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# STUDYING THE PREREQUISITES OF ESTABLISHING LEARNING BASED ON INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN EDUCATIONAL SYSTEM

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**ABSTRACT**
The goal of the present study is to investigate about the prerequisites of the establishment of learning based on information and communication technology (ICT) in Eastern Azerbaijan province in 2012-2013 school years. The population studied in this research was comprised of high school students including 74000 students. From among the whole population, 760 students were selected as our sample using Cochran's sampling table and there were 380 boys and 380 girls in the final sample that was selected using multiple stage clustering method. The research method was descriptive and a questionnaire was used to measure the variables and its reliability was calculated through Cronbach's alpha coefficient amounting to 0.86. Also the statistical analysis was carried out using SPSS software and t test. The results of research findings showed that computer literacy, the existence of administrative and encouraging regulations for students, hardware infrastructures and technologies accessible for students in schools, the current electronic content and the outlooks of students towards using information and communication technology in learning process that has been considered as a prerequisite for the establishment of learning based on ICT, have had meaningful effects.

*Keywords: Education based on ICT, Learning Process, Educational System, Eastern Azerbaijan*

**INTRODUCTION**
The entrance of computer into human life and the speed of ICT development caused an easy access of human beings to information and knowledge. This has also caused revolutions in all aspects and perspectives of life, industry, economics, sanitation, business, and education. Now, the world is approaching a destination through which most affairs in everyday life would be dependent on computer skills and following that education and the educational systems in the society would be crucially different from the one in the past because nowadays the capability in knowing information technology and communication and its exploitation in the strategic field of education is considered as one of the authority elements and teaching based on knowledge is developing exceedingly. Educational scholars believe that the traditional and ancient method of teaching based on teacher-oriented principles and subject oriented ones and rote learning through which the memory was filled by rote learning cannot develop the skills of learners anymore and satisfy the training needs of the current era. The studies carried out showed that in traditional educational system, 50 percent of what learners have learned is forgotten after education is over, 80 percent is gone after one year, and after two years almost all their learning is forgotten (Shekari, 2007). Also increasing demands for a novel and active education are challenging factors that confine traditional education systems. Thus, its status is going to lose its dominance exceedingly (Babaei, 2008). According to the Global Organization for the data in 2009, the traditional educational trends have been active in %25 of cases compared to novel educational methods based on technology occupying %75 of the educational system (Zare, 2008). Undoubtedly, life changes in 21st century have deemed the requirement of engineering and reforms in educational fields necessary due to the higher expectation levels of the public towards the outcomes and inefficient outputs and the faults in it. Therefore, the priority and optimization and investment in educational systems is considered as a reliable system to remove economic, and social crises and to do macro-planning which are emphasized by many of the global and international organizations. For example, the world assembly in 2003 in Geneva, and 2005 in Tunisia have stressed on practical principles and planning and the realization guidelines of policies and

