

Is the information fit for use? Exploring teachers perceived information quality indicators for Farsi web- based learning resources

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ABSTRACT

This paper explores teachers' perceived information quality indicators of Farsi Web-based Learning Resources (WBLRs) for instructional use. This research positions information quality as "information fit for use", which implies that it is relative, as information considered appropriate for one's use may not have sufficient attributes for another's use. The research employs a qualitative case study approach completed in two phases. A secondary smart school in Tehran Iran was chosen as the case setting. First, two focus group interviews were conducted with ten teachers, followed by face-to-face interviews with five teachers who were recruited from the focus groups. Next, five students were recruited for face-to-face interviews as an additional data source. Fourteen (14) information quality indicators emerged from the data in conjunction with four categories namely pedagogical usability, content, presentation and accessibility. These information quality indicators provide the web information content designers and producers with in-depth insights on the issues need to be considered when designing and publishing educational web resources, in general, and Farsi resources, in particular. It also can be of value to librarians who are engaged with evaluating and selecting desirable web-based information resources aimed to add such resources into their library holdings.

Keywords: Information quality; Farsi Web-based learning resources; Pedagogical usability; Instructional use; Iran

INTRODUCTION

Web-based learning resources have the potential to transform classroom instruction as they offer teachers new ways to engage students in learning, introduce students to scientific inquiry (Sadaf, Newby and Ertmer 2012) and infuse learning with student-focused, (Hew and Cheung 2013) equitable pedagogy and practice (Greenhow, Robelia and

Hughes 2009). Easy and fast access to web-based learning resources (WBLRs) are considered as a critical information resources in K–12 education (Hew and 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 and Valli 2007) as well as influence teaching and learning (Greenhow, Robelia and Hughes 2009).

However, inaccurate and low-quality information has been perceived to be a growing problem in the online information world (Tanaka 2010; Braten, Stromso and Salmeron 2011; Pan and Chiou 2011; Pattanaphanchai, O'Hara and Hall 2013). The quality of the web contents has also been a major concern for educators, expressed by Hartig and Zhao (2009) as scientific applications that are built upon the Web will be of "little value if scientists are skeptical of the quality of data" (p. 1). As the Web does not support the learning process as an individual subject in K-12 education (Kuiper, Volman and Terwel 2005), educators will have doubts about the credibility of Web resources unless they evaluate the web resources themselves. Educators need to assess the quality of web information before making any decision to use such resources, as this allows them to guide students to materials that are useful and appropriate for the students' 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.

The significance of using WBLRs in Iran is reflected in the government's Fifth Educational Development Plan connecting a large number of schools in the country to the national Internet networks in order to (a) support knowledge sharing and collaboration; and (b) transform teachers' teaching 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. In spite of the government efforts, previous studies showed that Iranian teachers' acceptance to use WBLRs in the school context remains a big challenge (Najafi 2006; Shahbaz, Nasr Esfahani and Zamani 2007; Moradi and Khalili 2008; Afshari et.al. 2009). The lack of teachers' technological skills in integrating web resources into their curriculum and insufficient technical supports at school as well as limited access to the Internet (IzadiYazdanabadi and Mirzaee 2011; Attaran, Alias and Siraj 2012) have been reported as the main barriers towards using WBLRs in Iranian schools' context.

Our preliminary research (Mohammadi and Abrizah 2013) has shown that teachers in Iran who use online information for classroom instruction were concerned about the content-related quality of the information (such as verifiability, accuracy, informativeness, reusability, completeness, timeliness and objectivity) rather than the visual design of websites when making credibility judgments. The participants in the study acknowledged that Farsi web resources do not provide enough information for users, and the amplification of repeated information represented in various Persian websites has been criticized as a barrier toward obtaining more useful information from websites which are similar in subject matter. Given the emphasis on teachers to model 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 to be used in teaching and learning in Iran. As there has been no accepted standard that suggests the information quality of WBLRS for K-12 classroom instructions, the present research aims to understand what constitutes the information quality in the case of Farsi WBLRs.

