/FY39400.pdf.

Hadjerrouit Said. (2010). A conceptual framework for using and evaluating web-based learning resources in school education. *Journal of Information Technology Education*, (9), 53-79.

Hadjforush, A., & Oranghi, A. (2004). An investigation of ICT usage in high schools in Tehran. *Educational Innovative Quarterly*, *3*(9).

Harnad, S. (1996). Implementing peer review on the net: Scientific quality control in scholarly electronic journals. In, Peek, R. & Newby, G. (Eds.) *Scholarly Publication: The Electronic Frontier.* Cambridge MA: MIT Press, 103-108.

Hartig, O., & Zhao, J. (2009). Using web data provenance for quality assessment. *Proceedings of the 1st Int. Workshop on the Role of Semantic Web in Provenance Management (SWPM) at the International Semantic Web Conference (ISWC)*, Washington, DC, USA, Oct. 2009.

Hasan, L., & Abuelrub, E. (2011). Assessing the quality of web sites. *Applied Computing and Informatics*, *9*(1), 11-29.

Helfert, M. & Heinrich B. (2003), Analyzing data quality investments in CRM: a model-based approach, *8th International Conference on Information Quality*, MIT, USA.

Helfert, M., & Foley, O. (2009). A context aware information quality framework. In, *Proceedings of the 2009 Fourth International Conference on Cooperation and Promotion of Information Resources in Science and Technology* (pp. 187-193). IEEE Computer Society.

Hennessy, S., Harrison, D., & Wamakote, L. (2010). Teacher factors influencing classroom use of ICT in Sub-Saharan Africa. *Itupale Online Journal of African Studies*, *2*(1), 39-54.

Herring, S. D. (2001). Faculty acceptance of the World Wide Web for student research. *College & Research Libraries*, *62*(3), 251-258.

Herrington, A., Herrington, J., Hoban, G., & Reid, D. (2009).   Transfer of online professional learning to teachers' classroom practice. *Journal of Interactive Learning Research*, *20*(2), 189.

Hersh, W. R., & Rindfleisch, T. C. (2000). Electronic publishing of scholarly communication in the biomedical sciences. *Journal of the American Medical Informatics Association*, *7*(3), 324-325.

Hew, K. F., & Cheung, W. S. (2013). Use of Web 2.0 technologies in K-12 and higher education: The search for evidence-based practice. *Educational Research Review*, *9*, 47-64.

Hosaini Farhangi, S. (2006). An evaluation of Iranian teachers' professional skills to use ICT in education. MA. thesis, Bahonar University of Kerman, Faculty of Literature & Humanities Sciences.

Hughes, J. (2010). The role of teacher knowledge and learning experiences in forming technology-integrated pedagogy. *Journal of Technology and Teacher Education*, *13,* 277-302. Retreved from http://www.editlib.org/p/4622.

Ihmeideh, F. M. (2009). Barriers to the use of technology in Jordanian pre-school settings. *Technology, Pedagogy and Education, 18*(3), 325-341.

Ivers, K. S. (2002). Changing teachers' perceptions and use of technology in the classroom. Document No. ED 467 095, Washington, DC: ERIC Document Reproduction Service, National Center for Education Statistics.

Izadi Yazdanabadi, A., & Mirzaee, M. (2011). Infrastructure requirements to train digital citizens in schools of Tehran. *The Journal of Humanities Science* , University of Imam Hosein-Islamic Education, *l 0*(18), 80.

Jalali, A. (2011). The road map of Iranian smart schools. Tehran: Office of Ministry of Education.

Jennings, D., Cormack, S., Coutts, A. J., Boyd, L., & Aughey, R. J. (2010). The validity and reliability of GPS units for measuring distance in team sport specific running patterns. *International Journal of Sports Physiology & Performance*, *5*(3), 328-341

Johnson, B. (1997). Examining the validity structure of qualitative research. *Education, 118* (2), 282-292.

Johnson, S. D. (1995). Will our research hold up under scrutiny? *Journal of Industrial Teacher Education, 32*(3), 3-6.

Julien, H., & Barker, S. (2009). How high-school students find and evaluate scientific information: A basis for information literacy skills development. *Library & Information Science Research*, *31*(1), 12-17.

Kandari, J. (2010). Information Quality on the World Wide Web: A User Perspective. Masters dissertation, Lincoln: The Graduate College, University of Nebraska.

