

QUALITY INITIATIVES IN E-LEARNING

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ABSTRACT

Quality assessment in e-learning is a dynamically developing area, aiming at an elimination of the effects of lack of FTF (face-to-face) contact with the teacher and with the learning team and at objectifying the objective as well as the perceived quality of courses. As ICT (information and communication technology) and e-learning develops, more and more ingenious techniques are added to the e-learning process. Benchmarking and quality control should not only make the learning content, process and context comparable, but also should enable the defining the highest quality solutions. The paper gives the work of some of the international Institutions working on quality assessment and promotion. It also discusses some of the new approaches to benchmarking and quality assessment.

Keywords: quality assessment, benchmarking, e-learning, pedagogy, andragogy

1. INTRODUCTION

Quality of an educational process is a key factor when evaluating the investment on both sides – that of the provider and of the client. E-learning develops together with the software and e-learning environment development. It is becoming more user friendly, but many times, it is not realised that it is a very work intensive process, where the contact with clients should be encouraging and supportive. Many e-learning programs became excellent, but we can still find quite a number of uninspiring ones, where clients can get through the process at low effort levels. With growing competition on the market, however, in case of providers that do not use e-learning as a “side-dish”, but as their main area of activity, quality processes were developed and implemented [13, 14, 15]. Quality is assessed during and after the courses, the customer satisfaction is monitored through self-assessment, assessment and follow-up [1]. The paper gives an overview of the progress that has been made in this field.

2. EUROPEAN INSTITUTIONS

There are several institutions and organisations in Europe to enhance the quality of e-learning. One of the leaders in this field is EIFEL [2] the European Institute for E-Learning that is an independent, not-for-profit professional association whose mission is to support organisations and individuals in building a knowledge economy and a learning society through innovative practice, professional development and the use of learning technologies. The activities of EIFEL are based on the key principles that learning is lifelong, formal and informal, moreover, individuals, organisations and communities learn in close interaction and finally, knowledge, information and learning technologies have the power to support innovation and unite all forms of learning. This institute provides services to its members through research, projects, special interest groups, workshops, conferences and consultancy.

EIFEL has set up the Europortfolio consortium to establish a place for ePortfolio leadership in Europe. An

ePortfolio is a personal digital collection of information describing a person's learning, career, experience and achievements. ePortfolios are privately owned and can be shared with others in order to support continuing professional development, e.g. complete exams, plan learning, reflect on career or search a job. In 2003 EIFEL launched the campaign "ePortfolio for all" as an objective for 2010. The main objective of the 2010 Campaign is that in 2010 all European citizens will have access to an ePortfolio.

Moreover, EIFEL is a founding member of EFQUEL [3] the European Foundation for Quality in E-Learning that is a European network with over 60 member organisations. The Foundation's initiators are the European Institut for e-Learning, the European Schoolnet, FIM Newlearning, the MENON Network, the University of Duisburg-Essen, Germany and the University of Reading/UK. The mission of the Foundation is to enhance the Quality of Learning in Europe by providing services and support for all stakeholders. EIFEL is leading the special interest group Quality Mark for the Foundation. The outcome of this research will be a report providing series of recommendations for the establishment of a European Quality Mark for the use of technologies in learning. Another initiative is the European Quality Dialogue List with experts registered on the list to discuss topics around the issues of quality in e-learning.

3. EUROPEAN PROJECTS

Some of the most important European projects linked to quality are SEEL, looking at quality for e-learning territories, SEEQUEL, brings together the companies in the e-Learning industry, EQO, supports the use of quality approaches, TELCERT, that looks at standardisation and testability of products and services.

SEEL [4], Supporting Excellence in E-Learning, was a project funded by the European Commission to define a quality framework to help learning regions to become e-Learning regions. The project outcomes are the e-Learning quality guidelines, the e-Learning Regions and Cities Memorandum of Understanding, the e--Learning Regions & Cities Centres of Excellence Charter, the e-

Learning Regions & Cities Benchmark system and the e-Learning Quality Award. It is an open initiative with possibility to join the initiative through the signature of a Memorandum of Understanding.

SEEQUEL [5] has produced as a result the European e-Learning quality Forum that is a web platform where the different e-Learning quality stakeholders can meet to discuss, exchange and present their approaches. The second outcome, the SEEQUEL Core Quality Framework is based on a matrix where a list of common quality criteria applicable to the whole e-learning experience can be weighted by the various user profiles, enabling any category of stakeholders to position their perception of quality with respect to the perceptions of another stakeholders' category. Moreover, four tools have been produced, the eLearners Bill of Rights, the eLearners Quality Guide, the Quality guide to the non-formal and informal learning processes and the Quality tool for industry decision makers.

