

DESIGN AND DEVELOPMENT OF E-COURSES: REQUIREMENTS, CHALLENGES, AND ASPIRATIONS

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ABSTRACT: *The present study aimed to identify the requirements and criteria of instructional design of e-courses in addition to what degree faculty members are familiar with such skills and requirements. It also sought to identify the most important visions for the development and design of e-courses from the perspectives of experts and faculty members besides the main obstacles that face them during the design process. The descriptive approach was used to carry out the study. The questionnaire is a main study tool used for data gathering. A sample of (101) was randomly selected out of the faculty members at the College of Education and the College of Science and Arts was randomly selected. Findings indicated that there were certain criteria and requirements for the instructional design of the e-courses that faculty members should refer to in order to obtain a suitable e-content. There were significant differences between the faculty members' degree of knowledge and degree of use in favor of their knowledge degree of the instructional design skills. Furthermore, their knowledge degree was moderate and their use degree was low. Results also showed that there were certain obstacles facing faculty members while developing their e-courses. The most prominent obstacles were the lack of enough training workshops for the basics of e-courses design and development in addition to the lack of e-laboratories for training on the primary development of e-courses. The most important visions provided by faculty members were the development of faculty members' skills of the e-courses design via specific training workshops besides following quality international criteria when they design and develop e-courses.*

KEYWORDS: Instructional design, e-courses, e-Learning, learning management system, Najran University.

INTRODUCTION

The current era is characterized by many rapid changes resulting from the tremendous progress and development in the field of technology, science and information technology. It has been necessary to develop the educational process to keep along with these developments. Attention should be paid to the design and development of e-content regarding accurate criteria that achieve the greatest interaction between the learners and teaching content.

The instructional design is the main component in any educational program or teaching course whether traditional or electronic. Its importance increases in the e-learning environments as it transfers the teaching content from merely a presentation via a computer to an integrative educational program that achieves specific learning outcomes. It also facilitates knowledge transfer and the acquisition of skills while keeping the good quality of the learning outcome. Learning instructional design is built upon the perception of learning outcomes, drawing the plans, defining the appropriate strategies and methods of electronic and interactive assessment to reach the desired outcomes. The importance of the instructional design is clearly seen in the

fact that it is the main factor in judging the efficacy or the educational process using the means of the multimedia.

Instructional design can be defined as a set of logical and scientific steps that account for the learner's needs, aims. They also take into consideration the development of transferring systems to face these needs and be concerned to develop, test, and retest the educational activities. Instructional design is the engineering of the educational process that seeks systematic development of scientific procedures aiming at the achievement of education in a limited time and space, (Al-Robaie, 2009). It is a bridge that connects the theoretical sciences, cognitive sciences, behavioral sciences, and applied sciences, and the use of technology in the learning-teaching processes. Thus, it can be claimed that instructional design is a warranty to avoid any conflict between the curriculum being taught, the teaching methods being used, the environment of being chosen, and the ways of assessment we adopt, (Abo- Khotwa, 2010).

Digital curricula mostly adopt one model of the instructional design models for electronic environments. The model of the instructional design is seen as the engineering design for the process of construction. Therefore, it is important to adopt a specific model to clarify the relationship among all components for the sake of understanding them appropriately. In brief, instructional design can be defined as “a mental abstract perception” to describe procedures and processes related to instructional design and its development, to define the interactive and interchangeable relationships between these processes and procedures, and presenting them in a simple picture as a linear drawing accompanied by a verbal description with a directive framework for these processes and relationships to understand, organize, interpret, and modify them, and explore new relationships and predict their results, (Khamis, 2006:23).

ADDIE model for instructional design

Despite the many models for the instructional design, ADDIE model is the most chosen one. Most educational experts and stakeholders in addition to instructional designers are still like and recommend it because it is simple, flexible, and can be used in the design of any kind of education or training. It helps the development of a common vision for eLearning and understanding the relation among the steps of education. It is the most effective in achieving the aims of the educational regime, (Driscoll, 2008: 82). Figure (1) shows ADDIE model.

