

The activities value in e-learning

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1. EXECUTIVE SUMMARY

This paper results from the observation of how e/b-learning methodologies were implemented in the engineering courses of ESTSetúbal. We pretend to define orientation guides, which allow the successfully implementation of pedagogical practices on the e/b-learning context, in the engineering courses curricular units.

In a blended methodology, the activity concept acquires a special relevance. We have identified three types of activities:

- Activities that take place in classrooms;
- Activities that take place in an e-learning platform, like Chat participation, with a teacher's moderation (synchronous activity), forum participation, quiz resolution and file upload for reading. Such acts are called e-activities.
- Activities that take place, out from the e-learning platform, like reading one book or a text, or even making an exercise resolution, proposed by the teacher.

In this context, the defined teacher's activities alignment will represent one of the core aspects in a strategy of education success.

The investigation objective is to identify in the engineering courses curricular units, which make use of the blended-learning methodologies, relevant learning activities, its alignment and its contributions for the:

- Learner Motivation;
- Socialization, namely teacher-learner and learner - learner interactions and the development of collaborative and autonomous learner skills.
- Development of skills and Acquired knowledge.

These aspects are then examined in the context of a specific example, the ongoing implementation of e/b-learning via the Moodle LMS in the Escola Superior de Tecnologia de Setúbal, (the School of Technology of Setúbal Polytechnic, Portugal).

2. INTRODUCTION

This present document is a result of the experience of the implementation of e/b-learning methodologies in several curricular units in engineering courses at the Escola Superior de Tecnologia of the Instituto Politécnico de Setúbal (EST-IPS).

The Technology and Industrial Management Course is considered a particular case-study, given that it was based in e-learning methodologies. It was created as a necessity to give response to an increasing number of working-students at night, with limited availability to attend in-person classes. In this context, the course predicted, for each curricular unit, only one in-person class a week, and complementary support distance learning, in a mixed methodology, which we name blended-learning.

In this framework, the teacher faces two great challenges: on the one hand, the predominance of the use of new technologies and, on the other hand, the inclusion of new approaches and methodologies, which postulates higher autonomy and accountability by the learner, collaborative approaches and an increasing flexibility and individuality of the learning process, which presupposes a new school culture.

In the engineering courses scenario, this communication's purpose - with its own specificities - is to identify the activities that fit blended-learning methodologies and that are relevant in terms of contribution to the student's motivation, socialization, development of competences and knowledge achievement.

3. THEORIES AND MODELS

Behaviorism, cognitivism and constructivism are the three great learning theories more frequently used in the creation of learning environments.

In the behaviorist theory, the brain is understood as a "black box", which receives certain inputs and reacts in a deterministic manner. The focus of the learning process is the learner's feedback to stimulation. Behaviorism, as a learning theory, is focused in observable and measurable data and explicitly keeps out ideas, emotions and considerations on each student's internal mental experiences.

Thus, in a behaviorist perspective, to understand observable behavior is more important than understanding mental activity, and it should be focused in its simplest element: stimuli and reactions.

In this context, the teaching process should be divided in a set of small stages, which should be subjected to a positive reinforcement after each one of them has been achieved.

In a perspective of the e-learning methodologies, according to the behaviorist theory, and according to Dietinger (2003), the following conclusions can be drawn:

- The learning contents should be divided in several small pieces (learning units);
- Only the relevant pieces are presented to the student. The demanded competence level to overcome each stage must not be too high nor too low;
- To add multimedia, interactivity and humor to the learning contents, so it is fun to "practice";
- To add multimedia contents or other information contents, so that the students are not restricted to the existing material, but are able to explore other study instruments.

In the cognitivism perspective, the main learning method is solving problems. Not only a response or reaction to a certain cause of stimulation must be practiced, but in general, the correct methods and procedures must be achieved and understood, until one leads to one or more of the correct solutions. It is likely that several methods - and not just one - lead to the optimum result and for that reason, all must be explicitly trained.

