

APPROACHES TO E-LEARNING QUALITY ASSESSMENT

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Abstract

The domain of e-learning is still characterized by many open questions such as: who should guarantee its quality? E-learning quality assessment is a difficult task that involves human intervention and cannot be based only on an easy and reproducible methodology. In this regard this paper is devoted to discuss different approaches and criteria that could be used for quality assessment within this domain: ISO/IEC19796-1: 2005, European Quality Observatory (EQO) and some important models such as the E-learning Success Model (Holsapple and Lee-Post, 2006), Klein et al's model (2006) and LCD. From this analysis we can conclude that, despite these attempts, e-learning quality assessment remains, so far, an open question, and we are still in need of e-learning best practice warranting that a course be effective both for the learner and the other actors involved.

Keywords: e-learning quality, assessment, quality factor of e-learning

1. Introduction

Economic, social and technological forces revolutionize everyday the teaching and learning processes in organizations, universities and schools. As regards this teaching and learning evolution, however, several different expressions have been used to characterize the innovation. Among them we can quote ‘e-learning’, ‘distributed learning’, ‘online learning’, ‘web-based learning’ and ‘distance learning’ (Wentling et al., 2000). According to the U.S. Department of Education’s National Center for Education Statistics, 90% of public 2-year and 89% of public 4-year institutions offered distance education courses in 2000–2001 with enrollments amounting to 1,472,000 and 945,000, respectively, out of a total enrollment of 3,077,000. Of these schools, 90% offered Internet courses using asynchronous computer-based instruction, and 88% indicated plans to start or increase use of the Internet as a primary medium of instructional delivery (Waits & Lewis, 2003). These statistics support the idea that Internet-based distance education is the most prevalent e-learning technology and that the Internet has caused dramatic changes to education in general and distance learning in particular.

As a consequence the use of Internet technologies to deliver training has been heralded as the “e-learning revolution” (Galagan, 2000). E-learning is essentially the network-enabled transfer of skills and knowledge, and refers to the usage of electronic applications and processes to learn. E-learning applications and processes include Web-based learning, computer-based learning, virtual classrooms and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM.

E-learning is preferred for a variety of reasons: it provides consistent and worldwide training, reduces delivery cycle time, increases learner’s convenience, reduces information overload, improves tracking and lowers expenses (Welsh et all, 2003). In this regard, this paper is devoted to discuss the complex, and perhaps most important, question of e-learning quality assessment. The latter has been dealt with by resorting to an analysis of advantages and shortcomings of the most important approaches introduced to assess the quality of e-learning.

First of all, what does “quality of e-learning” mean? The predominant view (according to the outcomes of a survey made by Ehlers et al., 2005) is that quality relates to obtaining the best learning achievements (50 %), together with ‘something that is excellent in performance’ (19 %). This primarily pedagogical understanding was more widespread than options related to best value for money or marketing. Besides, we must take into account that ‘quality in e-learning’ has a twofold significance in Europe. First, e-learning is associated in many discussion papers and plans with an increase in the quality of educational opportunities, ensuring a successful adaptation to the information society. This context is called ‘quality through e-learning’. Second, there is a separate but associated debate about how to improve the quality of e-learning itself and in this case, the context is called ‘quality for e-learning’ (Ehlers et al., 2005).

2. The quality for e-learning

According to Pawlowski (2003), quality in the field of e-learning is not associated with a well-defined measure. It is variable with respect to scope, perspective, dimension. Despite this problem, quality assessment is becoming an issue of increasing importance, as showed by the interest of ISO/IEC19796-1: 2005 and European Quality Observatory (EQO).ISO/IEC 19796-1:2005 is a framework to describe, compare, analyse, and implement quality management and quality assurance approaches. It will serve to compare different existing approaches and to harmonize the latter so as to converge towards a common quality model. Its main component is the Reference Framework for the Description of Quality Approaches (RFDQ).