EQO [6], the European Quality Observatory, has produced the EQO Quality Portal, a web-based platform that provides a database for strategies and services concerning quality in e-learning.

TELCERT [7] is a research project under the European Union's 6th Framework programme aimed to develop innovative software testing and conformance systems to assure interoperability in e-learning content and technology.

4. QUALITY OF PRODUCTS AND SERVICES

4.1. Open eQuality Learning Standards

The Open eQuality Learning Standards (Open eQLS, May 2004) are intended to help those who want to design, delivery, evaluate and purchase quality e-learning products and services for students and their sponsors [8]. The Open eQLs are open industry standards, researchers can contribute to their development and providers are free to use them non-commercially.

The two organizations co-sponsored the development of the standards, namely, EIfEL (European Institute for E-Learning), representing the European Union, and LIflA (Learning Innovations Forum -Forum d'Innovations d'Apprentissage -Foro de las Innovaciones que Aprende), representing the Americas. The Open eQLS are based on the Canadian Recommended E-learning Guidelines (CanREGs) which were launched in July 2002 at the Commonwealth of Learning Conference in Durban.

The Open eQuality Learning Standards describes in detail the Quality Outcomes, the Quality Processes and Practices, and the Quality Inputs and Resources for e-Learning Products and Services. The e-Learning products or services can take various forms, they may be single courses or entire programs, course units, lessons or components, aimed at specific age groups or aimed at individuals, etc.

The Quality Outcomes from e-Learning Products and Services address the detailed description of acquired content skills and knowledge, the necessary learning skills, the course credits or credentials, and the return on investment for learner.

The Quality Processes and Practices in e-Learning Products and Services include the management of students (registration procedures, placement procedures, management of student records, assistance with the technologies), the delivery and management of learning (approaches to learning, instructional strategies, scheduling and timetabling, assessment of learning, digital archive), appropriate use of ICT, communications facilities and practices, and finally, the digital archive and ePortfolio service/system. For example, scheduling and timetabling is available as needed and when needed, flexible and responsive to learners, adequate and realistic.

The Quality Inputs and Resources for e-Learning Products and Services address the detailed description of intended learning outcomes, curriculum content, teaching and learning materials, product and service information, appropriate learning technologies, technical design of learning materials, appropriate and necessary personnel (instructors/teachers/professors, content support persons, process support persons, program management accountable), learning resources, complete learning package, comprehensive course package (all materials and technologies), evidence of program success through routine review and evaluation, program plans and budget, advertising, recruiting and admissions information. For example, a complete learning package includes course description, learning objectives, assessment and completion requirements, information about the instructor(s), learning/lecture notes and additional learning resources, course activities and assignments, quizzes and examinations, access to answers for questions/quizzes, and a framework for portfolio development.

4.2. Example of Benchmarking System

In this section an example of Benchmarking System developed in the Institute for Higher Education Policy, Washington, DC, is presented [9,10].

Institutional Support Benchmarks

- A documented technology plan that includes electronic security measures (i.e., password protection, encryption, back-up systems) is in place and operational to ensure both quality standards and the integrity and validity of information.
- The reliability of the technology delivery system is as failsafe as possible.
- A centralized system provides support for building and maintaining the distance education infrastructure.

Course Development Benchmarks

- Guidelines regarding minimum standards are used for course development, design, and delivery, while learning outcomes—not the availability of existing technology—determine the technology being used to deliver course content.
- Instructional materials are reviewed periodically to ensure they meet program standards. Courses are designed to require students to engage themselves in analysis, synthesis, and evaluation as part of their course and program requirements.

Teaching/Learning Benchmarks

- Student interaction with faculty and other students is an essential characteristic and is facilitated

through a variety of ways, including voice-mail and/or e-mail.

- Feedback to student assignments and questions is constructive and provided in a timely manner.
- Students are instructed in the proper methods of effective research, including assessment of the validity of resources.

Course Structure Benchmarks

- Before starting an online program, students are advised about the program to determine (1) if they possess the self-motivation and commitment to learn at a distance and (2) if they have access to the minimal technology required by the course design.
- Students are provided with supplemental course information that outlines course objectives, concepts, and ideas, and learning outcomes for each course are summarized in a clearly written, straightforward statement.
- Students have access to sufficient library resources that may include a “virtual library” accessible through the World Wide Web.
- Faculty and students agree upon expectations regarding times for student assignment completion and faculty response.