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plans in international, regional, and national levels to realize a society based on knowledge and information and communication technology entitled as: "the reform and reestablishment in educational systems and revolution in learning and educational patterns" (Ebrahimabadi, 2009). Therefore, United Nations Educational, Scientific and Cultural Organization (UNESCO) tries to change the approaches used to establish a new educational system aiming at learning for living, life-long learning, education for all, and the requirement of utilizing ICT in learning process (Salimi, 2004). Computer-oriented education is a new type of educational system that is aimed at exceeding the speed of organized teaching and learning to enable human beings to process and categorize and optimal use of the technological resources of knowledge in today's life. The development and use of ICT in educational systems are considered as structures to change the educational systems that foster the presentation and receipt of educational contents in different time and location intervals and they create new ways in increasing efficiency, quality, and the elimination of limitations in traditional educational systems (Soltanzadeh, 2006). Solomonidou (2005) believes that the students' access to ICT in life and educational environments can transfer a positive outlook to use technology in learning process and can result in achieving the required skills in this field. Hawi (2010) emphasized that today most schools try to present a vast spectrum of syllabus materials and educational contents in the form of CDs, software, Discs, internet and … to achieve the highest advantages in learning. Technology prepares equal opportunities for the students individually and in groups. Thus, knowledge about ICT and computer literacy and its application will help students in novel educational approaches in 3rd millennium in increasing their capability to establish relations, gain skills in group working, the achievement of skills in innovation, critical thinking and … .Lam (2009) stated that using ICT by the students in learning process results in their self-esteem in classes, group relationships, and doing difficult educational projects. The studies carried out by Fery (2010) have had a similar result and accordingly the stress and tension among girl students while teaching, testing, and other educational processes in the absence of ICT are reduced by using technology based education. This is due to the fact that girls are active personally during learning activity by the help of technology and achieve acceptable self-learning levels. Undoubtedly ICT is a powerful tool to develop equal educational opportunities formally and informally for races, women, girls, drop outs, and … . The development of ICT among students, teachers, and educational agents prepares the appropriate grounds to exchange information and education rapidly and creates a better learning opportunity for them. Currently technology based learning has appropriated an important part of the decisions by planners and policy makers in educational fields to itself and surely fostering such a development will result in fundamental changes in educational processes and it will remove many of the problems and deficiencies of the traditional methods (Chen, 2005). Studies have shown that more than %96 of educational institutes in America utilize educational methods based on technology and it is predicted that in 2015 the highest amounts of business will be appropriated to learning based on ICT (Sharma, 2007). The implementation and utilization of educational system based on ICT has reduced educational expenses of learners tremendously due to great flexibilities and it removes time and location distances and prepares equal opportunities for learning (Rahmanpour, 2008). Regarding that the educational authorities follow the implementation and establishment of learning based on technology in educational institutes seriously, the goal of the present research has been to study the readiness of girl students and boy students regarding computer literacy, administrative rules and regulations, the existence of hardware technology, the existence of electronic education contents, and the attitudes of students towards these issues as the prerequisite factors in establishing learning based on ICT. The questions in this research are as follows:

1- Is the computer literacy status of girl students and boy students appropriate to establish learning based on ICT?

2- Are the rules and regulations dominating girl schools and boy schools appropriate to administer learning based on ICT?

3- Is it possible for girl students and boy students to access computer and the tools required for administering learning based on ICT?

4- Is electronic education content accessible for students?

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5- Is the outlook of girl students and boy students positive towards learning based on ICT?

## MATERIALS AND METHODS
### Research Method and Measurement Tools
The measurement tools to collect data have been questionnaires whose reliability has been approved by the scholars in the field and the validity has been calculated using Cronbach's alpha coefficient. The amount achieved for reliability was 0.86 and it has been a proper level of reliability. The present study has been an applied one and a measurement study. The statistical population for the present study was girl students and boy students of the second high school period in Eastern Azerbaijan province in 2012-2013 school years including 74000 students and that was comprised of 41800 boy students and 31200 girl students. The statistical sample of the present research has been determined to include 380 girl students and 380 boy students by using the sample determination table devised by Cochran. The sampling was done by using a clustering method and the percentage calculations, and averages were carried out through descriptive statistics and data analysis was carried out by using SPSS software and t test.

**Table 1: The statistical sample based on gender and major**

| Gender | Education major Mathematics | Experimental sciences | Humanities | Total |
|--------|------------------------------|------------------------|-------------|--------|
| *Boy* | 143 | 112 | 125 | 380 |
| *Girl* | 96 | 141 | 143 | 380 |
| *Total* | 239 | 253 | 268 | 760 |

