

ICT Challenges in education: Reflections from a developing country: Iran, with reference to the statistics from computer science students

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Abstract

In this paper, factors affecting the development and effectiveness of ICT in Iran's educational system, based on survey results from a group of computer engineering colleagues are discussed. Participants in the study were 22 students studying in Ferdowsi University of Mashhad, selected through a voluntary basis from a pool of students who had taken at least one web-based class at the university and were also familiar with Social Informatics, using a stratified sampling technique. The sample contained 20 to 23 years old male and female students. The emerged themes from the answers to questionnaires are categorized into five main titles: Hardware infrastructures, language proficiency and native language content, cultural attitude and tendency, application of ICT in primary and secondary schools, and Learning effectiveness in virtual classes. These main categories are discussed through the rest of the paper in addition to a brief review of Iran's current educational system.

Keywords: E-Learning, Web-based Education, E-Pedagogy, Communication Technology

Introduction

The impact of Information and communication technology (ICT) in the past two decades has been enormous (Oliver, 2001). ICT is a force that has changed many aspects of people's lives. As technology rapidly changes, more cost effective and more powerful technologies with great potentials for education continue to emerge and new types of people are needed. Indeed, in today's information and knowledge-driven world, a completely new set of skills is required (Hawkins, 2002).

In response to developing countries' demand for strategies to prepare their youth to compete in a world driven by information, technology, and knowledge, the role of ICT tools in education should be more emphasized. There have been a number of factors impeding the wholesale uptake of ICT in education. These include factors such as: lack of funding to support the purchase of the technology, lack of training among established teaching practitioners, lack of motivation among teachers to adopt ICT as teaching tools (Starr, 2001).

As education has been an important part of Iranian's strategy for economic growth and fight against poverty and has contributed to level out social differences, the main focus in this article is on the major challenges to the realization of ICT-related goals in schools which are categorized into 5 different titles: Hardware infrastructures, Language proficiency, Cultural attitude and tendency, Application of ICT in primary and secondary schools and Learning effectiveness.

Ferdowsi University of Mashhad is a state university in Razavi Khorasan province. Located in Mashhad, the university was established in 1949, making it the third oldest major state university of Iran. It is the largest university in northeast Iran, and has a large faculty.

Methodology

Participants in the study were 22 students selected through a voluntary basis from a pool of students who had taken at least one web-based class at the Ferdowsi University of Mashhad and were also familiar with Social Informatics and IT principles, using a stratified sampling technique. The sample contained 20 to 23 years old male and female students. Forty percent were junior and sixty percent were senior computer engineering students and eleven of them lived in dormitory.

The students were given a set of questions intending to study their first experience of facing ICT tools in their educational life. The answers brought a wealth of information which the authors have consolidated into this research article.

Results

The study reveals the challenges which students perceive as major impediments for realizing university based ICT objectives. These challenges fall into two main categories: Global Challenges and Student Challenges as shown in Table 1.

Table 1. The Major Obstacles to the Realization of ICT-related Goals

	Area	Respondent Theme
Global Challenges	1. Hardware infrastructures	<ul style="list-style-type: none"> • Insufficient computer laboratories and poor maintenance. • Not enough computers with simultaneous access to Internet. • Laboratory coordinator not skilful enough.
	2. Language proficiency, native language content	<ul style="list-style-type: none"> • Insufficient native language content over the web. • Poor quality of local content and applications.
	3. Cultural attitude and tendency	<ul style="list-style-type: none"> • Teacher-dependant students and instructors. • Unfamiliarity with online communication.
Student Challenges	1. Application of ICT in primary and secondary schools	<ul style="list-style-type: none"> • National university entrance exam. • Restrict education infrastructure and policies.
	2. Learning effectiveness	<ul style="list-style-type: none"> • Unfamiliarity with team work. • More interaction in face to face learning mode. • Huge gap between the learner's use of ICT in their personal lives and their experiences of ICT in education.

1. Global Challenges

1.1 Hardware infrastructures

Developing countries have a significantly lower level of diffusion and use of ICT than in the developed countries (Sharma, 2003). The main obstacles in the growth of e-learning in Iran is not the high price of computers, but rather the lack of government budgets for equipping universities, schools and public places with new computers and suitable hardware infrastructure.