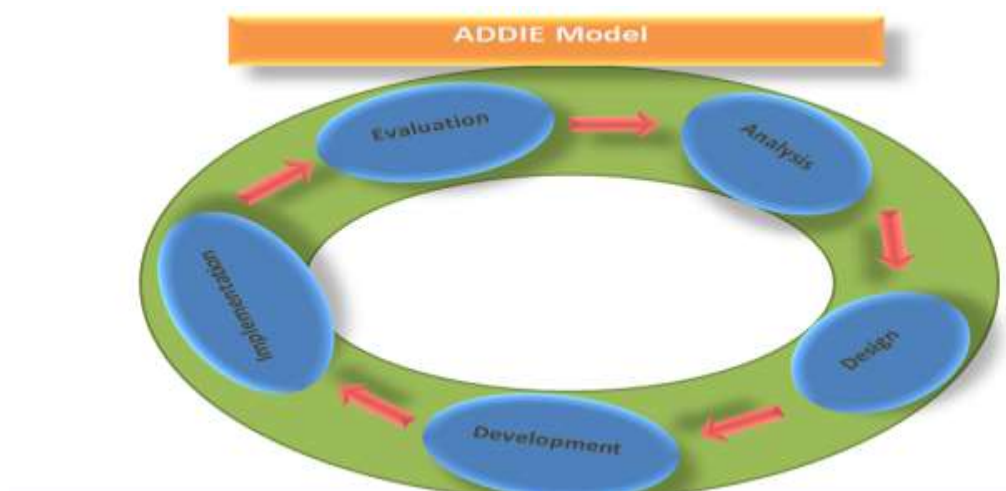


Figure 1: ADDIE Model

ADDIE model consists of the following main five main steps as mentioned by **Azmi (2016)**, **Al-Saleh (2005)** and **eLearning center (2009)**:

1. **Analysis phase** where the problem is identified, the scientific material is analyzed into facts, concepts, principles and laws. Moreover, needs and aims are defined and checked whether they cover the whole topics. The content itself is also analyzed into smaller pieces to be easily collected. Furthermore, characteristics of learners, levels of aims, activities, ways of assessment that fit the instructional environment are then determined. Gaps are distinguished and filled. The virtual environment is explored taking into consideration the logical sequencing. Data is ordered into prior information and multimedia. Finally, the pattern of teaching whether co-teaching or web-based is defined.
2. **Design phase** which involves the definition of specifications, the preparation of teaching strategies, the collection of the scientific material, the selection of the means of learning, the methods, and the necessary potentials, and the tools of assessment on paper in the form of preliminary drafts are the most important things that take place in this phase. After that, the description of procedures related to how to implement, setting aims and their levels, determining the method of assessment, creating a story board, and putting forward proposals course design take place.
3. **Development phase** which involves content composition regarding the decision taken in the previous phase where pictures, videos, interactive exercises, activities, and self-assessment exercises are collected and developed. After that, follow the step of content storage where the best educational treatments and plans are determined and applied to individuals and then to small groups to later on apply it where necessary.
4. **Implementation phase** where the teaching content is uploaded to the available eLearning management system. Teachers are trained how to use this system and interact with the e-content and assessment. The product is finally implemented in the targeted learning environment.
5. **Evaluation phase** where the efficiency and proficiency of the product is measured through the evaluation of all previous design phases in addition to making a decision regarding the product quality. Evaluation is carried out into two forms. Formative assessment where the e-course is evaluated and remarks from the first phase of the course development and building are gathered. While statistical evaluation is conducted via some tests and questionnaires related to the course after the implementation phase. Finally, some notes are taken from learners or trainees.

Requirements of the design of e-courses

The requirements of the design of the e-courses involve a set of elements, (**Abed Al- Atti, 2007**), (**Abo Shawish, 2013**) and (**Abu Khotwa, 2011**). These elements are re-classified and organized into these two main categories:

First: requirements related to the faculty member

1. Faculty members' mastery over the skills for computer use and Internet including surfing the net, uploading files, coping with an email, Microsoft Excel and Word in the right way.

2. Faculty members' mastery over the design of the educational software, the development and editing of media needed for the e-course such as pictures, videos, and sounds.
3. Faculty members' mastery over the skills of eLearning, the skills of communication and interaction with learners, the skills of electronic activities design, and the tools of the e-course.
4. Faculty members' mastery over the ways of assessment and evaluation, i.e. e-tests and e-assignments.
5. Faculty members' knowledge of the skills of the instructional design besides the criteria and assessment of the e-courses.

Second: Requirements related to the university and eLearning administration

1. The provision of infrastructure such as Internet and equipment.
2. The provision of a unit for the development of e-courses.
3. The provision of immediate technical support to repair any faults during lectures or tests.
4. The provision of a unit for the technical support specific for students and faculty members.
5. The provision of finance to support the development of e-courses.