LITERATURE REVIEW

Careful evaluation of electronic information has long been emphasized by researchers (Fitzgerald 1997; Walraven, Brand-Gruwel and Boshuizen 2009; Greenhow, Robelia and Hughes 2009; Kim and Sin 2011; St Jean et al. 2011; Sadaf, Newby and Ertmer 2012). Regarding the importance of WBLRs credibility in order to obtain users' trust to information, several researchers have attempted to develop their information quality assessment frameworks. A review of the information quality literature disclosed that there are two major approaches users used to assess the credibility of web resources, which include using checklists and critical thinking skills. The checklist approach was similar to the one that librarians used to evaluate printed materials. It included indicators such as accuracy, authority, objectivity, currency, and coverage (Rieh and Danielson 2007). The checklist approach included a series of questions designed to help students decide whether the web resource meets the specified quality requirement needs. However, the checklist approach provided some challenges too (Scholz-Crane 1998; Rieh 2002; Metzger, Flanagin and Zwarun 2003; Meola 2004). 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. Another study found that some users were reluctant to exert much effort and time to use a checklist when evaluating web resources (Metzger, Flanagin and Zwarun 2003). Meola (2004) indicated that the checklist could give correct website 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.

Some researchers took critical thinking into account when evaluating the credibility of information. Central processing is a concept, which has been used by Petty and Cacioppo (1986) and involves users' conscious cognitive effort to critically assess arguments in a text. Petty and Cacioppo (1986) argued that users apply central processing when evaluating information if they believe that the content of information is 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 are authorship/source, objectivity/bias, validity of content, bibliography/reference links, currency, and 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; (a) the likelihood of an element related to the source or message being noticed when people evaluate credibility (prominence); and (b) 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 colour 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. 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.

This literature review revealed that although many researchers around the world have examined teachers and students' perception of information quality indicators of WBLRs in the educational contexts, however most of the studies are associated with the developed countries. In the case of developing countries such as Iran there is a lack of understanding in the acceptable information quality criteria of Farsi WBLRS used for instructional purposes. Hartig and Zhao (2009) indicated that the web cannot be a trustworthy data source unless an approach for evaluating the quality of data is established and integrated as part of the data publication and access process. A review of literature in information quality of web resources revealed a notable lack of data representing various aspects of using Farsi WBLRs to highlight the likely available challenges and approaches related to the use these materials for instructions in Iranian schools.

OBJECTIVES AND METHOD

The objectives of this research are to:

- a) To explore the motivation and information quality challenges in using Farsi web-based learning resources for instructional use;
- b) To understand the perceived quality indicators of Farsi web-based learning resources for instructional use.

The following questions drive this research:

- 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 indicators of Farsi web-based learning resources for classroom instruction?

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 for instructional use. It 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 viewpoint of the quality of information because ultimately the user will decide whether he or she will use the information. Contextual aspect takes into account perception of decision makers who use the information (Stvilia et al. 2008; Helfert and Foley 2009; Watts, Shankaranarayanan and Even 2009). Therefore contextual assessment depends on the requirements and characteristics of the task at hand and characteristics of decision makers such as their experience.

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 the people who use the information. Therefore, this study employed the qualitative research design and adopted the case study approach. 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 secondary girls school in Iran was chosen as the case of study. Absal high school which is Iran's oldest smart school located in the northeast of Tehran, established and technologically equipped in 2004, was chosen. 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 that may represent the information quality of the resource. Focus group and face to face interviews within the case sample were used as the data collection techniques.

The key participants of this study comprised ten (10) teachers who had been purposively sampled based on the 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 five subjects that use Farsi language as the medium of instruction; chemistry, physics, mathematics, biology, and Farsi literature.

The teachers were selected in two steps. First we selected ten teachers for the two focus group interviews, comprising five teachers in each. The main aim of the 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 involved face to face interview, on the other hand. Therefore from ten teachers who participated in the focus group interviews, we recruited five teachers for the face to face interviews. We selected the teachers who were keener to participate in the individual interview sessions. The sample was kept small because of the exploratory nature of the study. The teachers' average teaching experience was 20 years and all of them were females. The data collection was conducted for seven months between February 2012, to September 2012. Each participant was interviewed 3 to 5 times, with a total duration of about 360 to 540 minutes.

