Exploring the effective elements of e-learning development in Iran's higher education system

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ABSTRACT:

This study, by considering the importance of e-learning in higher education system, has the aim to identify and explore alternative solutions of the development of e-learning in Iran. This research has been conducted using an exploratory qualitative research methodology with two groups of respondents including both faculty members and PhD students in three different higher education institutes in Hamedan and Kurdistan provinces. Data were gathered through interviews technique. The data collection process was conducted to obtain complete and comprehensive data, and saturation was attained by 25 respondents. The results revealed that effective elements of e-learning development in Iran were: promoting cultural environment for both faculty members and the students, supporting technical infrastructure, removing technological and economical barriers, conducting continuous training courses and workshops.

Keywords: E-Learning, Higher Education, Internet, Vensim's Software, Iran

1. INTRODUCTION:

A quick review of the changes of the previous periods shows that the educational systems of each period relates to the changes of that period. In the present time, the internet network has transformed the classical and traditional educational system; and, the new educational methods and practices are extending so quickly. With the advent of internet, traditional roles in society have changed and each of these current traditional roles present a new manifestation both electronically and virtually which added new terms the nations' culture and language (Ahmadi and Virjiniyari, 2003). The development of virtual education is one of the facilities that have created in the light of development of computers and, in the broad sense, information technology. Internet, which is located among the top ten inventions of the twentieth century, has achieved the concept of long-life learning and driven learning out from the limitation of time and place. Currently, educational institutions, research centers, government agencies, business centers and many other people are looking for the access to the internet so fast. It is clear that internet and World Wide Web have profoundly affected the society, especially universities and faculties. Thus, ICT (information and communication technology) has a major role in the guarantee the quality of higher education and this would be considered as a competitive advantage for universities. However, the development and use of communication technologies in the educational system is an infrastructure for applying changes in education which this can facilitate the presenting

and receiving the training programs in different places. New technologies can alter the type of people and organization needs. Advances in technology such as computers and robots have opened new ways to create and enhance innovative teaching methods for instructors. This technological change has had a significant impact on the education, especially teaching methods. Wonderful development of electronic communication has given Distance Learning a new position and the development of these types of education has changes it to such an educational approach that employees and the people whom are not able to attend physically in classes can continue their education. In response to these demands, the distance learning organizations are trying to provide a comprehensive training system, from registration to examination, for learners. These organizations make attempt to enhance the quality, quantity and presentation methods of education and to equate these elements to developed countries (Murphy and Terry, 1998).

The higher education centers are the applicants of the utilization of electronic education, because, these educations are not limited to a special time and place. Thus, the higher education centers consider this fact as a prominent advantage (Garrison, 1999). Generally, virtual education means making the best use of electronic systems such as computers, internet, multimedia discs, electronic journals, virtual newsletters, etc. The virtual education aims are to make the learning easier, and more effective, and it can save time, cost and energy (Anderson and Elloumi, 2004).

The present time that is considered as 'Information Age and Information Revolution' that has made major changes in human lifestyle and has created a new concept which is called 'information society'. Information society is a symbol of all conventional and traditional social processes such as business, education and the like which is located in a new format by using information and communication technology (ICT). Miladi and Malek Mohamadi (2010), based on Yaghoubi's quotation (2008), believe that broader approach towards E-learning indicates that the education and e-learning system have unique benefits and advantages for organizations and educational institutions.

Chahill (2008), based on Duderstat (2001), in this regard, stated that the higher education must meet these changes and they should invest in capacities which make the new types of learning, independent of time and place limitation, possible, in order to create a persuasive view in their future in the next millennium (Chahill, 2008). Soltani (2004) in a study entitled 'A Survey of Affecting Factors of the Use of Information Technology in Teaching and Research Activities of Faculty Members' considered the familiarity of faculty members with the information technology, and the use and attitudes of them toward it and its relationship with the individual characteristics of the faculty members. Moreover, it was found that there is a positive and significant relationship between positive attitudes of faculty members and their proficiency in computer knowledge (Soltani, 2004). Naghavi (2007), in his study, discussed about 'the Attitudes of Faculty and Graduate Students of Agricultural Extension and Education toward Distance Learning via the Internet'. Additionally, he considered the proficiency level of Information Technology of faculty and graduate students as a necessary element of e-learning development; moreover, he investigated the barriers of the expansion of this type of education (Naghavi, 2007).