It consists of the following items: a description scheme for quality management; a process model defining the basic processes to be considered when managing quality in the field of ICT-supported learning, education, and training, and a conformance statement for the description format. ISO/IEC19796-1 describes the processes as an e-learning lifecycle. It is a referenced model with a high level of abstraction which has to be adapted to a given organization. The model will be used as a framework for the description, comparison, and analysis of process-oriented quality approaches (Hirata, 2006). It essentially consists of two parts:

- A description scheme for quality approaches.
- A process model as a reference classification.

The Description Model is just a scheme to interoperably describe quality approaches (such as guidelines, design guides, requirements). It documents all quality concepts in a transparent way. The Process Model is a guide through the different processes when developing learning scenarios. It includes the relevant processes within the lifecycle of information and communication systems for learning, education, and training. The process model is divided in seven parts. Sub-processes are included by making reference to a classification

of processes. As regards the workgroup on quality, it is currently based on three further subtasks, developing more tools and support:

- Part 2: "Quality Model" will harmonize the aspects of quality systems and their relations and will provide orientation for all stakeholders. It will not enforce any particular implementation but will, instead, focus on their effects. The model will be extensible for the requirements of certain communities.
- Part 3: "Reference Methods and Metrics" will harmonize formats for describing methods and metrics for quality management and assurance. It will provide a collection of reference methods that can be used to manage and assure quality in different contexts. Furthermore, this part will provide a collection of reference metrics and indicators that can be used to measure quality in processes, products, components, and services.
- Part 4: "Best Practice and Implementation Guide" will provide harmonized criteria for the identification of best practice, guidelines for the adaptation, implementation, and usage of this multi-part Standard, and will contain a rich set of best practice examples.

As regards the EQO, a comparable and adaptable framework has to be defined and applied in order to structure quality approaches for a common European and global market for educational products and services,. The EQO repository is based on this approach and concept. The main objective is to provide a comprehensive platform for developers, managers, administrators, decision makers and learners to find a suitable quality approach that fits their needs. EQO provides a conceptual framework for the description and harmonization of quality approaches. Namely it is suggesting a reference framework as a European quality standard. The project is directly linked to standardization groups of CEN/ISSS (Workshop Learning Technologies) and ISO/IEC JTC1 SC36 in order to transfer results from standard committees to the users and vice versa. Therefore it provides an Internet-based repository for quality management, quality assurance and quality assessment approaches for the field of e-learning. Moreover, it provides recommendations for the use of quality management, quality assurance and quality assessment approaches for various target groups (e.g. end users, HE administrators, developers) and for specific purposes (e.g. process improvement, product transparency, domain-specific purposes, national / regional / local needs).

EQO project hopes that the following guidelines should shape the quality of e-learning by 2010:

- (a) learners must play a key part in determining the quality of e-learning services;
- (b) Europe must develop a culture of quality in education and training;
- (c) quality must play a central role in education and training policy;
- (d) quality must not be the preserve of large organisations;
- (e) support structures must be established to provide competent, service-oriented assistance for organisations' quality development;
- (f) open quality standards must be further developed and widely implemented;
- (g) interdisciplinary quality research must become established in future as an independent academic discipline;
- (h) research and practice must develop new methods of interchange;
- (i) quality development must be designed jointly by all those involved;
- (j) appropriate business models must be developed for services in the field of quality.

As it is possible to understand from the short descriptions of the two approaches presented above, both try to include all aspects to be taken into account when assessing e-learning quality. The problem with these frameworks, however, stems from their generality. Namely they presuppose the occurrence of processes on which concrete indications are lacking. On the other hand, each of them would require, to be correctly designed or controlled, a great amount of theoretical and experimental knowledge in domains such as psychology, information science, software engineering, sociology. Not only such a knowledge is not currently available, but it will be difficult to make it available even in a near future. Therefore these approaches sound as lists of generic recommendations, whose concrete implementation is left only to the fantasy (and not to the science) of single designers.

3. E-learning quality factors

Other approaches are trying to develop their own criteria, but they are using them nationally, regionally, locally (Wirth, 2005) or are still consisting only in models like the ones described in the following.