As an additional data source we conducted several face to face interview sessions with five students. Each session lasted for about 90 minutes. Each student participant was interviewed 3 to 6 times, with a total duration of about 270 to 540 minutes. The students were considered teacher assistants who helped their subject teachers to create customized digital contents for instructional use. The students were selected by their teachers based on following criteria:

- a) Having experience collaborating with teachers to produce customized web content;
- b) Having familiarity with important Farsi educational websites and weblogs;
- c) Being active weblog readers who read Farsi educational weblogs frequently and put comments on them.

To ensure trustworthiness in qualitative research, we applied three techniques indicated in Shenton (2004) - member checks, peer debriefing and triangulation. For member checks, transcripts of dialogues in which they had participated were provided to participants so they could verify the accuracy and correctness of interpretations. Member checking is the single most important provision that can be made to bolster a study's credibility (Shenton 2004). In terms of peer debriefing, as the data obtained from interviews were in Farsi, providing an accurately translated data in the English language was necessary. Thus during an iterative process all of transcripts, emergent codes and related memos were checked and compared by an inter-coder constantly. The inter-coder was an experience qualitative research practitioner and very conversant in both English language and Farsi. Furthermore through triangulation, this study gathered data from various sources (teachers and students) and techniques (interviews and focus groups) which compensate for their individual limitations and exploits their respective benefits.

The data was analysed through the following processes: transcribing, coding data, memo writing, translating and inter-coder checking. All recorded interviews were transcribed verbatim. During the open-coding process we identified a pool of substantive codes that emerged from the participants' words. The open coding stage was followed by a focus-coding process in which similar codes were compared and merged frequently, providing new codes, which could explain or interpret best what constitutes information quality of Farsi WBLRs. Then we provided memos for each of emerging codes. Translating and inter-coder checking processes were performed simultaneously during coding and memo writing

stages. Relevant themes that emerged from the analyzed data, associated with each research question, were interpreted.

RESULTS

Research Question 1 (Teachers' motivation to use Farsi WBLRs)

This study found that teacher's perceived pedagogical usability of WBLRs drives the teachers' to use these resources for instructional purposes. The study has captured teachers' motivations to use Farsi WBLRs in two main categories, i.e. for (a) the delivery of instructional materials; and (b) the development of instructional materials. Table 1 indicates that teachers were motivated to use Farsi WBLRs in the delivery of instructional materials due to (a) desirability, (b) content accessibility, (c) student-centred teaching, (d) interactivity and (e) feasibility of classroom instruction via simulation. Teachers on the other hand, were motivated to use Farsi WBLRs in the development of instructional materials for (a) collaborative resource development using social media, (b) controllability (c) supplementary sources for classroom enrichment, (d) professional knowledge development. Table 1 also summarizes the findings in association with sample evidences of teachers' motivation to use Farsi WBLRs for classroom instruction.

Research Question 2 and 3 (Challenges Encountered and Approaches Taken when using Farsi WBLRs)

In spite of teachers' motivations to use Farsi WBLRs, the interviews findings showed that occasionally the teachers came across challenges during actual use of the resources. The probable challenges teachers faced addressed three main areas including content, presentation and accessibility. These challenges were likely to discourage teachers and reduce teachers and students' trust in and motivation to use Farsi WBLRs. The teachers in this study tackled the challenges by adopting certain strategies. Table 2 summarizes the challenges encountered and problem solving approaches applied or suggested by the participants when they use Farsi WBLRs to meet their information needs. The possible challenges address three main areas: content (Appendix A), presentation (Appendix B) and accessibility (Appendix C) of Farsi WBLRs. The Appendices present sample evidences illustrating teachers' challenges and the approaches taken to use Farsi WBLRs for classroom instruction. Content-based challenges such as authority or accuracy are likely to generate trustworthiness problems. Besides, comprehensiveness and informativeness problems may appear in addition to trustworthiness challenges. It may occur because the credibility, quantity and quality of content may be questionable by the users. In general, each of the challenges addressing content, presentation and accessibility are capable to raise information quality problems and reduce utility of Farsi WBLRs.