Consequences of this theory in the learning process, namely in the role of the teacher are, for example, as it follows:

- Assuming that individuals, with their different learning experiences and that are useful in the understanding of a particular situation will have an impact in the learning results;
- Determining the more effective ways of organizing and structuring the information so that it takes the student's previous knowledge and competences into consideration;
- Developing tools that allow the student to practice and receive feedback from their actions.

In the constructivist theory it is suggested that learners create knowledge as they seek to understand their own experiences. Behaviorism and cognitivism assume that knowledge is external both to the learner and the learning process. Constructivism, on the other hand, assumes that students are not empty vessels to be filled with knowledge. Instead, learners attempt to create their own knowledge and often pursue their meaning. Constructivist principles acknowledge that real-life learning is confusing and complex. Classrooms which emulate the "confusion" of this way of learning will be more effective in preparing learners for life-long learning.

In a constructivist approach, Yager (1991) suggests a few guiding lines on how teachers should lead their classes:

- Using the student's questions and suggestions to conduct the classes;
- Promoting the student's ideas as well as intra-collaboration among them;
- Encouraging the use of alternative sources of information;
- Encouraging students to suggest causes for events and situations and thus to predict consequences;
- Seeking out and using student questions and ideas before presenting the teacher's;
- Motivate students to analyze and reflect.

E-learning can be used as a complement to traditional in-person classes, or as a teaching method in which in-person classes and online classes are complemented.

E-learning must not be considered as a mere content repository, for the reason that it can be used to promote learning in a more effective and interactive way, namely because it allows added opportunities for students to interact and work in group, to participate in a community and, as such, to build their own knowledge and achieve competences.

E-learning models have evolved towards the replication of traditional classes to models that include technology with educational issues.

The first e-learning models were focused on how to use technology in order to create virtual environments so that, at any place, any time, students could have access to study material. The development of contents, the training of tutors and students for online learning and teaching had less attention. Many educators and technology sellers assumed that e-learning was a traditional course posted on the Internet.

In the demand-driven learning model (MacDonald, 2001) technology was seen as a support tool to achieve results at a low-cost learning level. Its main goal was to encourage teachers in assuming a proactive role in the development and use of technology in the teaching process. Contents, delivery and service were the three e-learning pillars.

Contents should be understandable and researchable. Delivery should be web-based and the interface should be user-friendly with communication tools to support interactivity. Service should include the provision of resources needed for learning, as well as any administrative and technical support needed.

In a more recent perspective, in the Instructional Design Model, one of the most important prerequisites for the successful implementation of e-learning is the need for careful consideration on the underlying educational issues, and namely how learning takes place online.

Thus, e-learning good practices can be as follow:

- Customizing contents for the needs of learners;
- Defining learning goals based in outcomes;
- Logically sequencing material in order to reinforce those learning goals;
- Designing goal-based, interactive learning activities that must be completed so as to be evaluated.

Alexander (2001) has concluded that successful e-learning takes place within a complex system that involves the student's experience in learning, the teacher's strategies and planning, as well as the teaching process context. It is the combination of these different issues that generates the success of learning.

In the "community of inquiry" model, developed by Garrison and Anderson (2003), it is the community that provides the environment in which the students assume responsibility and control of their learning, through the interaction among students and teachers. These are crucial requisites for a high-order learning.

In this approach, interaction in all its forms (among students, students and educators, students and contents) is a key-element in the learning process.

A successful strategy must be focused in the different aspects of communication in an online environment - the facilitation of online interaction, the effective use of the communication tools and methodologies that encourage the students to participate.

This model is based on three key-elements that must be considered when planning: cognitive presence, social presence and teaching presence.

