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The Possibility Measurement of the Information and Communication Technology (ICT) Application in Teaching-Learning Process

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Abstract: The purpose of this study is to measure the possibility of information and communication technology application in teaching-learning process. The statistical population includes 15000 students, 364 educational factors of pre-university level out of which 372 students and 183 educational factors were selected as the sample population by a Sample Random Stratified method. The method applied in this study is survey type and periodical study. The measurement instrument used in this study is a questionnaire which its validity was confirmed by experts and its reliability was calculated by Cronbach's coefficient which was 0.86. Since, it was >0.6, it can be concluded that the instrument has an appropriate reliability. Statistical method has been done through SPSS and t-test. In this study, the possibility measurement has been studied in five axes (computer literacy, rules and regulations, production of software and educational materials, appliances and hardware deep structures and educational factors attitude).

Key words: Information and Communication Technology (ICT), teaching-learning process, educational factors, the possibility measurement, pre-university period

INTRODUCTION

The entrance of technology on mankind life has influenced human life and formed changes on system of human life (including industry, health, economy, trade, medicine and education) and nowadays, it's almost impossible to live without using information and communication, therefore, the present century can be called as the age of information and knowledge.

Now we are passing through agriculture and industry-based community to knowledge and information-based world in the other words, passing through physical age to cyber age and requisite of living at this age is to know factors, features, deviations, so on of that community.

Education and leaning entity is one of the effective social entities of this age caused by this technology has exposed to changes, transformation and prepared human growth and development. In fact, education is the instigator of development is strictly responsible for training human force and evolution necessities of human.

Therefore, one of the important factors of power at the present age is to dominate on information and communication and also using it in an important and strategic affair of education.

Information and communication technology is increasingly being developed and education event based on information and communication technology is increasingly taken into consideration in communities and educational institutes.

According to Data World Organization in 2009, traditional education rather than modern education based on information and communication technology is ranged between 25-75%.

Education experts believe that traditional and old method of education that is teacher and matter-based one and its purpose is memorization and reliance on memorized things, can't extend learners' skills and supply educational needs of present age.

On the other hand, being low educational quality is constantly followed by educational factors and parents' concern, due to this fact; education couldn't be successful in social reform and reconstruction and obviate available limitations and bottleneck confronting present evolutions. The researches show that on traditional method of education, 50% of learners' learnt matters is forgotten after finishing lessons and also its 80% is almost forgotten after 1 or 2 years (Babaee, 2008).

Also, increasing demand for education proportionate to needs, increasing cost of education ministry, time and local limitations, non-agreement with today needs, science and technology developments and its effect on life, so on are challenging factors that educational experts and specialists face with these problems and it's needed to solve them.

There is no doubt that traditional method of education can't resolve huge extent of demand for education for this reason, electronic literacy movement than customary literacy is raised as treatment to enter in information community.

At 21st century in scope of education by considering public expectation level compared with outputs of educational system and also available decrease and limitations, existence of reform is necessary at school process. In this respect, preference, improvement and investment on education is safe method removing economic, social and enormous planning crisis the majority of world and international organizations focus it. For instance, world conference in Geneva 2003, Tunisia 2005 which considered practical principles and plans and resolutions of reaching policies and plans at national, local and international levels for achieving population based on information and communication technology and knowledge titled as "reform and reconstruction at educational system and evolution of learning-training patterns" can be named (Salimi, 1997).

UNESKO international organization focuses more on necessity of using information and communication technology at learning process by changing new view of education with slogan of learning for living, lifelong education and education for everyone (Fathi and Nasiri, 2005).

According to researchers' reports in 1999, >99% of China teacher training institution proclaimed computer training as a compulsory lesson unit and also in 2000, >18000 teachers were trained by this way. In 1997, 76% of schools used information and communication technology in learning and also 93% of higher education schools in Europe and 100% of Japanese schools are connected to internet and use this technology in learning.

Most experts believe that education in 21st century should pay attention on ability to communicate, group work expertise, critical thinking, compatibility with innovation, creativity and awareness of modern technologies. Therefore, at world conference of science and social liability and higher education in 21st century focused on modern educational views, connection between education and population needs, playing role at producing world knowledge and movement toward electronic learning (Salimi, 1997).

Todays, development at technologies like computer, internet and web inaugurated new ways for teachers to create and increase modern methods of teaching and also achieving it (Atashak, 2007).

