IDENTIFICATION OF EFFECTIVE COMPUTER AND TECHNOLOGY FACTORS AND BARRIERS IN DISTANCE LEARNING

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ABSTRACT

The present research has been conducted aiming at identifying effective computer and technology factors and barriers in distance learning via field method. The statistical population consists of all the scholars at the area of distance learning in Tehran and universities throughout Tehran, of which 50 individuals were selected as the target sample via purposive sampling method, mentioned that 29-item questionnaires were given to them to identify the effective computer and technology factors and barriers in distance learning. The face and content validity of questionnaire was confirmed by professors at the department of distance learning and the reliability of questionnaire to estimate internal consistency of items was implemented on 30 individuals in target sample, whereby the Cronbach's alpha (0.88) indicated the high internal consistency in items. To sum up, inferential statistics methods including one-sample t-test have been used to analyze data. The research process was followed through four research questions using the titles including personal, economic, cultural-educational and infrastructural factors for exploitation from technology and computer in development of distance learning, that the scholars specified all the factors that can be fundamental in development of distance learning.

Keywords: Technology, Computer, Development, Distance Learning

INTRODUCTION

In today’s world, education systems have common and different challenges in modernization of learning. Experience of countries indicates that use of different technologies in learning results in acquisition of powerful tools to increase the capability for continuous improvement of learning, development of learning opportunities, expansion of access to learning, improvement of staffs’ efficiency, improvement of quality of learning, improvement of educational planning and management systems, creation of areas for continuous learning, representation of virtual learning and continuous learning. Education systems seek modern approaches with the ability for adjustment in exposure with world extensive developments. Without doubt, enriched curriculum, flexible learning, educational leadership, effective learning environment, the educational content beyond existing structures, competent instructors and the powerful schools are required for modernization of learning (Keegan, 2006). Nowadays, students and adolescents face a world which is subjected to numerous changes. A world, in which technical knowledge doubles in size per 5 years, refers to a social network which constantly keeps changing. Work conditions and the required professional abilities keep changing (Bayir et al., 2009). In the past, social changes were brought about so slowly beyond the lifetime of the individuals living in the community, which any person used to observe just a part of change process (Nasiri nia & Fahimi, 2006). The evolutionary processes in today's world change as rapid as possible that the youth will inevitably face them during their life. On one hand, a huge effort has been made to equip the schools, create internet position and access networks to data of education center and information systems in line with learning-teaching process; on the other hand, taking a thorough seriousness in regulation of rules and standards of development of education networks and collaboration of private sector with schools throughout country, a particular attention has been paid to spread of computer skills among instructors and modification of planning system under development of education (Montazari, 2003). In this regards, most of driving forces contributing in information technology play a potential role as the factors resulting in acceleration of process of development including policy making, technology, change of attitude and so on (Jong, 2008). Yet, other potential factors such as infrastructure, manpower, investment, institutionalization and
information content undergo deterrence state in development (Asnafi & Hamidi, 2007). Hence, in depiction of development visions in education networks under the concept of harmony between all education applications and the necessity for positive effectiveness of all driving forces of information technology, a special attention must be drawn into selection of position and a variety of missions in these computer networks, so that such thing results in improvement of current status of ICT development in education center (Ibid, 2007). In general, development of educational computer networks can be defined at three areas of learning-teaching process at schools, virtual infrastructure for tuition, and distance learning (Farhadi, 2004). It is obvious that distance learning centers develop their own education system during time through acquisition of knowledge and accumulation of experience, in which standards of curriculum planning, design content and teaching methods are based on type of media, educational support, evaluation and control of what learnt. Under such conditions, it can consider modern tools and development of use of information technology without serious damages to generality of education system under process of distance learning. Process of distance learning due to place and time gap between learner and instructor relies on continuous activities on one hand and requires for efficient and self-learning educational tools and resources (Asadi & Karimi, 2007). The key element in progress of modern communities is under rule of education center. If an education system engages in theoretical discussions and continues its way sustaining on inefficient and old methods, all dimensions of community will face a comprehensive recession. Hence, development of distance learning in education system seems vital, that under the current facilities and conditions, there is no way except for development of distance learning, deducing that emergence of extensive communication networks including internet besides advanced educational tools and facilities causes development in educational methods, so as to put a wide range of knowledge seekers throughout the world under coverage of educational network for the purpose of implementing specialized and academic trainings without any need to attendance in classrooms (Pollard and Pollard, 2005). Hence, accordingly, there are some barriers to progress in distance learning that must be scrutinized so as to transform the threats to opportunities for providing the areas for expansion and development of such learning in line with evaluation of existing status and measurement of problems and barriers. These barriers and problems must be examined in a multifaceted aspect from personal, economic, cultural and educational perspectives. Therefore, with regard to what mentioned above, the main problem of the present research is proposed in this way: what effective computer and technology factors and barriers exist in distance learning?

