Recommendations for Promoting E-learning in Higher Education Institutions: A Case Study of Iran

Payam Hanafizadeh\textsuperscript{a}, Mohsen Khodabakhshi\textsuperscript{b} and Mohammad Reza Hanafizadeh\textsuperscript{c}

\textsuperscript{a}Department of Industrial Management, Allameh Tabataba’ University, Haft Paykar Corner, Nezami Ganjavi St., Tavanneer, Valy Asr Ave, P.O. Box: 14155-6476, Tehran 1489684511, Iran. E-mail: hanafizadeh@gmail.com
\textsuperscript{b}Department of Industrial and System Engineering, Isfahan University of Technology, Isfahan, Iran. E-mail: mohsen.khodabakhshi@yahoo.com
\textsuperscript{c}Department of Industrial Engineering, School of Engineering, Science and Research Branch, Islamic Azad University, Tehran, Iran. E-mail: reza_hanafizadeh@yahoo.com

This paper intends to offer recommendations for promoting e-learning in higher education institutions in developing countries in general, and in Iran in particular. For this, 279 recommendations were extracted through the investigation of 11 countries and 5 regions. Using content analysis, 23 recommendations were selected and then categorized into five groups: infrastructures and technology; human resources; network enablers; curriculum design; and cooperation. Afterwards, a survey was conducted and the recommendations fitting with Iran’s internal situation were offered. These recommendations were prioritized on the basis of three criteria: experts’ opinions, the frequency of presentation of the recommendations in various countries, and whether or not the recommendations have already been implemented in Iran. Meanwhile, with respect to their priority, they were divided into three categories: necessary and urgent, necessary and not urgent, and specific to Iran.


\textbf{Keywords:} e-learning; higher education institutions; recommendations; Iran

Definition of E-learning

The term ‘e-learning’ has been used since 1998 and is being used to cover almost any technology-supported learning initiative (Wilson \textit{et al.}, 2000). Although the term e-learning has been used frequently since then, there is no consensus on its definition among those who use the term.

Reviewing the literature on the definitions of e-learning discloses that scholars and practitioners take two approaches into consideration. Some scholars define e-learning in comparison with distributed learning, online
learning, Web-based learning and distance learning (Wentling et al., 2000; Urdan and Weggen, 2000; http://www.spectrainteractive.com/pdfs/Corporate ELearningHamrecht.pdf), while others define it independently of these terms (http://www.learnframe.com/aboutelelearning/page2.asp; Berge and Giles, 2006).

From another perspective, Watanabe (2005) divided research concerned with e-learning definitions into two groups, and suggested her broad definition of e-learning reviewing these studies. Her survey illustrates that some research such as research done by the Consultative Council have defined e-learning as ‘Distance education using the Internet and/or other information technologies (IT)’ (Watanabe, 2005); meanwhile, other researchers, such as the Advanced Learning Infrastructure Consortium, define ‘e-learning as a self-learning process using IT communication networks and other means’. Langstaff et al. (2004) and Organization for Economic Co-operation and Development (OECD) (2005) directed their definitions towards the latter definition, that is, ‘the use of information and communication technology (ICT) to enhance and/or support learning in education’.

In order to ensure consistency within this paper, we adopt the working definition as follows: ‘e-Learning is the delivery of content via all electronic media, including the Internet, intranets, extranets, satellite, broadcast, video, interactive TV and CD ROM. E-learning encompasses all learning undertaken, whether formal or informal, through electronic delivery’ (Tabakov, 2005).

Drivers, Advantages and Disadvantages of E-learning

This section of the paper considers e-learning from three aspects; the first paragraph concerns drivers and trends influencing the use of e-learning; the second paragraph discusses the gains achieved from employing e-learning; and the last paragraph dwells on the side effects brought about by the use.

There are a number of trends impacting the increased use of e-learning. The emergence of the knowledge-based economy, the paradigm shift in the way education was viewed and delivered and huge knowledge gaps as significant trends have given rise to e-learning (Wentling et al., 2000). The shift from the industrial to the knowledge era, rapid technological change, the ever-shortening product developmental cycles, lack of skilled personnel, Enterprise Resource Planning, and migration towards value chain integration and the extended enterprise are presented as being the prominent contributors to e-learning value chain (Wentling et al., 2000). In the other words, technology, the rapid obsolescence of knowledge and training, the need for just-in-time training delivery, and the search for cost-effective ways to meet learning needs of a globally distributed workforce have redefined the processes that underlie
design, development and delivery of training and education in the workplace (Urdan and Weggen, 2000). The need for different learning models due to the skill gap and demographic changes and demand for flexible access to lifelong learning have played role in teaching and learning.

E-learning is emerging as an increasingly important component of higher education because it provides opportunities for those who are unable to attend universities and those who are unable to completely put their jobs aside to be on-campus students (Zang and Lin, 2006). It provides a new set of tools that can add value to traditional learning modes (Fung and Yuen, 2006). E-learning helps generate ideas, encourages class sharing and allows more time for discussion. If it is employed effectively, it can help address many shortcomings of the traditional distance education methods as well as the inherent problems the classroom teacher faces on a daily basis with a classroom of learners with different learning and perceptual styles and competencies (Santally and Alain, 2006). Furthermore, the online learning platform provides an interactive environment for communication between students and teachers and equips teachers to provide scaffolding to help students to engage in collaborative and cooperative activities (Fung and Yuen, 2006).

