

A Participant-Based Approach for e-Learning Evaluation

N.GRECO⁺, D.IMPEDOVO[#], G. PIRLO⁺

⁽⁺⁾ Centro “Rete Puglia” – Università degli Studi di Bari - via G. Petroni 15/F.1 – 70124 Bari - ITALY

^(#) Dipartimento di Elettrotecnica ed Elettronica (DEE) – Politecnico di Bari - via Re David 200 – 70126 Bari -ITALY

Abstract: - The evaluation of an e-learning activity is very complex since it depends both on the technologic infrastructure (equipments, tools, etc.) and on the organization (mission, people, etc.) and users (cultural and social level, motivation, etc.).

In this paper, an effective framework for the evaluation of e-learning activity has been defined that is based on a participant-based strategy. In particular, for each e-learning phase, the stakeholders involved in that phase provide a feedback according to well-defined “quality model”.

In such a way it is possible to evaluate various aspects of the e-learning activity, on the basis of the main characteristics of each phase (products, actors, etc.).

Key-Words: - E-learning, Learning Evaluation, Distance Learning, Lifelong Learning, Higher Education.

1 Introduction

Along with the development of ICT systems for e-learning new issues have been focused by the scientific community working on these topics [1], like for instance the most profitable use of technology for e-learning activities, for teaching and training, for content management and so on [2, 3].

Among the others, e-learning evaluation is rightly considered as a key aspect of any e-learning activity, that allows the definition of the most effective tools and methodologies for its adoption with respect to the e-learning products (e-learning courses, etc.) and processes (course design, production and use, etc.) [4, 5, 6].

In order to “measure” quality of an e-learning activity, several types of finalities can be considered, like for instance those based on client satisfaction, real learning, behaviour modification, and efficacy of investment [7]. Furthermore, several evaluation strategies that can be used for the evaluation of educational programs [8]: *Objectives-oriented* (it determines the extent to which program and instructional objectives have been met), *Management-oriented* (it servers to decision-makers in order to make decisions about the reallocation of funds), *Consumer-oriented* (it focuses on the development of information on products, that is essential for the appeal of distance education programs), *Expertise-oriented* (it mainly depends upon professional expertise to judge an educational program), *Adversary-oriented* (that attempts to use both positive and negative views into the evaluation itself) and *Participant-oriented* (it is used in qualitative research studies to evaluate and match all opinions).

In this paper an effective participant-based framework for the evaluation of e-learning activities is defined, which involves all the main stakeholders of the e-learning processes. Finally, some experimental results are reported, obtained from the activities carried out at the University of Bari.

2 Participant-based evaluation of e-learning activities

A framework for the evaluation of e-learning activities must adopt strategies well suited for the various stakeholders and types of finalities [9, 10]. In this work, e-learning is considered as the result of a continuous iterative process of analysis (of requirements, working conditions, etc.), design (of solutions, organizations, products, etc.), development (of products, operative environments, etc.) and use (of e-learning systems, products, educational environment, etc.). Each phase produces relevant information for the next one. The effectiveness of the frameworks descends from the capability to get the useful information from each phase and to use it properly for improving the next phases, continuously [9, 10].

Moreover, since e-learning activity strongly depends on human interaction (even supported by ICT), for each phase of an e-learning process a suitable feedback-based evaluation is defined, using well-defined questionnaires to be filled by the various stakeholders. In fact, the participant-based strategy is general and flexible enough to be adapted to the different types of analysis and individuals involved into the e-learning activities [11, 12].

3 e-Learning Evaluation: experiences at the University of Bari

For the aim of the e-learning activities at the University of Bari, the following stakeholders have been considered [11, 12, 13, 14]:

- *Internal experts (tutors)*: they are the experts internal to the organization (University of Bari). They are involved in getting knowledge and support (as tutors) all users of the e-learning community at the university of Bari both from technological and methodological point of view.
- *External experts*: they are the experts external to the organization (University of Bari). Strictly speaking they are technicians from Companies delivering ICT systems and tools, which support internal experts and improve their products and services on the basis of specific requirements of the e-learning community.
- *Teachers*: they are teachers and researchers from various Faculties of the University of Bari which are involved in e-learning course design, realization and use.
- *Managers of Faculty secretaries*: they are managers of Faculty secretaries of the University of Bari, that need to integrate the information from the e-learning platform into their information system.
- *Students*: they are the “core” stakeholders of the e-learning activity, involved in using the ICT systems and participating to the e-learning community.