In the case of this study, there is no computer laboratory available in the university's dormitory, and just one public laboratory with 30 computers for all 250 computer engineering students, where 75 percent of the students participated in the study have stated that they have at least one personal computer at their homes among which 45 percent are students living in other cities and have no access to their PCs.

The study shows that 80% of all participants and 100% of student in dormitory suffer from the lack of physical infrastructure especially high-speed internet connection, to carry out their online courses.

Getting computers into universities and institutions is relatively easy but keeping them up and running is a greater challenge. More than 70 percent agree that laboratory coordinators are not skilful enough in resolving technical problems. This is not because of the lack of human resources since the ever-growing computer educational centres provide several courses with different diplomas in various fields of

hardware and software for the interested people. But once again, the main reason here is the lack of assigned funding to keep the labs working.

1.2 Language proficiency, native language content

Language plays an important role in influencing the Internet usage. Since the Internet is dominated by English language content, English speaking countries have a strategic advantage in popularizing the use of the Internet (Xiaoming and Seet Kay, 2004). On the other hand, non-English speaking countries such as Iran face enormous difficulty in tapping the potential of the Internet as an information source. More than 60 percent of student stated insufficient native language content over the web as the main reason they can't use the internet as a reliable source to broaden their learning experience.

Though, there have been great efforts by both governmental organizations and Iranian corporations to compensate for this lack of high quality local content over the web, the rate of growth of such supervised information websites do not fulfil the need of huge Iranian internet users. (Among them websites like roshd.ir -related to the ministry of education- and tebyan.net - a-non profit organization - could be mentioned.) This is mainly considered to be caused by the serious lacks of qualified people, investment, financial resources and entrepreneurial initiative.

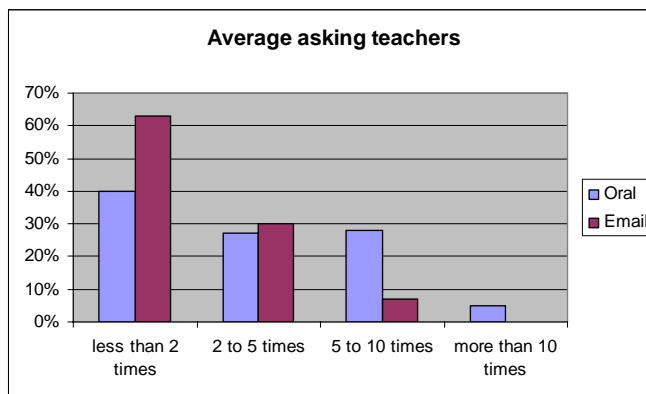


Figure 1. Average Number of Asking Teachers in a Course by Students including Class Sessions for Oral chart

1.3 Cultural attitude and tendency

Students, adapted to teacher-dependent educational system rather than self-directed and motivated, are more comfortable with a teacher-controlled learning as 75 percent of participants preferred the traditional modes of teaching over their new experience. The study can be supported by the idea of Akerlind and Trevitt (Akerlind and Trevitt, 1995) who argue that resistance to change is likely to be greatest when it conflicts with the students' past learning experiences, particularly when it also involves using the technology to foster a more active, self-directed style of learning. As R. Oliver (Oliver, 2001) shows in his study on the role of ICT in higher education for the 21st century, contemporary learning settings now encourage students to take responsibility for their own learning, through technology-facilitated approaches, which is in contrast with the current Iranian students' content-centred curricula.

Also, the study reveals that both students and teachers are not familiar with this new way of communication to solve their problems. More than 70% preferred to ask orally rather than using e-mails to contact their teachers.

The learners believe that except the new and young professors who have completed their P.H.D within the past few years, the ICT role in education is neglected by most of the professors. 30 percent of the students agree that ignorance is one of the core reasons that ICT is less integrated in the educational system. Most teachers don't use ICT in education, though enough computer infrastructures are available for some in major universities in Iran, mostly because they are generally not aware of how ICT can be used in the learning environment.

