MODEL FOR THE EVALUATION OF EDUCATIONAL QUALITY USING VIRTUAL LEARNING ENVIRONMENTS

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ABSTRACT

Education using virtual learning environments represents, in principle, a suitable instrument for the development of a mechanism which encourages permanent education during the entire life of an individual. Therefore, it is important to be aware that the new social necessities require a virtual educational model which comprises degrees of quality in such a way that they may be later evaluated, rationalizing and justifying the resources required by the teaching and learning processes and the investments undertaken by the organizations dedicated to the development of virtual education. This research project proposes a conceptual framework which defines the structure of a model for the evaluation of educational quality using virtual learning environments. The conception as defined is of a qualitative/quantitative model based on software quality models and the ISO standard which emphasizes the processing, production and qualitative activities currently in use.

KEYWORDS

e-learning, quality e-learning, virtual education, quality model

1. INTRODUCTION

The virtual method leads to the education of multi-qualified professionals, placing special emphasis on teamwork and the ability to learn about learning, as well as stimulating the individual to adapt himself to changing situations. Lifelong learning creates a favorable atmosphere for desirable contacts between the educational and working fields, which will require unusual pedagogical tools, generating effective impacts among both teaching methods and the organization of work environments. This commits us to work in search of a higher quality of virtual education, and its permanent improvement, but in addition it causes us to endeavour to make this education lead to greater equality and social relevance.

In spite of globalization, we have not found any one particular setting or profile, nor one particular or unanimous time, but rather varying realities in the different countries of the region and, even within our own country, where differing times and models live together and are superimposed on each other. E-learning opens interesting opportunities such as future access to education and also, it causes us to question the *quality* of the proposals offered by the market.

In order to determine whether the proposals offered by the market will contribute to lifelong learning by an individual, a *solid research framework* is required which guarantees methodological and scientific rigor. However, in spite of the great number of educational resources found totally or partially on-line, there are very few research projects centered on the evaluation of virtual educational programs from the conceptual to the utilization phase. On the contrary, reflection on educational efficiency and the teaching and learning objectives remains focused on analysis of information technology or organizational methods and course implementation.

We are accustomed to considering certain indications of quality used by organizations as indications of quality in e-learning. This is due to the fact that there does not yet exist a concrete system for the evaluation of standards of e-learning quality and educational performance in virtual learning environments. Nevertheless we do have, for example, the ISO 9000 standards, the EFQM Model of Excellence and international on-line learning standards such as ISO/IEC JTC1/SC36 as described in Scracked (2009), which offer us an excellent theoretical reference framework.

The arguments adduced, definitely, justify categorically the necessity to define an evaluation method which characterizes and evaluates appropriately all the scenarios which influence the educational processes in virtual learning environments. In this regard, our project entitled ***Model for the Evaluation of Educational Quality Using Virtual Learning Environments*** is part of the research project: E-learning Quality: Design and Implementation of a Reference Model for the Evaluation of the Efficiency of Virtual Education defined in (Clunie 2009).

2. QUALITY IN THE CONTEXT OF EDUCATION IN VIRTUAL TEACHING LEARNING ENVIRONMENTS

In institutions of higher education, there is a permanent debate with regard to the quality of the experiences and the education in virtual teaching learning environments. This involves not only the technological infrastructure, but also other aspects such as the pedagogical experience, the culture, the context and above all the inter-activity, since education is transformed into an interactive learning experience through the availability to the student of a great variety of resources and tools, thus creating a dynamic and learning-oriented environment.

When we speak of quality in the context of education in virtual teaching learning environments, it requires a clear perspective with regard to the actual teaching-learning process and the methodological practices required by it; and having experience which can only be obtained through the use of technology and the continuing validation of the different variables which participate in on-line educational processes. Generally speaking, the reality is that these requirements are not found in organizations who commercialize e-learning solutions.

The importance of quality varies in proportion with the objectives set out: virtual education may be good for certain objectives of quality, equality and relevance, but not for others. Every educational situation in virtual environments, whether classes are conducted wholly or partially in the classroom or lecture hall, presents a particular combination of factors of quality, equality and relevance to education.

