Implementing Quality Approach in E-learning

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Abstract—The aim of this paper is to prepare the National School of Applied Sciences (ENSA) of Agadir to implement a quality management approach in its online Master "Audit and environmental management." Throughout this work, we will present the methodology used in e-learning process modeling, and we will assess online tuition activities, the role of different stakeholders and the Agaplas platform in order to improve e-learning course.

Keywords—E-learning, Quality management, Information and Communication Technologies (ICT), Best Practices Guide (BPG).

I. INTRODUCTION

Thanks to the many possibilities of the web and ICT (information and communication technologies); online education has become a thriving market on the world [1]. In this context, the quality of education is a necessity for all stakeholders (schools /universities, funders, teachers, tutors, learners, online course designers...). However, the application of quality tools in the field of education requires an effort for adaptation, because e-learning cannot be equated with a linear and reproducible industrial process to which quality management and logic of standardization refer [2].

Being aware of this reality, professionals, researchers and standards organizations have undertaken initiatives to formulate standards targeting e-learning [3] and despite the existing difficulties and differences in approaches, efforts to develop e-learning standards have come a long way, even if the quality certification in e-learning is still at its beginnings [4].

In Morocco, several universities and private schools have begun to introduce online training [5] often in conjunction with foreign agencies or with governmental aid. Following the same trend, the National School of Applied Sciences (ENSA) of Agadir has launched an online Master "Auditing and Environmental Management" (http://agaplas.ensa-agadir.ac.ma/moodle/) in collaboration with the University of Las Palmas and the Institute of Business Administration from the University of Pau and Pays de l'Adour. The objective of this e-learning program of 18 months is to contribute to the upgrading of Moroccan firms competitiveness by making them aware of environmental and ecological aspects, (this would lead eventually to increase the number of ISO 14001 Moroccan firms certified).

In this case, the ENSA as a provider of e-learning course decided to implement a quality management approach of the Master to meet the needs and expectations of all its stakeholders.

Therefore, our work was to examine the e-learning Master of the ENSA and to evaluate the performance of its platform Agaplas.

Thus, in the first part of this article we present our methodology consisting of developing a checklist summarizing best practices of quality in e-learning and examining the results found; The second part will be devoted to the modeling of the training process such as it is established according to our scenarization of the course of the learners; Then in the third section we synthesize our diagnostic of the Agaplas platform and our suggestions for improvements to the Master program supervisors; Finally, we conclude this work by a summary of the results obtained and potential perspectives of research.

A. Methodology and conceptual approach

If the positive impact of ICT on the features of distance education is recognized by many scholars and researchers [6] [7] [8], attaining a consensus in quality approach applied to e-learning seems difficult to achieve. Indeed, the characteristics of online education (complexity of online learning activities, focusing on the learner, the central role of teaching resources in the process of e-learning) have created multiple and diverse standards [9]. Generally, we can find three main groups of quality standards applicable to e-learning:

• **The technological standards:** such as the standards established by the IEEE (Institute of Electrical and Electronics Engineers), the AICC (Aviation Industry Computer Based Training Committee), the SCORM (Shareable Course Object Reference Model), ISO (international Organization for Standardization) whose JTC1/SC36 working group has produced several projects standards for learning and information technologies among which we can mention ISO 29900 standard dedicated to the certification of providers of training ;

• **The technical and pedagogical standards:** Among them we find e-learning standards such as ISTE (International Society for Technology in Education) and the program of the European community DITRA (Training Programs for Trainers Involved in the organization and guidance of technology-based-distance-learning) aimed at the construction of skills references required by stakeholders;

• **The "Classical" Quality standards:** They are related to quality management of companies and organizations. The most famous ones are those of ISO 9001 and AFNOR (French Standardization Association) standards.

This set of reference and quality tools can make it difficult to choose appropriate quality reference for e-learning programs providers and a number of issues related to priorities (educational, managerial and technological) may arise.

In fact, in some universities, supervisors of e-learning projects, tend to focus primarily on the means (technology-driven) rather than the purpose (objective-driven) [9], whereas the conditions for successful integration of ICT in higher education and e-learning quality is related to the match between the instructional design and needs of teachers and e-learners. Therefore, a technology without an appropriate methodology is simply useless [11].

