

A Framework on the Critical Success Factors of E-Learning Implementation in Higher Education: A Review of the Literature

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Abstract—This paper presents a conceptual framework on the critical success factors of e-learning implementation in higher education, derived from an in-depth survey of literature review. The aim of this study was achieved by identifying critical success factors that affect for the successful implementation of e-learning. The findings help to articulate issues that are related to e-learning implementation in both formal and non-formal higher education and in this way contribute to the development of programs designed to address the relevant issues.

Keywords—Critical success factors, e-learning, higher education, life-long learning.

I. INTRODUCTION

IN the 21st century, Information and Communication Technology (ICT) has become an important medium for life-long learning since it can transform business, economic, commercial activities, and the social political environment in the current world [1]. More and more high level of competence is required to perform in organizations and in today reflexive society. ICT has created a need to renovate university education by using more modern, efficient, and effective way, such as e-learning [2]. According to [3], e-learning, or electronic learning, is one of the educational effects which arisen from the development of ICT and it has been defined in the literature in different contexts in many ways. Reference [4] indicated that e-learning has been stated as the synonymous with web-based learning, Internet-based training, advanced distributed learning, web-based instruction, online learning, and open/flexible learning.

E-learning is a delivery course content via the electronic media, namely, Internet, Intranets, Extranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM [5]. Reference [6] stated that e-learning plays a crucial role to transform an organization into a learning organization and it is accelerated for the effective learning in higher education. Reference [7] stated that “the use of computer network technology, primarily over or through the Internet, to deliver information and instruction to individuals”. According to [8], higher educational institutions are using e-learning to strengthen the learners and instructor’s role for the learning

community in order to develop new communication channels. Reference [9] and [10] stated the beauty of e-learning is that it can be done at any time, at an anyplace, and from anyone. For the non-traditional learners, this flexibility will accelerate a shift change for the higher education in the lifelong learning in order either to continue a professional development or to meet new higher learning demands in organizations. Furthermore, it is also more affordable and saves a lot of time to produce measurable results [11]. According to [12], learners can access e-learning lectures several times if something have been forgotten or not understood, which can allow students again to view and remember the delivered information that is required for a particular course.

Reference [13] stated “E-learning can solve challenges many people meet with work or family commitments; due to the high flexibility in time and place it offers. This could increase the number of students providing them with learning opportunities at minimum cost especially for those who are distant from educational institutions”. Currently, many of the higher educational institutions have made a significant impact on e-learning systems to supplement the traditional type of education since it can enable immediacy, consistency, and convenience, and finally, it can be implemented globally [14].

Reference [15] indicated e-learning can guarantee freedom for learners and instructors from constraints of time and place with a view of greater access in order to have better learning opportunities in the education with initial and further provision. It can break geographical boundaries that allow country side learners to interact with subject matters, subject materials, and further consultation online which cannot be done without technology. Furthermore, [15] stated that the crucial role of technology is to allow remote area learners in a way that they can feel that we are on-campus.

According to [8], currently many universities are using e-learning system to strengthen learning systems because it enhances a new communication channel between instructors and students. Instructors and learners can also use e-learning system to transfer knowledge among themselves to accomplish personal learning objectives.

II. PROBLEM STATEMENT

Reference [16] pointed out a critical problem to use e-learning facilities because it is totally dependent on ICT by teachers, learners, and administrators. Furthermore, [16] indicated that teachers or learners are not only depend on technical supports but also they face a lot of pressures from

pedagogues in terms of the role of technology in supporting constructive, authentic, and cooperative learning. According to [17], technology training alone cannot provide better service for users and it is important to have a continuous technical and human resource support for the technical integration. Reference [18] stated that several e-learning projects have failed to realize their aims and goals are raising many questions in terms quality and capabilities for this type of education. Reference [19] stated that investment for infrastructure, training for ICT staff and a content development is not enough for a successful adoption of e-learning in higher education. Furthermore, [19] indicated that learner's frustrations and dissatisfactions lead to delay feedback to use the web-based learning approach. According to [20], integration of e-learning in higher education may face a lot of barriers, namely, infrastructure of technology, students' competence, satisfaction of technology and instructors' motivation. Indeed many tertiary institutions have failed because of poor strategies, high cost of technologies, resistance change, competition, and poor delivery of courses [21], [22]. According to [23], many developing countries are now interested to implement e-learning systems, but, unfortunately, they experience a lot of difficulties to communicate online, instructional design, and many other technical aspects [24].

