

UNIVERSITY TEACHERS' VIEWS ON THE USE OF INFORMATION COMMUNICATION TECHNOLOGIES IN TEACHING AND RESEARCH

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ABSTRACT

Because of the potentialities and influences of information communication technologies (ICTs) in facilitating research and instruction in higher education, students' learning products and processes can no longer be restricted to ink on paper. The problem, however, is that ICT use for instructional purposes by staff members at institutions of higher education can be affected by socio-cultural perceptions in different contexts. This study used a convergent parallel mixed method design consisting of a survey followed by interviews to describe the views of a group of Iranian university teachers on the application of ICTs in teaching-learning processes as well as their reported uses of ICTs. 115 randomly selected full-time faculty members in social sciences, engineering, science, and the arts at three major universities in central Iran participated in the survey. Their familiarity with ICTs, their views about the instructional benefits of ICTs in higher education, and their reported uses of ICTs were studied using a researcher-made 20-item Likert-scale questionnaire. A purposive subsample of 15 was also interviewed to offer data on obstacles blocking their ICT use. The analyses of data showed that Iranian university teachers strongly agreed with the educational benefits of ICTs in higher education. In spite of this, they reported infrequent uses of ICTs for research and instruction. Limited resources and facilities, insufficient skills, lack of time for initial preparations, and policy-makers' little support and encouragement were reported as the most serious problems facing university teachers in the use of ICTs. Based on the results and the possible social, cultural, and economic limitations, the article highlights the necessity of promoting staff members' and policy-makers' knowledge of the educational potentials of ICTs as a major priority in in-service trainings.

Keywords: Information Communication Technology, Higher Education, Iranian Universities, Views about ICT, Staff Research

INTRODUCTION AND BACKGROUND

One of the most influential recent changes in higher education is the application of information communication technologies (ICTs). These rapid changes have not affected all societies equally. In other words, the history of the use of modern ICTs in higher education is quite short but spreading at different rates in different contexts. Used in a wide sense in this study, ICTs refer to all manifestations of communication technologies such as computers, videos, and the associated hardware, networks, and software that have the potentials to be employed for educational and research purposes. They allow teachers and learners worldwide to work with them in teaching, learning, and research. The use of these technologies in higher education systems can be strongly affected by social contexts, appreciations of usefulness, and a combination of factors that may promote or limit their use.

The use of ICTs in Iranian higher education is currently associated with some uncertainties. The country seems to be approaching ICTs with a combined feeling of hope and despair. The history of the use of ICTs in this context is even shorter than the general history of the use of modern technologies in education throughout the world. Moreover, limitations in access to ICTs, lack of support or even opposition in some levels of policy-making or at specific time intervals (e.g. periods of political or social dissatisfaction), less openness to the global community, and inadequate training are among the factors that can hinder the effective use of ICTs in Iranian institutions of higher education. Linking religious and cultural explanations to the present conditions, Godazgar (2009) reasoned that, because of the rule of Islamism and traditionalism since the 1979 revolution, the country has attempted to mix the modernity of institution of higher education with Islamic tradition and Iranian culture and that university education has continued with a stronger flavor of Islamic tradition to it. According to Godazgar ambiguous long-term aims of "making universities Islamic" and "the Unity of Seminary and University" ("Conclusion", para 1), have affected and complexified the post-revolutionary technological life of Iranian universities. Concerns about cultural invasion through ICTs, possible misuses of ICTs, or potential threats to national and ideological unity may also contribute to hesitations about promoting the uses of ICTs in higher education as evidenced by some limitations and controls. These concerns originate from serious attempts in the higher levels of the centralized education hierarchy to de-Westernize and Islamicize the country and its educational system (see Kheiltash, and Rust, 2009). This may also partially explain why around one-seventh of the credit units required for any first degree at any university in Iran should currently be related to Islamic topics in the country.

In spite of the existence of uncertain feelings of hopelessness and helplessness about the uses and influences of ICTs in the context of Iran, institutions of higher education have tried to pave the ground for the use of ICTs in their current learning and teaching activities. These institutions include public universities, private universities called Azad University branches, NGOs, and Distant learning centers called Payame-Noor University branches. Observation reveals that every individual university and most of its affiliated centers even in smaller cities remote from the capital have websites and are now usually equipped with an IT/ICT center where IT assistance is offered. Institutional email addresses are also provided for all students and teachers at almost all public universities. Most dormitories attached to public universities are also equipped with small computer and Internet centers where students can take turns to use computers and connect to their low-speed Internet. Almost all staff rooms in public universities and most staff offices in Azad and Payame-Noor universities, usually shared by two or three staff members, are equipped with a PC connected to the Internet. Even in some cities of the country, student registration and student record tracking is now done through the Internet and Intranets, with some students having to go to nearby internet cafes for services.