Despite the advantages that e-learning offers, there are also criticisms leveled at it. For example, the quality of learning in an e-learning environment is sometimes sacrificed since there is a high security risk in the system; uniqueness and personal identity is lost due to the existence of the computer between the student and the trainer in the learning relationship; the possibility of copyright infringements increases; and social contacts and direct communication with professors and colleagues are eliminated (Nayak and Suesaowaluk, 2007; Niculescu-Aron and Marinescu, 2007). In addition, intuitions have encountered some obstacles for making use of e-learning, such as lack of personal technical equipment, lack of digital literacy, expensive costs of startup and so forth (Zemsky and Massy, 2004; Nayak and Suesaowaluk, 2007; Niculescu-Aron and Marinescu, 2007).

Significance of Offering E-learning Recommendations

Owing to the significant benefits to be gained from e-learning and the insistent demand for greater accessibility of education, many higher education institutions have introduced an e-learning system into their traditional face-to-face classroom courses. In moving towards e-learning, higher education institutions may need to adopt new Web-enabled learning models that involve risk taking. Similarly, the successful and beneficial adoption of e-learning is highly related to the innovative capabilities of higher education institutions, and requires a powerful management. Therefore, deployment of e-learning requires an integrated and suitable plan based on institutions’ readiness.
One of the most appropriate ways to prepare the plan for utilizing e-learning is to exploit the experiences of other countries. Policy-makers, particularly in developing countries, encounter a chronic shortage of resources, so they should exploit experiences of developed and developing countries and adopt successful methods peculiar to their own countries’ circumstances. By doing so, they are able to avoid previous mistakes and bring maximum return from minimal resource allocations (Bui et al., 2003; OECD, 2003). Such experiences not only allow them to exploit the positive aspects of national policies, but also help them to obtain information on new ways of utilizing e-learning, as well as solutions and best practices of other countries for supporting decision-making process (Monge and Chacon, 2002).

In exploiting the experiences of other countries, it should be noted that recommendations for promoting e-learning in higher education institutions that may fit in with a country’s specific conditions at the same time might not be adaptable to another country’s situation. In the same line of argument, the focus of planning and analysis should centre on the capability of higher education institutions to support fundamental changes in existing strategic foundation and infrastructure. To address this problem, this paper presents a survey conducted to extract appropriate recommendations for promoting e-learning in Iranian higher education institutions. These recommendations are selected from a large number of recommendations drawn from the literature. Readers should remember that only the recommendations extracted from the literature are mentioned, and this study does not yield any insight on the success of the recommendations. In other words, we did not follow up the results of implementing the recommendations extracted from the literature and exploited in the given paper — whether or not they resulted in success.

**Literature Review**

E-learning is not a modernistic training approach (Fung and Yuen, 2006). The use of ICT to enhance teaching and learning processes has been practised for a number of years. In the 1970s, educational television programmes were made to deliver the curriculum. Since then, e-learning has kept pace with the emergence of advanced technology, and the components of e-learning have become more and more extensive. The invention of the Web was a significant event for the evolution of education technologies.

Owing to the increasing importance of e-learning, several attempts have been made to propose recommendations for promoting e-learning in higher education institutions. Some countries like Indonesia, Bulgaria and Australia have identified and applied recommendations suitable to their own internal conditions to promote e-learning in their higher education institutions.
However, others have deployed the recommendations proposed by international organizations such as the European Commission (2001), the World Bank (Armenia Development Gateway Foundation, 2003), the Economic Commission for Latin America and the Caribbean (Hilbert and Katz, 2003).

In the remainder of this section, the works conducted on recommendations of enhancing e-learning are divided into three categories and are reviewed based on this categorization. These categories include research done at the level of specific institutions or by individual researchers, research commissioned by a supranational agency and research done at the level of countries.

**Research done at the level of specific institutions or by individual researchers**

The University of Iowa launched an e-learning assessment project to assess the current status of e-learning (Langstaff et al., 2004). This assessment looked at specific examples of e-learning usage. The researchers of the university also offer several strategic recommendations in this project. These recommendations aimed at improving the university’s organization, policies and IT architecture, which enabled a strategic vision to be developed for effective e-learning practices. The recommendations were based on the feedback from the project and could be immediately implemented.

Lewis and Goodison (2004) surveyed universities, identified through an analysis of individual institutions’ subject review reports, where good pedagogic practices in ICT development and use had been undertaken for the period of 1998–2001. The starting point for the research project was the Quality Assurance Agency for Higher Education subject review method in force prior to 2002, which was based on six thematic headings. The reports for each subject highlighted areas of good practice and issues needing to be addressed under each heading. The subjects covered a broad spectrum of disciplines: Archaeology, Art and Design, Biosciences, Classics, Dentistry, Economics, Education, Sport Science, Maths, Nursing, Pharmacy and Politics. The research was carried out through questionnaires, interviews with staff and students, teaching/learning observations and a survey of university and programme documentation.

Arneberg et al. (2007) proposed a list of 34 recommendations for robust and sustainable provision of large-scale e-learning. Out of 34 recommendations 25 were based on the 25 factors proposed in the analyses of 26 megaproviders of e-learning in Europe. In addition, the two factors suggested by the analysis of the 26 megaproviders and the seven factors suggested through the analysis of the 10 e-learning initiatives were added to them.