Yaghoubi (2008), in his study, entitled 'the design of E-learning systems in the field of agricultural extension and education' refers to 'educational and technical factors affecting the E-learning system' and 'E-learning program restrictions' as stimulants and inhibitors of E-courses (Yaghoubi, 2008). He also refers to the following elements as important factors affecting students' attitudes toward e-learning: the evaluation of e-learning capabilities in solving the problems, the access to the internet, the use of

internet, students' overall assessment of the problems of the present system   (Yaghoubi, 2008).

Mohamadi (2009) in his paper entitled 'Determination and analysis of the components of E-learning system in agricultural scientific-applied educations of Iran' investigated the following elements in e-learning system in agricultural scientific-applied educations: incentives and the driving factors, the necessities and urgencies, the educators attitudes, the barriers and disincentives, the availability of e-learning technologies and organizational strategies of e-learning. Sadri Arhami et al. (2003), in a study entitled 'e-learning in Iran: challenges and alternative solutions in higher education' refers to the concept of e-learning and web-based studies, and he considers the issues and obstacles of its implementation.

A study entitled "Evaluation of ICT development strategies in the education system in Australia, the U.S. and India, and comparing them with Iran" have been conducted by Ghaedi (2007) and he compares 'the facilities', 'equipments', 'development methods' and 'barriers' of the mentioned countries. Jokar (2007) in an article entitled 'information resources as one of the support systems in E-learning courses' studied the students of virtual courses of Shiraz University, and he considers lack of information resources and E-learning content as the barriers of such educations.

Some, like Nasiri (2005), has studied about easier and better implementation of these educations in a virtual interactive environment. In other studies, including Farahani (2001), it has been shown that implementing e-learning would be merely successful when the courses are theoretical. In a study conducted by Salajeghe (2011), the factors that facilitate virtual education are discussed. Finally, the research by Salim Abadi (2006), and Jafari (2002), the obstacles and challenges of implementing e-learning have been investigated. There are also some researches indicating that e-learning is improper due to the following reasons: technical limitations like, lack of accessibility to telecommunications infrastructure, and the limited interaction between teacher and learner; therefore, the traditional face to face educational method is emphasized. The researches of Chizari (2010), and Ghaedi et al (2007), based on Brown's research are included in this study. There are some other researches in the field of E-learning that each of which have a particular look at it. The most important of these researches are: Salajeghe (2011), Musa Khani (2005), Martines (1997) etc.

Lynch (1999), in a study entitled 'investigation of effective variables for students participation in an electronic evaluation', that was conducted by regression analysis, showed that 'computer', 'gender' and 'the experience of participating in Electronic evaluation' are of the predictor variables of the variability of the dependent variables. There is a significant relationship between the variables 'attitude toward computers and CBT' and 'psychological readiness of the learners to participate in electronic evaluation (Lynch, 2004).

Oliver (2002) in a study entitled 'quality assurance of E-learning in Australian higher education' discusses the factors leading to successful adaptation and sustainable use of virtual learning in higher education in Australia.

Mohamadi (2009) in his study entitled 'investigation of ICT infrastructure and human resource capacity in Liberia' concluded that the development of ICT in this country is depended on the improvement of the following factors: telecommunication infrastructure, human resources, economic, social and information-technology-based curriculum planning.

Naghavi (2007) in his researches, about Development, establishment and application of e-learning, stated that in the e-learning readiness of human resources, these items are essential and effective: physical, cognitive, emotional, social and cultural factors. A glance at the recent changes in educational system shows that most of these changes in

the phase of educational technology utilization have focused on acquiring early technology skills. This can clarify the importance of the application of technology for basic skills (Rosenberg, 2001). Frazeen (2006), in his final dissertation, entitled 'effective factors in quality of web-supported learning' stated the relationship and impact of several basic factors. He divided these elements in following six groups: organizational and educational factors, instructor, students, technology and educational designing (Frazeen, 2005).