4. ACTIVITY FOCUSED TEACHING

Several challenges are placed in the implementation of the e/b-learning methodologies, when a higher education institution is concerned. Firstly, one must try to convince and train teachers in order to use new teaching technologies and methods, for which they have no previous training. Secondly, the elaboration of educational contents that are both interesting and stimulating to students, demands technical knowledge by the teachers. Furthermore, it requires a support technical team and, being an onerous task, it takes quite an amount of time, given the high number of subjects. And finally, it is difficult to define an e-learning model that fits rather dissimilar curricular situations/units.

Bearing in mind the general framework of the education theories and e-learning models, an appropriate educational methodology must not be strict, but propose minimum requirements for the practice of e/b-learning. It must provide an initial set of options and suggestions as guiding-lines to ease integration, for each teacher, in the reality of his subject or subjects, with the potential of the new e/b learning methodologies.

All teachers might and should have a voice in the development of their own teaching model, adapted to their specific curricular unit and educational situation.

In this context, the implementation strategy of e-learning methodologies in the Technology and Industrial Management Course of the EST-IPS was based in three basic sections. In the first place, teaching methodologies should accommodate in-person classes, as well as non-present activities, i.e., the option was blended-learning methodologies. Given the limited time available, insufficient technical training from the teachers to elaborate sophisticated contents and the scarcity of financial means to hire technical teams, it was decided that the contents provided to the students should keep simple, in the sense that even a teacher with basic knowledge would have the capacity to elaborate them. Lastly, the interaction among teachers and students, the motivation and feedback should be the crucial element of the new teaching process.

The concept of activity resided in the basic notion that allowed re-focusing the teacher in the new teaching methodology. The activities regarded as the set of tasks accomplished by the student throughout the teaching process and that effectively contribute for the prosecution of learning goals.

In a blended-learning methodology, we can identify three types of activity:

- Those accomplished in-person classes, such as the solving of a question proposed by the teacher, paying attention to the theoretical content presented;
- Activities carried out in the e-learning platform, such as the participation in a chat lead by the teacher (synchronous activity), participation in a forum, solving a quizz, uploading a file for later reading (these are asynchronous activities), etc. These are called e-activities.
- Activities carried out outside the classroom, without resorting to the platform, like reading a textbook or solving a practical exercise proposed by the teacher.

In a merged regime, when compared to the purely presential, the student has the opportunity to carry out a set of activities lead by the e-learning platform, which in the asynchronous case do not demand the teacher's participation and can be carried out in moments defined by the student.

LMS, like Moodle, allows the creation of a vast set of e-activities using the available tools for that purpose: like chats, forums, lessons, quizzes, and wikis, among others.

The chat is a synchronous communication tool that allows both teachers and students to communicate in real time. This tool can be provided to be used among students in online socialization, allowing direct contact, that might lead to the clarification of doubts, comments, or work planning, but it also allows the teacher to obtain feedback regarding the evolution of the student in that specific subject.

Among the activities that can be developed using the chat tool, the following are worth pointing out:

- A schedule for doubts explanation - in parallel with in-person situations, the teacher is able to predict a certain period to clarify the students doubts and guide their work, through the chat, whether individually or in group, etc;
- External experts sessions - an external expert is invited and the students, through the chat, can contact him or pose questions;
- Students questions sessions - after the work is concluded and available to the rest of the class, the elements of the group will answer questions posed by the teacher and remaining students;
- Discussion of themes or articles - after reading a text or after a theme is proposed by the teacher, the students can discuss it using the chat tool;
- Work group monitoring- the teacher can provide monitoring sessions for the evolution of the work carried out by a group of students;
- Absent students monitoring- the teacher can make chat sessions with less interested students or that have abandoned the evaluation process, seeking to understand their reasons and encouraging them not to give up;
- Questions and answers session - the teacher/students are able to answer in real time to questions made by students/teacher about a given theme;

Another of the tools with a quite high potential is the forum, which is a discussion tool by nature. Contrary to the chat, it allows an asynchronous communication.