Sangra (2008) in his Ph.D. thesis looked at the ways that universities were integrating ICTs. In this study, 16 universities were selected from North
America, Spain, the United Kingdom and Australia. He used three main research tools to collect data, that is, analysis of plans and documents of programmes, individual interviews with key decision-makers/policy-makers within the institution and focus groups with key faculty. The thesis ended with a set of recommendations, which include a formal planning process that deliberately includes consideration of technology, organization and pedagogy in an integrated manner, but also takes the emerging strategies throughout the organization into account.

**Research commissioned by a supranational agency**

The President’s Committee of Advisors on Science and Technology (PCAST) created a bridge between the private sector and the academic community for technology, scientific research and math and science education (Calinger and Howard, 2008). The PCAST addressed this lack of educational focus with the formation of a panel on educational technology in 1995. The report made a number of significant recommendations for using technology in K-12 education. The panel also recommended a large-scale programme of rigorous, systematic research on education in general, and on educational technology in particular.

The European Commission (2001) exploited wide survey research on the use of ICT in universities, and defined it as audio-visuals, computer programs and the Internet, in university learning and teaching. In the survey, the questionnaires were distributed among 2,000 students from different universities in Europe and a total of 1,998 valid questionnaires were obtained, indicating an acceptable response rate. This study was divided into two subsections: a descriptive one and an explanatory one.

Moreover, European Commission in 2002 launched the ‘thematic monitoring’ initiative in Leonardo projects (Attwell et al., 2003). The goal of this initiative was to analyse relevant projects, which were being conducted through the Leonardo programme, and to indicate how and to what extent these projects address issues and challenges in the thematic area of e-learning. To attain this goal, a survey was conducted through visits to the selected project coordinators or, more often, through telephone interviews. The concrete outcome of the study comprises interesting conclusions and recommendations that are expected to stimulate discussion and action beyond the Leonardo community.

To explore the relationship between academic libraries and e-learning in higher education, the US Online Computer Library Center (OCLC) created an ‘e-learning task force’ in 2003 (MacLean and Sander, 2003). The task force was charged with e-learning assessment and suggestion of specific recommendations for the OCLC to follow and to formulate strategies leading to collaborative initiatives by libraries in the e-learning realm. This research group met several times over several months and filled in and discussed a detailed institutional
survey. The task force’s overall recommendations fall into two categories: concrete suggestions for the OCLC products and services and consensus-building proposals that the OCLC, from its position as library advocate, should encourage within and beyond the global academic community.

**Research done at the level of countries**

The Republic of Armenia assessed e-learning and then proposed recommendations for its improvement based on desk study of various printed sources (reports, studies, speeches, etc.) and relevant websites. They conducted interviews with more than 12 experts and used statistical analysis derived from interviewees (Armenia Development Gateway Foundation, 2003).

Karmakar (2006), for successful deployment of e-learning in Bangladesh as a modern teaching method, first examined the status of e-learning readiness of Bangladesh, both quantitatively and qualitatively, and then proposed recommendations for improving e-learning readiness in the country. He proposed recommendations, depending on the analysis to be implemented, for establishing successful and sustainable e-learning systems in government, industry, society and education.

In the USA, the National Governors Association developed and implemented solutions to public policy challenges (Calinger and Howard, 2008). As part of its education initiative and its commitment to advancing the use of technology in the classroom, the association commissioned a series of reports and studies to investigate the status of technology implementation and its effectiveness in achieving educational objectives in K-12 education. One of these reports, the status of e-learning in the USA in 2001, focused on identifying the states promoting access to e-learning. This report suggested recommendations, including the need for developing content that optimally uses technology, the improvement of technology infrastructure and the need to reduce the digitally underserved by providing technology to schools serving socio-economically disadvantaged populations.

Finally, perusing the reputable studies on recommendations of enhancing e-learning revealed that some of which have consensus on some aspects. Table 1 illustrates these aspects and their sources.

**Research Methods**

**Extracting the recommendations**

In this stage, experiences and recommendations of different countries for promoting e-learning in their higher education institutions were studied. Owing to the limitations in the study, all countries’ experiences and recommendations
cannot be examined here, and therefore the following criteria are used to select countries:

- Rankings of the countries based on International Telecommunication Union (ITU) that divides countries into high, upper, medium and low e-ready countries (ITU, 2002). Since Iran’s standing in this categorization is medium, the selected countries are among high, upper and medium ones.
- Economic conditions: from each category of ITU rankings, countries with gross national income closer to Iran were selected.
- Geographical conditions: at least one country was selected from each continent.
- Accessibility to valid and up-to-date information about e-learning development activities in the higher education institutions of the countries.

Regarding the criteria mentioned above, 11 countries were selected for studying. These countries include Belarus, Australia, Trinidad and Tobago, Jordan, Uzbekistan, Turkey, Bulgaria, Indonesia, Ireland, Armenia and England. In addition, the activities of Association of Southeast Asian Nations, Commonwealth, Latin America and the Caribbean and European Commission (two reports) were also taken into consideration.