Further discussion with respondents revealed that individual skills may influence on the condition to use Farsi WBLRs in schools. Concerning individual skills, the creators, publishers and users' competency are taken in to account to produce, provide and use of FWBLRs. It seems that unskilled or biased authors are subject to generate low-quality contents which are not trusted by the users. In addition to producers' and publishers' competency, the users' information literacy skills in terms of searching, evaluating, selecting and using Farsi WBLRs would be considered as the most important feature in terms of providing effective use of these resources.

Table 1: Teachers' Motivation to use Farsi WBLRs in the Delivery and Development of Instructional Materials and Sample Evidences obtained from the Study Participants

| Motivation | Aspect | Description | Sample evidences |
|----------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Delivery of instructional materials | Desirability | Farsi WBLRs are worth having or seeking to be used for classroom instructions. | "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). |
| | Content accessibility | Contents of Farsi WBLRs are available or retrievable easily and quickly. | "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). "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) |
| | Student-centred teaching support | Farsi WBLRs support teaching by focusing on students' interests, abilities and learning styles. | "Students like web resources so much. They belong to the Net generation who surfs the web around 6 hours a day, so we can capture their motivation to learning activities using this motivation". (Farsi literature, Interview, 12 June 2012). |
| | Multimedia interactivity support | The audio-visual attributes of multimedia Farsi WBLRs as stimulus to accelerate students' understanding of subject matter | "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). |
| | Make feasible classroom instruction via simulation | Farsi WBLRs support the capability to carry out an educational activity practically and effectively using virtual laboratories. | "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) |
| Development of instructional materials | Collaborative resource development | Farsi WBLRs are developed collaboratively by both teachers and students through web log comments and discussion forums | "...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) "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) |
| | Controlled use | Farsi WBLRs enables the teachers and students to meet their specific information needs using hyperlinks | "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) |
| | Classroom enrichment | Farsi WBLRs are capable to support the teachers in classroom management and enrichment as well as to conduct classroom projects effectively. | "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" (Chemistry, Interview, 25 February, 2012) "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) |
| | Professional knowledge development | Farsi WBLRs are capable to enhance users' domain knowledge from a beginner to advance level | "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) "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) |

Table 2: The Challenges Encountered and the Approaches Taken in Participants' Use of Farsi WBLRs

| Challenges encountered | Approaches taken | |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Inaccurate content | Factual inaccuracy | Teaching students critically evolution of FWBLRs |
| | Stylistics inaccuracy | Teaching students academic writing using core standard resources |
| Unauthorized content | Evaluating the reputation of publisher of FWBLRs | |
| | Leaving the retrieved homepage and searching for the 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 | Determining 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 student to Keep their loyalty to 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 account with colleagues | |

According to the participants presentation-based challenges are rooted in distracting layout of web pages demonstrating Farsi WBLRs. Furthermore, the teachers believed that accessibility challenges are likely to appear in conjunction with licensing rules of educational Farsi websites which limit access to information only for their registered members. Likewise the websites' shortage in association with active links prevents the user to obtain their needed resources easily.

Similarly, inappropriate presentation of information as well as accessibility limitations imposed by the representing websites would decrease users' intention to use of Farsi WBLRs. Regarding the use context, it seems that prevalent educational policy as well as social and cultural beliefs in schools would also affect the condition of use Farsi WBLRs.

Research Question 4 (Teachers' Perceived Information Quality Indicators)

Comparing the findings of the first three research questions, the result of the last question provided an overall of 14 perceived information quality indicators of FWBLRs emerged from the focus groups and interview data. Five of these indicators contributed to pedagogical usability aspect. Six indicators contributed to the content. One was related to presentation and two indicators were related to the accessibility of web sites. Table 3 presents the information quality indicators of Farsi WBLRs, which emerged in conjunction with four categories of challenges encountered (Appendix) namely pedagogical usability, content, presentation and accessibility and describes the characteristic of Farsi WBLRs in relation to each information quality indicator found in this study.