III. RESEARCH QUESTION

What are the important critical success factors that affect e-learning implementation in higher education?

IV. METHODOLOGY

The objective introduced in this paper is to identify the critical success factors of e-learning in higher education. This study is a literature review and findings was based on the review and analysis from the existing related literature e-learning in higher education. The final results were drawn by compiling critical success factors to implement e-learning in higher education. Studies, which were not empirical by the relevant data was basically excluded in the review process. However, [25] stated a systematic review can be done based on a few steps: formulate the review question, devising the search strategy, study selection criteria, quality appraisal criteria, and design of the studies.

A. Formulate the Review Question

The formulation of the review question was identified the focus and boundaries, and shapes all aspects of the review process, such as inclusion and exclusion criteria, the search strategy, extent of the literature reviewed, the quality appraisal, and synthesis of evidence [25]. The review question was: "What are the critical success factors to implement e-learning in higher education?"

B. Devising the Search Strategy

The search strategy was comprehensive and articles were collected from Google and Google Scholar. However, we used "E-learning success factors in higher education" and

"Literature review on e-learning success factors in higher education" as keywords.

C. Study Selection Criteria

According to [25], there were subjected to two filters before can be entered into the systematic review. However, the first filter is a set of the inclusion and the exclusion criteria such that the literature review, which were related and able to address the issues were taken into the second filter.

D. Quality Appraisal Criteria

This study has met all the five steps that are necessary for the quality appraisal criteria in terms of validity and trustworthy findings. Selected Articles were significant, reliable, acceptable, and empirically valid. Moreover, some of the studies had good research questions and theory, along with a model or with a framework.

TABLE I
STUDY SELECTION: QUALITY CRITERIA

<i>Question</i>	Is the research question clear?	E
<i>Theoretical perspective</i>	Is the theoretical or ideological perspective of the author (or funder) explicit?	D
<i>Study design</i>	Is the study design appropriate to answer the question?	E
<i>Context</i>	Is the context or setting adequately described?	E
<i>Sampling</i>	Qualitative: Is the sample adequate to explore the range of subjects and settings, and has it been drawn from an appropriate population?	E
<i>Data collection</i>	Was the data collection adequately describe and rigorously conducted to ensure confidence in the findings?	E
<i>Data analysis</i>	Was the data analysis adequately described and rigorously conducted in the findings?	E
<i>Reflexivity</i>	Has consideration been given to alternative explanations of results?	D
<i>Generalisability</i>	Has consideration been given to any limitations of the methods or data that may affect the results?	D
<i>Ethics</i>	Do any claims to generalizability follow logically, theoretically or statistically form the data?	D
	Have ethical issues been addressed and confidentiality respected?	D*

E=Essential, D=Desirable, *Ethic may be essential in other sensitive fields
Source: [25] as cited in [26].

E. Design of the Studies

This study included only empirical evidence from various experimental or observational research, which included qualitative and quantitative research. However, this study did not include unpublished work. Furthermore, this study considered which were strongly related to critical success factors in the e-learning implementation in higher education.

V. LITERATURE REVIEWS

According to [27], the e-learning system delivers a content for learners via networked computer by using the Internet technology. The current research indicates three critical success factors are for e-learning, namely, information technology (IT), instructor, and student. According to [28], in developing countries, e-learning critical success factors include motivation toward e-learning, basic technology awareness and ability, good university support, computer training, and quality learning materials.