The main relationships among these classes of participants are reported in Figure 1.

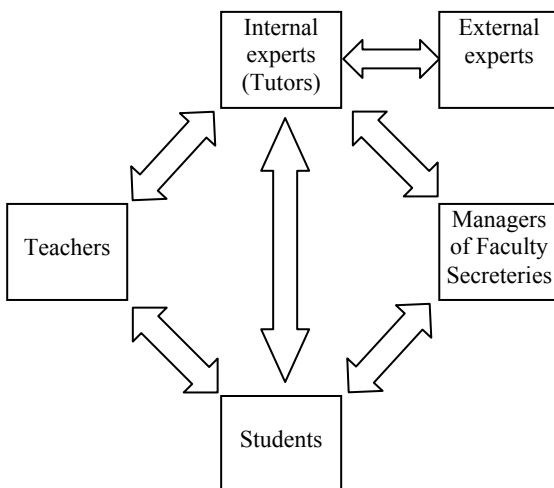


Figure 1 Relationships among Stakeholders

The evaluation has been carried out by well-defined “quality models” at the level of (a) ICT tools and (b) e-learning activity.

(a) Concerning ICT tools, specific “quality models” have been proposed for the evaluation of:

- the Course Maker “Lectora Publisher” [15, 16]. In this case the “quality model” consists of four sets of indicators [10, 11, 12]:
 1. the first set is related to the general characteristics as for instance functionalities of the editor, variety of the supported media, usability of the product etc.;
 2. the second set concerns the use of objects and involves characteristics as comprehensibility of object properties, simplicity in setting actions, etc. ;
 3. the third set concerns the tests and involves variety of test types and their options, simplicity in creating tests, etc.;
 4. the fourth set concerns the publication characteristics as variety of publication types, clarity of the publication procedures (also with respect to AICC standard), clarity in error warning, etc. .

Of course, the evaluation of the Course Maker mainly involve:

- *the teachers*. They are involved in the development of the courses (in particular they decide the contents and the didactic organization of the course);
- *the internal experts*. They are involved in the technical support of the teachers in the development of the courses;
- *the external expert*. They support technically the internal expert on very specific problems (for which internal experts are unable to provide solutions) concerning the Course Maker.

Figure 2 shows the relationships (marked by black arrows) focused by this kind of evaluation.

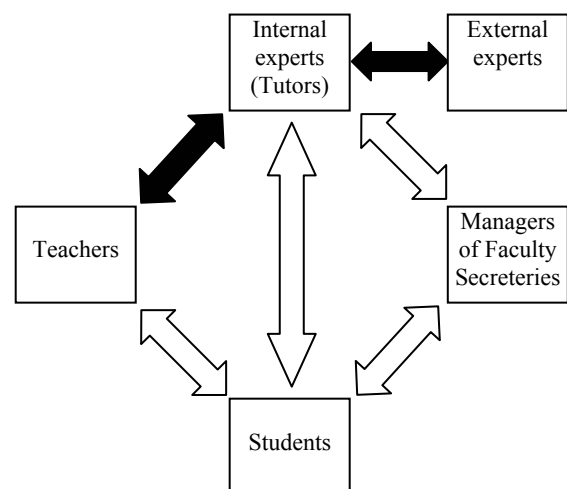


Figure 2 Relationships among Stakeholders - A focus on the Quality Model for CM -

- the Learning Management System “NetLearning” – Virtual Classroom [17]. In this case the “quality model” consists of three sets of indicators [10, 11, 12]:
 1. The first set is related to the administration options, such as the overall functionalities of the Virtual Classroom administration services and the intuitiveness of their use;
 2. the second set concerns the accessing facilities, such as the clarity of icons and related operations, usability of links etc.;
 3. the third set of indicators concerns the use of the Virtual Classroom based on audio-video quality, interactive tools etc.

Thus, the evaluation of the LMS Virtual Classroom mainly involve:

- *the teachers*. They are involved in the e-learning activity;
- *the managers of Faculty secretaries*. They are involved in using the LMS to obtain information on the advancement of student careers;
- *the internal experts*. They are involved in the technical support of the teachers and managers of Faculty secretaries;
- *the external expert*. They support technically the internal expert on very specific problems (for which internal experts are unable to provide solutions) concerning the Learning Management System.

Figure 3 shows the relationships (marked by black arrows) focused by this kind of evaluation.