Studying these countries and regional groups, 279 recommendations implemented in the institutions were extracted. Then, content analysis, a quantitative approach taken by counting the frequency of phenomena within

Table 1  Common aspects of recommendations and their sources

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure and technology</td>
<td>Commission of the European Communities (2001); Yalamov (2004); Economic and Social Commission for Western Asia (ESCWA) (2003); Ulukan (2005); Armenia Development Gateway Foundation (2003); Owen et al. (2001); Grant et al. (2001); National Academy of Sciences of Belarus (2003); Karmakar (2006)</td>
</tr>
<tr>
<td>Human resources</td>
<td>Commission of the European Communities (2001); Yalamov (2004); ESCWA (2003); Ulukan (2005); Armenia Development Gateway Foundation (2003); Owen et al. (2001); Grant et al. (2001); National Academy of Sciences of Belarus (2003)</td>
</tr>
<tr>
<td>Quality, content and services</td>
<td>Lewis and Goodison (2004); Commission of the European Communities (2001); Yalamov (2004); Karmakar (2006)</td>
</tr>
<tr>
<td>Enhancing education with ICTs</td>
<td>Yalamov (2004); Armenia Development Gateway Foundation (2003); National Academy of Sciences of Belarus (2003)</td>
</tr>
<tr>
<td>Network enablers</td>
<td>Ulukan (2005); Owen et al. (2001); Grant et al. (2001)</td>
</tr>
<tr>
<td>Curriculum design</td>
<td>Lewis and Goodison (2004); ESCWA (2003)</td>
</tr>
<tr>
<td>Teacher skills</td>
<td>Yalamov (2004); Owen et al. (2001)</td>
</tr>
<tr>
<td>Cooperation</td>
<td>Yalamov (2004); Karmakar (2006)</td>
</tr>
</tbody>
</table>
a case in order to gauge its importance compared to other cases (Walliman and Baiche, 2001), was utilized and the recommendations that have been implemented at least in two countries (at least with the frequency two) were selected as recommendations proposed to experts. The reason for selecting the frequency two is that the selected recommendations have been implemented and tested at least in two countries with different conditions. Owing to the high number of these recommendations (23 recommendations), based on Table 1, they were categorized into five groups in order to simplify the process of getting experts’ opinions. These categories include ‘infrastructures and technology’, ‘human resources’, ‘network enablers’, ‘curriculum design’ and ‘cooperation’. They are defined as follows:

**Infrastructure and technology**
This category deals with the technical and operational aspects of the ICT usage infrastructure in education sector. On the physical side, issues relating to the data networks, access channels and hardware are addressed. The operational side deals with standards and interoperability framework issues (Information Technology Association Jordan (INT@J), 2003; Karmakar, 2006).

**Human resource**
It entails expanding ICT skills and developing ICT workforce in educational realm (Grant et al., 2001; Owen et al., 2001; Information Technology Association Jordan (INT@J), 2003; National Academy of Sciences of Belarus, 2003; Ulukan, 2005).

**Network enablers**
This category concerns plans, policies and strategies adopted by higher educational institutes to improve the use of e-learning (Grant et al., 2001; Owen et al., 2001; Ulukan, 2005).

**Curriculum design**
Involves developing teaching materials and educational courses that aim at promoting literacy and e-learning skills among learners (Information Technology Association Jordan (INT@J), 2003; Lewis and Goodison, 2004).

**Cooperation**
This aspect is concerned with collaboration with other people, stakeholders, public and private organizations and other countries in order to benefit from their experiences in the implementation and use of e-learning at the higher education institutions (European Commission, 2001; Armenia Development Gateway Foundation, 2003).
The selected recommendations along with their frequencies and their aspects are shown in Table 1.

Data collection

At this stage, in order to select appropriate recommendations well fitted to Iran’s internal situations from among those extracted earlier, a survey questionnaire was conducted. This questionnaire was developed based on the recommendations that were frequently cited in different studies. It consisted of two types of questions: (1) How important is the recommendation? (2) Has it been implemented yet or is it being implemented now in Iran? Responses to the first type of the survey questions on the recommendations were entered on a five-point Likert-type scale with values ranging from one (strongly disagree) to five (strongly agree). The purpose of the second type of questions was to determine whether the recommendations have already been implemented or not, in Iran, so the responses were entered on a nominal scale with values, one (implemented) or zero (not implemented).

To test our recommendations, the questionnaire was sent via e-mail to 153 managers of Iranian higher education institutions and 947 faculty members considered as experts in this research. The higher education institutions were on the list available in the Iran’s Ministry of Science, Technology and Research website. The faculty members included those who hold Ph.D. in the fields pertinent to ICT (computer engineering, electrical engineering, industrial and system engineering, IT engineering and management and so forth) and had the research interests and professional experiences in e-learning development area at higher education institutions.

In addition, the managers were those who had influence on the e-learning development policies implemented by higher education institutions — decision-maker/policy-makers who oriented these policies. All the respondents were expected to be knowledgeable in the field of e-learning systems.

To ensure its validity and reliability, before the administration of the final survey, a random subset of 10 experts from among those described earlier was used for pilot testing. The respondents were asked to judge the degree to which they agreed with the devised items in the questionnaire. Fortunately, all of them took their time and reviewed the questionnaire meticulously. Their comments were taken into account and the questionnaire was revised for any potentially confusing items. Thus, the content validity of the questionnaire was incorporated into the survey.

Finally, after gathering the responses, 264 usable responses were completed, producing a 24% response rate. The analysis of the responses revealed that 15% of the participants were managers of higher education institutions
and 85% of them were faculty members. Among the managers, 66% had an average work experience of 4 years in the field of e-learning and overall 20 years in the education. In addition, 56% of respondents hold a Ph.D. degree and the rest a Master’s degree.