Table 3: The Information Quality Indicators of Farsi WBLRs and the Characteristics

| | Information Quality Indicator | Characteristics |
|-----------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pedagogical Usability | 1. Student engagement | Farsi WBLRs are capable of capturing students' interests and motivation to follow through the learning process voluntarily. |
| | 2. Content Accessibility | Numerous contents of Farsi WBLRs are available and quickly accessible. |
| | 3. Multimedia interactivity | Multimedia attributes of Farsi WBLRs 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 Farsi WBLRs could be developed in collaboration. |
| | 5. Reusability | Farsi WBLRs can be re-used in various contexts and has the capability to meet various information needs. |
| Content Usability | 6. Factual accuracy | The contents of Farsi WBLRs are expected to be trustworthy and present credible information. |
| | 7. Stylistic accuracy | The contents of Farsi WBLRs are expected to be well-written and free of spelling or grammatical errors. |
| | 8. Authority | Farsi WBLRs must be produced and supported by well-known and expert authors or organizations. |
| | 9. Currency | Farsi WBLRs should include the last up-date of information on their websites. |
| | 10. Target audience | The grade level of users of Farsi WBLRs should be determined. |
| | 11. Adequacy | Farsi WBLRs should provide enough amounts of contents. |
| Presentation | 12. Selective exposure | Farsi WBLRs should present only the information, which is related to the topic at hand. |
| Accessibility | 13. Active links | The reference hyperlinks provided by Farsi WBLRs should be active and accessible. |
| | 14. Website accessibility | The web sites, which include Farsi WBLRs should provide free access to their holdings. |

DISCUSSION ON THE INFORMATION QUALITY INDICATORS

a) Student engagement

One of the teachers' motivations to use Farsi WBLRs 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 (Recker, Dorward and Nelson, 2004; Wu, Chen and Hsieh, 2005; Kay, Knaack and Petrarca 2009; Afshari et al. 2009; Abrizah and Zainab 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 in previous studies (Light and Polin 2010; Silius, Kailanto and 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. The participants of this research claimed that their students' performances increased significantly 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 (Gebre, Saroyan and Bracewell 2014). Gebre, Saroyan and Bracewell (2014) identified four dimensions of student engagement, namely cognitive and applied engagement, social engagement, reflective engagement and goal clarity. The results indicated that students' cognitive and applied engagement and social engagement were

associated to educators' conceptions of effective teaching. Although previous studies confirmed the capability of WBLRs to enhance students learning outcome, none of these studies have identified student engagement as an information quality indicator for WBLRs in a school context. This research suggests that student engagement is an information quality indicator of using Farsi WBLRs.

b) Content accessibility

Teachers in this study characterized 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 Farsi WBLRs would save time and money. 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 activities. 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, other researchers (Recker, Dorward and Nelson 2004; Wu and Huang 2005; Wu and Chen, 2008; Kay, Knaack and Petrarca 2009; Light and Polin 2010) found that quick access to WBLRs 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 and Hendricks 1996; Dedekke 2000). In this study, content accessibility has been suggested as an information quality indicator for Farsi WBLRs in view of the advantages provided by easy access to the content of educational web resources.

c) 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 help 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 and 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, and that students would be encouraged to use web resources if the resources included sufficient amount of multimedia-based educational materials. 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. Therefore, this study suggests that multimedia interactivity is an information quality indicator of Farsi WBLRs.

d) 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 et al. (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. Similarly, 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 et al. (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 and 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 et al. (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. Similar result was obtained by Abrizah and 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. In summary, high quality Farsi WBLRs can be developed using feedbacks through collaboration with peers. This study suggests that collaborative resources development is an information quality indicator.

e) Re-usability

The Distributed National Electronic and Learning Objects (DNER&LO) described generic reusability of WBLRs as the ability of such resources to be reused in any subject field or discipline (Currier and Campbell 2002). In agreement with this description, the result of the current research showed that Farsi WBLRs were re-used in all five subjects covered by this study (chemistry, physics, biology, Farsi literature, mathematics). The teachers saw Farsi WBLRs 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 and 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 WBLRs 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 and Carroll 2001; Wepner, Ziomek and Tao 2003; Wu and Chen 2008). Participants from these studies believed that they were capable of locating and using readily available web resources in their work even though they have limited technological skills. Thus regarding the benefits that can be obtained from using readily available WBLRs, this study suggests reusability as the other information quality indicator for Farsi WBLRs.