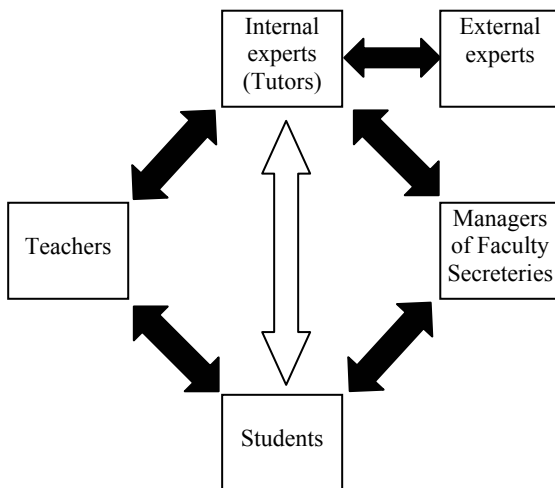


Figure 3 Relationships among Stakeholders - A focus on the Quality Model for LMS -

(b) Concerning e-learning activities, the quality model is based on three sets of indicators [11,12]:

1. the first set is for the course content evaluation: users are requested to judge characteristics as to what extent concepts

are discussed in depth, their correctness, the amount of information and the degree of interest derived from the arguments presented, etc.;

2. the second set concerns the teacher: some of the most important characteristics that students judge are the teacher clarity, his capability in creating a positive learning environment, the degree of attractiveness generated toward the discipline, his capability in using examples to support learning, etc..
3. the third set is related to the didactic activity: it is evaluated by considering relevant characteristics as the effectiveness of multimedia supports and ICT equipment, the degree of the overall organization, etc.

In this case, the evaluation of the e-learning activity mainly involve:

- *the students*. They are the final users strongly involved in all educational phases, tools and products of the e-learning activity;
- *the internal experts (tutors)*. They are the tutors of the activity that support students in all e-learning activity.

Figure 4 shows the relationships (marked by black arrows) focused by this kind of evaluation.

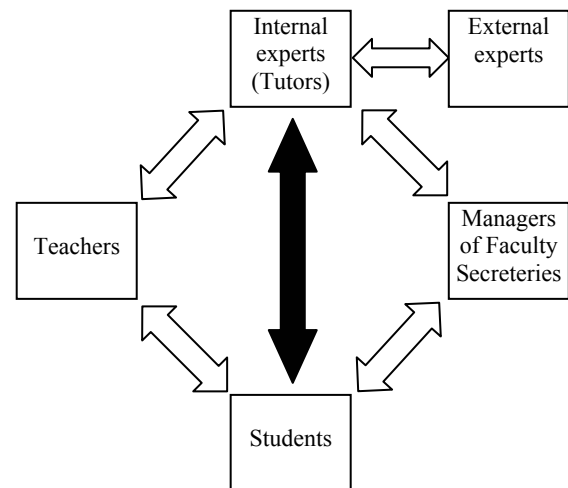


Figure 4 Relationships among Stakeholders -A focus on the Quality Model for e-Learn. activity-

Table 1 Standards of estimation

Level	Judgement	Score
SATISFACTORY	Superior to the requirements	3
	Acceptable	2
	Just acceptable	1
UNSATISFACTORY	Not acceptable	0

The evaluation measurement is preformed by using the standards scores reported in Table 1, according to the UNI ISO 9000-9001 [18, 19, 20]. In this way, the stakeholders express by a numeric score their judgments on the various characteristics of e-learning environment.

4 Experimental Results

From the use of the feedback-based evaluation framework proposed in this paper, several positive results have been obtained (see also [10, 11, 12]). Table 2 reports the judgments obtained for (a) the Course Maker, (b) the LMS-Virtual Classroom and (c) the e-learning activity. These results demonstrate that the learning environment under consideration is positive and adequate for e-learning activities.

Table 2 Evaluation results

	Characteristics	Score	Overall score
(a) CM	General	2,2	2,3
	Objects	2,5	
	Tests	2,2	
	Publication	2,3	
(b) LMS	Administrator	2,0	2,1
	Access	2,1	
	Use	2,2	
(c) e-Learning Activity	Course Content	2,1	2,1
	Teacher	2,0	
	Didactic Activity	2,1	

5 Conclusions

This paper presents a framework for the evaluation of e-learning activities. The framework adopts a participant-oriented strategy in which the various stakeholders of the e-learning activity provide, according to a closed loop continuous approach, a feedback on the different phases of the activity.

Some experimental results, carried out in the context of the e-learning activities at the University of Bari, demonstrate the simplicity and the effectiveness of the new approach for the evaluation of e-learning activities.

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