With respect to reliability, Cronbach’s alpha was computed. Alpha coefficients for these two types of questions were 0.883 and 0.912, respectively. These high estimates of reliability indicated the internal convergence between questions, and therefore the questionnaire had high reliability.

**Data Analysis**

After gathering the data to select the most important recommendations based on experts’ opinions, analysing the usable responses, a one-tailed (lower-tail) t-test was carried out for each recommendation. This test was carried out strictly so that the mean value was considered as four. It is worth mentioning that the choice of the mean value is somewhat arbitrary and the higher the mean value, the stricter the test is.

Thus, it was intend to test $H_0: \mu = \mu_0 = 4$ vs the alternative $H_a: \mu < \mu_0 = 4$, where $\mu$ is the mean of a single normal population. The rejection region is given by $T < -t_{0.05} = -1.670$ at the $\alpha=0.05$ level of significance, where $T$ possesses $df=263$ degrees of freedom. Rejection of null hypothesis demonstrates that the recommendation is not important for implementation.

Furthermore, to identify those recommendations that have not been implemented in Iranian higher education institutions, proportion test was carried out. Thus, it was desired to test the null hypothesis $\theta = \theta_0 = 0.5$ against the alternative hypothesis $\theta < \theta_0 = 0.5$, where $\theta$ is the parameter of a binomial population (Miller and Miller, 2003).

In this test, $P$-value was used in order to decide whether the observed data lead to the rejection of the null hypothesis. $P$-value or attained significance level is the smallest level of significance $\alpha$ for which observed data indicate that the null hypothesis should be rejected (Mendenhall et al., 1990). If an experimenter’s choice of $\alpha=0.05$ is greater than or equal to the $P$-value, the null hypothesis is rejected. Otherwise, if $\alpha$ is less than the $P$-value, the null hypothesis cannot be rejected.

**Results and Discussion**

At this stage, the recommendations extracted from the previous stages were categorized based on different criteria and analysed. First, the views of the experts and the above-mentioned tests were exploited to select the
recommendations that agree with Iran’s internal situation. The results of t-test and proportion test are indicated in Table 2.

Second, using Scree test, the recommendations were classified based on the number of times used in different countries (their frequency in countries). This method, proposed by Cattell, plots the successive frequency, which drops off sharply and then tend to level off (Department of IT of India, 2004). It suggests retaining all frequencies in the sharp descent before the first one on the line where they start to level off. Figure 1 illustrates the implementation of Scree test.

As it is clear from Figure 1, using Scree test, recommendations are categorized into three groups:

- Recommendations of high importance (with the frequency more than six)
- Recommendations of medium importance (with the frequency between four and six)
- Recommendations of low importance (with the frequency less than four)

Table 3 shows the categorization of the recommendations based on their frequency in different countries.

According to Table 3, the recommendations of infrastructures and technology and human resources aspects were attended by many higher education institutions of countries for their e-learning development; therefore, recommendations R1, R2 from infrastructures and technology, and recommendations R8, R10 from human resources are in level of high importance. Meanwhile, recommendations R3, R4 and R6 from infrastructures and technology and recommendation R9 from human resources are of medium importance. To improve e-learning usage, these countries urge users and individuals involved in the educational system, in addition to having a developed and integrated ICT systems structure and investing on requisite infrastructure for the use of e-learning, to be informed of opportunities and advantages brought about by e-learning. Furthermore, they should be knowledgeable about IT processes supporting educational operations and be interested in applying these processes. Therefore, in human resources aspect, countries have devoted much importance to training employees, educators and learners in the field of ICT, as well as hiring individuals in higher education institutions that are in favor of the usage of e-learning.