On the other hand, 60 percent of students believe that some teachers do not have enough time necessary to update their skills, experiment with and exploit opportunities provided by the virtual classes.

2. Student Challenges

2.1 Application of ICT in primary and secondary schools

Iran's current educational system consists of Elementary, Lower Secondary (Guidance), Higher Secondary and Pre-University programs. All public and private institutions are under the control of Ministry of Education and Training.

During the last 25 years, Iran's population has increased dramatically. According to the latest estimates (2006), Iran's population is 70,049,262 (National reports, 2006), and out of that more than 30% are less than 18 years of age (EDUTEX IRAN, 2007). More than 1,200,000 high school students take part in the highly competitive annual national university entrance exam, known as Konkoor, in the hope of getting a better career and a higher social prestige.

Konkoor is a national exam taken in all cities at the same time with the same conditions (about 200 4-choice questions in different areas which have to be answered in a four-hour time), and thus taking Konkoor successfully requires a special set of skills which has become the main goal in pre-university education. Educational institutes or high schools are judged by the number of their successful students in Konkoor (i.e. students who has successfully applied for major universities) This focus on solely having more students applied to universities has affected the secondary education severely, in a way that the use of tools for enhancing the student's educational experience (e.g., ICT tools), are ignored most of the times, despite the fact that motivational impacts of ICT upon learning are broadly similar and positive for both primary and secondary school pupils. (Passey et al, 2004)

Besides, students and educators are different today, in the information age, than they were in the industrial age, and they will continue to change as new ages emerge. (Huebner and Wiener, 2001)

Because of no useful structure for learning, the new ways (such as an online professional development community for schools and teachers) are not workable in schools across Iran. So, the lack of overall policy and poor harmonization of initiatives, and also restricted infrastructure in education have led to randomly adoption of different systems and standards, unnecessary duplication of efforts, and wastage of already scarce resources.

2.2 Learning Effectiveness

Today's networked world demands a workforce that understands how to use technology as a tool to increase productivity and creativity (Hawkins, 2002). But, the real experience of many of the learners, though, is that education is failing to keep up with them and understand what they are doing with technologies. The study shows that although 60 percent of students were satisfied with the new way of learning, they believe that class existence can help them more than virtual classes. A study by Joseph and Bejan (Kizito Bada and Khazali, 2006) also reported that there is a general feeling that face-to-face based learning programme allows learners to interact more closely with the facilitators and there is more value for money. Recognition of e-learning as a viable method is still a major challenge.

There is a huge gap in the contrast between young people's use of ICT in their personal lives and their experiences of ICT in education. Today's learners are having new practical experiences and engaging with new forms of practical learning on a daily basis. This tide of practical learning, because much of it is happening beyond the school walls in bedrooms and on the streets, is difficult to quantify and assess.

Students are more stressful because they are not aware of other students and they also believe that they are not familiar with team work which would be the vital way to reduce their stress. This finding is supported by other studies such as (Hunt et al, 2002), much of the current interest in on-line learning has been driven by its potential to harvest the benefits of collaborative learning through the establishment of learning communities. Group work is thought to facilitate learning in a number of ways. Cohen (Cohen, 1984) found that working with others reduced uncertainty when faced with new, complex tasks and increased engagement with the task. Others have shown how the nature of the interaction between students provides alternative models of thinking and clarification of concepts as they are forced to defend or explain their own views (Sharan, 1980).

Conclusion

The development of the school curriculum and its implementation to the information age does not simply mean taking some specific actions, but referring to the change of the educational system as a whole. The results convinced us that it should include systematic change of organizations, environments, and human

minds as well as physical changes toward the achievement of digital equality and all organization have to work together to make systemic change.

Also, There is the awareness with both the government and private sector actors that the key to a widespread and beneficial diffusion of ICT is to provide local content and produce local products, hence to move from a “network-centred phase to a content centred one”. (ZEF Bonn, 2002)

The study was conducted in the Ferdowsi University of Mashhad, one of the biggest universities of Iran. The future studies should consider different locations in different to get a broader view for generalization of research outcome.

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