

QUALITY ASSESSMENT OF ELECTRONIC LEARNING MATERIALS

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Abstract

Information and communication technology combined with multimedia and networking have enabled development of e-learning. E-learning opportunities expand access to education, without the learner's social, economic and geographical barriers. The main question in this situation has to take into account the quality of e-learning materials. The aim of this research was to explore the definition of the quality and scientific research literature on e-learning quality, and identify the quality influencing factors. This article looks at quality standards and summarizes the existing literature on the quality aspects of electronic materials. During the research was analyzed the literature of the last 13 years. Findings showed that the quality evaluation model covers a wide scale — from one e-course to e-learning system implementation quality aspects. The quality of electronic learning material can be measured by technical, pedagogy and content criteria. The technical quality of the e-material (text, picture, video, sound recording, visual presentation, multimedia, etc.) is influenced by many factors and specifying for each type. The research should be continued to indicate the quality criteria for each type of e-materials including the degree of importance.

Key words: e-learning, quality, e-material.

Introduction

E-learning has taken an important role in the higher education and distance learning industry. E-learning can support students who are employed and need access to study materials at a distance. Accordingly increases the need to update the e-learning quality assurance procedures. Literature review revealed that online training and its effectiveness has been widely studied (e.g. Henderson, 2005; Henderson and Chapman, 2007; Jung, 2010). There is a lot of research that affects the quality issue, but there is not a single point of view on this matter. Studies on the measurement of the quality problems are still valid. Quality assurance is an important task in any sphere, including education and e-learning. The challenge is in the issue of quality, which is expressed in different views and approaches (Stracke, 2006).

The first International Organization for Standardization (ISO) quality standards of training, education and training ISO / IEC 19796-1 (International Organization for Standardization / International Electrotechnical Commission) was developed, approved and published in 2005. E-learning standards is a challenge that affects two important areas — pedagogy and technology. Although in recent years, both the US and Europe in several standardization consortiums have defined an open technology interoperability standards, the emphasis is on the technical and substantive aspects of the didactic concept only slightly affected (Baumgartner et al., 2002). Research on the e-learning quality in higher education has identified several aspects and criteria for quality assessment, but they are different (Ehlers et al., 2005; Ehlers, 2007; Shah, 2013). The problem relates to the fact that e-learning affects many quality indicators in different dimensions — various stakeholders (the student and lecturer), technology,

educational content, etc. and each dimension has its own status.

The aim of this article was to explore the literature about e-learning quality in general and to identify the real situation, which might help to improve the quality of e-learning.

Materials and Methods

Monographic method has been used for this article. Information was searched in electronic databases and printed publications, published in Latvia and Europe. The study analyzes the literature of the period from 2000 to 2013, except one source about the definition of quality from 1980. The general term 'quality' characterisation used quality management standard ISO 9001:2008, but the e-learning quality performance — quality standard ISO / IEC 19796-1. Broad spectrum is discussed and analyzed in the scientific research literature on studies of how to identify the factors that influence e-learning quality.

Results and Discussion

Quality

Quality is defined as a set of product or service features and characteristics related to their ability to satisfy certain needs of product or service. According to ISO 9001, quality is the degree to which a set of inherent characteristics fulfills requirements (ISO, 2008). Quality development in its broad sense can be defined as follows - 'Quality is of fundamental importance, this is true over all the borderlines of organizations, branches and political economies' (Stracke, 2006).

The definitions of quality vary and commonly reflect the different perspectives of the individual and of the society. The quality of a product is its ability to satisfy the needs and expectations of the customer.

D. F. Davok defines quality as a set of attributes related to a specific object or process that allow to compare with a set of benchmarks (Davok, 2007 cited from Casanova et al., 2011). This definition alludes to a comparison between the object evaluated and a set of criteria related to quality (Ehlers, 2004). In education the term quality is a client-oriented concept in which quality requirements are defined through a participation process between clients and providers. J. M. Pawlowski defines quality as ‘appropriately meeting the stakeholders’ objectives and needs, which are the result of a transparent, participatory negotiation process within an organization’ (Pawlowski, 2007).