f) Factual accuracy

Accuracy in this research refers to having accurate and free of error content. This study identified two types of accuracy challenges related to the use of Farsi WBLRs, namely 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 Farsi WBLRs. According to the participants in this study, they faced problems when the contents of WBLRs 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 credibility of web-based 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 subjects 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 WBLRs. 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 participants suggested critically evaluating WBLRs before using Farsi WBLRs. Hence, using critical thinking skills would help the students to accurately verify the quality of web resources when they are looking for WBLRs. Similarly, many researchers have emphasized the critical evaluation of WBLRs to ensure the accuracy of web created content (Kapoun 1998; Scholz-Crane 1998; Herring 2001; Julien and Barker 2009; Metzger and Flanagin 2013). Therefore, considering the importance of content accuracy as a critical characteristic related to web resources, in this study factual accuracy emerged as an information quality indicator of Farsi WBLRs.

g) Stylistic accuracy

Stylistics accuracy in the current research refers to well-written content without typeface, grammatical or translational errors. According to the participants, many Farsi WBLRs 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 Farsi WBLRs 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 Farsi WBLRs.

In the case of Farsi WBLRs the accuracy of scientific information resources is more critical than the accuracy of the literary information. The accuracy issue was highlighted during the interview sessions by science teachers, while teachers who taught Farsi literature were neutral regarding this issue. Previous studies such as that of Walraven, Brand-Gruwe and Boshuizen (2009) indicated that the language of the resources, writing style and grammatical 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 Farsi WBLRs, stylistic accuracy has been identified as an information quality indicator of these resources.

h) 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 Farsi WBLRs have affected users' trust of the information. The results showed that the Farsi WBLRs 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; Katerattanakul and Siau 1999; Rieh 2000; Stvilia et al. 2008; Hasan and 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 Farsi WBLRs. The participants perceived that the authoritativeness of Farsi WBLRs 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 Fogg (2003) 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, Farsi WBLRs 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 (Chen et al. 2012; Ahmad et al. 2010) 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 Farsi WBLRs this study suggests authority as an information quality indicator.

i) 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 current study confirmed the significance of timeliness of learning resources used for students’ instruction. Several researchers have suggested currency or timeliness as an information quality dimension or indicator in their frameworks (Van Fossen and Shiveley 1999; Recker, Dorward and Nelson 2004; Rieh and Danielson 2007; Ahmad et al. 2010). The current study found conflicting views between the science and Farsi literature teachers’ beliefs regarding the currency of WBLRs in their respective domains. While teachers who taught Farsi literature claimed that there were huge numbers 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. 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 indicator for Farsi WBLRs.

j) Target audience

In this study comprehensiveness is described as a quality of Farsi WBLRs. 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 study participants indicated being influenced by the comprehensiveness of contents to perceive an information resource as useful. They indicated being dissatisfied with Farsi WBLRs, 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.

Provision of online resources would not necessarily generate value-added learning. 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 the digital library MERLOT. Also, target audience information 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 another information quality indicator of Farsi WBLRs.

k) Adequacy

Informativeness of content has been highlighted by the participants of the current study as an important criterion when evaluating WBLRs. The participants considered informativeness of Farsi WBLRs in conjunction with the adequate amount of information. Adequacy in this study refers to a desirable attribute of Farsi WBLRs in terms of the capability of these resources to provide enough and additional informational resources without being redundant. According to the study participants, although they might obtain sufficient amount of Farsi WBLRs, 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 WBLRs related to science and technology and social studies. The current study found differences in the perceptions of the adequacy of Farsi WBLRs amongst science teachers compared to teachers teaching Farsi literature. The Farsi literature teachers were surprised by the easy access to numerous types of Farsi WBLRs in their subject area. Conversely, the science teachers especially those teaching chemistry and physics revealed the shortage of Farsi WBLRs 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 Farsi WBLRs 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 indicator of Farsi WBLRs. 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).