General criteria for the design of e-courses

The general criteria for the design of e-courses are the main director or guide for the design of the e-courses. They involve these points as stated by **eLearning center (2008)**:

1. Depending while designing the course on the aims not the content.
2. Mentioning the educational aims (learning outcomes) at the beginning of each educational object.
3. Adding self-evaluation at the end of each educational object.
4. Not using sound or video file except when needed.
5. The course content should be complete, free from scientific errors, and fits the learner's level.
6. The content should be provided with accurate references and scientific resources that can be easily accessed.
7. The course should be provided with varied activities that encourage creative and critical thinking.
8. The number of assignments in the course should be appropriate.
9. To activate cooperation, propose some topics to be discussed in dialogue forum.
10. The course should be zipped using IEEE, IMS, or SCORM.
11. Paying attention to the size of zipping file.

Jung & Rha (2000:57) believe that e-courses' superior design achieves the learning aims and affects the learner's interaction and satisfaction with teaching. **Mehlenbacher, et.al. (2005)** pointed out that it is important to design the e-courses well to overcome some eLearning problems. **Tawfiq (2016)** stated that the success of eLearning is the result of the link made by the programs of instructional design between the design of learning tools according to the learning theory and the technology choice and use. Many other studies in this field indicated that instructional design is important for drawing the e-course map. **Al Saleh (2005)** for example tried to determine the criteria for evaluating the quality of eLearning instructional design. It also aimed to propose an approach for evaluating and measuring the course fitness level for the criteria of evaluation of the quality of instructional design. Findings indicated that there were nine criteria mainly, institutional support, Technical Support, student support, faculty support, technology, instructional design, technical design, cost effectiveness, and evaluation. The study also concluded that there were ten criteria for the evaluation of the quality of eLearning instructional design from which (116) criteria were generated to measure the course achievement level of specified criteria.

Zaharias, et.al. (2008) conducted a study that focused on fundamental and helpful elements in the design of asynchronous eLearning involving interactive content design, provision of constructive feedback, navigation support, visual design enhancement, support provision and directions for learners, ease of use, enhance the learner's abilities and increase the motivation to learn. Analysis of these elements indicated that they cover all processes in the e-learning design. They were all essential and indispensable.

Al-Qassas (2008) concluded that the most important topics that must be covered by the e-curriculum are Course Forum, Course Information, Course Evaluation Forum, Pre-test, General Course Objectives, Course Requirements, Course Teaching Material, Location Map, Glossary, General Questionnaire, Grading System, and Course Schedule.

Perez (2011) aimed to identify how faculty members incorporate the principles of instructional design in the development of e-courses. The study concluded the importance to educate faculty members how to design the e-courses. **Abu Shawish (2013)** studied the effectiveness of a proposed program for the development of e-courses skills on the web. Results asserted the effectiveness of the proposed program and recommended its application to all faculty members.

Abed Al-Ghafoor (2012) highlighted the importance of linking theory to practice in addition to its role in the instructional design. It also tried to determine the results and outputs of eLearning. Results showed that experimental, cognitive and social theories can form a basis for any electronic instructional design. In addition, the degree of awareness of eLearning users regarding how technology is used in educational contexts was low, which requires the identification of eLearning models based on teaching assets. They should be distinguished from those based on randomized or unplanned practices or that which tend to focus on tools and neglects the educational dimension.

Tawfiq (2016) aimed to identify the obstacles to the design of e-courses from the point of view of faculty members. Findings pointed out that there are obstacles faculty members suffer from when designing e-courses. The most effective obstacles were the technical and equipping obstacles including the lack of modern devices and laboratories, not allocating hours for training on the design of e-courses, design obstacles represented the second kind of these obstacles while self-obstacles were the least effective ones.

Afifi, et.al. (2016) indicated the importance of developing quality criteria for the instructional design of eLearning courses. Nine major areas, including ten general criteria, twenty sub-criteria and (170) indicators for measuring criteria' achievement. A step-by-step scale was also designed to evaluate the quality of instructional design of eLearning courses.