The quality itself is too abstract concept and therefore is defined in accordance with the given situation and context, taking into account the individuals involved. It is important to determine the relevant aspects and requirements to determine appropriate criteria. In order to obtain a common understanding of the quality, it is necessary to reach a consensus between the different views. This, in turn, would allow to avoid the sometimes contradictory meaning of quality and the needs of stakeholders (Donabedian, 1980; Deming, 2000).

Quality can be used to confirm that a specific process or object is made with quality, or it can be used to improve the process or object.

The process of the adoption, implementation and adaptation of quality development can be divided into three steps based on three different levels of quality development concept (Hildebrandt et al., 2006):

- Level of the individual person — the objective is to ensure that every stakeholder knows what quality development means and is standing for,
- Level of the organization — develop a quality vision and a common understanding of the quality objectives and the resulting mission statements, each individual is aware of the necessary base for this,
- Integration of quality development involving all stakeholders — to look for ways to improve organizational vision and quality objectives into the educational and business process to become a part of the daily business, all stakeholders are important for ensuring their motivation and contribution.

M. Jara and H. Mellar (2007) emphasize that quality assurance makes a comparison with a predetermined standard and quality improvement and is related with the relation between the current benchmark and the pathway to achieve this benchmark. For e-learning, and because of its characteristics, quality can be related to all the processes, products and services supported by information and communications technology (ICT) (Ehlers et al., 2005; Pawlowski, 2007). U. D. Ehlers prefers to address the importance of understanding

what quality is for learners in e-learning suggesting some preferences for each specific target group of students (Ehlers, 2004). In conclusion, quality in e-learning must involve the different actor’s interaction and participation and, at the same time, must introduce two different perspectives of quality: to assure that quality exists and to be used as a tool to its improvement (Casanova et al., 2011).

The quality of e-learning has often been viewed with skepticism and been the target of criticism. This criticism has focused on the lack of physical interaction (Yeung, 2003), technical problems (Zhao, 2003), or a technological and aesthetic focus instead of an educational one (Barbera, 2004). Other research reports show that the course delivery medium is rarely the determining factor for quality, or that online education in itself can be a quality enhancement factor in terms of accessibility, collaboration or community-building, for either teachers or learners (Connolly et al., 2005; Jara and Mellar, 2007; Dondi and Moretti, 2007).

E-learning quality assurance is a faculty evaluation process that ‘judges, measures, or assesses the quality of the development and delivery of online courses/ learning environments focused on appropriate design and best practice, and is aimed at self-improvement ensuring quality instruction in a non-threatening way’ (Quilter and Weber, 2004). According to Q. Wang, some of the main criteria are:

- Learning outcome assessment,
- Curriculum and instructional development,
- Institutional commitment,
- Student support,
- Faculty support (Wang, 2006).

Quality Standards

In the field of quality standards there are some formal and informal international standardization organizations. The most popular of formal standardization organization is ISO. As an informal standardization organizations can be mentioned the community and professional associations which develop industry specifications, for example, the Institute of Electrical and Electronics Engineers (IEEE), Instructional Management Systems Global Learning Consortium (IMS GLC). The above mentioned organizations standards are generally developed and adapted to the specific situation, while the consortium developed recommendations are often only available to consortium members and are not published. Below will be discussed standards relating to the quality of e-learning.

ISO 9001:2008 Quality Management Standard. ISO 9000 is a family of standards for quality management systems. ISO 9000 is maintained by the International Organization for Standardization and

administered by accreditation and certification bodies. ISO 9001 is one of the standards in the ISO 9000 family. ISO 9001:2008 Quality management systems — Requirements (ISO, 2008).

ISO 9001:2008 should be applied to the process approach of quality management systems development, implementation and efficiency in order to enhance the customer satisfaction with their requirements.

