

Critical factors for effective E-learning¹

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Over the past years, we have witnessed a fundamental economic transformation. Economists generally acknowledge that a profound shift has occurred in the role that knowledge and technology play in driving productivity and economic growth (Stiglitz, 1999 cited from Kozma, 2003), a phenomenon referred to as the “Knowledge economy.” These changes entail new skills, abilities, attitudes, and habits for employees in the knowledge economy and for citizens of the information society (Voogt and Pelgrum, 2003).

Information communication technology, in the common contemporary rhetoric, (ICT) provides the tools needed by the knowledge economy and information society. These tools allow us to create, collect, store, and use this new knowledge and information. As ICT become an integral part of our work, places, schools, and homes, it is changing the way we live, work, play, communicate, and learn (Kozma, 2003). This explosive growth of ICT has made it a popular platform for providing a wide rang of electronic services from business to education (Chiu, et al, 2005). It is widely accepted that advances in information technology and new developments in learning science provides opportunities to create well-designed, learner-centered, engaging, interactive, affordable, efficient, easily accessible, flexible, meaningful distributed and facilitated e-learning environments (Khan, 2005). The rapid growth in e-learning, experienced particularly during the 1990s has overcome many of the barriers to Higher Education (National Committee of Inquiry into Higher Education, 2001),

¹ The term “e-learning” may have several synonyms such as “distance” “distributed” flexible” or “virtual” learning and these often hides real differences in learning experience, forms of delivery and formal status. E learning can be thought of as any learning that is done utilizing an internet or intranet connection. Delivery can be asynchronous (allowing learners to go through learning materials at their own pace within broad time constraints) or synchronous (participants attend the on-line learning session at a scheduled time, allowing for live interaction with the instructor and other students) (Frazee, 2003). The preferred term in this article is E-learning.

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providing universities with an opportunity to meet 'knowledge-driven society' (Katz, 2001) demand for education.

Great expectations have emerged for e-learning advances to meet society's demands in new way. Many universities and private corporations are investing significant capital in e-learning systems (Levy, 2006). A variety of these higher education institutions are driven by an enormous increase in the global demand for higher education, which provides new opportunities to contribute to the educational process.

However, as Oliver (2005) and other researchers (like Romizowski (2005) Garrett (2004) Oppenheimer (2003) and Rada (2001)) pointed out many projects such as the UK e-University, NYU Online, Scottish Knowledge, Universities 21 and Global University Alliance (GUA), which all developed around e-learning applications, have failed to realize their aims and goals, leading many to question the quality and capabilities of this form of education. Full understanding of the factors contributing to effectiveness of e-learning systems will help E-Universities and institutions channel funding to effective factors and redesign or eliminate non-effective factors (Levy, 2006). Notwithstanding, as Alavi and Leidner (2001) concluded that "research that helps uncover the important attributes of VLS [virtual learning systems]... will be critical to our understanding of VLS effectiveness" (30).

Therefore, quality valuation, the assessing and enhancing of teaching and learning in higher education, has been placed squarely on the contemporary agenda in higher education (Newton, 2002).Continues improving of quality in e-learning environments (E-universities or Virtual University) is no exception. However, such qualifying is not unproblematic. As Watty (2003) highlighted, there are different ways of conceptualizing quality in the context of higher education. These conceptualizations, according to Vroeijenstijn (1992), come about because a variety of stakeholders (learners, teachers...) have interest in the quality of higher education but not everyone has the same idea about exactly what constitutes that quality.

Reviewing the literature reveals a distressing gap between the use of technology and sound pedagogical models (Khan 1997; Salmon, 2000; Willis 2000). Several researchers have written about the need for quality standards to ensure the academic integrity of e-Learning programs (Benson, 2003; Carstens and Worsfold, 2000; DeBard and Guidera, 2000; Salmon, 2000; Speck, 2000). As we noticed, defining these quality standards, however, can be challenging. Because of these challenges, evaluating and assuring quality in e-Learning programs has become a critical issue.

However, there are number of factors that contribute to create a qualified e-learning environment. A systemic understanding of these factors can help us create effective e-learning environments.