The promotion of skills in the use of ICTs has been emphasized in recent years in families as well as in higher education centers. For the young generation of all families, learning the use of modern ICTs is one of the priorities and most youngsters will need to attend private training centers. In higher education, many institutions offer workshops and training sessions to encourage their academic staff to use ICTs and internet-based activities for educational purposes. In other words, Macek's (2004) cyber-culture proposed to co-exist with the traditional culture is beginning to shape in the tertiary level of education in Iran under the influences discussed above.

Ordinary people, experts, policy-makers, and practitioners take different positions about the usefulness of ICTs in general and in educational contexts in particular. Some scholars (e.g. Kozma, 1994) have raised doubts about the effectiveness of ICTs in education. Others have claimed that the effectiveness of ICTs depends on those who use them. Teachers are the keys to the successful implementation of ICTs in higher education. "What we do know, whether from personal experience as teacher or learner, or as the result of 20 years of research into the question, is that ICT has an impact on learning, for some learners, under some conditions, and that it cannot replace a teacher" (McFarlane, 2002, para 2). McFarlane has placed great emphasis on the key role of the teacher in integrating ICTs with the curriculum and culture of the student believing that the use of ICTs in higher education is dependent on cultural contexts.

Even though some researchers like Kozma (1994) have expressed doubts regarding the effectiveness of ICTs, most scholars agree that they can be used effectively as instructional media. Bruce and Levin (2001) suggested that technology could be helpful in classroom settings by encouraging inquiry, helping communication, constructing teaching products, and assisting students' self-expression. ICTs can also help teachers in building socially constructed student-centered learning. Moreover, Bransford, Brown, and Cocking (2000) argued that technology could play the important roles of bringing real-world experiences into the classroom, providing scaffolding for cognitively complex learning tasks, increasing individualized feedback and group interaction, and expanding opportunities for teacher development. ICTs can be used to combine various elements of text, image, sound, and/or animation in an integrated and dynamic format. For instance, the availability of chat, email, blog, and other similar technologies on the World Wide Web "has the potential to extend instruction beyond traditional class time and to enhance student learning in blended courses" (Mackey & Ho, 2008, pp. 387). ICTs have shown to benefit from characteristics necessary for optimal learning environments including cost-effectiveness, interactivity, up-to-datedness, face-validity, rapidity, modifiability, ease of data navigation, and creativity as well.

Because of the positive dimensions that ICTs can add to research and instruction in higher education, demands for them increase daily among university students and teachers. In a recent survey, Kim and Bonk (2006) emphasized that more blended learning strategies using information and communications technologies were on the rise and that universities had to be responsive to these consumer demands. Numerous ICT-related educational tools and activities are created daily, waiting to be put to educational uses. These can be promoted and put at the service of higher education, provided that policy makers, teachers, and students show and develop the necessary understanding, willingness and preparation to use them. Nowadays, most students in developed countries come to university with expectations that in universities ICTs will be accessible, available, and effectively used (Sachs, 2006). In Iran, some students may be less aware of current developments in ICTs or may be digitally less literate to have the same level of expectations observed by Sachs.

The potential benefits of ICTs in higher education cannot be limited to teaching and learning. They can be very valuable resources for research conducted by teachers and students in institutions of higher education. Tools such as emails, wikis, and blogs, databases, analysis software, and many other forms of ICTs can be employed in

all stages of the research process from choosing the research topic to collection of data, to data analysis, to summarizing findings, and to drawing practical implications from the discussion of results. ICTs can, therefore, help university teachers in both instruction and research.