The word education based on educational technologies or electronic education was raised by Kraus for the first time. According to this opinion, this education refers to several kinds of education using internet technology to learn materials. Electronic education is considered to be a collection of education activities done by using electronic products including visual, audio, computer and network ones.

Electronic learning is also considered as active and intelligent learning that plays the role at evolution in learning-teaching process to develop, deepen and make learning constant.

Robert Murdoch believes that enormous part of internet will be on service of education in the future and also a research institute stated that in 2204, world growth of economy at the field electronic education reached 1/3 billion dollars as 68% growth.

In an study titled as "psychic machines", Kurzweil predicted revolution by late 21st century. This revolution isn't limited to education but make evolution whole human relationships, in his opinion, in recent years computer will became comprehensive and people will carry computer by themselves. In those years, education will be done by computer, students will carry a computer and its side necessities and learning will be achieved by wireless communication by internet. According to Kurzweils' prediction, we will face simulated teachers at schools and universities in 2019. Intelligent software will be replaced by teacher and lecturer. He also adds that in 2039, learning-based population will be appeared in which machines will teach students without help of human and create new knowledge without them and also human's role at producing knowledge will decrease also machines unlike human transfer knowledge structure from one person to other one. Therefore, computer science experts will intend to create intelligent-teacher systems by the help of psychologists and education experts. Intelligent-teacher systems are computer based training systems that are able to distinguish every student's knowledge (Cozma, 2001).

Researches showed that if technologies are used at the field of education, it will provide efficient and on time access to learning materials.

Cozma believes that computer programs need special features to simulate real life patterns for learner. He adds that computer and educational media don't influence learning and make students learning automatically but it is to design simulated patterns and students' interaction with that pattern that leads to learning more because computer is solely equipment that provide capability of information process and offer education to learners.

Experts consider electronic education as modern approach using web facility to train addressee from a distance.

Anderson apprehends electronic education more than providing learning materials with web and also knows learner and learning process as focus point of electronic learner. He defines electronic learning as follow: learner uses internet to acquire knowledge and construct individual meaning, grow learning experiences to achieve learning materials, make interaction among material, trainer and learner and also gain protection during learning process.

Karol states in future school projects: we will utilize information technology as a tool to design school that our children and grandchildren will learn there. At future school, there will be a computer for each person. All computers are connected to each other so that children can talk to their friends in classroom and also make relationship with overseas.

Bringing real world to classroom is another project that will develop learning area by technology in order students and teachers to be able to interact with every one and every source and to approach learning to life, interests and attentions (Carlos, 1997).

In 2004, Hong Kong performed policy at schools titled as "Empowering teaching-learning through Information and Communication Technology (ICT) at curriculum". Fenland compiled policy 2004-2006 to turn this country into networking community and follow powerful informational knowledge. Measurement need, the possibility measurement and connection between information and technology with the aim of education are some suggested examples at this field.

Investigating educational innovative designs at the field of information and communication technology showed that need measurement, possibility measurement, government financial protection from group cooperation and existing low-high approach are executive supporter of using information and communication technology at education.

Policy of development at information and communication technology at New Zeeland's schools during years 1998-2004 that was raised by cooperating and counseling educational factors of schools with researchers and economic parts of society are representative of this necessity.

Researches of America research institute evaluating information and communication technology at the field of education in developing countries show that information and communication technology cause to reform education and also it is one of important tools of education development in third millenary. The findings of this research indicated that information and communication technology had positive effect on learners.

The findings of this research (Fry *et al*., 2009) in Australia and (Sanchez and Salinas, 2008) in Chili done at the field of the possibility measurement of information and communication technology to execute ICT at education show that technology cause to improve quality of education and remove educational injustice.

This study aims to rise following questions by explaining the possibility measurement of the information and communication technology application to the teaching-learning process:

- How is the computer literacy condition between students and educational factors
- How is the rule and regulation available at schools to apply (ICT)
- How is the electronic-based materials' learning condition among students
- Is condition of hardware infrastructures and related instruments suitable for ICT-based instruction application
- How is students and educational factors' attitude to ICT application at schools

RESEARCH METHODOLOGY

The present research is application and survey study type and periodical type. Statistical population include 15000 pre-university students and 364 educational factors out of which 372 students and 183 educational factors were selected as samples in a random stratified method by Determining Sample Cochran (Table 1).

Measurement instruments of this research is a questionnaire which it validity was determined as 86% according to Cronbach's alpha coefficient (Table 1-5). Since, obtained value is >6 %, it can be concluded that the instrument is suitable valid.