Panitz (2008) in his study, about the advantages of electronic and participatory learning about motivating the learners, stated that working students, had less interest in face to face education (Panitz, 2008). Chahill (2008) in his paper entitled 'motivating factors of faculty members to participate in e-learning' refers to a significant relationship between 'vocational factors' (time, credit, career development, rewarding and high responsibility at work) and 'structural factors' (access to training materials over the course of learning, presenting different learning styles) with the implementation of e-learning courses (Chahill, 2008). Gamble (2009) in his research entitled 'The learning effects in a multicultural environment' compared and investigated the impacts of an E-learning course that was held in China and the US (Gamble, 2009).

The main advantages of e-learning are: Saving time and cost, expanding communication domain, expanding courses, up to dating information, having a flexible method of study, increasing interaction and increasing curiosity and initiative.

The main e-learning barriers are: high costs of infrastructure creation, reduction of face to face interaction, the high initial cost of preparing materials, and lack of appropriate hardware and software, and unfamiliarity with the technology of e-learning for both teachers and learners. Of course, e-learning for different groups (e.g., teachers, students, planners, managers and executives) have different advantages and disadvantages.

Table 1: Summary of studies in the field of e-learning in Iran and other countries

Nr.	Effective factors in E-learning promotion	Author/ organization and date
1	infrastructure facilities: (infrastructure, designing and preparation of learning system components)	Sadri Arhami (2003), Miladi and Malak Mohamadi (2001), Chizari (2010), Ghaedi et al (2007), Chahill (2008)
2	importance and advantages	Miladi and Malek Mohamadi (2010), Farahani (2010), Panitz (2008)
3	motivational factors	Gamble (2009), Chahill (2008), Frazeen (2006), Oliver (2002)
4	technical skills and knowledge of teachers and learners	Soltani (2004), Naghavi (2007), Yaghoubi (2008), Mohamadi (2009), Murphy and Terry (1998)
5	barriers and Challenges	Salim Abadi (2006), Jafari (2007), Jokar (2007), Lynch (1999)

In table 1, the effective factors of e-learning promotion such as infrastructure facilities, motivation factors, knowledge and skills of learners and etc. and with the other researches in this field have been briefly discussed.

2. METHOD

In order to answer these research questions, a qualitative approach was used; and, in order to collect the necessary data, the meaningful and snowball sampling method were used. Statistical population of this study was the following groups: 1) faculty members of agricultural higher education of Hamedan and Kurdistan provinces; 2) faculty members and PhD students of electronics, telecommunications, Hamedan Jahad Daneshgahi (JD). It must be mentioned that, in the qualitative researches, the sample size does not matter; since, the crucial aspects are the procedure of sample selection and the quality of research process. As soon as the theoretical saturation is obtained, sampling and data collection would be finished. Totally, there were 25 respondents in this study and the interviews ended as soon as the data were saturated. The main approach of data collection in this study is semi-structured interviews. Since, the main purpose was, as much as possible, to collect the data from the respondents, it was tried to use the open questions. The data analysis was performed by using open coding. The reason for coding is to convert the data into concepts. Therefore, at the beginning, the data were separated from each other and the phrases are categorized based on the semantic units in order to attach the codes to the data. Then, these codes were classified based on the discovered phenomena of the data, which these data are directly relevant to the research questions, and these codes were conveyed to the abstract codes and finally these codes were reported jointly and commonly. The literature review was profoundly investigated to ensure the data validity and reliability. This deep investigation was conducted for both a better understanding of the subject and an appropriate formation of the interview questions. The professors and faculty members' point of view were used in this study.

The main research questions are:
- What are e-learning development approaches?
- What are the advantages of e-learning in comparison to traditional teaching?
- What facilities are needed for the establishment of e-learning?