Cooperation and collaboration between private and public sectors in the e-learning projects and adopting other countries’ experiences is another crucial aspect that countries take into consideration (with recommendations R20, R22, R23). Collaboration with other educational institutions can guarantee the success and sustainability of e-learning providers’ initiatives. E-learning initiatives can greatly benefit from experiences of other countries and the private sector. Cooperation with the private sector (especially in the
<table>
<thead>
<tr>
<th>Aspects</th>
<th>Recommendation code</th>
<th>Extracted recommendation</th>
<th>Frequency</th>
<th>Results of t-test</th>
<th>Results of proportion test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Test statistic</td>
<td>Lower-tail H₀</td>
</tr>
<tr>
<td>Infrastructures and Technology</td>
<td>R₁</td>
<td>Connecting the higher education institutions to broadband</td>
<td>9</td>
<td>6.997</td>
<td>−1.67 accepting</td>
</tr>
<tr>
<td></td>
<td>R₂</td>
<td>Increasing the investment in new hardwares, softwares, network access and educational content for higher education institutions</td>
<td>8</td>
<td>2.239</td>
<td>−1.67 accepting</td>
</tr>
<tr>
<td></td>
<td>R₃</td>
<td>Acquire well-integrated ICT systems that support e-learning</td>
<td>4</td>
<td>1.661</td>
<td>−1.67 accepting</td>
</tr>
<tr>
<td></td>
<td>R₄</td>
<td>Provide improved and sustainable platform for e-learning</td>
<td>6</td>
<td>−1.000</td>
<td>−1.67 accepting</td>
</tr>
<tr>
<td></td>
<td>R₅</td>
<td>Develop high competence in ICT</td>
<td>2</td>
<td>1.544</td>
<td>−1.67 accepting</td>
</tr>
<tr>
<td></td>
<td>R₆</td>
<td>Develop ICT infrastructure within the higher education institutions and provide in-house training through e-learning systems</td>
<td>4</td>
<td>2.154</td>
<td>−1.67 accepting</td>
</tr>
<tr>
<td></td>
<td>R₇</td>
<td>Focusing on asynchronous communication. Students’ time flexibility leads to asynchronous communication and little focus on synchronous communication technologies</td>
<td>2</td>
<td>−3.507</td>
<td>−1.67 rejecting</td>
</tr>
<tr>
<td>Human resources</td>
<td>R₈</td>
<td>Training the employees, students and professors in ICT area based on international standards to enhance ICT-based knowledge</td>
<td>10</td>
<td>1.561</td>
<td>−1.67 accepting</td>
</tr>
<tr>
<td>Aspects</td>
<td>Recommendation code</td>
<td>Extracted recommendation</td>
<td>Frequency</td>
<td>Test statistic (T)</td>
<td>Lower-tail (-t_a)</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>-----------</td>
<td>--------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td></td>
<td>R_9</td>
<td>Informing and improving the ICT knowledge level of managers and decision-makers of higher education institutions to introduce ICT as a tool for improved teaching and learning experience</td>
<td>6</td>
<td>2.177</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R_10</td>
<td>Attract enthusiastic employees who believe in online education</td>
<td>10</td>
<td>0.205</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R_11</td>
<td>Providing incentives for those instructors that use e-learning in their daily training</td>
<td>3</td>
<td>-1.648</td>
<td>-1.67</td>
</tr>
<tr>
<td>Network enablers</td>
<td>R_12</td>
<td>Developing strategies that support online education and make sure that the employees are loyal to the strategy</td>
<td>6</td>
<td>3.999</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R_13</td>
<td>Considering privacy and security issues associated with e-learning</td>
<td>3</td>
<td>-0.239</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R_14</td>
<td>Changing or modifying higher education institutions culture to achieve the e-learning strategic objectives</td>
<td>3</td>
<td>2.325</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R_15</td>
<td>Setting standard for evaluating e-learning systems</td>
<td>3</td>
<td>1.305</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R_16</td>
<td>Centring the focus of higher education institutions on R&amp;D of e-learning in higher education institutions</td>
<td>2</td>
<td>-0.190</td>
<td>-1.67</td>
</tr>
<tr>
<td>Recommendation Number</td>
<td>Description</td>
<td>Value 1</td>
<td>Value 2</td>
<td>Value 3</td>
<td>Value 4</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>R17</td>
<td>Incorporating ICT learning as a discrete course in obligatory educational curriculums of higher education institutions</td>
<td>-2.611</td>
<td>-1.67</td>
<td>-0.28</td>
<td>0.996</td>
</tr>
<tr>
<td>R18</td>
<td>Selecting a wise choice of topics, courses and programmes that are onlineable</td>
<td>-0.751</td>
<td>-1.67</td>
<td>-0.34</td>
<td>0.975</td>
</tr>
<tr>
<td>R19</td>
<td>Providing balance between industry, business and technology needs in creating online educational content</td>
<td>-0.455</td>
<td>-1.67</td>
<td>-0.13</td>
<td>1</td>
</tr>
<tr>
<td>R20</td>
<td>Take initiatives to build partnership programmes with government and other peer organizations on a win-win condition</td>
<td>-4.767</td>
<td>-1.67</td>
<td>-0.09</td>
<td>1</td>
</tr>
<tr>
<td>R21</td>
<td>Encouraging cooperation between private and public sectors in the projects aiming at launching e-learning projects in higher education institutions</td>
<td>-1.761</td>
<td>-1.67</td>
<td>-0.25</td>
<td>0.999</td>
</tr>
<tr>
<td>R22</td>
<td>Cooperating and collaborating with stakeholders, particularly professors, to ensure successful implementation of designed strategies in the case of e-learning</td>
<td>-2.552</td>
<td>-1.67</td>
<td>-0.16</td>
<td>1</td>
</tr>
<tr>
<td>R23</td>
<td>Sharing with other countries and regional groups the successful experiences in e-learning policies in higher education institutions</td>
<td>-1.099</td>
<td>-1.67</td>
<td>-0.09</td>
<td>1</td>
</tr>
</tbody>
</table>
technological field) is necessary, but not sufficient in itself. The government has to become the prime mover in ICT adoption. However, successful implementation of an e-learning programme requires the incorporation of all the different stakeholders, particularly professors.

For any business such as a higher education institution providing e-learning, the key components are viability and profitability. Nowadays in the current competitive market, these capabilities depend on the strategy of the business and the skilled manpower, which can execute the strategy. Robust and sustainable e-learning initiatives should have strategies that support online education to be and remain successful. On the other hand, the perceived profitability of e-learning has attracted many new publicly funded and for-profit providers into the field of distance education. To deal with this competition, the leaders of higher education institutions should explore and consider the appropriate strategic options open to them nationally and globally. Hence, here, the countries stress that formulating an integrative vision and general strategy builds a coalition of supporters that is a prerequisite for

Table 3  Categorization of the recommendations based on their frequency

<table>
<thead>
<tr>
<th>Categorization</th>
<th>Recommendation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>R_1, R_2, R_8, R_10</td>
</tr>
<tr>
<td>Medium</td>
<td>R_3, R_4, R_6, R_9, R_12, R_20, R_22, R_23</td>
</tr>
<tr>
<td>Low</td>
<td>R_5, R_7, R_11, R_13, R_14, R_15, R_16, R_17, R_18, R_19, R_21</td>
</tr>
</tbody>
</table>

Figure 1. Classification of recommendations using Scree test.
successful implementation of e-learning (with recommendation R_{12}). Such a coalition of supporters endorses the strategy, guides and coordinates the process by which the strategy will be implemented.