Given that, the main question conducting this article focus on quality and effectiveness of e-learning environments. Following, lead us to the key questions like, what are the critical factors for qualified e-learning environments? and can these factors assurance that e-learning will be effective? And also what constitute quality in E-learning contexts? Many of these questions have become more important in the current era where accountability is a key concern in the higher education sector.

Quality in E-learning

E-learning creates new contexts, constraints, and issues, making it fundamentally different from traditional learning environments. E-learning occurs in a wide range of teaching activities where technology of one form or another is involved. Technology necessarily underpins the administrative functions of most universities and higher education institutions and, for many, the lines between the administration, and the conduct, of teaching can be blurred.

Quality has been defined in terms of the design of the e-Learning experience, the contextualized experience of learners, and evidence of learning outcomes (Carr and Carr, 2000; Jung 2000; Salmon, 2000). The quality and design of e-Learning courses, however, are sometimes compromised in an “. . . effort to simply get something up and running” in response to pressing consumer demands (Dick, 1996: 59). Educators and researchers have voiced concern over the lack of rigorous evaluation studies of e-Learning programs (e.g., Arbaugh, 2000; Howell, Saba, Lindsay, and Williams, 2004; Lockyer, Patterson, and Harper, 1999; Robinson, 2001). McGorry (2003) adds, “although the number of courses being delivered via the Internet is increasing rapidly, our knowledge of what makes these courses effective learning experiences is limited”.

Within this diverse and broad range of activities, we are now seeing increased levels of awareness and concern for the quality of the activities that result. There is a heightened level of interest in being able to monitor and review performance and to demonstrate successful outcomes.

E-learning quality is often approached in terms of content or resources, whereas quality is ultimately dependent on the decisions and behaviors of learning and teaching practitioners and participants. The quality of resources needs to be framed within and guided by an understanding of the broader quality of learning activity. However, in qualifying e-learning programs one point is clear that the same principles apply to E-learning as in the quality of teaching and learning in general. However, there are some special characteristics in e-learning that need to be specified.

Critical success factors in e-learning environments³:

E-learning occurs in a wide range of teaching activities where technology of one form or another is involved. Hence, to create an effective open, flexible, and distributed learning environment for diverse learners, we must explore key factors encompassing various dimensions of e-learning environment (khan. 2005).

A broad range of factors that can influence the success of E-learning environments has been mentioned in the literature. For example, much has been stated about technology factors and pedagogical factors as important considerations for its accomplishment. However, no systematic work exists on characterizing a collective set of vital factors for implementing successful e-learning environments. An appropriate set of these factors will help them to keep in mind the important issues that should be dealt with in designing and implementing e-learning. In terms of e-learning, critical success factors can be viewed as those activities and constituents that must be addressed in order to ensure its successful accomplishment.

Based on the insights gleaned from the study of QUALITY ON THE LINE by The Institute for Higher Education Policy in (2000), these key success factors highlighted for e-learning environments.

Institutional Support; These benchmarks address technological infrastructure issues, a technology plan, and professional incentives for faculty.

Course Development; this category includes benchmarks for the development of courseware, which is produced largely either by individual faculty (or groups of faculty members) on campus, subject experts in organizations, and/or commercial enterprises.

³ The studies summarized in this part approach the notion of quality in online learning from various perspectives (e.g. lecturer, student, institution and evaluation of exemplary programs).

Teaching/Learning Process; this category addresses the array of activities related to pedagogy, the art of teaching. Included in this category are process benchmarks involving interactivity, collaboration, and modular learning.

Course Structure; the benchmarks in this category address those policies and procedures that support and relate to the teaching/learning process. They include course objectives, availability of library resources, types of materials provided to students, response time to students, and student expectations.

Student Support; this category includes the array of student services normally found on a college campus including admissions, financial aid, etc. as well as student training and assistance while using the Internet.

Faculty Support; these benchmarks address activities that assist faculty in teaching online, including policies for faculty transition help as well as continuing assistance throughout the teaching period.

Evaluation and Assessment; The benchmarks in this category relate to policies and procedures that address how, or if, the institution evaluates Internet-based distance learning. (outcomes assessment and data collection) (Institute for Higher Education Policy, 2000).