This is a dynamic study, therefore the system dynamics methodology is a suitable method for this study. The present research was analyzed conceptually by Vensim software. Using the system dynamics makes the investigation of different behaviors and their feedbacks in various times possible and it helps with the management development and appropriate policies in the case of this study. The systemic thinking is considered as a framework, procedure, rule and a rationale for recognizing the problem and it includes analytic and synthetic aspects.

Table 2 indicates the faculty members' view point of the above universities.

Table 2: the respondents' view about e-learning development approaches

Topics in terms of repetition	Common topics	Conclusions/recommendations
economic infrastructures technological infrastructures human infrastructures	material and immaterial infrastructure	The required investment for updating technical knowledge and skills as well as telecommunications infrastructure and the required equipment should be provided.
Culturalization	culturalization	Logic and proper culture of using this type of education must be institutionalized among the users.
computer and internet knowledge	technical knowledge and	Familiarity with the English and how to use the Computer software, networks

computer use	skills of the users	and the Internet and etc. will increase
english proficiency		their participants' ability in this field.
technical-vocational	presenting	The learners must have passed
courses	preliminary	International Computer Driving License
Workshops	training	(ICDL) and should have participated in relevant workshop

3. RESULTS:

In table 2, respondents view and comments, stated issues, common topics, the conclusions and recommendations were briefly discussed. As it can be seen in the table, the approaches of e-learning development includes material and immaterial appropriate infrastructure (economic, technological and human), culturalization, development and skill training and technical knowledge of the users and providing fundamental educations to the teachers and students. Generally, the content analysis of respondents' views of their questions was presented in four general areas and the investment in the mentioned sectors is considered as a development approach. For example, the following elements were taken into account in the sector of 'skill and technical knowledge of the users' which familiarity with English and proficiency of different tutorial and computer software are of those elements.

In table 3, frequency and the percentage of each of the e-learning elements, based on table 2 conclusions, were presented both individually and in association with the other elements.

Table 3: The approaches of e-learning development

Priority	Common topics	Frequency	Percentage of each element individually	Percentage of each element in association with the other elements
1	material and immaterial infrastructure (economic, technological, human infrastructures)	22	88	18.2
2	culturalization	21	84	17.4
3	technical knowledge and skills of the users (Computer and internet knowledge, computer use, English proficiency)	19	76	15.7
4	presenting preliminary training (technical-vocational courses, workshops)	17	68	14

Here, some comments are quoted directly:

One of the respondents commented on the advantages and barriers of e-learning in comparison to traditional teaching "the main advantages in establishment of e-learning are: flexibility, the elimination of unnecessary and costly traffic of learners, lack of limitation to a particular time and place; and, lack of access to high-speed and

inexpensive internet and lack of understanding of responsible men and the audience from e-learning are the main barriers of this era."

Another respondent said: "e-learning is not limited by time and place and the management of e-learning plans can be practicable for a large group of students."

Regarding necessary facilities and resources, another respondent stated that: "information, knowledge and ability of learners to use computers and E-learning tools and hardware facilities, such as: computer, webcam, headset, tablet and etc. are of utmost importance."

Regarding the skills of e-learning learners, another respondent stated that: "the learners of this system should be familiar with computer, web, network and hardware and software"; another interviewee said that "the learners of this system must attend in tutorial courses of authoritative organizations like technical-vocational organization, and they should participate in seminars and workshops in order to acquire the essential skills."

In table 4, frequency and percentage of each of the effective elements in describing the benefits of e-learning in comparison to traditional education are discussed both individually and in association with the other elements.

Table 4: e-learning advantages in comparison to traditional education

Priority	Common topics	Frequency	Percentage of each element individually	Percentage of each element in association with the other elements
1	saving the costs	24	96	28.9
2	diversity in training (flexibility, the number of admissions)	22	88	26.5
3	updating the data (data access, effectiveness and efficiency of training)	19	76	22.9
4	lack of need to the physical presence of the master	18	72	21.7

As it is inferred from table 4, the four major advantages of e-learning in comparison to traditional education are: saving the costs, diversity in training (flexibility, the number of admissions), updating the data (data access, effectiveness and efficiency of training), lack of need to the physical presence of the master. Since, in the present time, the increasing pace of human life and their different roles and responsibilities in communities has caused time shortage and economic problems, therefore, e-learning utilization seems to be so essential and cost-benefit.