The forum can be used to support several activities, such as:

- Presentation - in the beginning of classes, students/teacher must present themselves sending profile information to the forum;
- Work presentation - the students can provide their individual or group work in the forum so that the remaining students and the professor are able to look it up and comment;
- Permanent forum for clarification of doubts - a forum on doubts and questions will be permanently available, in order that the students might pose general doubts or on the contents, which can be answered by the teacher or fellow students;
- Discussion - the students are divided in groups, which must report a viewpoint of solution for a question posed by the teacher to the forum.

The Lesson is created both by an interactive and an evaluation component. These can be used as a way of self-evaluation or formative evaluation and can restrict the progress of the study. The quizz tool allows the teacher to build a database with questions and answers. Quizzes can be used as formative or global evaluation activities, but in this particular case it will demand some kind of answer certification.

Wiki is a tool that allows the collaborative work of several authors. Workshop, on the other hand, is a tool that allows students to submit their work and the remaining to review it and evaluate it. The Exercise method allows the teacher to require the elaboration of a practical work: to write an essay or a report, to prepare a presentation, etc. The Glossary mode allows the students to flexibly add a set of words and its definitions. These definitions might have correspondent links throughout the subject. Students can also evaluate entries and suggest possible reviews.

E-activities, aligned with in-person classes, can ease and encourage relations among students-students and students-teachers. Students learn from reflections and interactions with their colleagues and teacher. Moreover, it allows the support of collaborative work, contributing thus for the participants to develop, throughout the learning process, strategic alliances and solidarities.

In this framework, the teacher must assume a different role, namely to promote human interaction and communication, having the creation of knowledge and competence as a goal.

It is the teacher's responsibility to define learning stages, proposing the students a set of activities that allow them to fulfill the proposed goals, giving feedback at the right time and properly motivating students.

5. ACTIVITIES VALUE AND ALIGNMENT

Some activities are still open, namely which activities must be proposed to the students by the teacher and what should its alignment be, bearing in mind that traditional classes coexist with in-person activities.

Salmon (2002) presented a teaching and learning online model in five stages. In the first, e-activities must be proposed, having access and motivation perspectives as a base, which aim to motivate students to explore the online learning environment and overcome possible access difficulties to the platform. In the second stage, proposes e-activities connected to online socialization, promoting collaborative work.

Stage three involves e-activities connected to information exchange, with the purpose of encouraging the students to cooperate, exchanging information and helping each other to achieve the pre-defined goals. The fourth stage involves e-activities related to knowledge construction. Activities become progressively more reflective. Students are encouraged to face different perspectives and viewpoints on a same problem. In stage five, we have the development e-activities, which encourage participants to reflect upon their new experiences and newly acquired knowledge, to fulfill proposed goals and go further.

A chief aspect in the planning of activities proposed to the student, whether in-person or online, is related to its value, namely its contribution to:

- The student's motivation;
- Socialization, specifically teacher-student, student-student interaction, development of the student's autonomy and collaboration ability;
- Knowledge acquirement and competence development.

A successful strategy in the implementation of e/b learning methodologies presupposes the planning of a set of activities, whether they are in-person or e-activities, which must contribute for the progress of the learning goals: knowledge attainment and competences by the student. However, the degree of evolution of these goals depends mainly on the level of socialization and motivation of the student, and it is the cement that keeps him motivated in the learning process.

By proposing activities to the student, the teacher must take its value into consideration and only propose those activities that might add value to the teaching process. Each proposed activity must be translated into value. This is, however, a subjective element and it will depend on the teacher's evaluation and on the type of curricular unit. Obviously the type of activity that can be proposed to the students of a unit such as Literature will be rather different from the Mathematic students.

Another aspect in which e-learning methodologies can be translated into added value in the learning process is feedback. It plays a very important part in education, since it is through it that individuals and groups are aware of their performances. Moreover, it allows the students to solidify their knowledge and teachers to encourage changes in the way learning is processed. E-activities and associated tools provide a great amount of ways of interaction with students and thus, of giving them feedback of their actions, as well as changing their role in the teaching process.