Finally, a general categorization of the recommendations was performed based on the following three criteria: experts’ opinions, their frequency in different countries and whether or not the recommendations have already been implemented in Iran. General categorization is displayed in Figure 2.

On the basis of the three criteria discussed earlier, the recommendations can be categorized as:

- **Type I:** These recommendations were those with frequency one in countries, so they were dropped from the set of recommendations and were not considered in the survey.
- **Type II:** This type involves those recommendations that have been implemented in Iran, but experts consider them as highly important; therefore, it is essential to evaluate their implementation and to make the required modifications. In evaluating the implementation of these recommendations, priority is given to those that have high or medium importance with respect to the frequency of their presentation in different countries.
- **Type III:** This type refers to recommendations that are regarded as significant in experts’ opinions, with respect to the frequency of their presentation in different countries, and have not yet been implemented in Iran. It is necessary to implement these recommendations that are in urgent need of the implementation.
- **Type IV:** These recommendations are viewed as important in experts’ opinions, have medium importance with regard to the frequency of their presentation in different countries and have not been implemented in Iran before. Although the implementation of these recommendations seems necessary, Type III Recommendations have priority over them.
- **Type V:** This type concerns those recommendations to which significance is attached by experts, have low importance concerning the frequency of their presentation in different countries and have not been implemented in Iran before. They are peculiar to Iran and are given low priority compared to Type IV Recommendations.
- **Type VI and VII** Recommendations are those to which importance is ascribed by experts and have high or medium importance with respect to the frequency of their presentation in different countries, respectively. These recommendations have no priority for implementation, but can be implemented in certain cases. In this paper, they were not considered as proposed recommendations either.
- **Type VIII:** This type is concerned with those that are not of any significance in experts’ opinions, of low importance with respect to the frequency
Figure 2. General categorization of the recommendations.
of their presentation in different countries, and have no priority for implementation.

In this paper, Type III, IV and V Recommendations were proposed to promote e-learning at Iranian higher education institutions. However, not all countries and their higher education institutions are at the same level of ICT development or have well-developed (e)-learning systems. Therefore, countries differ in terms of their need for and interest in exploiting the proposed recommendations. As a result, the list of the recommendations presented here is not a rigid one and each country should modify and customize it as appropriate for its internal conditions.

Table 4 illustrates the general categorization for each recommendation.

Owing to the variety of advantages considered, higher education institutions are resorting to e-learning to provide online instruction, on the one hand, while time, financial and human resources limitations, on the other hand, require us to prioritize the proposed recommendations for implementation in Iran — recommendations that are important based on experts’ opinions. Hence, these recommendations were ranked based on the average of the degree of importance accorded in experts’ opinions. The rankings of the proposed recommendations are shown in Table 5.

Considering Tables 3 and 5, the priorities accorded by experts’ opinions to the recommendations confirm the previous studies. In other words, the views

<table>
<thead>
<tr>
<th>Rank</th>
<th>Mean</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.72</td>
<td>R₁</td>
</tr>
<tr>
<td>2</td>
<td>4.44</td>
<td>R₁₂</td>
</tr>
<tr>
<td>3</td>
<td>4.35</td>
<td>R₁₄</td>
</tr>
<tr>
<td>4</td>
<td>4.31</td>
<td>R₂₂</td>
</tr>
<tr>
<td>5</td>
<td>4.26</td>
<td>R₉</td>
</tr>
<tr>
<td>6</td>
<td>4.22</td>
<td>R₈</td>
</tr>
<tr>
<td>7</td>
<td>4.22</td>
<td>R₃</td>
</tr>
<tr>
<td>8</td>
<td>4.16</td>
<td>R₁₅</td>
</tr>
<tr>
<td>9</td>
<td>4.03</td>
<td>R₁₀</td>
</tr>
<tr>
<td>10</td>
<td>3.97</td>
<td>R₁₃</td>
</tr>
<tr>
<td>11</td>
<td>3.97</td>
<td>R₁₆</td>
</tr>
<tr>
<td>12</td>
<td>3.94</td>
<td>R₁₉</td>
</tr>
<tr>
<td>13</td>
<td>3.88</td>
<td>R₁₈</td>
</tr>
<tr>
<td>14</td>
<td>3.81</td>
<td>R₂₃</td>
</tr>
<tr>
<td>15</td>
<td>3.78</td>
<td>R₄</td>
</tr>
<tr>
<td>16</td>
<td>3.78</td>
<td>R₁₁</td>
</tr>
</tbody>
</table>
of Iranian experts on recommendations are more or less similar to those stemming from the literature. As a result of the comparison between experts’ opinions and the literature the following findings can be achieved:

- In the 21st century, developing the broadband networks is the most important ICT infrastructure at higher education institutions (Ireland Information Society Commission, 2002). Broadband is an enabler infrastructure through which knowledge and information can be accessed, used and shared. The importance of broadband to the higher education institutions will not be less significant than that of electricity to the industrial development in 20th century. All ICT-related educational programmes should be planned on the basis of a powerful infrastructure — the main one being broadband (Armenia Development Gateway Foundation, 2003). Therefore, broadband investment has to be guided by a clear sense of its importance as a key infrastructure and the main stimulus for developing e-learning at higher education institutions, particularly in developing countries (National Academy of Sciences of Belarus, 2003). Experts stress the importance of broadband and put emphasis on connecting the higher education institutions to broadband as the most important recommendation for improving e-learning.