According to [29], e-learning is recognized as the Internet-based learning or the web-based learning, online learning, and the distributed learning. There are currently two main e-learning approaches such as distance learning and the computer assisted instruction. In the distance learning approach students can learn from remote areas and it also allows students to access e-learning materials or to join courses by using the information technology. On the other hand, though computer assisted instruction approach, students can access multimedia packages for the e-learning and teaching in the standalone computer.

In Malaysia, a study, conducted by [1] with 120 university students at the Universiti Teknologi MARA Pahang, identifies important elements of e-learning. The study revealed that ten critical successful factors in the e-learning, namely, ease of use, appearance, linkage, structure and layout, information, reliability, efficiency, support, communication, and security. A study conducted by [30] indicated that the critical success factors for e-learning in higher education institutions are intellectual property, suitability of course for the e-learning environment, building e-learning course, course content for e-learning, maintenance of e-learning course, e-learning platform, and measuring the success of an e-learning course. In Australia, a study was conducted by [31] in an Australian University on the e-learning based management course and they found that three critical success factors are included for e-learning in tertiary institutions are technology (ease of access and navigation, interface design and level of interaction); instructor (attitudes towards students, instructor technical competence and classroom interaction); and previous use of technology from a student's perspective.

A study conducted by [32] indicated eight categories of critical success factors that affect the successful implementation of e-learning in tertiary institutions and these factors are institutional, management, technological, pedagogical, ethical, interface, support, and evaluation. In a study by [33] pointed out that the main e-learning critical success factors are instructor's attitude toward students, student's characteristics toward e-learning, and technical competency. However, [30] showed that critical success factors in higher education include e-learning cause's contents, maintenance of e-learning, sustainability of e-learning, e-learning platform and measuring the success of e-learning implementation.

Reference [34] conducted a study on the e-learning critical success factors and their study revealed the e-learning critical success factors are sufficient users training, organizational commitment, management support, technical support, positive attitude of users, easy to use tools, sufficient training to engineers, sufficient e-learning initiatives, sufficient manpower, availability of info on e-learning website, support from other departments.

A case study was conducted by [33] on the e-learning critical success factors and found that the critical success factors, namely human factors, technical competency for instructors and students, mindset for e-learning by instructors and students, level of collaborations, and the perceived IT

infrastructure.

A study conducted by [35] revealed that e-learning critical success factors for the higher educational institutions are IT infrastructures like interface design, simplicity of the navigation of the course content, university students attitude on the e-learning, namely participation in the discussion group, collaboration, ability to initiate in the new discussion topic, and finally instructor attitude about students.

Reference [2] based on a study using a questionnaire based survey of the university students and a total of 538 students participated in the study, eight categories of critical success factors for the e-learning successful implementation in higher education. He indicated that specifically the e-learning critical success factors are based on students' perceptions and included "instructor characteristics (attitude towards and control of the technology, and teaching style), student characteristics (computer competency, interactive collaboration, and e-learning course content and design), technology (ease of access and infrastructure), and support".

A study conducted by [36] based on 19 papers published during the 2000-2012, revealed that the critical success factors of e-learning implementation in higher education are grouped five categories that each of the factors again including sub-factors: institutional management, learning environment, instructional design, services support, and the course evaluation.

Reference [37] conducted a study using a questionnaire based survey of the postgraduate students at Curtin Business School and the study found three critical success driving forces for the e-learning implementation in higher education institutions: information technology, market demands, and the education brokers namely, universities.

In Thailand, [38] conducted a study in higher education institutions and the results found that critical success factors for the e-learning implementation are media and technology, institution and management, instructional design, supporting factors, and the evaluation components.

Many other researchers have also found critical success factors in higher education institutions. These factors includes institutional support, course development, teaching and learning, course structure, student support, faculty support, and the evaluation and assessment [39], instructor characteristics technology and student characteristics [40], technology, instructor, and technology use from a student based on the previous computer knowledge [31].