Table 1: Test of determining literacy condition of human resources to apply ICT

Significant level	t-value	Mean deviation	SD	Mean	Numbers	Group
0/000	3/56	1/18	27/12	45/78	525	Sample

Table 2: Test of determining condition of regulation available to apply ICT at teaching-learning process

Significant level	t-value	Mean deviation	SD	Mean	Numbers	Group
0/000	23/6	0/83	19/07	30/18	525	Sample

Table 3: Test of determining condition of producing learning material to start ICT

Significant level	t-value	Mean deviation	SD	Mean	Numbers	Group
0/000	28/81	0/88	20/36	24/39	525	Sample

Table 4: Test of determining condition of existed hardware infrastructures to start ICT

Significant level	t-value	Mean deviation	SD	Mean	Numbers	Group
0/000	22/96	0/82	19/00	30/95	525	Sample

Table 5: Test of determining condition of educational factors' attitude to start ICT at teaching-learning process

Significant level	t-value	Mean deviation	SD	Mean	Numbers	Group
0/000	2/21	7/17	26/98	47/39	525	Sample

The method of statistical analysis: At this study, in order to rank preferences of the possibility measurement needed at investigated indices for Information and Communication Technology (ICT) application, weighted coefficient statistical method was used and also in order to explain qualitative qualities for calculating percent, quantitative qualities for calculating central indices and also data analysis, SPSS Software and t-test were employed. Table 1-5 of t-test related to research questions:

- How is the computer literacy condition of human resources to apply ICT at teaching-learning process?
- How is the regulation available to start information and communication technology at teaching-learning process?
- How is the condition of producing learning material to start ICT at teaching-learning process?
- How is the condition of hardware infrastructures to start ICT at teaching-learning process?
- How is educational factors' attitude to start ICT at teaching-learning process?

DISCUSSION

The results of study show that computer literacy condition and basic expertise needed among students, teachers and executive factors to apply information and communication technology at teaching-learning process are significant and also human and executive factors are ready to apply technology at learning.

The possibility measurement of digital literacy was one of study factors (Sanchez and Salinas, 2008) in Chili that was done to perform ICT for increasing public education quality and removing educational injustice.

The data obtained of statistical test of research question 2 show that regulation and policies condition available in relation to start ICT at teaching-learning is significant. Therefore, it can be concluded that applying ICT at schools and educational institutes is possible by considering existed situation.

To confirm these results, Atashak in addition to considering rules and regulations related to ICT in offices and educational entities, indicates that harmonic and integrated national policies and regulations related to apply ICT in learning is one of challenges directed to execute electronic learning in Iran, therefore distinct national policies to apply ICT at learning should be taken into consideration.

Also, Montazer states that compiled plan based on technology should be existed in Iran. It should be compiled that is it should distinguish that information system of each society has been formed at framework of which technology development model, then suitable investment, decision making center of unit to apply ICT at teaching-learning process can be taken into consideration.

Accomplishing intelligent school plan is in fact higher level of ICT application in country educational system that is based on management and control through computer and network. Also, information and communication application plan at country enormous policies to achieve comprehensive and constant development at the field of information and communication and project of connecting country schools to internet in 1385 are examples of these plans and policies.

In addition to these facts, Iran is traced at 20 years perspective horizon (1404) as society having developed knowledge, being able to create science and technology and also information technology is advised at learning and official process and applying electronic education and providing curriculum proportionate to this approach.

International scientific and cultural organization, UNESCO, provided collection of studies at the field of designing and compiling policies of ICT development at world educational system specially in African and developing countries to promote quality at curriculum. And also, in order to achieve these polices, this organization performed studies at the field of the possibility measurement and measurement need of information and technology in 14 African countries.

Compiling learning policy for information community to develop human force, hardware infrastructures for using ICT in learning matter of Australia or Work of Hong Kong in 2004 by saying slogan "empowering teaching and learning by ICT" to combine ICT with curriculum of schools and also designing strategic policies in 2004-2006 in Finland to turn this country into networking society together with powerful informational knowledge are ICT-based education strategies that are directed to this research.

Producing learning materials and softwares to start ICT at teaching-learning process is another index of

evaluation and research question of the present research. Obtained results indicate that condition of created learning materials and softwares based on information and communication technology is significantly different. ICT-based learning materials are available for learners.