Many variables can limit university teachers in their use of ICTs for research and instruction. Socio-cultural limitations in the context of the use of ICTs, different perceptions of their (dis)advantages, and obstacles encountered in their application in higher education are among the factors that can negatively affect their understanding and use. Previous research has shown that many obstacles can prevent teachers from using ICTs such as problems in infrastructures (Mehlinger & Powers, 2002; Pelgrum, 2001), lack of training (Jacobson & Weller, 1988; Schrum, 1999; Willis, Thompson & Sadera, 1999), weak technical support (Schrum, 1995), and logistical factors such as the lack of time, software, hardware, keyboarding skills, knowledge of available information technology resources, and unavailability of computer labs and computer lab technicians (Parker, 1997). Individual perceptions in finding ICT frustrating, believing that changes are too fast, and not having a positive view of the effectiveness of ICT can be other negative factors in the use of ICT.

Research on Iranian university teachers' views on the usefulness of ICTs in higher education and their actual use of ICTs is scarce. Major studies carried out on the use of ICTs for university teaching and learning in this context have come up with different and sometimes contradictory results. Salajagheh (1998) studied the attitudes of computer users in the ICT center of Shiraz Medical University in Iran and found that all users there had a positive attitude about the use of ICTs in teaching and learning. He found no differences between subgroups of users with different genders, fields of study and teaching experience. However, in a study of factors affecting the use of ICTs for research and instruction among Iranian faculty members, Sarmadi, Ebrahimzadeh, Tafazoli Moghadam, and Dayani (2010) found significant effects on the amount of ICT use for perceived complexity of ICT, positive attitude toward the advantages of ICTs, perceived testability of teaching and learning through ICT, and proficiency in English as a foreign language. They reported no significant effects on the amount of ICT use for perceived adoptability of ICTs to the Iranian university teaching and learning context. In another study, Sotoodeh (1998) studied the use of computers and the Internet in both medical and non-medical universities in Shiraz and found that most users approached ICTs for accessing new thoughts and ideas and that their most frequent use of ICT facilities was the word processor and the email. Similarly, Tasviri Ghamsari (1999) investigated ICT use among faculty members of the Iranian Institute of Industrial and Scientific Research and found that email was the most frequently used form of ICT and that university degree and field of study were positively correlated with the amount of use. Significant positive effects on ICT use by Iranian university teachers have also been reported for field of study, age, university degree, and teaching experience. University teachers in the humanities and older teacher have been reported to use ICTs less than all others (Sharifi, 2003).

The studies reported here focus mainly on the type of ICTs preferred or used by Iranian university teachers and on the relevance of variables such as teaching experience, age, and field of study. In order to understand more about Iranian university teachers' role as good models of using information and communication technologies, a first necessary step is to explore their knowledge of and beliefs about the uses of ICT in higher education. It seems somehow odd to try to promote the use of ICTs in Iranian higher education without knowing about the perceptions of the more traditionalist faculty members and policy-makers as well as those of the young generation. As Snelbecker (1999) argued, it is *almost* (emphasis added) impossible not to be aware of the uses and influences of technology in instruction, education, or training issues. Inconsistent, limited, and somehow hesitantly growing level of ICT access usually provided in the country and in university settings in Iran that can, according to Schneiderman (2002), affect variability of ICT use. For Schneiderman, deeper human issues like "feelings of mastery, satisfaction with accomplishment, and a sense of responsibility" are important considerations in the use of technology by everyone" (p. 65). The human factor is one of the major dimensions to consider in relation to the use of ICTs in higher education and university teachers are the key human actors in this scene. Their views and perceptions can determine how they use ICTs and how they may be helped to employ their potentials more effectively for teaching and research. This study aimed to investigate Iranian university teachers' familiarity with ICTs, to describe their reported use of ICTs, and to survey their views on the benefits of ICTs for higher education. Furthermore, the study aimed to discover the main obstacles in using ICTs for teaching and research from the perspective of university teachers. More specifically, the study sought answers to the following research questions:

1. How familiar are Iranian university teachers with ICTs as indicated by their responses to questionnaire items?
2. What are Iranian university teachers' views about the usefulness of ICTs in higher education?
3. How much do Iranian university teachers use ICTs as reported in the frequency of their responses to questionnaire items?

4. What are the most frequent obstacles for the use of ICTs in higher education as reflected in interviews with university teachers?