Kapoun, J. (1998). Teaching undergrads web evaluation: A guide for library instruction. *C&RL News,* July/August, 522–523

Kargar Bideh, M. J. (2008). A Framework for Evaluating Information Quality of Persian Weblogs. (Doctoral dissertation), Serdang, Malaysia: Universiti Putra Malaysia.

Katerattanakul, P., & Siau, K. (1999). Measuring information quality of web sites: Development of an instrument. *Proceedings of the 20th International Conference on Information Systems.* Charlotte, North Carolina, United States, 279–285.

Katz, E. (1968). On reopening the question of selectivity in exposure to mass communication. In *Theories of cognitive consistency: A sourcebook*. Edited by Robert P. Abelson, et al., Chicago: Rand McNally, 788-796.

Katz, R. N. (2002). The ICT infrastructure: A driver of change. *EDUCAUSE Review*, *37*(4), 50-61.

Kay, R., Knaack, L., & Petrarca, D. (2009). Exploring teachers perceptions of web-based learning tools. *Interdisciplinary Journal of E-Learning and Learning Objects*,(5), 1-24.

Khan, M., Hossain, S., Hasan, M., & Clement, C. K. (2012). Barriers to the introduction of ICT into education in developing countries: The example of Bangladesh. *International Journal of instruction*, *5*(2), 61-80.

Kim, K. S. & Sin, S. C. J. (2011). Selecting quality sources: Bridging the gap between the perception and use of information sources. *Journal of Information Science*, *37*(2), 178-188.

Kling, R., & Covi, L. (1995). Electronic journals and legitimate media in the systems of scholarly communication. *The Information Society*, *11*(4), 261-271.

Klobas, J. (1995). Beyond information quality: Fitness for purpose and electronic information resource use. *Journal of Information Science, 21*(2): 95.

Krefting, L. (1991). Rigor in qualitative research: The assessment of trustworthiness. *The American Journal of Occupational Therapy, 45*(3), 214-222.

Krueger, R.A. & Cassey, M.A. (2009). *Focus group: A practical guide for applied research*. Newbury Park CA: Sage.

Kuiper, E., Volman, M., & Terwel, J. (2005). The Web as an information resource in K-12 education: Strategies for supporting students in searching and processing information. *Review of Educational Research, 75* (3), 285-328.

Kusano, K., Frederiksen, S., Jones, L., Kobayashi, M., Mukoyama, Y., Yamagishi, T., ... & Ishizuka, H. (2013). The effects of ICT environment on teachers' attitudes and technology integration in Japan and the US. *Journal of Information Technology Education: Innovations in Practice*, *12*(1), 29-43.

Lee, M. H., & Tsai, C. C. (2010). Exploring teachers' perceived self-efficacy and technological pedagogical content knowledge with respect to educational use of the World Wide Web. *Instructional Science*, *38*(1), 1-21.

Lewis, D., Chang, B. L., & Friedman, C. P. (2005). *Consumer Health Informatics*, New York: Springer, 1-7.

Light, D. & Polin, D. (2010). *Integrating Web 2.0 tools into the classroom: Changing the culture of learning*. EDC Center for Children and Technology. Retrieved from http://cct.edc.org/admin/publications/report/Integrating%20Web2.0.PDF.

Lin, M. Y. E. & Davis, J. (2012). Web 2.0 tools in teacher education classrooms. In P. Resta (Ed.), *Proceedings of Society for Information Technology & Teacher Education International Conference* 2012 (pp. 4011-4013). Chesapeake, VA: AACE. Retrieved from http://www.editlib.org/p/40233.

Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic Inquiry*. Beverly Hills, CA: Sage.

Liu, L., & Chi, L. (2002). Evolutional data quality: A theory-specific view. Proceeding of the 7th International Conference on Information Quality, (MIT IQ Conference), 292-304.

Lubans, J. (1998, April). How first-year university students use and regard Internet resources. Retrieved 12 February, 2011, from http://www.lubans.org/docs/1styear/firstyear.html.

Lucassen, T., & Schraagen, J. M. (2011). Factual accuracy and trust in information: The role of expertise. *Journal of the American Society for Information Science and Technology*, *62*(7), 1232-1242.

Malterud, K. (2001). Qualitative research: standards, challenges, and guidelines. *The Lancet*, *358*(9280), 483-488.