According Papp's study (2000) e-learning critical success factors included intellectual property, suitability of the course for e-learning environment, building the e-learning course, e-learning course content, e-learning course maintenance, e-learning platform, and measuring the success of an e-learning course. Papp (2000) suggested studying each one of these imperative factors in isolation and as a composite to determine which factor(s) influence and affect e-learning success.

Thierry Volery (2000) based on an empirical study among college students suggested a framework for the Critical success factors in online education, focusing on three aspects in e-learning. Technology (ease of access and navigation, interface design and level of interaction); the instructor (attitudes towards students, instructor technical competence and classroom interaction); and the previous use of the technology from a student's perspective or students previous computer knowledge (Volery, 2000).

Soong, Chan, Chua, and Loh (2001) using a multiple case study, verified that the e-learning critical success factors are: human factors, technical competency of both instructor and student, e-learning mindset of both instructor and student, level of collaboration, and

perceived information technology infrastructure. They recommended that all these factors should be considered in a holistic fashion by e-learning adopters.

Graf and Caines (2001) in “WebCT Exemplary Course Project” developed a scoring rubric to evaluate online courses. They present criteria in two categories: academic rigor (10 items) and content robustness⁴ (6 items).

Academic rigor includes items such as course objectives, assignments, student participation, use of technology, course content, and ancillary resources.

Content robustness refers to the degree to which the course content is available online, how it is structured, the use of images and graphics, the degree of interaction among students and with the lecturer and the type and quality of student assessment.

Oliver (2001) in “Assuring the Quality of Online Learning in Australian Higher Education” addresses the major issues confronting the successful adoption and sustained use of e-learning in Australian higher education context. Factors to support and sustain quality in e-learning programs are illustrated.

Teacher expertise in online teaching:

- teaching online;
- using technology in teaching;
- technology currency;
- teacher training.

Student readiness to move online:

- technology skills;
- access to technology;
- technology literacy;
- self-regulated learning.

Technology infrastructure:

- courseware delivery systems
- hardware and software
- service provision.

Provision of content and learning resources:

- reusable learning objects.

Instructional design:

- reusable learning designs.

⁴ Paloff and Pratt (as cited in Graf & Caines, 2001) describe academic rigor and content robustness as follows: academic rigor: “the degree to which a web-enhanced or asynchronous online course causes students to become immersed in the course content through the application of higher level learning objectives” (p. 1);

And also in an attempt to provide a pedagogical foundation as a prerequisite for successful e-learning implementation, Govindasamy (2002) discussed seven e-learning critical factors namely, **institutional support, course development, teaching and learning, course structure, student support, faculty support, and evaluation and assessment.**

According to studies conducted by Selim (2005), eight main factors affect the success of e-learning environment. The specified e-learning CSF categories were 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.**

Fresen (2005) in an inclusive study highlighted eight critical success factors in his thesis “Critical success factors for quality web-supported learning.” He suggested the following categories in his research. He also analyzed and categorized each of these factors to sub factors (around fifty sub factors) which specifically explain the feature of respected factors. (Fresen, 2005)

• **Institutional factors;**

Technology plan,

Infrastructure/adequate resources for web-supported learning,

Student advice and consultation (with respect to courses, careers, bursaries etc.),

Institutional evaluation of program effectiveness

Technology factors embrace these sub factors;

Reliability/robustness

Accessibility/24–7 availability

Technical support for lecturers and students

System training for lecturers and students

Appropriate use of technology

Accurate management of student records/data

• **Lecturer factors** comprise;

Interaction with students/facilitation of web-supported learning

Frequent and constructive feedback to students

Academic background/qualifications

Professional training in education/professional development

• **Student factors;**

Communication with fellow students
Time management/time on task
Learner control over time, place, pace of learning
Expectations of efficiency and effectiveness
Employ critical thinking strategies
Motivation/commitment/self esteem
Improve problem-solving abilities

• **Instructional design factors cover;**

Co-operative/group learning/team work/reciprocity
Student engagement in higher cognitive levels/knowledge
construction/challenges
Rich learning resources/Sound-learning materials
Interactivity/Active learning/learning activities
Enhanced student motivation/responsibility for own learning
Design standards/guidelines/minimum requirements
Manageable segments/modular/chunking
Inclusively: social, cultural, gender, disabilities
Routine review and evaluation of courses/products
Purposeful use of learning media
Usability/Minimize student frustration/appealing
Appropriate use of images, graphics
Offer a complete learning package
Appropriate layout and presentation
Appropriate bandwidth and download demands/speed