The E-Learning Success Model (Holsapple and Lee-Post, 2006) is a description of a process devoted to measure and assess success. Success in e-learning is defined as a multifaceted construct to be assessed in three successive stages: system design, system delivery and system outcome. As shown in fig.1, in the first

stage the goal is to attain system design success by maximizing the three quality dimensions: system quality, information quality and service quality. The second stage is to attain system delivery success by maximizing the use and user satisfaction dimensions. The final stage is to attain system outcome success by maximizing net benefits dimension. Each success dimension is quantified as a single numeric measure by aggregating the ratings of its set of attributing factors obtained via survey instruments.

The overall success of e-learning can then be evaluated for each dimension. A low score for any success dimension indicates a deficiency in that area and efforts can be spent accordingly to remedy for the deficiency.

The model outlined above suggests that a critical factor of e-learning success is the online readiness of the students. The screening of students for online courses is based on assessing their responses with reference to four readiness measures: academic preparedness, technical competence, lifestyle aptitude, and learning preference toward e-learning. An online-ready student is characterized by a high rating on all four readiness measures. Students' online readiness have a definite impact on their successful course performance and e-learning satisfaction.

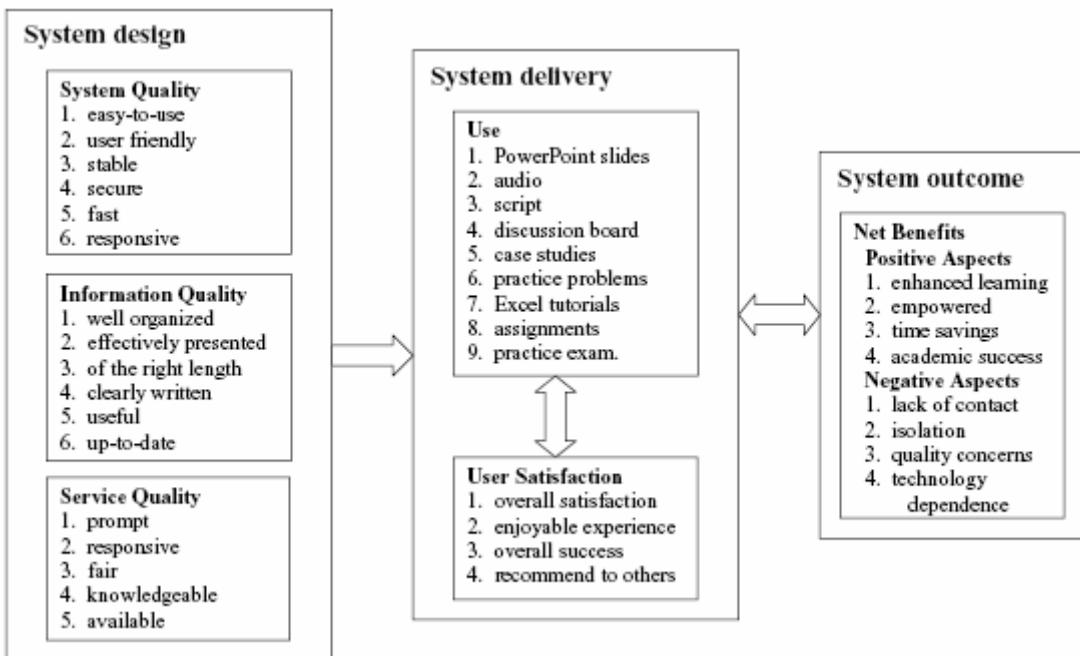


Fig. 1. The E-learning Success Model

On the contrary the model presented in Figure 2 assumes that course outcomes are a direct result of motivation to learn (Klein et al., 2006). Motivation to learn is a key determinant of the choices individuals make to engage in, attend to, and persist in learning activities. It is influenced by learner characteristics, instructional characteristics, and perceived barriers and enablers (perceived barriers and enablers are environmental events or conditions that are believed to exist or be encountered and thought to impede or facilitate progress). Perceptions of barriers and enablers are themselves influenced by learner and instructional characteristics.