Mansourian, Y. (2004). Similarities and differences between Web search procedure and searching in the pre-web information retrieval systems. *Webology*, *1*(1), Article 3. Retrieved 3 February, 2014, from http://www.webology.org/2004/v1n1/a3.html.

Marshall, C., & Rossman, G. B. (1995). *Designing Qualitative Research* (2nd ed.). Thousand Oaks, CA: Sage.

Martin, G. P., Currie, G., & Finn, R. (2009). Leadership, service reform, and public-service networks: the case of cancer-genetics pilots in the English NHS. *Journal of Public Administration Research and Theory*, *19*(4), 769-794.

McDowell, L. (2002). Electronic information resources in undergraduate education: an exploratory study of opportunities for student learning and independence. *British Journal of Educational Technology*, *33*(3), 255–266.

MDG Report, (2010). *The Millennium Development Goals (MDG) Report 2010*, New York: United Nation, New York, 72.

Messing, S., & Westwood, S. J. (2012). Selective exposure in the age of social media: Endorsements trump partisan source affiliation when selecting news online. *Communication Research*, December 31, doi: 10.1177/009365021246640. Retrieved 25 June, 2013, from http://www.stanford.edu/~seanjw/papers/CRsocialNews.pdf.

Meola, M. (2004). Chucking the checklist: a contextual approach to teaching undergraduates web-site evaluation. *Libraries and the Academy, 4*(3), 331-344.

Metzger, M. J. (2007). Making sense of credibility on the web: Models for evaluating online information and recommendations for future research. *Journal of the American Society for Information Science and Technology, 58* (13) : 2078–2091.

Metzger, M. J., & Flanagin, A. J. (2013). Credibility and trust of information in online environments: The use of cognitive heuristics. *Journal of Pragmatics*, *59*, 210-220.

Metzger, M. J., Flanagin, A. J., & Zwarun, L. (2003). College student Web use, perceptions of information credibility, and verification behavior. *Computers & Education*, *41*(3), 271-290.

Miles, M. B., & Huberman, A. M. (1994), *Qualitative Data Analysis: An Expanded Sourcebook*, 2nded., Sage, Thousand Oaks, CA.

Miller, H. (1996). The multiple dimensions of information quality. *Information Systems Management*, *13*(2), 79-82.

Mintzberg, H. (1979). An emerging strategy of "direct" research. *Administrative Science Quarterly, 24,* 580-589.

Minocha, S. (2009). A study of the effective use of social software to support student learning and engagement. Retrieved from http://kn.open.ac.uk/public/workspace.cfm?wpid=8655.

Mohamed Zaki, F. Z., Danby, S., Hansen, J., & Thorpe, K. (2013). ICT usage in early childhood education: A comparative of Australian and Malaysian teachers beliefs and current practices. In *Prosiding Seminar Penyelidikan Pendikan IPG*, 1(1). Retrieved 13 Januuary, 2014, from

http://eprints.qut.edu.au/63895/1/Filzah%20Zahilah_Mohamed%20Zaki_Thesis.pdf.

Moradi, S., & Khalkhali, A. (2008). Evaluation of the level of ICT integration & usage in teachers curricula in Iranian schools. *Multicultural Education & Technology Journal*, *2*(3), 170-178.

Morgan, R. F. (1996). An Internet marketing framework for the World Wide Web (WWW). *Journal of Marketing Management*, *12*(8), 757-775.

Morris, S., Meed, J., Svensen, N. (1996). *The Intelligent Manage*r, London: Pitman Publishing.

Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2008). Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods*, *1*(2), 13-22.

Motamedi, V., & Piri, R. Analysis of Distance Learning in Smart Schools in Iran: A Case Study of Tehran's Smart Schools.(2014). *Malaysian Online Journal of Educational Technology (MOJET)*. 2(4)

Murphy, J., & Lebans, R. (2008). Unexpected outcomes: Web 2.0 in the secondary school classroom. *International Journal of Technology in Teaching and Learning*, *4*(2), 134-147.

Najafi, S. (2006). The impact of school principal's willingness on encouraging teachers to ICT integration in classroom. *Electronic Journal of NAMA*, *6*(3).

