

DISRUPTION IN HIGHER EDUCATION - A NEW APPROACH PROPOSAL BASED ON COLLABORATIVE BLENDED MOBILE LEARNING

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Abstract

The emergence of new technologies contributes to the change in the behavior of society in general and the younger generation, named Generation Z, in particular requires that higher education institutions “look” for teaching in a different way and change the approaches (methodologies) of the teaching learning process. Since the current approach to teaching learning process in higher education is predominantly the traditional model, i.e. expository lectures. Thus, teachers who a collaborative blended mobile learning are stimulating students autonomy and motivation, so that students get more skills. In order to answer these new challenges an innovative approach was developed and implemented. The approach was implemented in a post-graduation course untitled “Web Communication”. The results are very promising because they allow on the one hand student’s engagement, and on the other hand, resulted in a 80% pass rate.

Keywords: Innovation; Technology; Research projects; Higher education; Teaching-learning process.



1. INTRODUCTION

Information technologies are the essence of up-to date organizations in general, and higher education institutions (HEI) in particular, and changes in this field are occurring at an uncontrollable pace, interrupting traditional models and forcing organizations to implement new models. On the other hand, the target audience of higher education is increasingly digital, generation Z, forces a disruption and innovation in HEI, particularly with regard to the teaching learning processes (TLP) [1]. However, educational systems in general and those of higher education in particular have not had the expected evolution in terms of the potential introduced by the adoption of technology and virtual teaching/learning approaches, e-learning [2], [3], b-learning [4], [5], mLearning [6], [7], and u-learning [8], [9], although used, do not sufficiently exploit its great potentialities and the objectives for which they were proposed. In this context, it is possible to refer bLearning, which theoretically has great potential, since it allows the expansion of access to learning contents and collaborative learning environments, anytime and anywhere, combining physical and virtual spaces. With the stated purpose, the Massive Open Online Courses (MOOCs) [10] and some alternative approaches like active learning methodologies are some of the innovations introduced in the teaching-learning process (TLP) but they do not have the expected/intended success [11].

With the support of blurring approach students can use the educational material and thus acquire the desired knowledge/skills. The materials can range from multimedia contents to learning objects, which are characterized by: (1) high interactivity, (2) attractive and effective visually, contributing in this way to a better learning [4]. In addition to the stated i.e. attractive material provide to use, its use is maximized by the technologies in general and the internet and Wi-Fi in particular, that allows an “always there, always on” use.

In this paper, a validated approach will be presented through a case study, in which an innovative learning approach developed for a curricular unit of a post-grad course was introduced. The proposed approach took into consideration, in addition to the motivational aspects, the fusion of several learning strategies for the development of new competences, framed in the current and future moment. The approach used was based in the MIPO model [12]. According to [12] the MIPO model “intends to be a guide for the definition of management procedures, planning, developing and implementation of teaching - learning processes using web technologies”.

In order to achieve the presented goals, a set off skills (specific and soft skills), was defined according to the European Qualifications Framework [13]. The fact that the students are the central figure in the education process demands that they pay particular attention to the management and development of self-guided activities.

The approach, which is validated empirically, encompasses several learning techniques, namely slides presentation, videos presentation, learning objects, e-Learning platform resources, videoconference platform resources and Social Network resources, and individual/group activities. The strategy, the methodology, and the techniques that have been applied was fully aligned with the lesson's objectives/skills.

The results obtained, with this approach, allowed to promote student's engagement inside and outside of the classroom and achieved an approval rate of over 80%.

The paper is organized as follows. In section 2 the background is presented and discussed. The proposed approach is presented in section 3. In section 4 is presented the analysis and discussion of results. Finally, section 5 presents the final conclusions and some directions for future work.



2. BACKGROUND

There several approach to the teaching learning process (TLP) proposed in the literature [14], as referred, that range from traditional to virtual models; some of these approaches are summarized in fig. 1. In the following subsections it will be presented and discussed two of them (bLearning and mLearning) since they are the base of the prosed approach presented in this work.

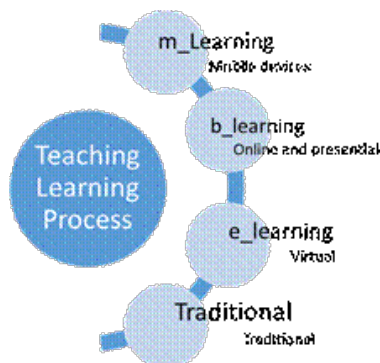


Figure 1. Learning Models (Adapted from [14]).

In the next subsections the main concepts associated to the proposed approach are presented and discussed.

2.1. B_Learning

Blended learning (bLearning) is a common practice in higher education [15]. According to [14] bLearning is a mixed system of teaching/learning, which includes classroom and online lessons, and incorporates in itself the conjunction centrality of different teaching approaches, the interaction of different technological tools and the adoption of virtual spaces. bLearning derives from e-learning (distance learning, i.e. non-face-to-face teaching), and refers to a teaching model in which part of the contents are transmitted by both attendance or at a distance. bLearning is therefore a hybrid system of learning that mixes these two systems together.