- The most significant role fulfilled by the top management of higher education institutions in the field of e-learning is to formulate an integrating vision and general strategy that is responsive to the needs of all sectors (Ireland Information Society Commission, 2002; Ulukan, 2005). Formulating the strategy is the most important driver of e-learning development at higher education institutions (Lewis and Goodison, 2004). Having a transparent and integrated strategy for e-learning makes the initiatives and approaches robust, and they have the least change in the event of changed local circumstances (Lewis and Goodison, 2004). The strategy of each higher education institutions distinguishes it from the others and will provide a sustainable competitive advantage (Ulukan, 2005). Despite

<table>
<thead>
<tr>
<th>General categorization</th>
<th>Recommendation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>R₃, R₅, R₆</td>
</tr>
<tr>
<td>III</td>
<td>R₁, R₂, R₈, R₁₀</td>
</tr>
<tr>
<td>IV</td>
<td>R₄, R₆, R₁₂, R₂₂, R₂₃</td>
</tr>
<tr>
<td>V</td>
<td>R₁₁, R₁₃, R₁₄, R₁₅, R₁₆, R₁₈, R₁₉</td>
</tr>
<tr>
<td>VI</td>
<td>—</td>
</tr>
<tr>
<td>VII</td>
<td>R₂₀</td>
</tr>
<tr>
<td>VIII</td>
<td>R₇, R₁₇, R₂₁</td>
</tr>
</tbody>
</table>
the establishment of infrastructure at Iranian higher education institutions, since these institutions lack an integrated and appropriate e-learning strategy, e-learning has not fully developed and is still going through its initial stages.

- There are several factors that impact upon the successful implementation of e-learning strategies at higher education institutions. The important ones are described below.

1. One of the most important factors is to change the organizational culture to implement e-learning in learning and teaching — a cultural climate in which the staff acknowledge that their practice in teaching and supporting learning has to be updated regularly (Lewis and Goodison, 2004). The leaders and managers need to identify the dominant culture in their higher education institutions and attempt to affect or manage it in a systematic way in the pursuit of the organizational goals.

2. The successful implementation of the strategy is dependent on appointing key staff to act as ‘champions’ of the initiative. The approach to strategy implementation should be based on satisfaction, not obligation, and emphasize on opportunity-creating and supporting the professors and employees. Instead of specifying detailed guidelines for change at all levels of higher education institutions, it is advisable to encourage middle- and lower-level managers to transform their own units in a way that is consistent with the vision and strategy (Ulukan, 2005).

3. Increasing the employees’ awareness, developing the skills of managers and adopting the key individuals and stakeholders for using e-learning in education and learning is one of the main drivers for successful implementation of e-learning strategy at many higher education institutions (Ireland Information Society Commission, 2002; Ulukan, 2005).

These factors were emphasized by experts in the recommendations ranked third, fourth and fifth.

**Conclusion and Limitations of Research**

The purpose of this paper is to extract recommendations that promote the use of e-learning in higher education institutions in developing countries, particularly in Iran. This research draws upon previous innovative research on recommendations for improving e-learning, and corroborates some of the findings of these studies indicated earlier (e.g., the importance of infrastructure and technology and human resources in enhancing the use of e-learning). The paper identifies five significant aspects of enhancing e-learning development in developing countries. They are ‘infrastructures and technology’, ‘human resource’, ‘network enablers’, ‘curriculum design’ and ‘cooperation’.
Since countries selected for extracting their recommendations are those whose internal circumstances resemble Iran’s, the outcome of this paper would be of critical significance for higher education institutions in developing countries in general and in Iran in particular, as they plan further investments in e-learning systems. By applying the proposed recommendations, higher education institutions could successfully improve key areas that are necessary to efficient and effective use of e-learning.

Finally, this paper contributes to e-learning literature and creates additional poll of resources that practitioners and academics could use to further enrich and extend their knowledge of the evolving phenomenon. Empirical data on e-learning development and growth in Iran is still in its infancy; nonetheless, it is moving towards enhancing and extending the discussion on e-learning as a global platform for instructional activities.

It should be admitted that the present study suffers from a number of limitations: first, the response rate was nearly low, and therefore the power of the study may not be high. Second, the local survey involved representatives of national chains. Although managers of higher education institutions are knowledgeable about IT processes supporting their operations, their IT expertise level may not be at the same level of IT professionals.

Note

1 A ‘megaprovider’ is a term coined by the MegaTrends project for a project conforming to the concrete and measurable indicators of the critical mass required for a ‘European Mega E-learning Provider’ in the following four dimensions:
   ● an e-learning system with more than 5000 enrolments per year; or
   ● an e-learning system with more than 100 courses on offer on any one time;
   ● the project focuses only on distance learning situations, which means that courses should be included only if designed for and aimed at distance (off-campus) students; and
   ● at least 50% is normally provided as e-learning (the provision of some e-learning modules in forms of blended learning by face-to-face institutions for their on-campus students is not the focus of this project)

There is a list of Megaprovoders by country at http://nettskolen.nki.no/in_english/megatrends/nominated.html#Country

References