VI. RESULTS

Systematic review of this study was a total of 57 articles and a total of 31 articles were included in this study. A proposed conceptual framework was designed based on critical success factors of e-learning implementation in higher education. The framework was designed by compiling critical success factors from 28 articles.

TABLE II
 IMPORTED DATA FROM DIFFERENT DATABASES

Databases	Total articles	Duplication	Relevant	Inclusion criteria passed	Quality criteria passed
Google	42	5	32	25	25
Google Scholar	15	3	10	6	6
Total	57	8	42	31	31

Table I clearly shows that only 31 articles which were passed the inclusion criteria and the quality criteria.

A. Proposed Conceptual Framework

The proposed framework has compiled based on eight factors: Technological Factors; Institutional Factors; Pedagogical Factors; Management Factors; Ethical Factors; Evaluation Factors; Resources Factors; and the Social Interaction Factors. Each of the factors has many sub-factors.

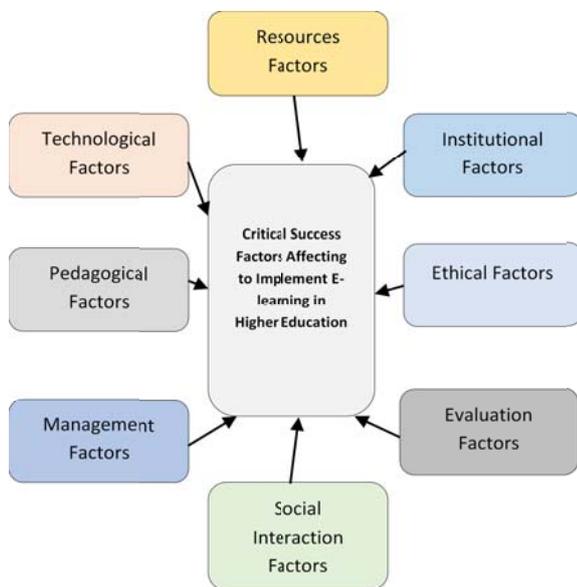


Fig. 1 A proposed conceptual framework on the critical success factors affecting to implement e-learning in higher education

B. Technological Factors

Several researchers indicated that technological factors affect the successful implementation of e-learning in higher education, such as ease of use, appearance, linkage, structure and layout, information, reliability, efficiency, support, communication and security [1], infrastructure planning, hardware, and software [41], security and privacy concerns [42], reliability, accessibility, technical support for lecturers and students, system training for the lecturers and student [43], ease of access and navigation, interface design and level of interaction [31], ease of access, internet speed, screen design [2].

C. Institutional Factors

Institutional factors also affect successful implementation of e-learning in higher education. Such institutional factors includes need assessment, financial readiness, infrastructure

readiness such as Internet connections, cultural readiness, and content readiness [41], technical infrastructure, leadership strategy, management support for training [41], learning culture, change in study habits, making people understand how to learn [44].

D. Pedagogical Factors

Many researchers underlined pedagogical factors that affect the successful implementation of e-learning in higher education. Such factors include attitudes towards students, technical competence, context interaction [31], content analysis, audience analysis, goal analysis, medium analysis, design approach, organization, learning strategies [41], learners/facilitation of web-supported learning, frequent and constructive feedback to learners, academic background/qualifications, professional training in education/professional development [41], communication with learners [41].

E. Management Factors

Many researchers indicated how management factors affect the implementation of e-learning in higher education: management team, managing the content development process, managing delivery and the maintenance [32], lack of implementation expertise, exclusive technology focus, limited continued managerial support [45], [46], time management, efficiency, effectiveness, thinking strategies, motivation, problem solving abilities [41].

F. Ethical Factors

Several researchers found how ethical factors affect to implement the e-learning system in the higher education; such factors include social and political influence, cultural, diversity, bias, geographical diversity, learner diversity, digital divide, etiquette, legal issues [41], [32].