Accordingly, the overabundance of the technological references should not overshadow the ultimate objective of e-learning, which remains the satisfaction of learners and the need for optimal use of resources in the broad sense (technical, material, financial, human...). For our part, we found difficulty to obtain most of the references, so we preferred to use simpler tools, especially because e-learning certification is not yet on the agenda of the ENSA. Therefore, our choice was on the best practices guideline of AFNOR (BPG), which includes nearly 280 recommendations, grouped into five major processes constituting a reference model for e-learning courses. Drawing inspiration from the RBP, the approach we adopted consisted of:

• **Checking** the online Master processes conformity in comparison with the (BPG) requirements;
• **Modeling** steps of e-learning (information, registration, acquiring educational content...);
• **Proposing** recommendations to optimize the process of e-learning offered by ENSA.

Using the recommendations of the best practices established by AFNOR, we developed a checklist covering all the requirements of e-learning programs efficiency that we used to interview persons in charge of the Master to evaluate the online training process. Thus, after completing the checklist, we were able to detect non-conformities of the Master that we have converted/quantified into statistics (percentage of conformity of each process) as shown in the following diagram:
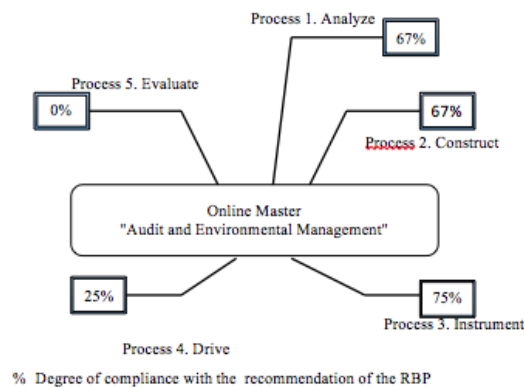
Fig.1 Results of checklist

Therefore, it appears from these results that the main flaw in the design of the Master is the lack of the evaluation process and the low level of conformity of the construction process and control compared to the requirements of the BPG. This is explained by the fact that for ENSA, the launching of e-learning program was made in haste, to meet schedules and commitments with partners so there was not enough time to define the modalities for online teaching and assessment (note in this regard that there was no survey of e-learners satisfaction). To remedy this, we tried to modelize the course of learning and then to develop a process to periodically audit the performance of the online Master.

II. MODELIZATION OF THE E-LEARNING PROCESS

To establish a clear representation of the online Master of ENSA stages, we relied on a process model derived from the BPG of AFNOR to which an audit process and assessment is added to insure continuous improvement of e-learning as shown in figure below:
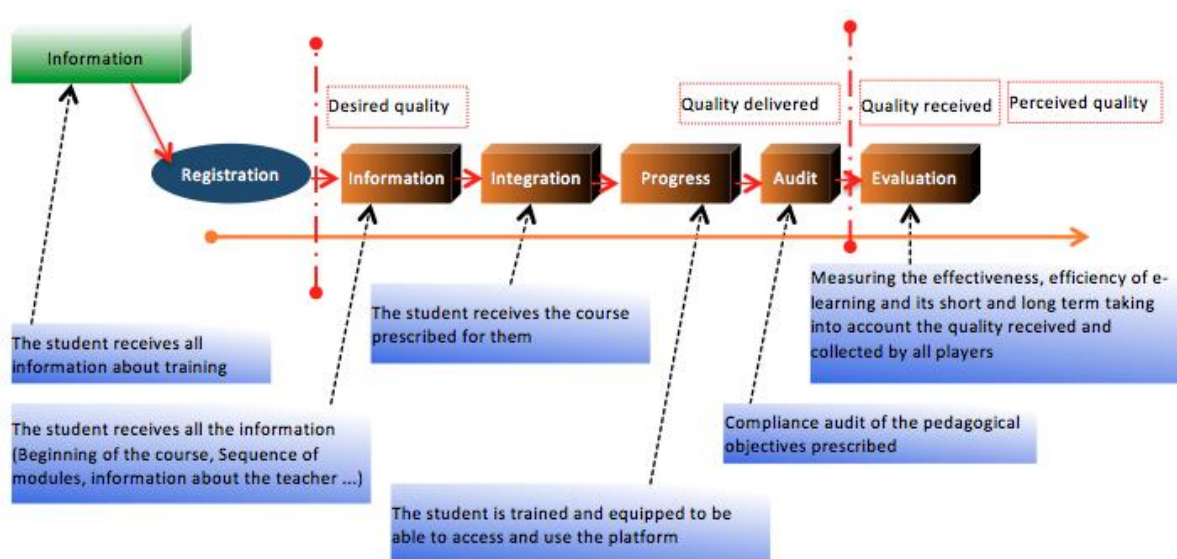
Fig. 2 Modelization of the Master process

Before introducing quality approach to ENSA, the e-learning process was carried out automatically with poorly defined responsibilities of participants, which discouraged and demotivated e-learners. In this perspective, modeling the process of training allows the different stakeholders (designers, funders, tutors, e-learners...) to have understandable information, which is the basis for future improvements or future on-line learning projects.