Characteristic is the distinguishing feature (ISO, 2008). It can be:

- Physical (mechanical, electrical, chemical, biological),
- Sensory (related to smell, touch, taste, sight, hearing),
- Behavioral (courtesy, honesty, veracity),
- Temporal (punctuality, reliability, availability),
- Ergonomic (physiologically characteristic, or related to human safety),
- Functional (e.g. maximum speed of an aircraft).

However, quality characteristic inherent characteristic of a product, process or system is related to a requirement. Standard does not describe how to take measurements in the field of education.

ISO/IEC 19796-1:2005 Information technology — Learning, education and training — Quality management, assurance and metrics. This is the first ISO quality standard of training and education, and training. The ISO/IEC 19796-1 standard was developed by the Working Group 5 ‘Quality Assurance and Descriptive Frameworks’ of the standardization committee ISO/IEC JTC1 SC36 (International Organization for Standardization / International Electrotechnical Commission Joint Technical Committee 1 — Information Technology — Subcommittee 36 — Information Technology for Learning, Education, and Training). ISO/IEC 19796 is a formal standard for quality management and quality assurance in education and training, composed of several parts (ISO, 2005). The first part provides a common framework available to the critical properties, characteristics and metrics for quality to understand, describe and specify by existing approaches, concepts, specifications and terms for the education and training to be harmonized. The reference process model is Reference Framework for the Description of Quality Approaches (RFDQ) (Stracke, 2007a). The quality standard contains the reference process model RFDQ to help stakeholders in learning, education, training, and especially in e-learning or blended learning to document and (re-)define their everyday business and processes. It will be shown that the reference process model can serve as a valuable instrument for the implementation and the establishment of quality development in learning, education, and training (Stracke and Hildebrandt, 2007; Stracke, 2010).

This standard is an instrument for developing quality in the field of e-learning. It consists of three parts:

- A description scheme for quality approaches,
- A process model as a reference classification,
- Reference criteria for evaluation (Pawlowski, 2007).

The ISO/IEC 19796-1 standard is a basic model or road map for educational organizations and has to be adapted to each organization’s specific context. However, the standard does not contain detailed guidelines of how to use the model.

The reference process model covers the whole e-learning or blended learning cycle and therefore it can be used to describe any offer of learning, education and vocational training scenarios. The reference process model can be characterized by the following aspects (Stracke, 2007b):

- Integration,
- Completeness,
- Openness,
- Adaptability,
- Uniqueness.

It is important to note that the reference process model does not include any regulations about the sequence of the processes or interdependencies between them or any specifications on its implementation. It serves as an open descriptive framework that always needs the adaptation to the organization, the educational context and the given situation.

Quality standards are not able to guarantee high quality and success. Any standard should be seen as a set of recommendations to be adapted to the particular situation. By adapting quality standards correctly, customers benefit from the significant advantages in the long run.

The European Association for Quality Assurance in Higher Education (ENQA) aims to achieve integration across the European Union (EU), but it faces a long journey with many starting points (Grifoll et al., 2010). Points of difference include: whether the function of a quality assurance system is to check compliance with standards or to promote quality enhancement; the extent to which external oversight is required; and the applicability to e-learning compared to face-to-face contexts (Inglis, 2005; Jara and Mellar, 2007). EU policy documents that affect the e-learning are: the European Commissions e-Learning Action Plan, the European Unions e-Learning Programme, the European Commissions Lifelong Learning programme and Digital Strategy Programmes. All these documents are intended to increase the new multimedia technologies for education and update the importance of lifelong learning. E-learning quality in these documents is not accessed. Instead they refer to

the arguments and initiatives to promote e-learning. This appears to be the common pattern in EU initiatives related to e-learning.

E-material and Quality Assessment

D. Dinevski has subdivided the electronic learning material into three types: technical parts, learning units, and learning entities (Dinevski et al., 2010). The technical details consist of:

- Text,
- Picture,
- Animation,
- Video,
- Sound recording,
- Programme supported presentation of the contents (Dinevski et al., 2010).

If the technical units provides with a didactic description to turn into a learning and it is the most useful material. For its part, the e-material quality assessment criteria can also be divided into three groups — pedagogy, content and technical implementation requirements. Successfully defined quality requirements give the course developers unlimited choice of teaching methods, training materials, or use of technical tools (Judrups, 2010).