In conclusion, the review of the related literature has shown that nearly all studies have emphasized the importance of the instructional design of the e-courses. They all have indicated the importance of developing faculty members' skills in the instructional design. Some of these studies focused on identifying the frameworks, criteria and elements of the e-courses design and development like, **Zaharias (2008)**. Some of them addressed the identification of the fields and criteria of the e-courses evaluation like **Al-Saleh (2005)**. Some sought to identify the obstacles facing the design and development of the e-course as **Tawfiq (2016)**. Others tried to investigate how technology can be integrated in the educational contexts through the determination of models and plans previously specified as in **Abed Al-Ghafoor (2012)**. Whereas **Afifi, et.al. (2016)** tried to define criteria that help developing the quality of instructional design for the eLearning. However, the present study aims at identifying the criteria of e-courses design and development. It also seeks to investigate o what level faculty members possess the skills of instructional design and to what degree they use them in their e-courses. Moreover, the study tries to reveal the obstacles facing faculty members when designing their e-courses besides their visions and perception regarding how e-courses instructional design at Najran University, in specific and all universities in general, can be enhanced.

Aims of the study

The present study aims to:

1. Identify the criteria and requirements of the instructional design and development of the e-courses.
2. Identify to what degree faculty members possess and use the skills of instructional design of the e-courses.
3. Identify the most prominent obstacles for the design, development and development of the e-courses facing faculty members.
4. Identify the most important visions of faculty members and experts for developing the instructional design and development of the e-courses.

Statement of the problem

Whatever the teaching material is rich in information and theoretical knowledge that learners should have however it needs proficient teachers to use and translate them to a digital form in an interactive way on the learning management system. Because Najran University has completely adopted eLearning in some courses, a shortage in some skills for the e-courses design among faculty members was noticed by the researcher of the present study. Thus, the idea of the present study stemmed to identify the most important skills that a faculty member should have and be able to use while designing and producing his e-courses. In addition, the study seeks to point out the criteria and requirements of such a design that all faculty members should be familiar with to achieve the desired learning outcomes. In short, the present study seeks to answer these questions:

1. What are the criteria and requirements for the design and development of the e-courses that faculty members should have?
2. To what degree do faculty members have and use the skills of the instructional design of the e-courses?
3. Are there statistically significant differences between faculty members' degree of knowledge and degree of use of the skills of the e-courses instructional design?
4. What are the most prominent obstacles for the design, use and development of the e-courses facing faculty members?
5. What are the most important faculty members and experts' visions for developing the instructional design and the development of the e-courses?

Importance of the study

The present investigates the importance of the educational design of e-courses. It is important to identify the specific design bases that teachers of e-content should refer to so that they can present and introduce the teaching content better, more attractive and more beneficial. Doing so can provide learners with feedback and distinctive interaction with teachers and the e-content. Therefore, the present study is an attempt to establish knowledge bases for the criteria of e-courses design and development from which educational institutions can make use to develop their own e-content. Faculty members, especially beginners can be guided to design and develop their e-courses. Moreover, it can disseminate the culture of interest in the specific criteria of e-courses instructional design and development based on eLearning at Najran University.

METHODOLOGY

To achieve the aims of the present study, the descriptive approach was used. It is one of the scientific research approaches, which studies the phenomenon as it is, describes it accurately and expresses quantitatively or qualitatively. Survey and analysis of related literature and previous studies related to the field of the study was carried out to identify and validate the skills of e-courses design and development.

Population and sample

The population of the present study involved all faculty members at Najran University. A random sample of (101) of those faculty members was randomly selected to identify the degree to which they have and use the skills of the instructional design in their e-courses.

The instrument

After the review process of the previous studies and related literature, a two-part questionnaire was developed as the main instrument for data collection in the present study. It consisted of two main parts. The first part addressed the skills of e-courses design and development in light of ADDIE design model because of its fitness for e-courses design on the web and comprehensiveness for all instructional design phases. ADDIE is also simple, clear, modern and flexible while being applied to all educational environments. The second part of the

questionnaire consisted of two open-ended questions. The first question looked for the most prominent obstacles facing the design of e-courses. The second one looked for the most important visions to develop the e-courses in future.

Validity and reliability of the questionnaire

To verify the validity of the questionnaire, it was presented to a number of specialists in the field of educational technology. Modifications were necessary according to their views were made. While its reliability was verified by using Cronbach Alpha. Reliability coefficient was (0.87) which means that it was satisfying for scientific research purposes.

Results and discussion

Findings related to the first question

To answer the first question that stated, "What are the criteria and requirements for the design and development of the e-courses that faculty members should have?" Answering this question was done implicitly through the revision and presentation of related literature and previous studies conducted in this area.

Findings related to the second question

To answer the second question that stated, "To what degree do faculty members have and use the skills of the instructional design of the e-courses?" Mean scores and standard deviations for respondent's replies were calculated and extracted. The Mean scores estimation is shown in table (1)

Table 1: Estimation of the mean scores

Degree	High	Moderate	Weak	Not available
Estimation	3.26-4.00	2.60-3.25	1.76-2.50	1.00-1.75

Detailed mean scores of respondents' replies to the degree of having and using the skills of instructional design are presented in table (2).