In table 5, frequency and the percentage of each of the elements (both individually and in association with the other elements) and necessary facilities to establish E-learning system is discussed.

Table 5: necessary facilities to establish e-learning system

Priority	Common topics	Frequency	Percentage of each element individually	Percentage of each element in association with the other elements
1	Essential hardware and software equipments	23	92	19.5
2	High-speed and inexpensive internet	22	88	27.1
3	Professional human resources (professors, managers, experts)	19	76	16.1
4	Learners' knowledge and skills	17	68	14.4
5	Holding tutorial courses for the learners	14	56	11.9
6	culturalization	13	52	11

In table 5, the essential facilities and equipments to establish e-learning system are presented in the above six major factors. The most important factor is essential and appropriate hardware and software equipments for starting up and holding e-learning courses.

In figure 1, dynamic relationships of essential material and immaterial infrastructure for the operation and development of e-learning system were investigated by Vensim Software.

As it is inferred from figure 1, economic, technological and human infrastructure has positive effects on necessary infrastructure for e-learning development and they are considered as approaches of e-learning development. For example, 'material and immaterial infrastructures' and 'technology infrastructures' develop 'human infrastructures'; and, 'material and immaterial infrastructures' and 'technology and human infrastructures' promote 'economic infrastructures'. And yet, 'material and immaterial infrastructures' enhance 'economic, human and technological infrastructures'.
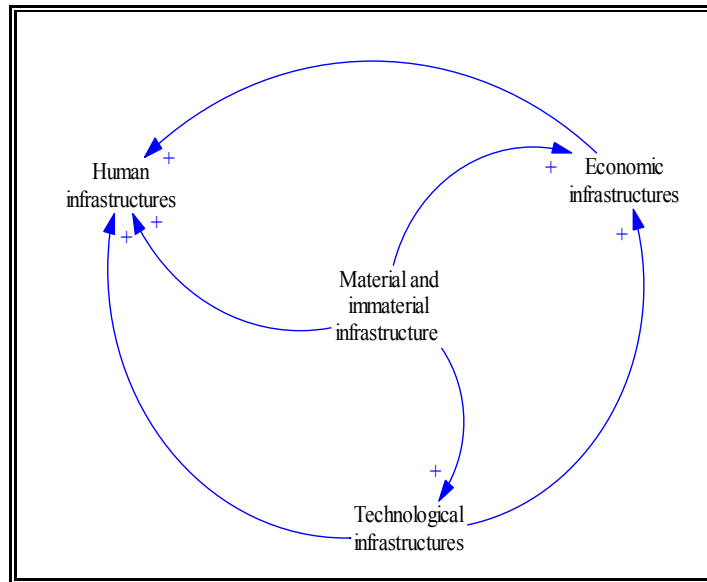
Figure 1: dynamic relationships of essential material and immaterial infrastructure

In figure 2, the dynamic relationships of the learners' skills and knowledge were considered.
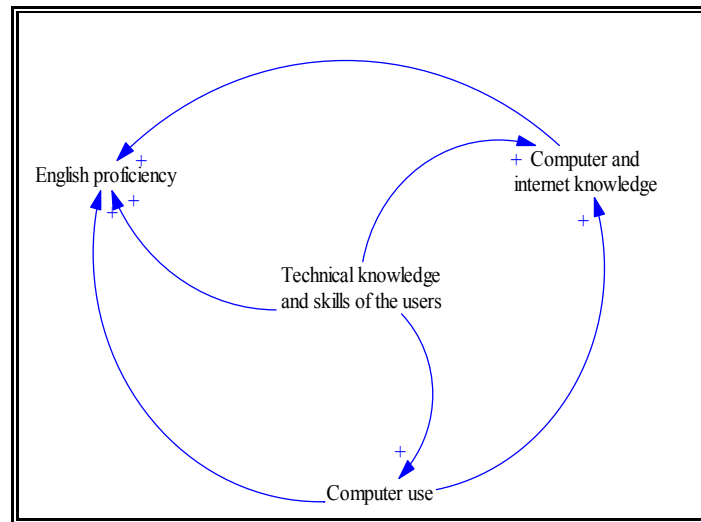