Based on the work described by Silvio (2006), quality in the context of virtual education is the effective acquisition of a series of competencies, abilities, knowledge and skills, by a group of students, through appropriate learning content, conveyed through an efficient virtual environment and with the support of a network of additional services, which process, from the identification of requirements, the development and evaluation of the content, up to the acquisition of the competencies and the analysis of the joint educational participation, is guaranteed by a rigorous process of evaluation and follow-up, monitored by a team of persons who undertake an integral tutorial job during the student's entire educational process.

Various aspects stemming from this definition can be identified: quality as a multi-dimensional concept which involves variables such as technology, education, pedagogy, andragogy, (adult education), contents. It would seem that the concept of quality includes only service per se, but education affects each and every one of the process components, including the participation and commitment of all the participants involved in the virtual education process.

The virtual education experience with respect to the construction of solutions, indicates that many of these have been generated rationally and rigorously and have produced important economic benefits. However, unfortunately, these efforts have not satisfied the various users and many of these organizations have had to modify their projects. We believe that one of the factors contributing to this is that in order to effectively educate a user by means of virtual teaching-learning environments, the commitment of the organization offering the service must include, as a general rule, quality factors directed toward technological, pedagogical and cultural resources. In this regard, it has been possible at least technically to consolidate concrete proposals on technical specifications, centered on aspects of inter-operability of the technological platforms. However, pedagogical, andragogical, cultural and even inclusion aspects are not treated with the deserved level of importance.

3. CONCEPTUAL QUALITATIVE-QUANTITATIVE MODEL – MEQ@eva

The task of evaluation of virtual learning environments is developed through modular designs known as models. Casanova (2002), from a metaphorical perspective, perceives it as an agreeable way to reach the goal. In effect, this determines the phases or steps before and after the act of evaluation which must be undertaken to accomplish the expected objectives. The structuring of a model implies the selection of the method to be used in the work, the techniques to be applied, the instruments to be used and of course the presentation of the results obtained; its application contributes significantly to the achievement of the objective, the evaluation. From these perspectives, in the educational plan, we have proposed the following evaluation model.

The process of development and the use of solutions for education in virtual learning environments must be undertaken in an organized and disciplined manner. For this to occur and to be able to ensure an appropriate quality control during the development process and to guarantee the quality of the final product, it is necessary to apply an evaluation model which includes qualitative and quantitative aspects, recording quality observations at three different times: *process quality, product quality and quality in use* as indicated in Figure 1.

3.1 Phase I: Process Quality

Process quality is undertaken through the treatment of a group of variable inputs which are determined according to previous activities, discussion of ideas and the diagnostic of the educational requirements taking into account the total environment. For the examination of these elements, we considered several rules and standards such as: SCORM, and IMS, the Methodology for the Analysis of Quality of the Open and Distant Education MECA-ODL and the ISO/IEC Rule 19796-1 based on the Reference Framework for the Description of Quality (RFDQ, *Reference Framework for the Description of Quality Approaches)* for assurance of the quality of the process.
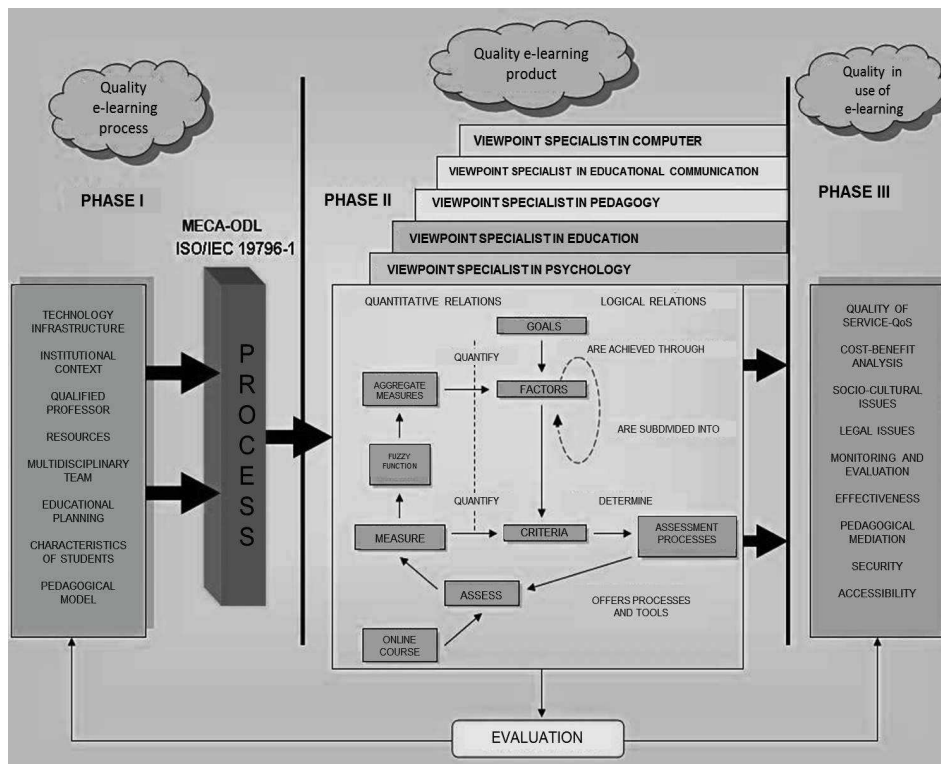