Table 2: Mean scores of respondents' replies to the degree of having and using the skills of instructional design

No.	Field	Degree of having the skill			Degree of using the skill		
		Mean	SD	Degree	Mean	SD	degree
1.	Analysis	2.45	0.81	Weak	2.13	0.79	Weak
2.	Design	2.83	0.82	Moderate	2.59	0.83	Moderate
3.	Development	2.41	0.84	Weak	2.06	0.86	Weak
4.	Implementation	2.40	0.83	Weak	2.19	1.20	Weak
5.	Evaluation	2.69	0.68	Moderate	2.24	0.91	Weak
General mean		2.56	0.83	moderate	2.26	0.98	Weak

Table (2) indicates that the degree of faculty members' knowledge of the e-courses instructional design skills was higher than their degree of using these skills. The mean score of having these skills was (2.56) and the standard deviation was (0.83) while the mean score of using these

skills was (2.26) and the standard deviation was (0.98). Moreover, the design aspect ($M=2.83$) had the highest degree regarding participants' degree of having and, on the same time had the highest degree of using ($M=2.59$). In other words, faculty members were interested in the details of the design aspect components in the system of e-courses design more than other aspects because of its relation to the aims, their classification and content. The lowest mean score and so the weakest degree was for the development aspect ($M=2.41$) in accordance to participants degree of having the skills and degree of using ($M=2.06$).

Figure (2) compares between respondents' mean scores of having and using the skills of the instructional design of their e-courses.

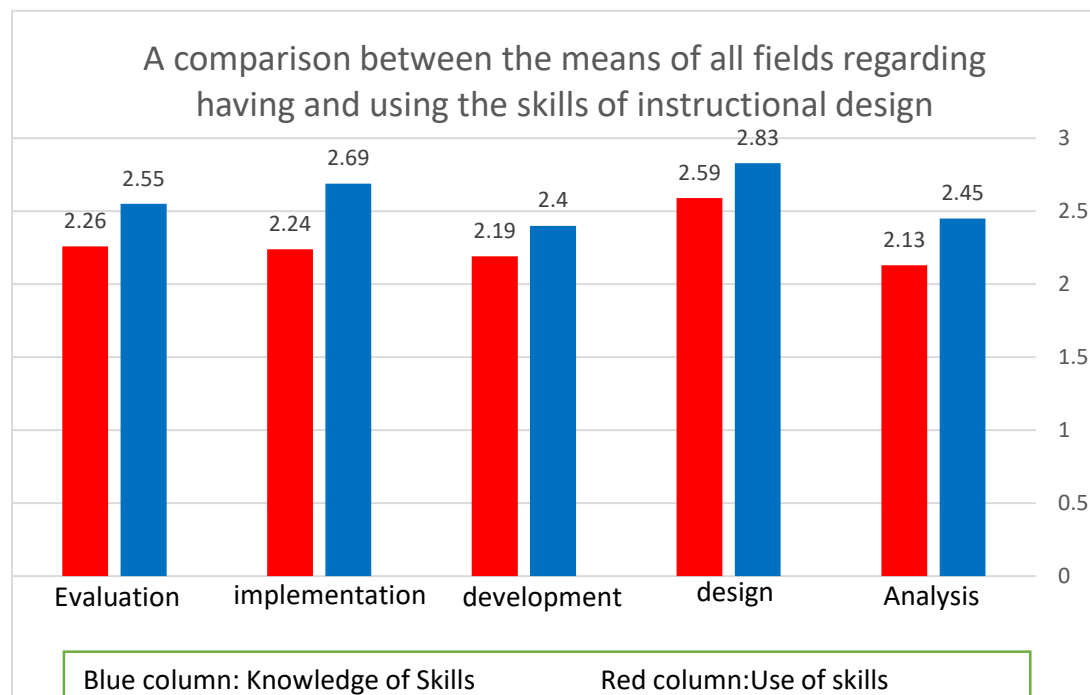


Figure 2: Mean scores of faculty members' level of having and using the skills of instructional design

Findings related to the third question

To answer the third question that stated, "Are there statistically significant differences between faculty members' degree of knowledge and degree of use of the e-courses instructional design?" T. test was used. Table (3) illustrates the results.