Nasser, R. (2008). A formative assessment of information communication technology in Lebanese schools. *International Journal of Education and Development Using Information and Communication Technology*, *4*(3), Retrieved from http://ijedict.dec.uwi.edu/viewarticle.php?id=492&layout=html.

National Center for Education Statistics. (2000). *Teachers' Use of Computers and the Internet in Public Schools*, Jessup, MD: National Center for Education Statistics.

Nazari, M. (2009). Information literacy for online distance learning GIS programmes Unpublished PhD. thesis. Sheffield: University of Sheffield.

Neo, M., Neo, T., & Yap, W. (2008, November). Students' perceptions of interactive multimedia mediated web-based learning: A Malaysian perspective. In *Int. ASCILITE Conference, Melbourne*. Retrieved 18 March, 2010, from

http://www.ascilite.org.au/conferences/melbourne08/procs/neo.pdf.

Newmark, P. (2003). No global communication without translation. In, *Translation today: Trends and perspectives*. Cleveland: Multiligual Matters, 55-67.

Norman, C. C., & Wittenberg, K. (2003). The electronic publishing initiative at Columbia (EPIC) and the use and costs evaluation program. *New Review of Information Networking, 9*(1), 66–78.

Padfield, M., & Procter, I. (1996). The effect of interviewer's gender of the interviewing process: A comparative enquiry. *Sociology: The Journal of the British Sociological Association, 30*(2), 355-366.

Pan, L. Y., & Chiou, J. S. (2011). How much can you trust online information? Cues for perceieved trustworthiness of consumer-generated online information. *Journal of Interactive Marketing*, *25*(2), 67-74.

Pattanaphanchai, J., O'Hara, K., & Hall, W. (2013, May). Trustworthiness criteria for supporting users to assess the credibility of web information. In *Proceedings of the 22nd International Conference on World Wide Web Companion* (pp. 1123-1130). International World Wide Web Conferences Steering Committee.

Patton, M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Services Research*, *34*(5 Pt 2), 1189.

Patton, M. Q. (2001). *Qualitative Research and Evaluation Methods* (2nd edition) Newbury Park, CA: Sage.

Peat, M., Franklin, S., Lewis, A. & Sims, R. (2001). Staff and student views of the usefulness of information technology materials within an integrated curriculum: are these educational resources effective in promoting student learning? *Conference of the Australasian Society for Computers in Learning in Tertiary Education (18th : 2001 : University of Melbourne, Victoria)*, Biomedical Multimedia Unit, The University of Melbourne, Melbourne, Vic., pp. 471-480. Retrieved 28 July, 2012, from http://dro.deakin.edu.au/view/DU:30009518.

Pelgrum, W. J. (2001). Obstacles to the integration of ICT in education: Results from a worldwide educational assessment. *Computers & Education*, *37*(2), 163-178.

Petty, R. E. & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York, NY: Springer-Verlag.

Pickard, A. J. (2007). *Research Methods in Information*. London: Facet Publishing.

Prestridge, S. (2012). The beliefs behind the teacher that influences their ICT practices. *Computers & Education*, *58*(1), 449-458.

Princeton Survey Research Associates. (2002). A matter of trust: What users want from web sites. Results of National survey of Internet user for consumer webwatch. Retrieved from http://www.consumerwebwatch.org/pdfs/a-matter-of-trust.pdf (accessed June 16 2011)

Pynoo, B., Tondeur, J., Van Braak, J., Duyck, W., Sijnave, B., & Duyck, P. (2012). Teachers' acceptance and use of an educational portal. *Computers & Education*, *58*(4), 1308-1317.

Rafe, V., & Monfaredzadeh, M. (2012). A qualitative framework to assess hospital/medical websites. *Journal of Medical Systems*, *36*(5), 2927-2939.

Rahimi, E., Den Berg, J. V., & Veen, W. (2012). Designing and implementing PLEs in a secondary school using Web2.0 tools. In . Jan Herrington et al. (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications* 2013 (pp. 2222-2231). Chesapeake, VA: AACE. Retrieved 3 April, 2013,from http://www.editlib.org/p/112281.

Recker, M.; Dorward, J.; Nelson. L.M. (2004). Discovery and use of online learning resources: Case study findings. *Journal of Educational Technology and Society*, *7*, 93-104.

Redman, T. (1996). *Data Quality For The Information Age*. London: Artech House Inc.