l) Selective exposure

Selective exposure has been suggested by this study as an information quality indicator of Farsi WBLRs in conjunction with the theory of "selective exposure". The selective exposure theory is a concept in media and communication research (Freedman and Sears 1965; Katz, 1968; Frey and Wicklund 1978; D'Alessio and 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, 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), and Messing and Westwood (2012), none of them identified this concept as a quality indicator for WBLRs. This study therefore suggests selective exposure as an information quality indicator for Farsi WBLRs.

m) Active links

The participants of the current study acknowledged the existence of hyperlinks in WBLRs 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 Abuelrub (2011), and 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 indicator for Farsi WBLRs.

n) 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. Adeoye and 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 these resources. As indicated by 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 indicator of Farsi WBLRs.

CONCLUSION

This study contributes to the existing literature on information quality related to WBLRs for instructional use by suggesting 14 information quality indicators. This study also examined teachers and students' perception and experience when using Farsi WBLRs. As such, it 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. Therefore, the pedagogical usability indicators emerging from the interviews may contribute to meeting the gap of the literature related to teachers and students' perceptions of the usefulness of WBLRs for classroom instruction and teachers professional development.

Stakeholders of Farsi WBLRs could apply the results of this study and be more confident in terms of providing suitable web resources. The stakeholders are school librarians, information producers, educational website designers and school managers. 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 enables the Iranian librarians to select information resources based on actual user needs. The awareness about user accepted criteria 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 WBLRs and would help accelerate knowledge development amongst both Iranian teachers and students about using new technology in classroom learning. This study also indicates 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 enables educational website's designers to produce attractive layout, which could improve teaching-learning process using appropriate design.

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APPENDIX

Appendix A: Content-based Challenges and Approaches and Sample Evidences obtained from the Study Participants

| Challenges | Sample of evidences | Approaches | Samples of evidences |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inaccurate content | <p><i>"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)</i></p> <p><i>"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)</i></p> | Teaching students critically evaluate FWBLRs. | <p><i>"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, 21 April 2012)</i></p> |
| Unauthorized content | <p><i>"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)</i></p> | Evaluating the reputation of publisher of FWBLRs. | <p><i>"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)</i></p> |
| Out- of- date content | <p><i>"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)</i></p> | Ignoring the date and using the resources or leaving undated resources and searching for alternative updated resources. | <p><i>"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)</i></p> |
| Incomprehensive content | <p><i>"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 C, interview, 10 September 2012)</i></p> | Informing about the target audience on the top of web pages. | <p><i>"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)</i></p> |
| Redundant texts or images | <p><i>"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)</i></p> | Translating web-based educational texts from other languages into Farsi language. Using substitute traditional resources rather than web resources. | <p><i>"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)</i></p> <p><i>"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)</i></p> |

Appendix B: Presentation Challenges and Approaches and Sample Evidences obtained from the Study Participants

| Challenges | Samples of evidences | Approaches | Samples of evidences |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Distracting layout due to too many hyperlinks | <i>"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 "</i> (Farsi literature, Interview, 20 February 2012) | Teaching students to remain loyal to a web page. | <i>"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".</i> (Farsi literature, Interview, 20 February 2012) |
| Distracting layout due to irrelevant banner ads | <i>"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".</i> (Farsi literature, Interview, 20 February 2012) | Referring students to selected websites. | <i>"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".</i> (Farsi literature, Interview, 20 February 2012) |

Appendix C: Accessibility Challenges and Approaches and Sample Evidences obtained from the Study Participants

| Challenges | Samples of evidences | Approaches | Samples of evidences |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Accessibility challenges due to broken links | <i>"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".</i> (Student E, Interview, 10 September 2012) | Leaving the inactive web pages and searching for alternative accessible resources during subsequent search process. | <i>"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".</i> (Biology, Interview, 10 June 2012) |
| Accessibility challenges due to Websites' licensing issues | <i>"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".</i> (Farsi literature, Interview, 12 Sep. 2012) | Sharing access account with colleagues. | <i>"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".</i> (Farsi literature, Interview, 12 September 2012) |