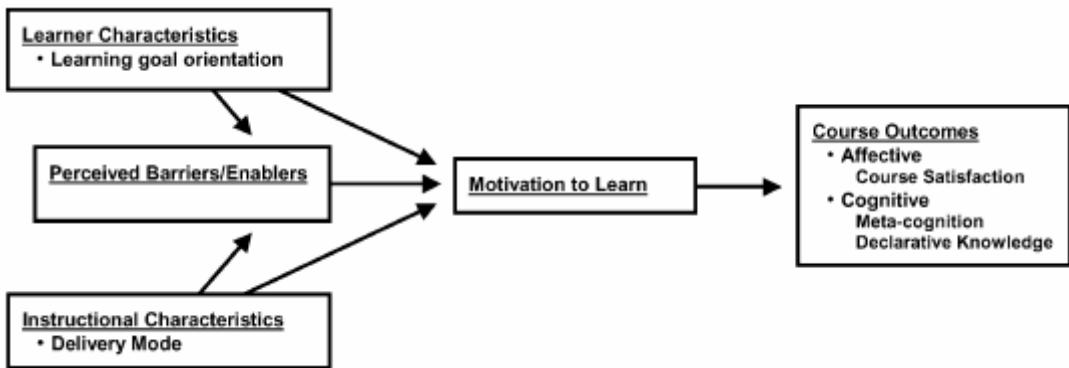


Fig. 2. The conceptual model of Klein et al. (2006)

This model highlights the central role of both motivation to learn and learner perceptions of features as barriers or enablers: enhancing trainee perceptions of enablers and addressing concerns about potential barriers are important strategies for enhancing motivation to learn which, in turn, facilitates positive course outcomes. According to Klein et al. (2006) a better understanding of how the use of technology in the delivery of instruction impacts training effectiveness requires the examination of mechanisms that can account for differences in learning, such as motivation to learn, as well as direct effects of technology on learning.

A somewhat different perspective has been adopted by Lim et al. (2007), which identify five dimensions affecting efficacy of online training: motivation and self-efficacy of the trainee, training content, level of communication between trainer and trainee, the organizational environment and ease of use of online website resources. As regards the latter dimension, a specific strategy can guarantee the ease of use: the Learner Centered Design (LCD).

A LCD approach is based on the knowledge of the users and their different characteristics: how learners prefer to learn, how they are learning the information, under what pressures the learners operate in their day-to-day life, their motivation or incentive to engage in online learning, what constraints they face, what special accommodations they need, how they feel comfortable the online applications used, what experience they have with e-learning (Miller 2005).

Understanding learners' profiles is the best way to create useful designs, styles and tones, but, when delivering training via online learning, there are some special design concerns that represent other potential benefits in planning. They start from a common step: select a delivery technique or combination of techniques in order to define, *a priori*, a user interface design. Design of course's interface is critically important (Jones 1994), because it has a positive or negative impact on user performance (Tselios et all 2001).

Then it should be desirable to use screen-friendly fonts and web-safe colours in order to create a standard consistent look and provide quick download times and help users by providing printer-friendly pages. According to Norman (1998) the interface should be also interactive and provide feedback, have specific goals, motivate, communicating a continuous sensation of challenge, provide suitable tools, avoid any factor of annoyance interrupting the learning stream.

LCD should take into account that learners are sensitive to the readability of on-screen text. Therefore formatting and spacing of the text as well as colours are important. Moreover a common look helps users to distinguish course pages from external linked hyper-pages. People do not like studying texts from the screen and they do not want to go more than three clicks far from the main page, so they need a navigation frame always available. Learners are always in search of something new inside the web. It is therefore important to update frequently contents and news and also give a direct indication of what is new as soon as possible (Van Rennes et al., 1998).

4. Conclusion

E-learning is progressing from the basic use of ICT for learning to new forms of education and training which emphasise creativity and collaboration and new skill requirements for the knowledge society. This, in turn, requires a significant change of emphasis, away from a focus on technology, connectivity and Internet, towards a greater consideration of the context of learning, and of the need for collaboration, communication and innovation. However, this change requires an amount of knowledge so far not fully available. This is the

cause for the difficulty encountered in assessing e-learning quality. Namely, on one hand, we have very interesting frameworks, such as the ones of ISO/IEC19796-1: 2005, and of EQO, but consisting essentially in list of suggestions and prescriptions without indications on practical implementation. On the other hand, we have a number of models, such as the ones sketched in the previous section, each one associated to concrete indications, but differing one from another as regards the basic hypotheses and the contexts of application. In such a situation the quality of e-learning remains an open question, and we are still in need of e-learning best practice warranting that a course is both efficient for the learner and the other actors involved. Such a warrant, however, cannot be grounded only on a practice. We need, in this regard, further scientific investigations and ad hoc researches involving educational experts, e-learning teams and designers.