### Descriptive Data Analysis
*Comparing Sample Groups*

**Table 2: Comparing sample groups based on research variables**

| Factor | Group | N | Average | Standard Error | Standard Deviation | t | Sig |
|--------|-------|---|---------|----------------|--------------------|---|-----|
| Computer literacy | Girls | 380 | 46.51 | 24.21 | 2.19 | 0.395 | 0.000 |
| | Boys | 380 | 45.48 | 27.32 | 1.40 | | |
| Rules and regulations | Girls | 380 | 27.06 | 17.21 | 0.89 | 6.03 | 0.000 |
| | Boys | 380 | 37.77 | 21.10 | 1.71 | | |
| Hardware infrastructures | Girls | 380 | 27.93 | 17.54 | 0.90 | 5.84 | 0.000 |
| | Boys | 380 | 38.28 | 20.43 | 1.65 | | |
| Electronic content production | Girls | 380 | 33.25 | 20.13 | 1.62 | 6.649 | 0.000 |
| | Boys | 380 | 20.75 | 19.33 | 1.00 | | |
| Attitudes of educational agents | Girls | 380 | 46.51 | 23.02 | 1.45 | 2.50 | 0.012 |
| | Boys | 380 | 51.96 | 28.15 | 1.86 | | |

By observing the averages in groups and t gained from the data and regarding the meaningfulness level of the research variables among the groups we can conclude about the status of the prerequisites to establish the application of ICT in teaching and learning process in the population under investigations in this research.

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*The Descriptive Analysis of the Test*

**Table 3: Status identification test for research variables to implement learning based on ICT**

| Factor | Group | N | Average | Standard Error | Standard Deviation | t | df | Sig |
|---|---|---|---|---|---|---|---|---|
| Computer literacy | Students | 760 | 45.78 | 27.12 | 1.18 | 3.56 | 759 | 0.000 |
| Rules and regulations | Students | 760 | 30.18 | 19.07 | 0.83 | 23.6 | 759 | 0.000 |
| Hardware infrastructures | Students | 760 | 24.39 | 0.88 | 20.36 | 28.81 | 759 | 0.000 |
| Electronic content production | Students | 760 | 30.95 | 0.82 | 22.96 | 22.96 | 759 | 0.000 |
| Attitudes of educational agents | Students | 760 | 47.39 | 7.17 | 26.98 | 2.21 | 759 | 0.027 |

By observing the test results we can conclude that the research questions about computer literacy, the existence of administrative and encouraging regulations for students, hardware infrastructures and technologies accessible for students in schools, the current electronic content and the outlooks of students towards using information and communication technology in learning process that has been considered as a prerequisite for the establishment of learning based on ICT, have had meaningful effects.

*Discussion and Conclusion*

The results gained were accorded with local researches carried out by Bagherzadeh (2006), Jaafari (2007), Fathi *et al.,* (2005), and Kamalian *et al.,* (2009) and similar goals have been achieved regarding the meaningfulness of computer literacy for the application of ICT in learning processes.

Digital literacy has been one of the variables in a study by Sanches (2008) in Chile aiming at the administration of ICT to help increasing the public education quality and removing the educational injustice and it has accorded with results gained in our study.

The existence of rules and regulations in schools has been among prerequisite factors to establish learning based on ICT and its meaningfulness has been approved.

Atashak (2007) considered it necessary to establish the same rules and regulations in educational centers to use ICT in his research paper and has considered it as one of the overall educational strategies. The administration of smart school program and ICT program in educational centers and having the same rules and regulations requires cooperation (Mohbali, 2007).

United Nations Educational, Scientific and Cultural Organization (UNESCO) has presented some studies regarding the designing and devising policies and strategies for ICT development in educational systems worldwide in African and in developing countries aiming at enhancing the quality in syllabus programs and the teaching processes in all educational levels (UNESCO, 2002). And it has started to carry out researches regarding the possibility and needs analysis of ICT in 14 African countries (UNESCO, 2006).

Studies have shown that having hardware tools and equipments such as computers, video-projectors, educational software, aid educational CDs, access to internet and … can improve the trend of using information technology in teaching (Atashak, 2007). Also Montazer (2007) has remarked that there should be a regular program devised in Iran based on using technology. This means that it should be identified that which technology development model should be formed to improve information system in our country to start appropriate investment, and establish unified decision making in order to move forward in ICT use in teaching and learning processes within our country.