Teaching units didactic quality is probably the most important point in education, but in this study it is not discussed. Didactic quality assessment focuses on the learning content — connections between learning objectives, content, methods, and the student.

In general, electronic material has to undergo similar procedures as comparable classic material if it is to be certified as a learning aid, textbook, or supplementary material. Practice shows that customer composes the quality of services. M. Badri et al. (2005) offers to use five criteria for the assessment of the service:

- Tangibility: the appearance of physical facilities, equipment, personnel and communication materials,
- Reliability: the ability to perform the promised service dependably and accurately,
- Responsiveness: the willingness to help customers and to provide prompt service,
- Assurance: the knowledge and courtesy of employees and their ability to convey trust and confidence,
- Empathy: the provision of caring, individualized attention to customer. Customer Satisfaction.

E-material may be performed in accordance with the technical implementation and compatibility evaluation. E-material quality of the technical parts (text quality, graphics quality, the quality of visual presentation, use of multimedia) is influenced by many factors: legibility and clarity of the text, grammatical correctness of the text, consistent use of style,

organization and clarity of presentation, structuring text, hyperlinks, etc. Others measure the quality of e-materials is important not only for technical quality, but to achieve learning objectives use methods and technologies.

A Model for Quality Assessment of Electronic Learning Material, developed by a group of e-learning experts established by the National Education Institute of the Republic of Slovenia, proposed that e-material could be evaluated according to the following elements: technical implementation and compatibility evaluation (Dinevski et al., 2010). Those elements of e-materials are to be focused on things that specifically determine the quality of production, installation, upgrading, and uninstallation in different systems and environments: availability of learning materials, installation, registration, starting the programme, use of material; end of use (Khazaaleh et al., 2011). To evaluate e-materials it is recommended to pay attention to three things:

- Description of the material with metadata,
- Technical evaluation,
- Content and didactic evaluation.

Swedish National Agency for Higher Education (E-learning..., 2008) has defined a model for quality assessment of e-learning. This model is made up of ten quality aspects which we consider crucial when assessing quality in e-learning:

- Material/content,
- Structure/virtual environment,
- Communication, cooperation and interactivity,
- Student assessment,
- Flexibility and adaptability,
- Support (student and staff),
- Staff qualifications and experience,
- Vision and institutional leadership,
- Resource allocation,
- The holistic and process aspect.

The quality aspects are thematic areas, each with a set of specific e-learning problems and issues. For each quality aspect, 3–4 quality criteria have been developed. These criteria are recommendations for concrete measures for dealing with the problems and issues identified at an institutional level.

Educators believe that a combination of all these aspects is needed — and not only as the sum of the different parts, but aligned in a functional manner that adopts a systemic view. It is important for all elements to fit together in a coherent manner on the basis of a pedagogical philosophy.

B. F. Chapman and R. G. Henderson (2010) emphasize 18 quality criteria. Their study showed that the most important quality criterion is ‘rich content’. More importantly, it is referred to as ‘user friendly’, ‘interaction’, ‘reliability’, ‘flexibility’, ‘technical support’ and ‘informative’.

A. Usoro, A. Abid and G. Majewski (Usoro and Abid, 2008; Usoro and Majewski, 2009) defined the nine factors, such as e-learning in higher education quality ingredients.

Since e-learning is related to different target groups (the material interests of creators and users interests) and e-learning material users have different needs and desires, the quality aspects are to be seen in the context of many influencing factors.

Conclusions

In recent years e-learning quality aspects have been widely studied. Several e-learning quality

models of technical realization, platform choice, and improvement of accessibility are developed. The main role of quality standard is to support the educational process implementation and management. The quality criteria affecting electronic learning materials can be divided into three groups — technical, pedagogical and content criteria. Technical quality of electronic teaching materials, which are different for each technical unit, and quality criteria are still investigated. The study should continue with specifying the quality criteria for each type of e-materials and indicating the degree of importance of the criteria.

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