BIBLIOGRAPHIE

- Ehlers U.D., Goertz L., Hildebrandt B., Pawlowski J.M. (2005). *Quality in e-learning*. Cedefop Panorama series; 116. Luxembourg: Office for Official Publications of the European Communities, 2005. URL: http://www2.trainingvillage.gr/etv/publication/download/panorama/5162_en.pdf.
- Galagan, P.A. (2000). *The e-learning revolution*. Training & Development, v54 n12 p24-30 Dec 2000.
- Hirata K. (2006). *Information model for quality management methods in e-Learning*. Proceedings of the Sixth International Conference on Advanced Learning Technologies (ICALT'06). URL: <http://csdl2.computer.org/comp/proceedings/icalt/2006/2632/00/263201147.pdf>
- Holsapple C.W., Lee-Post A. (2006). *Defining, Assessing, and Promoting E-Learning Success: An Information Systems Perspective*. Decision Sciences Journal of Innovative Education Vol. 4 Number 1 January 2006.
- Jones M.G. (1994). *Visuals information access: a new philosophy for screen and interface design*. In *Imagery and visual literacy: selected readings from annual conference of the international visual literacy association*, Tempe, October 12-16, 264-272.
- Klein H.J., Noe R.A., Wang C. (2006). *Motivation to learn and course outcomes: the impact of delivery mode, learning goal orientation and perceived barriers and enables*. Personnel Psychology 59, 665–702.
- Koper E.R.J. (2001). *Modelling Units of Study from a Pedagogical Perspective: the pedagogical meta model behind EML*. URL: <http://eml.ou.nl/introduction/docs/ped-metamodel.pdf>.
- Lim H., Lee S.G., Nam K. (2007). *Validating E-learning factors affecting training effectiveness*. International Journal of Information Management 27 (2007) 22–35.
- Miller M.J. (2005). *Usability in E-Learning*. URL: <http://www.learningcircuits.org/2005/jan2005/miller.htm>.
- Norman D. (1998). *The invisible computer*. Cambridge MA, MIT Press.
- Pawlowski J.M. (2003). *The European quality observatory (EQO): structuring quality approaches for e-learning*. Proceedings of the 3rd IEEE International Conference on Advances Learning Technologies (ICALT'03).
- Tselios N. K., Avouris N. M., Dimitracopoulou A., Daskalaki S. (2001). “*Evaluation of Distance-Learning Environments: Impact of Usability on Student Performance*”. International Journal of Educational Telecommunications, Vol. 7, No. 4, pp.355–378.
- Van Rennes L., Collis B. (1998). *User interface design for WWW-based courses: Building upon student evaluations*. ED428731.
- Waits, T.,&Lewis, L. (2003). *Distance education at degree-granting postsecondary institutions: 2000–2001*, NCES 2003-017. Washington, DC: National Center for Education Statistics, U.S. Department of Education.
- Welsh E.T., Wanberg C.R., Brown K.G., Simmering M.J. (2003). *E-learning: emerging uses, empirical results and future direction*. International Journal of Training and Development 7:4.
- Wentling T.L., Waight C., Gallaher J., La Fleur J., Wang C., Kanfer A. (2000). *E-learning - A Review of Literature*. URL: <http://learning.ncsa.uiuc.edu/papers/elearnlit.pdf>.
- Wirth M.A. (2005). *Quality Management in E-Learning: Different Paths, Similar Pursuits*. 2nd International SCIL Congress. URL: <http://www.scil.ch/congress-2005/programme-10-11/docs/workshop-1-wirth-text.pdf>.