**Literature Review**

Moghadam & Sarkararani (2004) conducted a research entitled "learning based on network and innovation in distance learning" aiming at elaborating process of distance learning through information and communication technologies. This article has examined effect of information and communication technologies on expansion of distance learning courses. Then, it has examined role and process of distance learning and teaching based on changes in technology and transformations at higher education system. This article has introduced some of the most important distance learning methods through network and discussed on the developments raised in learning adults and their professional education programs through new methods by exploitation from modern technologies. Then, it has analyzed social nature and strategies of distance learning from different aspects especially cost -benefit analysis.

Fardanesh & Farahani (2003) conducted a research entitled "distance learning as a new approach in physical education practices and programs", that the results of this research indicate that students involved in distance learning have acquired higher education performance in theoretical lesions with nature of human science and basic science despite higher scores of students who come and go in education center. A significant difference has not been observed between two groups in practical lessons. Anyhow, there are few studies at this area that each knows distance learning as an absolute principle and modern approach in development of learning.

Razavi Ibrahimi & Abyarjo (2011) conducted a research entitled "representation of a framework to evaluate areas of information technology in distance learning universities (case study: Payame Noor University)" and concluded that today concept of distance learning has changed due to numerous
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developments which have occurred at the area of information and communication technologies. The distance learning associations and organizations are required for recognizing capabilities of this technology and planning to achieve useful achievements so as to achieve competitive advantage and propose high-quality services and acquire higher position. Yet, planning and designs will come beneficial when they have been measured based on an evaluation system and their defects have been resolved. In evaluation process, a particular attention must be paid to all aspects considering aims and strategies of organization. Balanced scorecard is one of the useful techniques at this area which draws a particular attention to other organizational dimensions such as learning and growth, domestic processes and customer satisfaction in addition to financial problems and proposes a balanced framework from important organizational dimensions. This research proposes a framework to evaluate information and communication technology in distance learning through the balanced scorecard. In this framework, in addition to common views of balanced scorecard, a new view entitled cultural view is proposed. In addition to aforementioned aim, the present research seeks to propose a qualitative relationship between use of information technology and cultural improvement. Abdoljabar (2011) has conducted a research entitled "effects of globalization on distance learning (case study: Payame Noor University)" and stated that globalization refers to an inevitable process which influences all dimensions of human life. Emergence and expansion of distance learning with an emphasis on digital technologies which provide the possibility for distance learning as well as expansion of demand for higher education at all age groups and assistance for expansion of equal opportunities in access to higher education keep growing in today's communities. In Iran, in addition to the aforementioned factors, due to overpopulation of young generation and increase of demand for higher education, Payame Noor University as the main trustee started working since 1984. This research aimed to examine effects of globalization on Payame Noor University so as to specify the barriers to reach to the favorable status, strategies and requirements to reach to favorable status under influence of the changes under globalization. This research has been conducted through qualitative and quantitative method. Grounded theory has been used in the first section and survey has been used in the second section. Results indicate that there is not an alignment between current status of Payame Noor University and trend of globalization, yet there are suitable educational, social, international and technology capabilities in this university that it can achieve a favorable status in sake of educational method, educational philosophy, policy making, educational technology and international interactions by use of suitable strategies including revision of processes, development of programs based on distance learning, development of human resources, improvement of communication technologies and learning-teaching methods under overcoming social, educational, legal and technical limitations. On the whole, theoretical and empirical analyses indicate that it can overcome the challenge over poor equation in distance learning in this university through modern educational approaches and providing technical infrastructure and manpower and assist for practicability of education at all places and times in meeting all the social needs.