Student Support Benchmarks

- Students receive information about programs, including admission requirements, tuition and fees, books and supplies, technical and proctoring requirements, and student support services.
- Students are provided with hands-on training and information to aid them in securing material through electronic databases, interlibrary loans, government archives, news services, and other sources.
- Throughout the duration of the course/program, students have access to technical assistance, including detailed instructions regarding the electronic media used, practice sessions prior to the beginning of the course, and convenient access to technical support staff.
- Questions directed to student service personnel are answered accurately and quickly, with a structured system in place to address student complaints.

Faculty Support Benchmarks

- Technical assistance in course development is available to faculty, who are encouraged to use it.
- Faculty members are assisted in the transition from classroom teaching to online instruction and are assessed during the process.
- Instructor training and assistance, including peer mentoring, continues through the progression of the online course.
- Faculty members are provided with written resources to deal with issues arising from student use of electronically-accessed data.

Evaluation and Assessment Benchmarks

- The program’s educational effectiveness and teaching/learning process is assessed through an evaluation process that uses several methods and applies specific standards.

- Data on enrolment, costs, and successful/innovative uses of technology are used to evaluate program effectiveness.
- Intended learning outcomes are reviewed regularly to ensure clarity, utility, and appropriateness.

5. QUALITY OF ONLINE COURSES

5.1. Criteria for Evaluating the Quality

To assist educators in evaluating the effectiveness of online courses the criteria for evaluation of quality are needed [11]. Usually it is course general information, accessibility, organization, language, layout, goals and objectives, course content, instructional strategies and opportunities for practice, learning resources, and evaluation.

General information should include a goal and learning objectives or outcomes, course credit value, prerequisites and/or corequisites, list of required and recommended resources, special hardware/software requirements if needed, estimated time required to complete course, guidelines for participating in online course (netiquette), learners’ backgrounds and ability levels, information about technical support, availability of the instructor, link to frequently asked questions, learners’ rights to privacy, information about instructors and developers, and course copyright statement.

Accessibility means that all information can be found quickly, i.e., each icon/button is explained and evident, table of contents is provided, every course section begins with a preview, every page is linked to the previous page / start of the module / beginning of the course / e-mail, links are provided to other parts of the course, page headers / footers identify position of learner, keywords and glossary is provided, finally, a course should be accessible to learners who may have visual or auditory challenges.

Organization of course components is consistent, e.g., each module may have the introduction, objectives, pretest, directions, explanatory text including learning activities such as case studies, suggested answers for learning activities, links to additional information, module summary, self-test including answers, references, additional readings, and module assignment. Except above, organization of the content is appropriate for the subject matter / audience, references and links are correct.

Language should be appropriate for the intended audience, i.e., clear writing style and directions, familiar words, short sentences, supportive tone of the writing, defined abbreviations / symbols, simple and easy to understand instructions, consistent and accurate spelling and grammar, edited course material for language and content.

Layout is appropriate for the content and audience, simple layout is best, typeface is appropriate for web (e.g. verdana), underlining is used only for hyperlinks, appropriate contrast between text and the background, jpeg files are used, etc.

Goals and Objectives cover course content and are clear, objectives specify learning outcomes related to knowledge, skills, competencies, behaviours, and/or attitudes, the accomplishment of objectives should be measurable.

Course Content is complete, appropriate to the learner, relevant, current, broken into small learning steps, illustrated by examples and/or case studies, linked to other sources

Instructional / Learning Strategies and Opportunities for Practice / Transfer, instructions are clear, deadlines are specified, learners can proceed at a pace that is appropriate for them, activities are used to promote interactivity as online discussions / online conferencing / collaborative assignments, activities motivate and learners must frequently respond or contact others, activities encourage critical thinking, creativity, and problem-solving, learners are encouraged to interact with others and benefit from their experience, learners are linked to resources beyond the course, activities are realistic and appropriate, opportunities are provided for practice and knowledge transfer, frequent feedback is provided, summaries are provided.

Learning Resources are accessible and appropriate, divided into required and optional categories, multimedia format is specified including a link to a plug-in, various resources are used to ensure different learning styles / points of view, resources are accurate and current, bibliography includes a variety of material (url, books, video), external links are provided.

Evaluation is feasible, relevant and accurate, learners are given clear expectations and criteria, number of assignments and their due dates are reasonable, links to institutional policies are provided, guidelines for submitting assignments are provided, students are informed about the evaluation criteria (incl. online discussions), learners are able to track their own progress, plagiarism consequences are known.