• **Pedagogical factors**

Offer multiple paths for recursive learning
Provide a learner-centered environment
Students instructed in proper research methodology
Relevance and accuracy of content
Currency of learning resources and content
Research and continuous improvement (Fresen, 2005:9-11)

Khan (2005) in E-Learning QUICK Checklist identified various critical factors for successful e-learning. He clustered critical success factors in eight categories:

INSTITUTIONAL factors like Need assessment, Financial Readiness, Infrastructure readiness such as internet connections..., Cultural readiness ,and content readiness

MANAGEMENT factors including Management Team, Managing Content Development Process, and Managing Delivery and Maintenance

TECHNOLOGICAL factors cover Infrastructure Planning, Hardware, and Software
PEDAGOGICAL factors include Content Analysis, Audience Analysis, Goal Analysis,
Medium Analysis, Design Approach, Organization, Learning Strategies

ETHICAL factors comprise Social and Political Influence, Cultural, Diversity, Bias,
Geographical Diversity, Learner Diversity, Digital Divide, Etiquette, Legal Issues

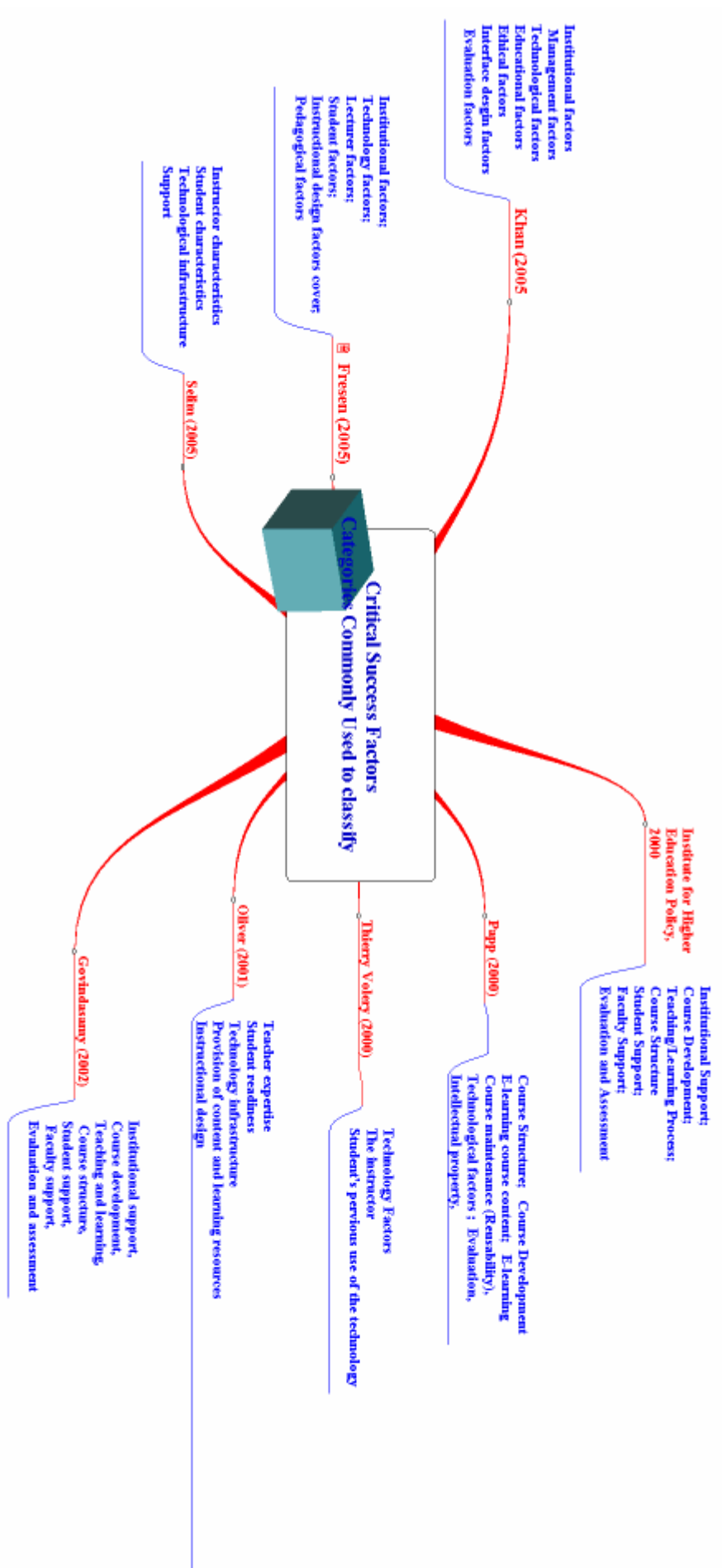
INTERFACE DESIGN factors embrace Page and Site Design, Content Design
Navigation, Accessibility, Usability Testing, resource Support, Online Support,
Online Resources, Offline Resources,