Theoretical Framework

Since ancient period in Greece, the man has engaged in knowing technology. The term "technology" has been developed from techne (skills and techniques) and logos (speech and word) used as display of arts of applied technology and modeling. During two thousand years ago, the man's understanding from technology has widely changed. In ancient Greece, vision of technology has changed to a large extent. This extent encompasses all the things including techniques of agriculture and traditional medicine to the techniques of politics and art.

The most prominent view in ancient Greece can be found in works of Plato, one of the greatest philosophers of ancient Greece. It has been mentioned in the book "defaiat" that technology encompasses production technology and acquisition technology. Acquisition technology includes technologies for learning, acquisition of knowledge, productivity, technique of hunting, yet production technology encompasses practical production technology or production technology for art and handicraft techniques. Practical production technology includes techniques of agriculture, traditional medicine, techniques of construction (Rosenberg, 2006). Kohen (1970) believed that the science advancement model refers to
development from a pattern to another pattern. Information technology refers to a new pattern that is used at all areas, causing a big change in the world through creating other patterns and providing the possibility for an education well suited with the needs at current age.

People's increasing needs to education, lack of their access to educational centers, shortage of economic facilities, shortage of skilled instructors and high costs paid for education obliged the experts to invent new methods for education through information technologies so as to train a majority of learners. Technology in distance learning is accounted as a sub-set of a learning program. Distance learning might use variety forms of technology so as to let the learners to achieve their educational aims within organization in a successful way.

Although technology increases the possibility for rapid access to information, it is not accounted as a distance learning (Asgarpoor, 2004). In distance learning, the educational contents are proposed through different methods, including the preliminary methods to use of radio, television, video, computer and internet. Since the 1990s, the distance learning has supplied in a wide extent to internet environment, including the programs which are both close and open.

Open programs are called in this way that exempt the citizens from involvement in educational institution and close programs are called in this way because how the contents are supplied is limited to internet. Yet, it should be noted that some of educational courses are proposed both open and close regarding their contents (Keegan, 2000).

The advantages in distance learning include:
1-lack of place limitation, 2-lack of time limitation, 3-no limitation in admission capacity, 4-considering personal talents, 5-expansion of culture of independent learning, 6-employing skilled professors at wider ranges, 7-the possibility for adjustment and optimization of classrooms and consultation with personal needs, 8-flexibility in modification of content, 9-increase of speed at learning, 10-non-educational advantages, 11-assisting for protection from environment, 12-reduction of traffic, 13-reduction of air and noise pollutions, 14-reduction of need to physical space.

Concept of Flexibility in Learning through Use of Information and Communication Technology and Development of Distance Learning

Flexibility in learning implies diversifying how to access the learning from qualitative dimension and breaking the barriers of time and space. In traditional learning method especially in organizing methods for subject-based curriculum, students get present in classrooms at determined hours based on the predetermined aims, that is, the classrooms start and finish for all the students at the same time.

Information and communication technology in higher education is required for flexible learning. Information and communication technology refers to a concept which attributes to different relationships between institutions, faculty members and students. Through information and communication technology, faculty members should bring about fundamental changes in their attitudes towards learning and teaching as the tools for transfer of information (Ramsden, 1997). Information and communication technology refers to a different series of technology tools and resources which are used to communicate, create, disseminate, store and manage information. In addition to role of knowledge and information, a particular attention has been paid to role of communication as the tools to transfer information and communicate between two sectors of information and technology. To use information and communication technology in learning, it must consider three stages: selection of information and communication technology, adjustment with existing conditions, and bringing about change by the help of information and communication technology (quoted from Razavi Ibrahimi, 2011). Information technology can cause individual learning and tendency towards areas, talents and special characteristics by considering personal differences and different educational approaches. In point of view of Blum, what a person can learn in the world, all the people can learn it in case suitable conditions are provided (Ataran, 2003). Montazar (2004) has mentioned the factors below essential to achieve cohesion and success in use of flexible learning, using the indicators proposed by UNESCO:

- formulation of the policy to use information technology in learning
- formulation of a comprehensive plan for development of information technology in learning
- the necessity for allocation of sufficient budget to develop information technology in learning
- the authority to implement comprehensive plan for information technology in learning, creation of a mechanism for monitoring and evaluating implementation of comprehensive plan for development of information technology in learning
- creation and development of an infrastructure for transfer of information throughout the country between universities and research centers to create a scientific network throughout the country
- management of scientific network and representation of content for it through creation of national infrastructure and facilitation of access to academic sources existing in libraries, books and theses, and improvement of quality of search, increase of exploitation
- development of international collaborations to enhance educational and research areas
- development of a scientific network to develop information technology as one of the necessary tools to accelerate and regulate the process of academic information affecting development of knowledge and technology in Iran's industrial and scientific research organization.

**Aims of Research**

**Major Aim**
- Identification of effective computer and technology factors and barriers in Distance Learning

**Secondary Aims**
- Identification of personal factors and barriers in use of computer and technology concerning development of distance learning
- Identification of economic factors and barriers in use of computer and technology concerning development of distance learning
- Identification of cultural-educational factors and barriers in use of computer and technology concerning development of distance learning
- Identification of infrastructural factors and barriers in use of computer and technology concerning development of distance learning

**Research Questions**
1-what are personal factors and barriers in use of computer and technology concerning development of distance learning?
2-what are economic factors and barriers in use of computer and technology concerning development of distance learning?
3-what are cultural-educational factors and barriers in use of computer and technology concerning development of distance learning?
4-what are infrastructural factors and barriers in use of computer and technology concerning development of distance learning?

**Research Method**
The present research has been categorized as a field study regarding nature of research. The statistical population consists of all the authors and practitioners at the area of distance learning, of which 50 individuals were selected as the target sample via purposive sampling method, mentioned that 29-item questionnaires were given to them to identify the effective computer and technology factors and barriers in distance learning.

The face and content validity of questionnaire was confirmed by professors at the department of distance learning and the reliability of questionnaire to estimate internal consistency of items was implemented on 30 individuals in target sample, whereby the Cronbach's alpha (0.88) indicated the high internal consistency in items. To sum up, inferential statistics methods including one-sample t-test have been used to analyze data.

**RESULTS AND DISCUSSION**

**Findings**
1-what are personal factors and barriers in use of computer and technology concerning development of distance learning?
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Table 1: One-Sample T-Test for Personal Factors and Barriers in Use of Computer And Technology Concerning Development of Distance Learning

<table>
<thead>
<tr>
<th>Item</th>
<th>DF</th>
<th>Mean</th>
<th>T</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not having sufficient knowledge in use of computer and technology</td>
<td>49</td>
<td>4/24</td>
<td>8/60</td>
<td>0/000</td>
</tr>
<tr>
<td>Resistance against the change due to use of computer and technology</td>
<td>49</td>
<td>4/11</td>
<td>7/22</td>
<td>0/000</td>
</tr>
<tr>
<td>Not having sufficient skill in use of computer and technology</td>
<td>49</td>
<td>3/50</td>
<td>7/52</td>
<td>0/000</td>
</tr>
<tr>
<td>Weak motivation in use of computer and technology</td>
<td>49</td>
<td>3/38</td>
<td>7/48</td>
<td>0/000</td>
</tr>
<tr>
<td>Negative attitude towards technology and computer</td>
<td>49</td>
<td>3/27</td>
<td>6/31</td>
<td>0/000</td>
</tr>
<tr>
<td>Lack of dominance on English language</td>
<td>49</td>
<td>3/20</td>
<td>5/24</td>
<td>0/000</td>
</tr>
<tr>
<td>Negative attitude towards technology and computer</td>
<td>49</td>
<td>3/15</td>
<td>2/94</td>
<td>0/000</td>
</tr>
</tbody>
</table>

According to the results from table 1, from point of view of scholars at the area of distance learning, personal factors and barriers in use of computer and technology concerning development of distance learning include:
- Not having sufficient knowledge in use of computer and technology
- Resistance against the change due to use computer and technology
- Not having sufficient skill in use of computer and technology
- Negative attitude towards technology and computer

Therefore, it can conclude that the hypothesis over aforementioned factors and barriers in use of computer and technology concerning development of distance learning is confirmed at 95% confidence level.