Moreover, during one of our meetings with the person in charge of the Master, we focused on the fact that e-learners, seldom participated in forums and online discussions and they were only browsing the courses available on the Agaplas template. Our main questions were: How can we explain the reluctance of the e-learners? Is it due to technical difficulties? Aren't e-learners aware of the fact that is only their level of involvement that influences the success and the quality of tuition?

To respond, we referred to several studies on quality in e-learning, which focused on e-learners motivation as a factor determining the success of online training [12] [13] [14] [15] [16].

Based on their conclusions, we assumed that for Moroccan e-learners, motivation is a major influence of their involvement in the Master of ENSA. Moreover, we produced and distributed a questionnaire to 20 e-learners in which we asked them to justify their lack of participation in discussion forums. Thus, according to e-learners responses, it appears that their laxity is mainly due to their busy schedule, their "unfamiliarity" with the AGAPLAS template and lack of coaching tutors to encourage them to better engage in e-learning.

In this regard and to identify incentives for e-learners involvement in the Master, we referred to the available literature on the subject which allowed us to recommend that administrators, teachers and tutors to modify their intervention to take into account the following elements:

• **The interactions** between the participants whether in synchronous mode (which involves simultaneous interactions in real time) or asynchronously (which induces delayed interactions over time) and their sense of social presence affect their participation in online discussions, as shown by the work of several researchers [17] [18] [19] [20] [21];

• **Autonomization** [22] is a key element of motivation of e- learners. To achieve the objectives of e-learning, the courses should be structured at the beginning and to as the autonomization of the e-learners develops; this structure should be reduced over time [23]. This strategy implies that the trainer/teacher online should play a role of facilitator, which differs fundamentally from classroom teaching and crucial in e-learning [24] [25];

• **The work** environment significantly affects the reception and transfer of courses in e-learning [26]. Several authors suggest that organizations support their employees enrolled in e-learning [27] who will be more motivated to perform if they perceive that their efforts may be rewarded [28]. We must not forget also that finding time to follow training modules is one of the challenges of e-learning at work [29] [30];

• **The technology** infrastructure that plays a mediating role of learning can also affect the motivation of e-learners, since the reliability of technologies used is a prerequisite for a quality e-learning[31] [32] . In contrast, technical problems (difficult access to emails and training materials, poor quality of audio-visual content, difficulty in handling softwares, lack of online help...) can cause frustration [33], loss of motivation [34] and withdrawal [35] [36].

In connection with this last point, the next part of our work will focus on analyzing the template of the Master.

III.   DIAGNOSIS OF THE AGAPLAS PLATFORM AND PROPOSITIONS OF IMPROVEMENT

The platform of Master is called AGAPLAS and was created using the open source software « moodle » that allows the development of online courses and web sites. It incorporates several features (homework, Chat, survey, Forum, Test, Resource, Workshop, Workshop Glossary, Journal, lesson, Resources Scheduler, Wikis). In addition, our brief overview of this platform allows us to see the ease of navigation and efficiency of the modules available: the courses are divided into disciplines according to teachers and tutors and the user can easily customize the interface (choice of language,

display or hide elements on the sides, etc.) or their profile. In the home page, we find all useful information for e-learners (latest news, upcoming events, recent activity, users online, search, etc.). In addition, the various forums and chat modules are designed to facilitate the exchange and communication between e-learners and tutors.

However, we can also note some weaknesses in the platform such as the Masters courses are in pdf format (no interactive courses in flash for example) that do not allow tracking the training courses of e-learners (viewed chapters, time given to each part of the course, lack of exercise for self-evaluation and progress monitoring). Moreover, the courses are not referenced in the current bibliographies/webliographies and the number of e-learners on forums and chat is generally low.