EVALUATION factors include Evaluation of E-Learning Content Development Process,
Evaluation of E-Learning Environment, Evaluation of E-Learning at the Program and
Institutional Levels, Assessment of Learners

He claims out that these crucial factors based his studies are logically comprehensive and empirically the most useful dimensions for open, flexible and distributed learning environments.

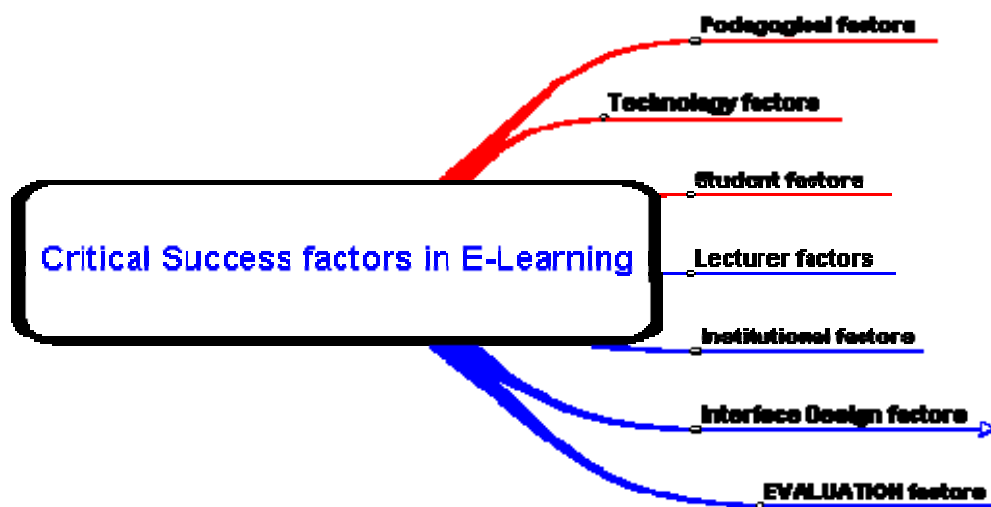
Summary and conclusions

Overview of Critical Sccess Fctors in E-learning environments:



The categorization is a holistic synthesis of critical success factors in e-learning settings based on mentioned literature and from different perspectives.

As is evident, different sets of critical success factors in e-learning environments have been put forward by different studies. In spite of this, they can possibly be grouped into a number of generic factors such as PEDAGOGICAL factors; ORGANIZATIONAL factors; and TECHNICAL factors, etc. It sounds whole of these factors could be classified in three main factors PEDAGOGICAL factors; TECHNICAL factors, and factors contributed to LEARNER as main role player in E-learning environments and consequently as key quality success factor.



However, one should also consider that numerous factors help to create a meaningful learning environment, and many of these factors are systemically interrelated and interdependent. A systemic understanding of these factors can help us create successful e-learning environments. In other words, in isolation, no category would be sufficient to assure quality in e-learning environment.

In this manuscript, I try to explore the critical success factors in e-learning environment based on the related literature. In other words, this (deriving a set of factors from various literature sources) is first part of my work. Then conducting a Delphi study, comprising an international panel of E-learning academics and practitioners to further explore and evaluate the factors that they had developed earlier.

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