Figure 2: the dynamic relationships of the learners' skills and knowledge

In figure 2, it is shown that, the learners' skills and knowledge which includes internet and computer knowledge, English proficiency are considered as the factors that affect positively on e-learning development.

As figure 2 shows, increasing the learners' skill and knowledge enhances internet and computer knowledge, English proficiency and computer user. And, increasing level of computer user enhances computer and internet knowledge and also English proficiency. And, finally, increasing computer and internet knowledge develop English proficiency.

In figure 3, the approaches of e-learning promotion is presented.

In figure 3, the approaches of e-learning development is presented with all its subcategories. As the figure clearly shows, each of the four branches of presenting preliminary training, material and immaterial infrastructure, culturalization and the learners' skills and knowledge along with its subparts have positively and directly affected on e-learning development. Deficiency and shortage in each of the above parameters are considered as the barriers of e-learning development.
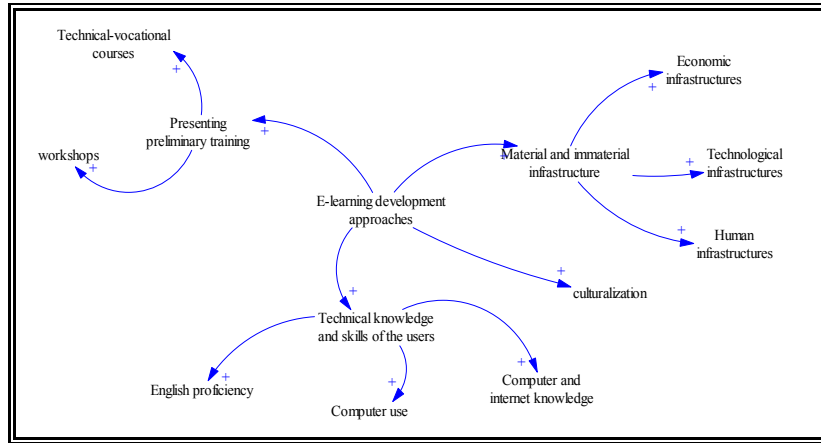