Thus, following discussions with teachers and managers of the Master, we have formulated a number of proposals that we have articulated in five main poles as shown in the following figure:

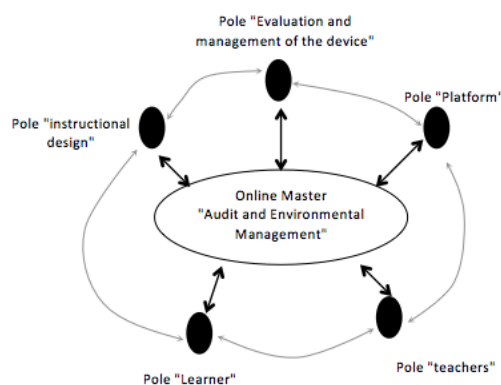The axes of improvements for each pole could be defined as following:

Fig. 3 The Master's Poles of improvement

1.1 Recommendations for "teachers":
- Encourage teachers to conduct online seminars, update courses and participate in forums of the Master;
- Establish regular meetings of teachers with the administration to verify the achievement of objectives and progress of e-learners.

1.2 Recommendations for "Pedagogical design":
- Developing specific educational resources and approaches that encourage e-learners to work in groups to reduce their risk of "isolation";
- Dividing courses in simple and clear parts;
- Creating simple dashboards/roadmap for each e-learner to determine their individual progress.

1.3 Recommendations for "e-learners":
- Planning activities among teams in face-to-face and online to create pairs that can support each other throughout the e-learning course and elect among e-learners a group leader who will be the direct link with teachers to overcome the reluctance of the learner-teacher contact;
- Proposing meetings of all e-learners with the administration, teachers and tutors when necessary to explain the objectives, progress and involve e-learners in the organization of courses and forums. Our survey of e-learners showed that this was a fundamental phase in which were expressed clearly their expectations and needs (80% of e-learners say that the first meeting has not met their expectations).

1.4 Recommendations for the "AGAPLAS Platform":
- Designing interactive exercises and simulations for specific situations with various course materials (video animations, Flash...);
- Adding bibliographies and webographies in courses and developing tests for e-learners auto-evaluation.

1.5 Recommendations for "Evaluation and management of the Master":
- Developing a program guide with goals, objectives, evaluations and progress of e-learning;
- Anticipating various problems, which may confront the Master, program: educational issues, financial, technical...
- Programming recess periods where problems encountered during e-learning (conflict between e-learners, learners-tutors problems, difficulties of e-learners with the programs...) could be discussed and solved;
- Establishing an evaluation system to improve and control the Master: evaluation of e-learning, of teachers, of training programs, etc. To this end, several quality indicators can be used, including:
- The success rate of e-learners;
- The number of graduates;
- Satisfaction rate of e-learners that covers several aspects of e-learning (ease of assimilation of e-learning, availability of teachers and technical tutors, usability of course materials, coherence of the Master with the professional career of e-learners...);
- The number of firms associated with the Master;

The performance and return on investment of the Master that take into account the initial investment as well as all operating costs.

Ultimately, the key issue in the improvement process of e-learning is to establish performance indicators for assessing the degree of achievement of the objectives of the Master. We also suggested establishing a history of the development of the Masters since its initiation in 2005 wish will allow officials to establish a strategic analysis such as SWOT (Strengths, Weaknesses, Opportunities, Threats) to identify areas for improvement and future directions of the e-learning program.

IV.   CONCLUSION

At the conclusion of this work, we believe that its limits are related to the complexity of the subject studied: the establishment of quality management in the field of online education is a difficult task with many facets and which requires several approaches (educational, managerial and technical).

Through our analysis and investigations, the Moroccan e-learners of the Master appear to be sensitive to the factors of autonimization and interaction, which we also add the importance of program design, the impact of technological infrastructure and the role by supervisors and e-tutors. Therefore, our proposals infer that the e-learner and the e-teacher must adopt innovative and unconventional roles: the e-learner must take responsibility over their own learning and the e-teacher must no longer lead the learning as of classic teaching methods, but he/she must be able to guide and encourage e-learners.

It should be noted that our study is a first draft likely to be enhanced by further work. In this perspective, among the possible extensions of our work, we believe it would be wise to initiate comparative research between the Master of ENSA and similar e-learning programs in other neighboring countries or Europe that implement quality approaches in online education, or to analyze the socio-cultural dimension and its impact on success of e-learning projects and the influence of learning methods on the effectiveness of online teaching.

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