Remenyi, D. (2012). *Case Study Research: The Quick Guide to Case Study research*. London: Academic Publishing international Limited.

Rieh, S. Y. (2000). Information Quality and Cognitive Authority in the World Wide Web. PhD thesis, Rutgers: Communication, Information, and Library Studies, The State University of New Jersey.

Rieh, S. Y. (2002). Judgment of information quality and cognitive authority in the Web. *Journal of the American Society for Information Science and Technology, 53*(2), 145–161.

Rieh, S. Y., & Danielson, D. R. (2007). Credibility: A multidisciplinary framework. *Annual Review of Information Science and Technology*, *41*(1), 307-364.

Rojas, E. M. (2002). Use of web-based tools to enhance collaborative learning, *Journal of Engineering Education, 91*(1): 89-95.

Ryan, A. B. (2006). Post-positivist approaches to research. In M. Antonesa, H. Fallon, A. B. Ryan, A. Ryan, T. Walsh & L. Borys (Eds.), *Researching and writing your thesis: A guide for postgraduate students* (pp. 12-28). Maynooth, Ireland: Maynooth Adult and Community Education, NUI.

Sadaf, A., Newby, T. J., & Ertmer, P. A. (2012). Exploring pre-service teachers' beliefs about using Web 2.0 technologies in K-12 classroom. *Computers & Education*, *59*(3), 937-945.

Salehi, H., & Salehi, Z. (2012). Integration of ICT in language teaching: Challenges and barriers. *International Proceedings of Economics Development & Research*, *27*

Sandhu, H. S. & Jalandhar, D. (2012). Use of open access resources by the engineering students of Punjab (India). *International Journal of Library and Information Science*, *4*(1), 10-15.

Schaal, M., Smyth, B., Mueller, R. M., & MacLean, R. (2012, October). Information quality dimensions for the social web. In *Proceedings of the International Conference on Management of Emergent Digital EcoSystems* (pp. 53-58). ACM.

Scholz-Crane, A. (1998). Evaluating the future: A preliminary study of the process of how undergraduate students evaluate web sources, *Reference Services Review*, *26*(3/4), 53–60.

Seaman, J., & Tinti-Kane, H. (2013). Social media for teaching and learning. Retrieved 11 January, 2014, from http://www.pearsonlearningsolutions.com.

Shafaipour Motlagh, F (2011). Efficient educational strategies for developing teachers' needed skills for effective teaching in smart schools of iran. In *Proceedings of the 10th WSEAS*

international conference on E-Activities (pp. 13-18). World Scientific and Engineering Academy and Society (WSEAS).

Shahbaz , S., Nasr Esfahani, A., & Zamani, E. (2007). Investigating barriers towards using ICT in schools from teachers and school administrative perspectives. The Journal of Educational Research, *1*(3), 75-95.

Shankar, G., & Watts, S. (2003). A relevant, believable approach for data quality assessment. *Proceeding of 8th International Conference on Information Quality*, 178-189.

Sheard, J., Carbone, A. & Hurst, A. J. (2010). Student engagement in first year of an ICT degree: staff and student perceptions. *Computer Science Education*, *20* (1), 1–16.

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, *22*(2), 63-75.

Silius, K., Kailanto, M., & Tervakari, A. (2011, April). Evaluating the quality of social media in an educational context. In *Global Engineering Education Conference (EDUCON), 2011 IEEE* (pp. 505-510). IEEE.

Small, R. (1997). *Assessing the motivational quality of world wide websites*. ERIC Clearinghouse on Information and Technology. (ED 407 930).

Smart School Project Team. (1997). The Malaysian Smart School: An MSC Flagship Application. (A Conceptual Blueprint). Malaysia, Government of Malaysia.

Song, M., & Parker, D. (1995). Commonality, difference and the dynamics of disclosure in in-depth interviewing. *Sociology. The Journal of the British Sociological Association, 29*(2), 241.

St Jean, B., Rieh, S. Y., Yang, J. Y., & Kim, Y. M. (2011). How content contributors assess and establish credibility on the web. *Proceedings of the American Society for Information Science and Technology, 48*(1), 1-11.

Stevens, K. (2007). The development of virtual educational environments to support interschool collaboration. *The Turkish Online Journal of Distance Education*, *8*(2), 29–37. Retrieved March 6, 2009, from http://tojde.anadolu.edu.tr/tojde26/pdf/article_2.pdf.