G. Evaluation Factors

Results from many researchers revealed that evaluation factors affect to implement e-learning and these factors include evaluation and assessment [47], [30], [48], course evaluation [36], e-learning content development process, e-learning evaluation program, learners' learning assessment [32].

H. Resources Factors

Many researchers have found the critical e-learning success factors includes lack of financial support, content development costs for the e-learning, ownership of computers and availability, Internet access, computer competency, fluctuating and unreliable electricity supply [46], [49].

I. Social Interaction Factors

Findings from several researchers stated that the social interaction factors affect in order to implement the e-learning system in higher education and these factors include lack of social interaction, lack of cultural interaction, isolation and decreased motivation [49], [50].

VII. DISCUSSION

The main objective of this study was to identify the critical success factors of e-learning implementation in higher education. The methodology was designed based on a systematic review process: formulate review questions; devising the search strategy; study selection criteria; quality appraisal criteria; design of the studies. However, in the quality appraisal criteria, the study met all the necessary five steps. Two databases (Google and Google Scholar) were used to import articles and a total of 57 articles were imported. This study designed by analyzing 31 articles which were passed by the quality criteria and all the major critical factors were included in order to design a framework. In addition, this framework is line with the Technology Acceptance Model [51] but there is also another model: Theory of Planned Behavior [52]. However, the literature showed that many of the researchers have a Technology Acceptance Model. Our results lead to eight groups of factors:

- Technological factors have a relationship with the pedagogical factors and it is one of the critical success factors for the e-learning implementation.
- Institutional factors have a relationship with the pedagogical factors and these factors influence on the implementation of e-learning in higher education.
- Pedagogical factors have an impact on the implementation of e-learning in higher education and it has relationships with technological factors and institutional factors.
- Management factors have an influence on the implementation of e-learning in higher education. However, management factors have a relationship with the technological factors.
- Ethical factors also affect for instructors and learners to implement e-learning in higher education. Furthermore, this factors has relationships with pedagogical factors as well as with the technical factors.
- Evaluation factors have a relationship with the pedagogical factors. It has a relationship with the pedagogical factors.
- Resource factors also affect the intervention of instructors and the participation of learners. These factors have a link with technological factors.
- Social interaction factors between instructors and learners affect also the implementation of e-learning in higher education. Finally, the social integration factors have a relationship with the ethical factors.

All the eight critical major factors can be considered as external variables which can have an influence on the perceived usefulness and perceived ease of use. These eight factors can be classified as variables of their dimensions such as close context, medium context, and the large context. If the Technology Acceptance Model is used, then the following variables must be considered such as perceived usefulness, perceived ease of use, and user acceptance [51].

Regardless of which theory is followed, technological factors, institutional factors, pedagogical factors, management factors, ethical factors, evaluation factors, resource factors, social interaction factors are important factors affecting

implementation of e-learning in higher education. In knowing what critical factors affect the implementation of e-learning in higher education, it was possible to offer a conceptual framework based on those critical success factors. However, there is a need for the future research in order to validate this framework.

VIII. CONCLUSION AND RECOMMENDATION

The findings and the analysis of literature reviews indicated critical success factors having an influence on the implementation of e-learning in higher education. A total of 31 articles was included, but several other articles which were not included due to irrelevancy. This emerging conceptual framework is crucial in developing instructional programs to improve e-learning implementation in higher education by instructors and learners. New studies, however, are required, first, to explore other critical factors like the perception of the valence or usefulness of the planned training (“valence”) and of its feasibility (“expectancy”), but also to decipher the interrelation between the factors noted above and to take into account the diverse national infrastructural technological context. Furthermore, the demand for higher education includes but goes beyond initial formal education of new generations. It includes the return to formal education of people along their life course, the continuing professional education of graduate university students and the growing demand for non-formal continuing education intervention across the adult population and in the various areas of human activities. The contextual variety of these growing learning demands will precisely require E-learning Implementation in these emerging missions of higher education in the 21st century context of life long and life large learning.

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