Moreover, all of the participants' actions are registered by LMS, which represents a fundamental source of information for the teacher, allowing him to monitor the student's progression and thus creating feedback. Consequently, it can be included as a part of the e-activities flow more than something that occurs occasionally.

In a blended-learning methodology in which activities are mixed with those carried out in in-person classes, the correct chain of activities is a crucial aspect. Both must play its role in terms of the contribution of the learning process measured in value.

According to Biggs (2002), in this context it is possible to identify the following stages in the alignment process: the first consists in defining the expected results (curricular goals); subsequently, it is necessary to choose learning activities that encourage the students to achieve those goals, and then negotiate learning rhythms, incentivate and motivate students to carry out learning activities and, finally, give the students permanent feedback, namely on the results of the global or formative evaluation activities, in order to help them improve their learning process.

6. GOOD PRACTICES

Given the multiplicity of subjects that compose a higher education degree, teaching methodologies must be appropriate to each curricular unit with its specificities. It is possible, however, to identify a few aspects that were a result of our experience in the implementation of these methodologies in a wide range of subjects in the framework of an engineering school and that, in our point of view, are translated into good practices:

1. Carefully plan activities that will be proposed to the students - planification assumes a crucial role in the definition of an educational model, appropriate for each subject in particular. The planification of teaching activities, whether in-person or at a distance, whether learning or evaluation activities (formative or global), becomes a priority task. Activities must be correctly evidenced, explained and scheduled. Planification guides the students throughout the whole learning process and contributes for the student's successful achievement;
2. Promote short term goals - the content units must be short and for each of them evaluation activities must be predicted;
3. Proximity evaluation - the student's work must be awarded, from the participation in a chat, to solving a mini-test or participating in a wiki;
4. Promote interaction with the students - interactivity among teachers and students and students-students is a vital aspect in terms of motivation and monitoring of the learning process;
5. Support the students - predict an extra support mechanism for the students outside in-person classes. Create a timetable to attend the students through a chat. The students requests must not be unanswered and should be carried out in a short period of time, never over 24 hours;
6. Double the information - all information granted in in-person classes must be duplicated in the platform, sent to the news forum and to the student's email. Bear in mind that some of the students might choose not to attend in-person classes. A set of alternative mechanisms and activities must be predicted so that these students are able to follow the learning process.

7. CASE STUDY

7.1. Description

This study was developed in 2007/2008 school year first trimester, in the Technology and Industrial Management course. It was in this school year that this course started, using the blended-learning methodology and only functioning during the night time. During the week only two classes take place, being the rest of the days used for student's activities, through the Moodle Platform.

This study occurred during the student's first year classes, being the majority of them working-students, people that came back to school after a long period away from it.

To obtain the necessary data, a questionnaire was created consisting in opened and closed questions, which main objective was to obtain the students feedback about the platform, such as: facility level using; students contribute learning; and lowest or biggest facility in communication between learning process actors. We also wanted to find out the importance given by the students to the several available tools on this platform.

The questionnaire also included questions related with the study central aspects: activities and their value. Those questions allowed students to identify the most motivating developed activities, which more contributed to their socialization and skills acquisition.

7.2. Some results

On the first part, student's interaction with platform and its effects on the learning process results will be presented, and secondly, identifying the activities contributions to **motivation, socialization and skills acquisition**.

For now, the results about the student's interaction with the platform:

Relatively to the question "how to describe your overall experience on using Platform Moodle", 81 % considered a very positive experience and 19 %, considered it only positive.

On the "*how do you classify the facility level on the Moodle Platform using*" question, results revealed that 67% classified Moodle as easy to use and 14% classified it as very easy to use.