Figure 3: the approaches of e-learning development

Figure 4 represents the flowchart of the findings and conclusions of effective factors of e-learning development especially in Iranian higher education system.
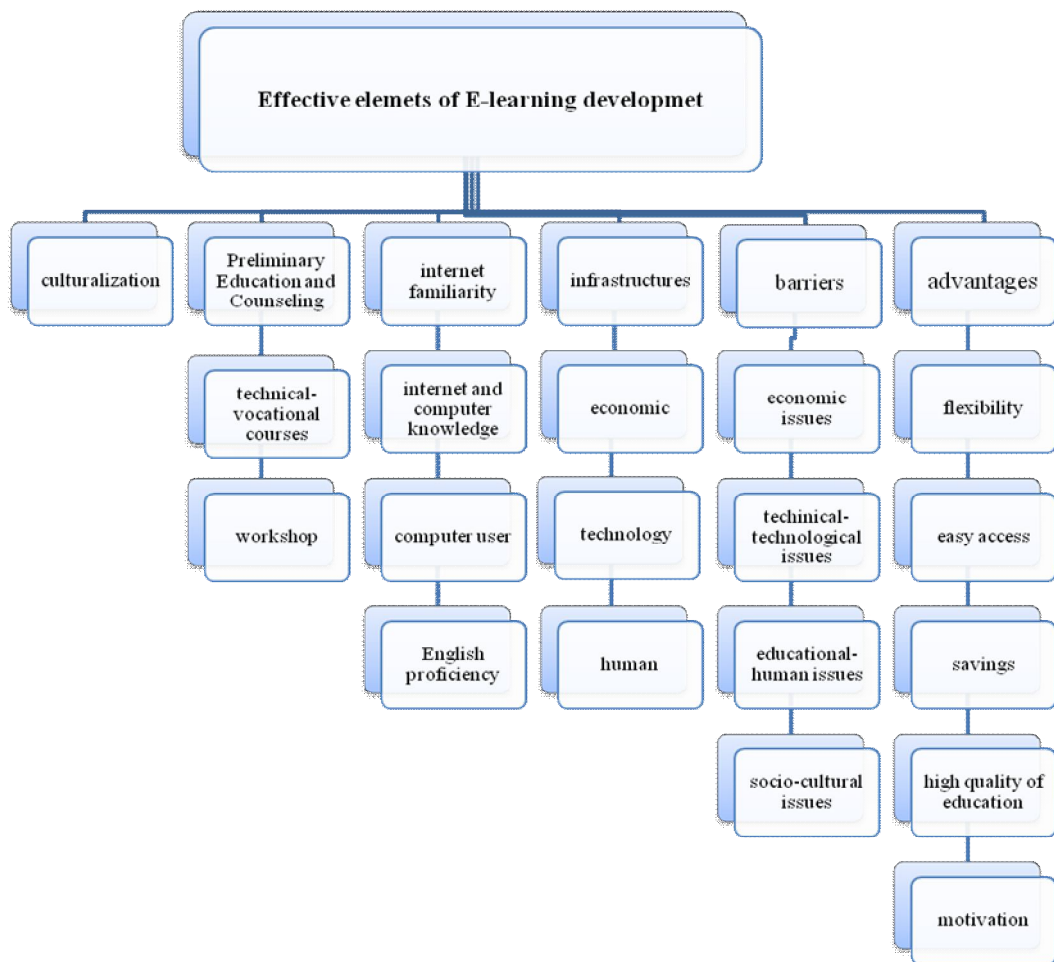
Figure 4: Effective elements of e-learning development

4. DISCUSSION:

If the government and the responsible authors invest properly in e-learning, the development and extension of economic, technological, telecommunication, electronic infrastructures and human resources would be achieved. This finding matches to Howard (2008) study in Liberia that states: "the development of ICT would be possible by reinforcement of telecommunication, human resources, economic, social infrastructures and IT-based curriculum planning."Creating the appropriate cultural context and establishing reasonable and proper use of education cybernetic and electronic environments is a part of development and extension requirements of e-learning.

The most important skills of e-learning learners are 'technical skill and knowledge of learners in English proficiency', 'software, hardware and network proficiency' and other required potentials in e-learning. This finding accord to Yaghoubi (2008) study which asserts that: "internet and computer knowledge and the students' interest in e-learning must be taken into account."

It is necessary for the virtual course students to be familiar with internet skills and English proficiency. Also, they should participate in tutorial workshops.

Massive spending and investment plans in developing appropriate and essential infrastructures have a significant effect on 'the scientific growth and development of the country' and 'increasing the scientific potential of Iran universities in comparison to foreign universities.'

It seems that if it is invested on the development of infrastructures and proper physical and technical contexts of e-learning, it will be more efficient than a situation in which huge budgets are spent for creation of educational environment.

5. CONCLUSIONS:

The educational system of the country must present more comprehensive services in English education and computer skills for students.

The government and responsible people of cultural and social affairs should provide proper social and cultural contexts for developing and establishing of public use of e-learning.

Training interested and knowledgeable E-learning professors and also producing electronic content in educational syllabus is of utmost importance while lack of such a thing is felt.

Regarding that no exact and documented study in the field of 'the payment of teaching per hour' has not been done either in a traditional or electronic way, it seems that, if an exact and proper research is done in the field of investigating the technical and economic justification, then, responsible men will be convinced to invest in e-learning development.

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