METHOD

A mixed method research design (Creswell, 2003) including the collection and quantitative analysis of questionnaire data followed by qualitative analysis of focus group interview data was used to address the research questions. In this type of convergent parallel mixed method design (Creswell & Plano Clark, 2011) qualitative focus group interview data were collected to further understand the quantitatively reported and analyzed use of ICTs in higher education. The survey questionnaire was designed and administered to collect quantitative data on university teachers' familiarity with ICTs, their views on the usefulness of ICTs in Iranian higher education, and their reported uses of ICTs. Such surveys are most often used in the early stages of investigating ICT use to better understand potential users (Rubin, 1994). Focus group interviews with a purposive sub-sample of the participants, who reported the lowest level of ICT use in the quantitative analyses of questionnaire data, helped the researcher classify the most common obstacles to the use of ICTs in educational contexts. Focus group interviews in educational research use purposive sub-samples to provide specific data on peoples' views and attitudes (Cheng, 2007). With its focus on a selected sub-sample, this technique offered data on university teachers' views about the problems that they encountered in their application of ICTs for research and instruction. Interview data was used to further clarify the quantitative data provided by the whole sample.

The teachers: The research population of the study included about 500 faculty members teaching social sciences, humanities, engineering, science, or arts at different universities in Kashan, central Iran. A randomly-selected sample of 193 teachers was selected from this population to participate in the study. Only 115 teachers completed the questionnaires that were personally handed to them, forwarded to them through email, or sent to their offices through institutional post. The sample (n=115, male=107, female=8) was carefully chosen to reflect the male-female combination ratio in the research population. A disproportionate combination of male and female teachers is presently a feature of most Iranian institutions of higher education. When a respondent failed to return the completed questionnaire, an alternative method was tried or a replacement was made randomly from the research population to allow for the collection of data from an appropriate male-female ratio and a considerable sample size. The participants, all full-time tenure teachers, had different experiences of teaching courses in their disciplines which offered opportunities for the use of ICTs. A sub-sample of 15 teachers with the lowest reported use of ICTs also agreed to take part in focus group interviews. They were interviewed during three 25-minute sessions in groups of five. Since their level of proficiency in English was very low, both questionnaire and interview data were collected through the medium of their first language.

The questionnaire and the interviews: To measure university teachers' views on the use of ICTs in their teaching and research, a Likert scale questionnaire consisting of 50 items was initially developed based on a review of the related literature on the use of ICTs in education, pilot interviews with colleagues, and an earlier study of blogging in higher education (Zare-ee, Shekarey, and Fathi Vajargah, 2009). For validity considerations, the items of the questionnaire were written in the respondents' mother tongue, Persian, to make sure that they were fully comprehensible for all the participants. The questionnaire was also pilot tested with a convenience sample of 25 university teachers at two universities in the research setting. Based on the results of the analyses of pilot data and feedback from respondents and colleagues, irrelevant and ambiguous items were deleted and the remaining items were revised and used to prepare the final form of the questionnaire. This final version of the questionnaire (see Appendix) consisted of 20 Likert-scale items with 1 representing "strongly disagree" or "never" and 5 representing "strongly agree" or "always" for positive items. Weightings for the negative items (9 and 10) were reversed in the computations. The questionnaire included seven items on the respondents' familiarity with ICTs (items 5, 6, 7, 11, 13, 15, 19), eight items on their views about the usefulness of ICTs as instructional tools in higher education (items 1, 2, 3, 4, 8, 9, 10, 12), and five items on their use of ICTs (items 14, 16, 17, 18, 20). The Cronbach alpha reliability for the 20-item questionnaire was significant at the specified level of 0.05 ($R=0.76$, $p \leq 0.01$, $N=115$). Back-translation by an expert colleague from the English department was used to validate the wording and translation of questionnaire items. For the qualitative part of data collection, the leading interview question for the focus group interviews was the following: What do you think are the main obstacles that hinder university teachers' use of ICTs for teaching and learning? Selected teachers were interviewed in three groups of five. At the beginning of the three 25-minute semi-structured interview sessions, this leading question was raised and probes were used to focus the interviews on it when necessary. Interview responses to this question were recorded, semi-transcribed for significant statements, and coded for categories of obstacles to ICT use and emerging themes.