2-what are economic factors and barriers in use of computer and technology concerning development of distance learning?

Table 2: One-Sample T-Test for Economic Factors and Barriers in Use of Computer and Technology Concerning Development of Distance Learning

<table>
<thead>
<tr>
<th>Item</th>
<th>DF</th>
<th>Mean</th>
<th>T</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>High cost in use of internet</td>
<td>49</td>
<td>4/04</td>
<td>6/46</td>
<td>0/000</td>
</tr>
<tr>
<td>High cost of skill learning</td>
<td>49</td>
<td>4/01</td>
<td>6/23</td>
<td>0/000</td>
</tr>
<tr>
<td>High cost of purchasing educational contents</td>
<td>49</td>
<td>3/49</td>
<td>5/73</td>
<td>0/000</td>
</tr>
<tr>
<td>High cost of telephone</td>
<td>49</td>
<td>3/22</td>
<td>3/93</td>
<td>0/000</td>
</tr>
<tr>
<td>High cost of purchasing software and hardware</td>
<td>49</td>
<td>3/12</td>
<td>2/54</td>
<td>0/000</td>
</tr>
</tbody>
</table>

According to the results from table 2, it can say that economic factors and barriers in use of computer and technology concerning development of distance learning include High cost in use of internet, High cost of skill learning, High cost of purchasing educational contents. Therefore, with regard to the result from one-sample t-test and significance level (0.000) at each of economic components at 95% confidence level, it can say that hypothesis over aforementioned factors and barriers in use of computer and technology concerning development of distance learning is confirmed at 95% confidence level.

3-what are cultural-educational factors and barriers in use of computer and technology concerning development of distance learning?
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### Table 3: One-Sample T-Test for Cultural-Educational Factors and Barriers in Use of Computer and Technology Concerning Development of Distance Learning

<table>
<thead>
<tr>
<th>Item</th>
<th>DF</th>
<th>Mean</th>
<th>T</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust on undermining values by means of use of computer and technology</td>
<td>49</td>
<td>4/60</td>
<td>8/82</td>
<td>0/000</td>
</tr>
<tr>
<td>Shortage of necessary trainings for use of computer and technology</td>
<td>49</td>
<td>4/45</td>
<td>8/46</td>
<td>0/000</td>
</tr>
<tr>
<td>No use of trainings pertaining to use of information and technology</td>
<td>49</td>
<td>3/90</td>
<td>7/54</td>
<td>0/000</td>
</tr>
<tr>
<td>Insufficient notification concerning culture of use of technology and computer</td>
<td>49</td>
<td>3/65</td>
<td>6/43</td>
<td>0/000</td>
</tr>
<tr>
<td>Shortage of incentive mechanisms at school to use technology and computer</td>
<td>49</td>
<td>3/49</td>
<td>5/22</td>
<td>0/000</td>
</tr>
<tr>
<td>Employ unqualified instructors in training use of technology and computer</td>
<td>49</td>
<td>3/31</td>
<td>3/57</td>
<td>0/000</td>
</tr>
</tbody>
</table>

According to the results from table 3, it can say that cultural-educational factors and barriers in use of computer and technology concerning development of distance learning include Trust on undermining values by means of use of computer and technology, Shortage of necessary trainings for use of computer and technology, No use of trainings pertaining to use of information and technology, Insufficient notification concerning culture of use of technology and computer, Shortage of incentive mechanisms at school to use technology and computer, Employ unqualified instructors in training use of technology and computer. Therefore, with regard to the result from one-sample t-test and significance level (0.000) at each of cultural-educational factors components at 95% confidence level, it can say that hypothesis over aforementioned factors and barriers in use of computer and technology concerning development of distance learning is confirmed at 95% confidence level.