Strauss, A. L. (1987). *Qualitative Analysis for Social Scientists*. Cambridge: Cambridge University Press.

Strauss, A. L. & Corbin, J. (1990). *Basics of Qualitative Research Techniques and Procedures for Developing Grounded Theory*. Newbury Park, CA: Sage.

Stvilia, B., Twidale, M. B., Gasser, L., & Smith, L. (2006). Information quality discussions in Wikipedia. *Proc. 2005 ICKM*, 101-113.

Stvilia, B., Twidale, M. B., Smith, L. C., & Gasser, L. (2008). Information quality work organization in Wikipedia. *Journal of the American Society for Information Science and Technology*, *59*(6), 983-1001.

Sundar, S. S. (2008). The MAIN model: A heuristic approach to understanding technology effects on credibility. In, *Digital Media,Youth, and Credibility*. Edited by M. J. Metzger and A. J. Flanagin. The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning. Cambridge, MA: The MIT Press,. 73–100. doi: 10.1162/dmal.9780262562324.073

Tahira, M., & Ameen, K. (2009). Information needs and seeking behavior of science & technology teachers of the University of the Punjab, Lahore. *Pakistan Journal of Library & Information Science*, *10*, 80-96.

Tanaka, K. (2010). Web information credibility, In *The 11th International Conference on Web-age Information Management* (WAIM 2010), editors, L.Chen et al. Berlin: Springer-Verlag, 781.

Tavakol, M., Torabi, S. & Zeinaloo , A. (2009). Grounded theory in medical education research. *Medical Education Online* 11. Retrieved from http://www.med-ed-online.org

Teddlie, C., & Tashakkori, A. (Eds.). (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Newbury Park, CA: Sage.

Tellis, W. (1997). Applications of case study methodology. *The Qualitative Report*, *3* (3), Retrieved March 13, 2014, from http://www.nova.edu/ssss/QR/QR3-3/tellis2.html?ref=dizinler.com.

Tenopir, C. (1995). Authors and readers: The keys to success or failure for electronic publishing. *Library Trends*, *43*(4), 571-591.

Thompson, A. D., Schmidt, D. A., & Davis, N. E. (2003). Technology collaboratives for simultaneous renewal in teacher education. *Educational Technology Research and Development*, *51*(1), 73-89.

Tomaiuolo, N. G. (2005). Faculty views of open web resource use by college students. *Journal of Academic Librarianship*, *31*(6), 559-566.

Tseng, S., & Fogg, B. J. (1999). Credibility and computing technology. *Communications of the ACM*, *42*(5), 39-44.

Van Fossen, P. J., & Shiveley, J. M. (2000). Using the Internet to create primary source teaching packets. *The Social Studies*, *91*(6), 244-252.

Van Zeist, R. H. J., & Hendriks, P. R. H. (1996). Specifying software quality with the extended ISO model. *Software Quality Journal*, *5*(4), 273-284.

Venkatesh, V., Croteau, A. M., & Rabah, J. (2014, January). Perceptions of effectiveness of instructional uses of technology in higher education in an era of Web 2.0. In *System Sciences (HICSS), 2014 47th Hawaii International Conference on* (pp. 110-119). IEEE.

Walker, A., Recker, M. M., Lawless, K., & Wiley, D. (2004). Collaborative information filtering: A review and an educational application. *International Journal of Artificial Intelligence in Education*, *14*(1), 3-28.

Walraven, A., Brand-Gruwel, S., & Boshuizen, H. P. A. (2009). How students evaluate sources and information when searching the World Wide Web for information. *Computers and Education, 25* (1), 234-246.

Walsham, G. (1995). Interpretive case study in IS research: Nature and method. *Journal of Information System, 4*, 74-81.

Wang, R. Y., & Strong, D. M. (1996). Beyond accuracy: What data quality means to data consumers. *Journal of Management Information Systems*, *12*(4), 5-33.

Wang, S., & Reeves, T. C. (2006). The effects of a web-based learning environment on student motivation in a high school earth science course. *Educational Technology, Research and Development, 54*(6), 597-621.

Watts, S., Shankaranarayanan, G., & Even, A. (2009). Data quality assessment in context: A cognitive perspective. *Decision Support Systems*, *48*(1), 202-211.