Figure 1. Conceptual Qualitative-Quantitative Model

3.2 Phase II: Product Quality

As shown in the conceptual framework, the quality of the process of an e-learning solution, directly affects the quality of the product whose evaluation is to be observed in view of five specialized visions: psychology, content, pedagogy/andragogy, educative communication and information technology.

Based on the work described in Stracked (2009), Rocha (2001), Belchior (1997), it is possible to define a group of quality attributes for virtual education solutions. The organization and discussion of these attributes is undertaken in accordance with the quality evaluation model proposed, which is based on the following concepts:

Quality objectives: The general properties which the e-learning solution should possess.

- **Quality factors:** The properties which determine the quality of the e-learning solution from the point of view of the different users.
- **Quality criteria:** The primary attributes possible to be evaluated.
- **Evaluation processes:** Determine the activities and instruments which will be used to measure the presence level of certain criteria, in the e-learning solution.
- **Measurements:** Indicate the presence level of certain criteria, in the e-learning solution.
- **Fuzzy Function:** Relation of the primary or additional quality attributes, through a group of linguistic terms.
- **Added measures:** These are the result of the addition of measurements obtained during the evaluation, in accordance with the criteria quantifying the factors. The quality objectives are reached through the quality factors, which may be composed of other factors and are evaluated by means of criteria. The criteria define the quality attributes for the factors. Measurements are values resulting from the evaluation of the e-learning product in accordance with a specific criterion.

Objectives and factors not directly measurable, may only be evaluated through criteria. A criterion is a primary attribute, i.e. an attribute independent of all the other attributes. No single criterion is a complete description of a certain factor or sub-factor, likewise no factor may completely define an objective.

3.3 Phase III: Quality in Use

Product quality contributes de improvement of the quality in use of the e-learning solution, which will depend on a group of factors such as: quality of service, socio-cultural aspects, accessibility, satisfaction, safety, effectiveness, pedagogic mediation, legal aspects, among others. By evaluating and improving the development processes, we improve the quality of the e-learning solution; in the same way, when we evaluate the e-learning solution in its utilization phase, by means of the resulting indicators, we obtain feedback that enables us to improve the existing solution, as well as its development process. In this regard, we need appropriate quality evaluation processes, that support the measurement activity during the specification, development, maintenance and utilization phases of the e-learning solution.

3.4 Validation of the Model

A methodology of validation of the model has been defined under which implementation phases are identified. An evaluation guide, made up of a group of instruments, based on the proposed model structure, has been defined. Therein, a group of indicators are identified with their corresponding evaluation processes. These instruments serve as inputs for the list of information in each of the phases. In addition, the definition of a support tool for the entire process of compilation and analysis of information is in the modeling phase.

To carry out this validation activity, there is support from the UTPVirtual within the Center for Information Technology Research and the Communication - (Spanish acronym CIDITIC) of Panama University of Technology.

4. CONCLUSION

The implementation of a Quality Standards System, based on the application of models, for virtual education, should result in a considerable improvement in production and utilization of offers of e-learning, ensuring its effectiveness in the process of education of the individual.

This work has presented a proposal for an evaluation model for the efficiency of education in virtual learning environments. This proposal has been influenced by work carried out in the area of software engineering and adapted for an educational context. In order to activate the model, a group of evaluation instruments is defined for each phase of the model, as well as the definition of the first model validation experiment.

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