4-what are infrastructural factors and barriers in use of computer and technology concerning development of distance learning?

### Table 4: One-Sample T-Test for Infrastructural Factors and Barriers in Use of Computer and Technology Concerning Development of Distance Learning

<table>
<thead>
<tr>
<th>Item</th>
<th>DF</th>
<th>Mean</th>
<th>T</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low speed of internet</td>
<td>49</td>
<td>4/69</td>
<td>8/90</td>
<td>0/000</td>
</tr>
<tr>
<td>Unsuitable design of educational software</td>
<td>49</td>
<td>4/55</td>
<td>8/76</td>
<td>0/000</td>
</tr>
<tr>
<td>Lack of operating system</td>
<td>49</td>
<td>4/45</td>
<td>7/59</td>
<td>0/000</td>
</tr>
<tr>
<td>Lack of educational websites in universities and schools to use technology and computer</td>
<td>49</td>
<td>4/10</td>
<td>7/20</td>
<td>0/000</td>
</tr>
<tr>
<td>Limited educational software</td>
<td>49</td>
<td>3/49</td>
<td>4/22</td>
<td>0/000</td>
</tr>
<tr>
<td>Shortage of centers to supply computer and technology services</td>
<td>49</td>
<td>3/33</td>
<td>3/55</td>
<td>0/000</td>
</tr>
<tr>
<td>Technical defect in educational hardware</td>
<td>49</td>
<td>3/30</td>
<td>3/01</td>
<td>0/000</td>
</tr>
<tr>
<td>Limited access to computer and equipment of computer</td>
<td>49</td>
<td>3/21</td>
<td>2/66</td>
<td>0/000</td>
</tr>
</tbody>
</table>

According to the results from table 4, it can say that infrastructural factors and barriers in use of computer and technology concerning development of distance learning include low speed of internet, unsuitable design of educational software, lack of operating system, Lack of educational websites in universities and schools to use technology and computer, Limited educational software, Shortage of centers to supply computer and technology services, Technical defect in educational hardware, Limited access to computer and equipment of computer.
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computer and technology services, Technical defect in educational hardware, Limited access to computer and equipment of computer. Therefore, with regard to the result from one-sample t-test and significance level (0.000) at each of infrastructural factors components at 95% confidence level, it can say that hypothesis over aforementioned factors and barriers in use of computer and technology concerning development of distance learning is confirmed at 95% confidence level.

Conclusion

The world in 21\textsuperscript{st} century will be the world replete with modern information technology undergoing academic, economic, cultural and political changes. Education systems in a community and distance learning will not enable to know themselves as an island from other social and national entities throughout the world. Most of problems in development of information and communication technology which include shortage of cultural infrastructures, shortage of skilled manpower, unfamiliarity with foreign languages, low motivation, lack of tendency to work, effort and practice, reduction of abilities in life skills, keep changing in meeting the needs of individuals within community. The present research has been conducted aiming at identifying effective computer and technology factors and barriers in distance learning. The obtained results indicate that it can refer to personal factors and barriers in use of computer and technology concerning development of distance learning as follows:
- Not having sufficient knowledge in use of computer and technology
- Resistance against the change due to use computer and technology
- Not having sufficient skill in use of computer and technology
- Negative attitude towards technology and computer

It can say that economic factors and barriers in use of computer and technology concerning development of distance learning include High cost in use of internet, High cost of skill learning, and high cost of purchasing educational contents. It can say that cultural-educational factors and barriers in use of computer and technology concerning development of distance learning include Trust on undermining values by means of use of computer and technology, Shortage of necessary trainings for use of computer and technology, No use of trainings pertaining to use of information and technology, Insufficient notification concerning culture of use of technology and computer, Shortage of incentive mechanisms at school to use technology and computer, Employ unqualified instructors in training use of technology and computer.

It can say that infrastructural factors and barriers in use of computer and technology concerning development of distance learning include low speed of internet, unsuitable design of educational software, lack of operating system, Lack of educational websites in universities and schools to use technology and computer, Limited educational software, Shortage of centers to supply computer and technology services, Technical defect in educational hardware, Limited access to computer and equipment of computer.

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