Wells, J. & Lewis, L. (2006). Internet access in US public schools and classrooms: 1994-2005, Washington, DC: National Center for Education Statistics, Document NCES 2007-020.

Wepner, S. B., Ziomek, N., & Tao, L. (2003). Three teacher educators' perspectives about the shifting responsibilities of infusing technology into the curriculum. *Action in Teacher Education*, *24*(4), 53-63.

Wims, P., & Lawler, M. (2008). Investing in ICTs in educational institutions in developing countries: An evaluation of their impact in Kenya. *International Journal of Education and Development Using Information and Communication Technology*, *3*(1), 5-22.

Wu, M.D. & Chen, S. C. (2008). Elementary Schoolteachers' use of instructional materials on the web, *The Electronic Library, 26*(6), 833-843.

Wu, M.D., Chen, S.C. & Hsieh, M.C. (2005). A study of elementary school teachers' searching behavior for instructional resources on the Internet, *Journal of Educational Media & Library Sciences*, *42* (4), 481-98.

Wu, M.D. & Huang, Y.C. (2005), An analytical study of contents and retrieval interfaces of instructional resource web sites in Taiwan, *Bulletin of Library and Information Science* (534), 1-22.

Yin, R. K.(1981). The case study crisis: some answers. *Administrative Science Quarterly*, *26* (1), 58-65.

Yin, R. K.(1984). *Case study research: Design and methods*. Beverly Hills, CA: Sage Publishing.

Yin, R. K.(1989). *Case study research: Design and methods.* (Rev. ed.). Newbury Park, CA: Sage.

Yin, R. K.(1994). *Case study research: Design and methods* (2nd ed). London: Sage.

Yin, R. K.(2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.

APPENDIX : CONSENT FORM

Faculty of Computer Science & Information Technology, University of Malaya

Informed consent for teachers and students of Absal Smart high-school- Focus groups' and one to one interviews.

Title of research: "Information quality dimensions of Farsi Web-based Learning Resources used for instruction"

Researcher: Faegheh Mohammadi (Supervisor: Dr. Abrizah Abdullah)

Objectives: There are two objectives for this study as follows:

a) To understand the motivation and information quality challenges in using Farsi Web-based learning resources for instructional use

b) To explore the perceived quality dimensions of Farsi Web-based learning resources for instructional use.

Procedures:

If you agree to participate, I would like to have you attend interview sessions. Depend on the necessity of clarifying the answers provided to research questions and revealed issues by you, the one –to – one interview sessions might be held several times.

Each of sessions might be take more than one hour. The questions will be open-ended which means that you answer them in as much detail as you like.

 Please feel free to question me if you are uncertain about the purpose or meaning the question. Also you can refuse any questions that you are not willing to answer them. The interview will be Audio taped and transcribed by me and the material will be kept confidential. I will keep the tapes secure and erase them the end of study.

Benefits and risks:

No direct benefit comes to you from this research. Likewise there should be no more than minimal risks to you from participating in this research. That is no more risk than there would be if you were talking about your perceptions and experience about using Farsi web based learning resources for classroom activates. So that during this interview sessions , aside from whatever pleasure you may take in sharing your opinion. I hope that exploring motivations,

challenges and approaches related to use of web based learning resources in Farsi, provide a set of acceptable criteria of these resources that might be taken into account in terms of producing and using them for pedagogical purposes.

Extent of Anonymity and Confidentiality:

When I analysis the interviews, I will insert a pseudonym in place of your name, and change other identifying information so that someone reading the transcript would probable not be able to connect it to you. Then they will be destroyed or ereased once the tapes have been transcribed and checked.

Compensation:

At the end of this study participants will be given a pen drive as a gift

Freedom to Withdraw:

You are free to withdraw from participation in this study at any time without penalty. If you sign now to participate and realize later that you want to withdraw, just inform me. By signing below, it means that you have read and understand the informed consent and conditions of this research that you have had all of your questions answered. It indicates that you give your voluntary consent for participation in the research.

Your signature

Name:

Email:

Tel No:

Date:

Thank you.

 Fagheh Mohammadi

Researcher (Ph.D candidate)

Department of Library & Information Science

Faculty of Computer Science & Information Technology

University of Malaya, Malaysia

Department of Library and Information Science

Faculty of Computer Science and Information Technology

University of Malaya

Kuala Lumpur, Malaysia