ANALYSES AND RESULTS

Questionnaire data were summarized and analyzed using the Statistical Package for Social Sciences (PASW). Frequencies of responses and descriptive statistics for individual questionnaire items clarified what university teachers taught about the use of ICTs in higher education. For further information and reference, the descriptive statistics for all questionnaire items have been incorporated into the list of items in the Appendix. Response frequency and descriptive analyses showed that items related to university teachers' views on the benefits of ICTs in higher education (e.g. items 1, 2, and 8) received the highest means as shown in Table 1. In fact, all of the 115 respondents strongly agreed that ICTs were more powerful than printed materials and other traditional tools of teaching and research. The respondents rated the educational value of ICTs very high with a total score of five and a standard deviation of zero for the first four items in Table 1. Moreover, from their viewpoints, ICTs are valuable tools for human societies in general and for higher education in particular as evidenced by the lowest means assigned to the two negative items in Table 1 below.

Table 1: University teachers' views on the usefulness of ICTs in higher education (n=115)

Item	M	SD
In my view, ICTs are more powerful tools of teaching and research than more traditional tools.	5	0.00
I feel that ICTs do not necessarily provide face-to-face intimate interactions between teachers and learners.	5	0.00
In my view, ICTs are more powerful tools of teaching and research than more traditional tools.	5	.000
In my view, ICTs are more effective for teaching and learning in higher education than books and other printed materials.	5	0.00
I think ICTs do <i>NOT</i> have noteworthy values for human societies in general.	1.83	.381
I think ICTs do <i>NOT</i> offer educational/instructional values in higher education.	1.70	.580

While all the respondents strongly agreed that ICTs were useful and valuable tools for research and instruction in higher education, they unanimously reflected concerns for possible losses in intimate face-to-face teacher-students interactions in university settings. Familiarity with the functions and characteristics of ICTs addressed through items 5, 6, 7, 11, 13, 15, 19 of the questionnaire was very high among the teachers. Descriptive analyses of the data returned the highest means for these items summarized in Table 2. Teachers either agreed or strongly agreed with the statements related to familiarity with ICTs. They all reported having obtained or developed ICT-based materials for teaching and research (questionnaire item 15, mean=5, 'the highest possible mean', SD=0), but no data was obtained about the quality or quantity of such materials.

Table 2: University teachers' familiarity with ICTs (n=115)

Item content	M	SD
Possession of ICT-based materials	5.00	.000
Knowledge of interactions through ICTs	5.00	.000
Knowledge of accessibility	4.85	.356
Knowledge of manipulation potentials	4.83	.381
Knowledge of problems that teachers can avoid through ICTs use	4.78	.414
Knowledge of speed in spreading information	4.76	.431
General self-perception of Knowledge of ICTs.	3.39	.952

The reported educational use of ICTs by teachers was addressed in items 14, 16, 17, 18, and 20 that produced lower means than the other two groups of items measuring familiarity with ICTs and views on the educational usefulness of ICTs. The data suggested that teachers in the context of this study emphasized the educational usefulness of ICTs (Table 1) and reported good levels of familiarity with ICTs (Table 2). However, based on the responses to the related items, they less frequently reported the use of ICTs in their teaching and research in higher education. All the participants strongly agreed that their experience of using ICTs for research and instruction in English was limited with the mean of five and standard deviation of zero. They also rated their colleagues' uses of ICTs low with (mean=2.9, SD=1.6).

To gain a more holistic view of what university teachers thought about the usefulness of ICTs in higher education, how familiar they were with them, and how frequently they used ICTs in teaching and research, total means were calculated for each question by adding up the means of the related questionnaire items. As shown in

these aggregate means in *Table 3*, the targeted university teachers familiarize themselves with ICTs, believe in their educational potentials, but seldom use them.

Table 3: Educational usefulness, familiarity, and reported use of ICTs (n=115)

Variables	Questionnaire items	M	SD
Views on the Educational usefulness of ICTs	1, 2, 3, 4, 8, 9, 10, 12	33.20	.850
familiarity with ICTs in higher education	5, 6, 7, 11, 13, 15, 19	33.16	1.631
Reported use of ICTs in higher education	14, 16, 17, 18, 20	20.92	1.612

The participants in this study cannot be considered frequent users of ICTs for educational purposes. Even though no participants selected never (or disagree) on the five questionnaire items related to their use of ICTs for teaching and research, the reported use of ICTs produced the lowest total mean (20.92) compared with the total means for views on the educational use of ICTs and Familiarity with ICTs. 57 teachers (49.6%) said they rarely used ICTs and 58 (50.4%) reported that they sometimes used ICTs in their mother tongue, Persian.