5.2. Example of Pedagogical Rating

Sonwalkar [12] proposed an instrument for overall evaluation of large numbers of online courses named *Overall Rating* which is defined as follows:

$$\text{Overall Rating} = \text{PEI} \times \text{Summative Rating Score} \quad (1)$$

where *PEI* is *Pedagogy Effectiveness Index*, and *Summative Rating Score* is the sum of ratings of different factors based on Likert scale (psychometric response scale often used in questionnaires).

Pedagogy Effectiveness Index of an online course can be defined as a summation of learning styles, media types, and interactivity. It is based on pedagogical learning cube with three dimensions (see Table 1).

PEI is calculated as a sum of weights of styles/elements which exists within online course. Consider following example. The PEI for a course with three learning styles, four media elements, and two interactive elements will be:

$$\text{PEI} = 3*0.068 + 4*0.055 + 2*0.066 = 0.556 \quad (2)$$

The PEI varies from 0 to 1. There is an assumption that the probability of the pedagogical effectiveness increases as cognitive opportunity increases with the inclusion of learning styles, media elements, and interaction.

Table 1 Pedagogical learning cube

| Dimension | Style / element | Weight |
|---|-------------------|--------|
| <i>Style</i> (functional learning styles) | Apprenticeship | 0.068 |
| | Incidental | 0.068 |
| | Inductive | 0.068 |
| | Deductive | 0.068 |
| | Discovery | 0.068 |
| <i>Media</i> (media elements) | Text | 0.055 |
| | Graphics | 0.055 |
| | Audio | 0.055 |
| | Video | 0.055 |
| | Animation | 0.055 |
| | Simulation | 0.055 |
| <i>Interaction</i> (student engaged with the learning content) | System feedback | 0.066 |
| | Revision | 0.066 |
| | e-mail exchange | 0.066 |
| | Discussion groups | 0.066 |
| | Bulletin boards. | 0.066 |
| Total | | 1.0 |

Summative Rating Score address different factors of online course: content factors, learning factors, delivery support factors, usability factors, and technological factors.

Content factors: Quality, Authenticity, Validity, Media, Presentation, Attribution

Learning factors: Concept Identification, Pedagogical Styles, Media Enhancements, Interactivity, Testing and Feedback, Collaboration

Delivery support factors: User Management, Course Content, Accessibility, Reporting

Usability factors: Graphical Interface, Interactive Design, Clarity, Chunk Size, Page Layout

Technological factors: Network Bandwidth, System Configuration, Server Capacity, Browser Software, Database Connectivity

These factors are ranked according five levels of Likert scale.

| | | | | | |
|---------|--------|------|---------|------|-----------|
| Level: | Absent | Poor | Average | Good | Excellent |
| Rating: | 0 | 1 | 2 | 3 | 4 |

Resulting *Summative Rating Score* is the sum of the ratings of all the factors in each of the five categories.

Suggested rating reflects really wide scale of different factors and can serve as clear assessment method which identifies strength and weakness points of online course. Widespread use of these tools could guide and motivate online education developers toward the creation of better educational systems.

6. CONCLUSION

Presently, the tools available for benchmarking and quality assessment are sufficient to enable a reliable monitoring and achieve a good result. Some of the areas

that are to be addressed are separate evaluation methods for pedagogical and andragogical learning environment. Specially, if the learning processes are related to lifelong learning, learning and transfer effectiveness criteria should be different.

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Received Jun 16, 2008, accepted November 6, 2009

BIOGRAPHIES

Peter Košč was born in 1964 in Košice, Slovakia. He received the MSc and PhD at the Faculty of Electrical Engineering, Technical University of Košice, in 1988 and 1994. His research interests are information systems, especially e-learning technologies, and management of human resources. He managed for several years the development of e-learning platform.

Gejza M. Timčák was born in 1942. He graduated from the Technical university (Faculty of Mining) in 1964. He was awarded PhD by the Imperial College, London University in 1975. As a founder-director of the Institute of lifelong education of the TU Košice, he became interested in e-learning in 1997. At the Institute of Geotourism, BERG Faculty, he is actively engaged in implementing e-learning strategies in geotourism study.

Peter Bober graduated (MSc) in 1987 with distinction at the Department of Technical Cybernetics of the Faculty of Electrical Engineering of the Technical University of Košice. He defended his PhD in the field of electric drives in 1993; his thesis title was "Digital Control of Induction Drive". He is an assistant professor at the Department of Electrotechnics, Mechatronics and Industrial Engineering, Faculty of Electrical Engineering and Informatics of the Technical university of Kosice. His scientific research focuses on modelling and simulation in various application areas.