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The experts believe that the ICT protected education, along with appropriate and advanced hardware in schools can help learners in achieving knowledge skills, and practical skills required and it enhances life-long learning in our society. The devising of learning strategies for the information society aiming at developing human forces in Australia by using hardware infrastructures to exploit ICT in learning issues, or the program administered in Hong-Kong in 2004 announcing the strategy of: "enabling learning and teaching through ICT", to aggregate ICT and curriculum in schools and the strategic program in Finland in 2004 and 2006 aiming at changing that country into a network country with a strong information knowledge to implement a developed and pioneering educational system are among those to be considered in our country to establish educational strategies based on ICT that accord with aims in the present study.

Research has shown that the education supported by ICT along with appropriate hardware can enhance knowledge gaining and skills needed for life-long learning of students. Accordingly we should try to develop technical infrastructures and telecommunication facilities to administer ICT in learning process in a way that the per capita bandwidth appropriated for each student in the country should be 300 b/s, while it has been 2 mb/s in developed countries (Fattahian, 2007).

Studies by Rogers (2007) among 30 European countries in primary schools regarding hardware, and equipment supply possibility showed that %100 of primary schools in first 6 countries, %90 of the same level schools in 15 countries, and only 3 countries have had less than 0.9 access to internet and hardware equipments.

Studies by Sobhaninejhad (2006) have shown that hardware equipments and investment on equipments and development of technology can help the implementation and application of ICT based education greatly.

The production of educational content and software to implement and establish ICT in teaching and learning process is another assessment index and research question in the present study. The results found showed that the status of educational content and software produced have been meaningful regarding the accessibility for the learners.

Kezroil stated that in 2009 the production of educational contents based on ICT has been generalized and learning has been realized in the form of self-actualization. Based on his prediction the process of education is approaching towards using smart software instead of teachers or instructors and therefore if the production of textbooks and educational products are efficient and useful and increase daily, the students would tend to use automatic teachers more (Attaran, 2007).

A research carried out by Anderson showed that if ICT is used to present educational contents, there would be more efficient and more in time developed access and learning would be easier (Anderson, cited in Zamani, 1995). The results of these researches showed that the production of educational contents and software has a sensitive and key role in ICT application.

The data gained from the statistical test of the research question (5) regarding the outlooks of students to implement learning aided by ICT showed that the attitudes of students towards the administration of ICT has had a meaningful effect on teaching and learning processes and it is appropriate to be discussed here, but it has had a medium effect compared to other factors assessed.

Studies have proved that ICT has been a potential powerful tool to develop educational opportunities and it makes non-simultaneous learning possible. Also the present generation is prepared for the future work place and job better (Lie, 2008). Results of a research on 462 students of a school in the United States showed that most teachers have tried to prepare a learning environment based on ICT (Means, 1995).

Studies carried out on teachers and students in primary school in 16 countries throughout the world showed that from the time the students start using ICT in education, they have been successful in managing complex issue such assessment problems, devising appropriate questions, and cooperation with peers and friends and their learning has accompanied incentives and self-esteem (Robert, 2007).

Researchers in Taiwan have concluded that the tendencies of students and teachers to utilize ICT are increasing daily and students and teachers oblige themselves to use web as an educational tool (Tisas, 2007).

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The result of a research on education based on mobile through SMS in Malaysia showed that this technology has transferred learning quickly and the learners' incentives have been promoted to use ICT in learning more (Aziant, 2009).

Fairle (2005) believed that using computer transfers a positive outlook towards using information technology in schools among high school students.

Hatch *et al.,* (2004) showed that using information technology has resulted in developing cooperative learning of students and this smoothen research and operations in learning process.

Results of all these studies make it clear that ICT is present in all aspects of life and is almost one of the most important conditions of survival in this era.

Due to the results in this research, the following suggestions can be posed to help and develop the speed of implementation of learning based on ICT in schools and educational entities.

1) Regarding the results gained there is a smart plan administration in high schools.

2) The reinforcement of the incentives of students to apply ICT in educational process by presenting homework and research projects to implement it.

3) Emphasizing at designing and producing electronic content, leading students to use paperless tests and presenting courses in electronic format promotes the incentives o students in utilizing ICT in educational process.

4) Students should be guided to do administrative jobs, office jobs or distant learning to help the implementation and development possible.

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