Kurzweil said that in 2009, producing ICT-based learning materials is being comprehensive and also learning is automatically achieved by ICT. According to his prediction, teaching process will intend to use intelligent softwares than teacher and lecturer; therefore if producing lesson materials and educational outputs are proper and suitable, students' tendency to use automatic teachers will be more.

Andersons's research show that if information and communication technology is used to provide learning materials, more efficient and on time access to learning will be easier (Carlos, 1997).

The results of these studies show that producing learning materials and softwares to apply ICT at education plays an important role.

Results of research related to research question 4 at the field of school software infrastructures put this point that condition of equipment and hardware infrastructures to start ICT at teaching-learning process is significant, therefore, condition of telecommunication and hardware infrastructures like other indices of this research is suitable for ICT application at learning trend.

There are several elements in which lacking equipment and hardware facilities to use ICT at teaching-learning process is raised. The first on is computer calculation center unit that its speed should be high to be able to do a hundred thousands of billion calculation instantly. The second element is memory with enormous three dimensional capacities that can save so high information. It needs laser memory or molecule memory having hardware facilities to save related information. Third element is instrument transferring data from one point to another and one computer to another one with extra high speed through wire or wireless network. Optic fiber is the best instrument to transfer data endless band width.

Research has shown that hardware proportionate to information and communication technology can accelerate place changes at educational technique that is available at the core of educational reformations in 21st century. If protected teaching of information and communication technology is designed by well and suitable hardware, it can promote gaining skills and science needed for students' life-time learning. Therefore, it should be attempted to develop telecommunication and technical infrastructures for applying information and communication technology at learning process, so that now per capita average of band width dedicated to each student in country is 33 b sec^{-1}, although, this matter is 2 mb sec^{-1} in developed countries.

Studies show that at ICT development, investment and hardware equipment is more efficient way to use ICT at learning process.

Studies among 30 European countries at elementary period in relation to the possibility measurement of hardware and equipment show that 100% of elementary schools in first sex countries, 90% of same schools in 15 countries and only three countries out of these countries are equipped to internet network and suitable hardware equipment (Roger, 2007).

Data obtained of statistical test of research question 5 at the field of educational factors' attitude about technology application at teaching-learning process indicate that condition of executive and educational factors' attitude (students, teachers, executive factors) to apply ICT at teaching-learning process has significant difference and proportionate to measure ICT but it was close to in-between limit compared with other evaluated factors.

Studies proved that ICT in Malaysia is considered to be potential powerful instrument to develop educational opportunities. Also, ICT provided non-simultaneous learning possibility and prepared present generation for better future occupational surrounding.

The results of other research administered on students of 462 schools in USA show that majority of school teachers provided ICT-based learning environments.

The studies fulfilled in 1992-1998 on students and teachers of elementary period in 16 world countries show that while students utilize ICT at learning matter they succeeded to do complicated activities like evaluation difficulties, compliment of suitable questions and cooperate with friends and their learning was accompanied by motivation and self-confidence.

Thai researchers concluded that teachers and students' attitude to apply ICT is increasingly developed. Students and teachers obligated themselves to use web as learning instrument (Tisas, 2001).

In Malaysia, the results of research on education based on mobile through message show that this technology leads to quick learning transfer and promoting learners' motivation to use ICT at learning matter (Azian and Abdullah, 2006).

ICT application is vital at whole fields of life specially at learning process, therefore, according to obtained results of the present research, suggestions can be provided to improve educational procedure and promote this trend including as follow:

- Teaching the seven skills (ICDL) to educational factors and students at whole academic periods leading to promote computer literacy quality is getting constant and completely supervising its trend. In this regard. Obligating collogues to have Electronic Mail (E-Mail) to send and receive official and educational data can help promotion of this trend
- Focusing on production and design of electronic materials, directing students toward using non-paper test and prepare electronic lessons like power point can promote students' motivation to apply ICT learning process
- Equipping and developing schools and educational centers with update hardware technology and promoting it based on needed standards and applying it in classrooms can spread background of applying intelligence-based design
- Promoting students' motivational principles to apply ICT at learning process with providing assignments and research projects based on electronic education can be possible
- Doing this research at other educational periods and regions can recognize strong and weak point of this matter at learning process

CONCLUSION

The findings showed that the application of ICT in the studied population was significant to apply ICT to teaching-learning process considering (computer literacy, rules and regulations, production of and educational materials, software and hardware deep structures, educational factors attitude) and it is prepared to be done.

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