Table 3: T. test for participants' mean scores regarding their degree of instructional design skills knowledge and degree of use

Aspect	Mean	SD	T	N	Sig
Having the skills	2.558	0.840	-2.225	101	0.027
Using the skill	2.262	0.982			

Table (3) reveals that T. value was (-2.225) and was significant ($\alpha=0.05$). That is, there were statistically significant differences between the mean scores of faculty members' knowledge and use the skills of the instructional design of the e-courses in favor of having the skills not

using them. The result can be explained by the fact that a faculty member has the skill to design his e-courses but other conditions or obstacles might play a role and hinder him from using his skill in his e-course.

Findings related to the fourth question

To answer the fourth question that stated, "What are the most prominent obstacles for the design, use and development of the e-courses facing faculty members?" Percentages and frequencies were used to identify the most frequent obstacles. Results indicated that (68%-75%) of faulty members agreed on these things below as main obstacles that hinder the development of the e-courses instructional design.

1. The lack of adequate workshops for training faculty members on the basics of design and the development of e-courses.
2. The lack of e-laboratories for training faculty members how to start developing the e-courses.
3. The lack of spiritual and financial encouragement for distinguished faculty members who develop and use e-courses.
4. The e-course is normally developed by an individual effort of the faculty member whereas adequate development of these e-courses requires teamwork.
5. Storage space available on Blackboard is limited and not adequate.
6. The shortage of time for faculty members and the unavailability of finance for the instructional design of the e-courses.
7. Low internet speed that hinders uploading files.
8. Faculty members are not usually informed about the updates that take place on the Blackboard system during the academic semester, which in turn causes many problems when updating and developing these-course.
9. The difficulty to upload multimedia files of big size on the Blackboard.
10. Vision fatigue as eyes have to be exposed to light for long hours.

Findings related to the fifth question

To answer the fifth question that stated, 'What are the most important faculty members and experts' visions for developing the instructional design and development of the e-courses? Percentages and frequencies for participants' responses were calculated. Results indicated that (60%-79%) of faulty members agreed on fulfilling these things below as their visions to develop the e-courses instructional design.

1. Develop faculty members' skills of e-courses via training workshops.
2. Use the quality international criteria when designing the e-courses.
3. Create a copyright system that keeps faculty members' rights and the intellectual properties after the designing and developing their e-courses.
4. Nominate some of the faculty members for paid training workshops offered by the center of eLearning and distance learning, more specifically in the field of e-courses design.

5. Enable faculty members to directly contact the unit of support and guidance at the eLearning deanship at the university.
6. Encourage faculty members to design and develop their courses electronically and then upload them to the digital repositories because they save time, effort and cost.
7. Specify financial rewards at the level of the university and colleges for the best courses that achieve the new instructional design bases.
8. Encourage faculty members to develop themselves to go along with new developments and master the entire process of the instructional design and e-course development.
9. Related parties should be interested in the development proposals provided by faculty members.
10. Construct special centers for the design of the e-courses and support them financially.
11. Equip the educational environment with needed devices to run the e-courses.
12. Build up digital repositories to store different courses in various specialties at the local level and in a way, that guarantees the mutual exchange and vast usage of experiences.

CONCLUSION

The present study mostly aimed to identify the criteria and requirements of the instructional design and development of the e-courses. It also aimed to point out some of the obstacles facing faculty member when trying to design their courses electronically. Moreover, visions of those faculty members were investigated to reach common ones regarding how courses can be designed and developed electronically. Findings showed that there were certain criteria and requirements related to the instructional design of the e-courses that faculty members should work accordingly. The faculty members' level of mastery of the skills of the instructional design was moderate while their level of using these skills was low. Of the obstacles reported by participants, the most prominent ones were the lack of training on the basics of e-course design and development, the lack of e-laboratories that train faculty members on the primary production of the e-courses, and the lack of spiritual and financial Incentives for pioneer faculty members. The most important visions that were seen important by participants were the development of the skills of faculty members in the e-courses instructional design via training, the use of quality international criteria, and create a copyright system to keep the innovations of faculty members.

RECOMMENDATIONS

1. Establish a unit for the design and development of e-courses that involves a project manager, content clerk, educational designer, e-courses developers, and technical production team.
2. Provide lecture halls with interactive display screens connected to the Internet.
3. Provide each faculty member with a PC.

4. Provide computer labs completely equipped for the use of students to upload their assignments and participations.
5. Pay attention to the training workshops that can raise the competency of faculty members in the area of the instructional design.

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