On the question "*what importance do you give to the following highlighted Moodle tools*", the average answers were superior to three considering the likert scale. On this point, we only emphasize some of those tools: work upload, quizzes, glossary, wikis, questionnaires, chats, forums and content availability.

Considering the question "*what was the Moodle importance given to your learning process*", we emphasize the next results:

- Interaction facility between teacher and students, the learning process actors, allowing a major approach facilitated by forums and chats;
- The possibility of content access at any time and at any hour, and the availability of the most important curricular unit information;
- The collaborative learning facilitated by forums with group resolution exercises and forward discussion;
- The platform facilitates students to support each other.

We now present the three dimensions results that best define the activities value: motivation, socialization and skills acquisition.

On **motivation**, according with the results, the activities that more motivated students during their learning were:

- Quizzes, (formative and summative assessment);
- Pedagogical content (provided by teacher or other resources available on the Web);
- Text readings about one specific theme;
- Doubts explanation occurring on forums;
- Real time conversation using chat system, between students and teachers about one specific theme.

According with the results, the activities that more contributed to students' **socialization** during their learning were:

- Chats
 - Activities: doubts explanation and online discussion about one specific theme mediated by the teacher.
- Forums
 - Activities: doubts explanation, reflection activities about one specific theme;
 - Group resolution exercises and forward comments;
 - Terms contributions to glossary allowing comments.

The activities that more allowed the students to develop their **skills acquisition** were:

- Text readings and forward discussion between students and teachers;
- Pedagogical content ((provided by teacher or other resources available on the Web);
- Wiki tool utilization, with collaborative construction texts about one specific theme;
- Terms contributions to glossary allowing comments;
- Collaborative activities facilitated by forums and chats tools.

8. CONCLUSIONS

In first place some platform aspects will be discussed as it will the value activities, in second.

About the platform and based on the results we can conclude that Moodle Platform, was well accepted by students. This acceptance is related with the use facility identified by students. Piteira & Costa (2006) concluded that the perceived Moodle Platform usability is high. So the results are according with Piteira & Costa study. This acceptance also results from the importance given by students to the Platform, during the learning process. This importance results from some aspects: easy access to pedagogical contents at any time and any place, teachers and students facilitated access, facilitated communication between students-students and students-teachers, facilitated interaction and curricular units logistics.

Thus we can say that students feel more comfortable using the platform and its facilitated provided activities.

We are now available to discuss the value activities, respectively motivation, socialization and skills acquisition. Based on the results, we can say that students have notion about the activities value.

In motivation, students identified facilitated activities through quizzes, lessons, forums and chats. Resuming, challenging activities are good for motivation.

In socialization students have identified activities that facilitate interaction between students-students and teacher-students, respectively facilitated activities using chats, forums and glossary. This interaction resulted in collaborative learning by providing challenges on forums and chats, and terms contributions to glossary allowing comments.

The skills acquisition value was identified by the following activities: text reading with later discussion, group works resolution, individual learning with alternative routes of learning and all of the activities that provide collaboration between the learning process actors. These activities are facilitated by forums, chats, lessons, glossary and quizzes.

Finally, we can conclude that curricular units planning from the course initiated on this school year (2007/2008) were not similar. We were not able to obtain the activities alignment data.

The suggestion we make for a future work is the activities alignment identification in a superior course, in particular engineering course.

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Annex 1 - Map summary: Value Activities

ACTIVITIES	VALUE ACTIVITIES		
	Motivation	Socialization	Acquisition Skills
Doubts explanations - Forums and Chats	X	X	X
Real time conversation using chat system, between students and teachers about one specific theme.	X	X	X
Group resolution exercises and forward comments		X	
Terms contributions to glossary allowing comments		X	X
Quizzes (formative and summative assessment);	X		
Pedagogical content (provided by teacher or other resources available on the Web)	X		X
Text readings about one specific theme	X		
Text readings and forward discussion between students and teachers			X
Wiki tool utilization, with collaborative construction texts about one specific theme			X