Interview results on obstacles that can hinder teachers' use of ICTs in university teaching and learning were obtained during three semi-structured group interview meetings. The oral responses to the leading question of what teachers saw as the main obstacles that hindered university teachers' use of ICTs for teaching and learning were recorded. They were semi-transcribed for significant statements referring to an obstacle or a problem and were coded and verified with the help of a colleague. The codes fell into six categories or themes: facilities, skills, feedbacks, managerial support, time, and other obstacles. *Table 4* summarizes these results. *Limited resources* and facilities were reported as the greatest problems facing university teachers (27.7% of all the reasons provided). This was followed by *insufficient skills* (22.1%), the felt *need for on-the-job training* in the use of ICTs (22.1%), and *lack of time* for initial preparations by the teachers (20.1%).

Table 4: Most common problem categories in using ICTs in university teaching and learning

Obstacle in Using ICTs	count	%
Lack of facilities for the use of ICTs	89	27.7
Insufficient skills in using ICTs	71	22.1
Lack of time for initial preparations	65	20.3
Equal treatment of those who do and those who do not use ICTs	42	13.1
Lack of support from managers	37	11.5
Reasons no falling in the above categories	17	5.3
Total number of codes in the data	321	100

One of the teachers interviewed said that he had to arrange at least about a week ahead if he wanted facilities in his university for using the PC Lab or showing PowerPoint slides in his lectures and that many teachers, in his view, were discouraged from using group internet-based activities because of various problems. All the other participants in his group agreed with his stance. Some of the obstacles in his view are provided in the following excerpt from the transcript of his responses.

Sometimes the big problem is some students' lack of mastery and cooperation. Before you can help them get going, class time is over.... Thinking of problems that I have experienced because of low internet speed, device failures, difficulties in making arrangements, and seeking permissions tempt me to prefer traditional lecturing....

Along with lack of support from some managers and policy-makers, the unwillingness of some senior more experienced teachers in adopting ICTs was also mentioned as an obstacle for promoting the academic use of ICTs. Unlike the interviewee quoted above, another interviewee pointed out that the younger generation was now usually ahead of some senior teachers in ICT use and that not all teachers felt good in being helped by student assistants in ICT use.

DISCUSSION

The study suggests a mismatch between teachers' familiarity with ICTs and their beliefs in the value of ICTs in Iranian higher education on the one hand and current practices and limitations on the other. The significance of the findings of this study is that they indicate how consumer expectations in the use of ICTs may be adversely affected by the social context. In Iranian higher education, ICTs seem to be used less vigorously than they are believed they should be because of their numerous educational potentials. Most obstacles qualitatively revealed

in the interview phase of the study (such as lack of support, lack of encouragement, unfair assessment, and insufficient facilities) are beyond the control of university teachers. The removal of these obstacles calls for the active participation of policy makers. This also suggests that while many educational policy-makers and leaders in this highly centralized higher education system may favor traditionalism as discussed earlier quoting Kheiltash, and Rust (2009), the practitioners show the understanding and the eagerness to use ICTs more frequently and more effectively.

University faculty members targeted in this study appreciate the potential benefits of ICTs for higher education and regard ICTs more powerful than traditional methods. This does not lend support to the claims made against the educational usefulness of ICTs. In the quantitative questionnaire survey part of the study, items related to the educational usefulness of ICTs received the highest means. Similar findings have been reported both internationally (e.g. Andrewartha, and Wilmot, 2001) and locally (e.g. Salajagheh's (1998). A positive attitude about the use of ICTs in teaching and learning among Shiraz Medical University staff was reported by Salajagheh (1998).

In the context of the possibility that vague general goals of Islamicizing and de-Westernizing Iranian universities might adversely affect their ICT use, Godazgar (2009) observed that Tabriz University teachers had the same positive attitudes but limited use. The findings of this study also call for measures on the part of educational policy makers to employ this positive attitude. The reported use of ICTs was relatively low for the population studied in this study yielding support to similar findings by Sotoodeh (1998), Tasviri Ghamsari (1999), and Bagherian (2002), who addressed university teachers in two other major cities of the country, Tehran and Shiraz. These findings suggest that claims for the ease of the use of ICTs in terms of technological requirements (e.g. Johnson, 2004; Mackey & Ho, 2008) be cautiously approached in the light of socio-cultural considerations. According to Warschauer, Knobel, and Stone (2004), narrowing the gap in numbers of computers in different social groups, greater attention to technology use for academic purposes, increased peer mentoring among teachers and better support for students (and teachers) who lack home computers are some of the steps that can be taken to properly employ modern dynamic educational media. To this, one can add measure that can enhance socio-cultural readiness for the educational uses of ICTs.

CONCLUSION

The conclusion that can be drawn from this study is that the use of ICTs as weapons against ignorance may be limited not only because of individual human failures (e.g. lack of skills, insufficient trainers, etc.) but also because of socio-cultural influences (e.g. loss of managerial support due to felt potential ideological threats behind ICT use). Making sure that there are enough qualified teachers who can operate computers and use ICTs in their learning and teaching is a very important part of today's educational reform and development. Training for these purposes is so important and vital in education that some researchers claim if insufficient effort is put into training teachers to use technology and to use it imaginatively then it is probably better to dispense with technology altogether (see Davies, 2005). If ICTs are now powerful and if they are becoming even more and more powerful, they will not probably win the battle against ignorance in higher education when there is human failure and a lack of investment in training teachers who use ICTs in developing countries. Previous research in this area suggests that technology can reduce social stratification or enhance equal research and educational opportunities for men and women (Warschauer, et. al. 2004). All these may, of course, depend also on how willing human sources in positions of power are to implement changes for the better use of ICTs.

This study suffered from a few limitations that future research may plan to overcome. First, it addressed university teachers in central Iran. A survey at the national level could have given a clearer picture of ICT use in higher education. Second, because of its scope the study was limited to questionnaire and interview data. Policy documents, observations, formal statistics, and other sources of data can enrich future studies in this area. Finally, ICTs were considered in a relatively underspecified and general conceptualization. Future research can broaden the scope of the survey to include more specific instances of ICT use in higher education. Further research in this area can investigate what might result in different patterns in the use of modern technologies in different developing or undeveloped countries and in different subgroups of their populations. It can comparatively explore the use of ICTs in the higher education systems of other nations with distinct emphases on research and instruction across geographically and economically diverse contexts.

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Appendix: Questionnaire items on the use of ICTs in higher education^a

No	Items	M	SD
1	In my view, ICTs are more powerful tools of teaching and research than more traditional tools.	5.00	.000
2	ICTs (referring generally to computers, videos, hardware, software, and networks) increase my knowledge and skills as a university teacher.	5.00	.000
3	In higher education, ICTs are more powerful tools than discussions and lectures without the use of ICTs.	4.85	.356
4	ICTs can be used as advanced instructional tools in higher education.	4.84	.365
5	I know that ICTs do not necessarily provide face-to-face intimate interactions between teachers and learners.	5.00	.000
6	As far as I know, ICTs can be used to effectively manipulate instructional contents and materials.	4.83	.381
7	I know that ICTs can spread knowledge and information faster than traditional methods.	4.76	.431
8	In my view, ICTs are more effective for teaching and learning in higher education than books and other printed materials.	5.00	.000
9	I think ICTs do NOT have noteworthy values for human societies in general.	1.83	.381
10	I think ICTs do NOT offer educational/instructional values in higher education.	1.70	.580
11	I know that many forms of ICT tools and techniques for higher education are accessible for use in teaching and research.	4.85	.356
12	In my view ICTs can be used as curriculum materials in higher education.	4.98	.131
13	I can avoid problems in many areas such as in handwriting and in organizing ideas when I use ICTs.	4.78	.135
14	I use/have used ICTs for teaching and research in Persian myself.	4.70	.858
15	I have obtained and developed ICT-based material for use in my teaching and research.	5.00	.000
16	I know about ICT-related materials developed in other languages like English that I can use for my teaching and research.	3.93	.491
17	My friends who learn about and use ICTs use them for educational purposes.	4.19	.687
18	My colleagues use ICTs for educational purposes.	2.86	1.643
19	Generally speaking, I have enough and satisfactory information about ICTs.	3.39	.952
20	I have limited experiences in using ICTs in English.	5.00	.000

^a Each item was followed by a 5-point Likert scale for respondents to mark their responses. Means and standard deviations are based on responses provided by 115 full-time university teachers in central Iran.

Note: Items were introduced using clear instructions, definitions of terms, and blanks for demographic data including highest qualification, experience in years, and institutional affiliation in Persian to avoid misinterpretations.