The adoption of bLearning, i.e. combine face-to-face with virtual, not intend to compromise with either system, but rather to benefit from the advantages of both approaches [15].

The advantages of bLearning are many, on the one hand it allows teachers to be in direct contact with their students, facilitating interaction with students.

On the other hand, online provides students with greater flexibility, since the course can be held anywhere and at any time given the availability of different types of documents (texts, videos, slides, audio, graphic information, ...), besides allowing to gather information about the learning process of each student. At the same time, bLearning can be applied to many students at low cost and allows the updating of course content very quickly [5].

2.2. M_learning

mLearning has emerged as a new paradigm in the world of digital learning [7]. It (mLearning) can be defined as a form of learning that makes use of mobile technology and gives students the possibility to learn anywhere and at any time. That definition is a result of the following mLearning definitions: (i) "Any sort of learning that happens when the learner is not at a fixed, predetermined location or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies." (Malley et al., 2003); (ii) "The use of wireless and mobile networks to facilitate, support, enrich learning and provide greater educational coverage" (MoLeNET, 2015); (iii) "E-learning through the use of mobile devices (smart-phones, tablets, handhelds, etc.), that provides mobility to students" (Gost, 2011); (iv) "Educational activities through the use of compact and portable devices that allow students to master learning materials more effectively consume and create information" [16].

According [17] mLearning can be used to support traditional learning as well as distance learning. The implementation of mLearning offers students the opportunity to enjoy absolute flexibility, collaboration, freedom and just-in-time learning [18]. Another clear advantage of mobile learning is to support the communication and increase student-student and student-teacher interactions [19]. A real-time monitoring is carried out of students' progress. This monitoring will make it possible for students to adjust their performance with the teacher's help [20]. Cost issues related to mLearning are minimal, since the implementation of mLearning systems is encouraged in open source platforms, technologies and operating systems such as Android, iOS and others. Students can explore this opportunity to learn and develop free applications [20]. Technological innovations are not immune to the challenges, and the mLearning also has its



limitations with regard to technical, security, social and learning challenges [21].

2.3. Bloom's Taxonomy

The Bloom's Taxonomy [22] was developed by Benjamin Bloom, together with a group of scholars; the taxonomy proposed a classification of learning levels based on intellectual behaviour. The Bloom's Taxonomy [23] is characterized by defining a set of educational goals and objectives. Thus, in this referred framework are presented the objectives and the respective processes and resulting learning. The author describes a set of thinking capacities, beginning with the lower-order thinking capacities, which form the basis of a hierarchy and which terminates in higher order thinking capacities. [24] presents Bloom's Taxonomy with the following classification: Remembering, Understanding, Applying, Analyzing, Evaluating and Creating, where each level has a set of verbs to be used in the definition of learning objectives to be achieved by students (see fig. 2).

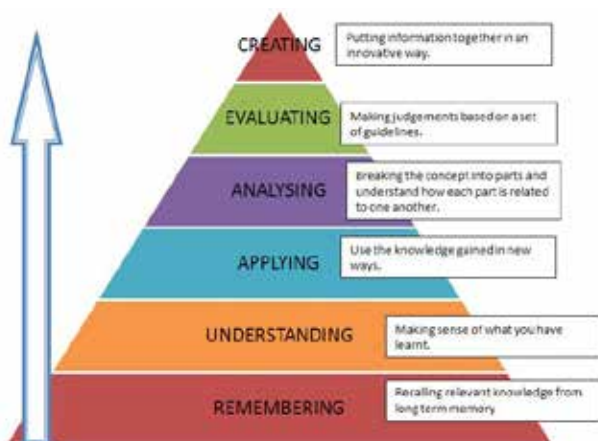


Figure 2. Bloom's Taxonomy (Font: [25])

[26] in your research extends the Bloom's Taxonomy. The referred research changes the "core of the Bloom's Taxonomy - learning objectives - for learning outcomes. The approach introduces two main elements: knowledge and skills (see fig. 3) in order to accommodate the results of the students learning i.e. skills. The knowledge element is the bases to students to get skills. The skills element has as bases four levels: Application, Analysis Synthesis and Evolution that results into students Intellectual skills.

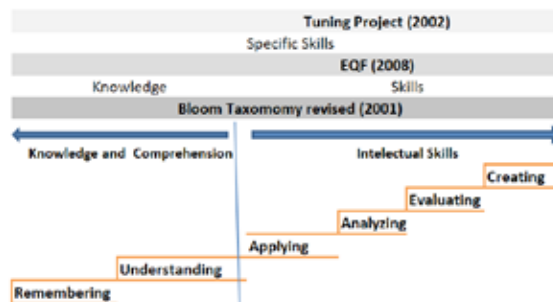


Figure 3. Concept of Specific Skills (Adapted from [26])

2.4. Learning Objects

The concept of LO (Learning Objects) is subject to multiple definitions, some of which are more restricted than others. They differ in terms of size, scope, content, design, and technical implementation. [27] observes that "there are as many definitions of LO as there is of a number of users". However, some requirements seem to gather consensus: Re-use, interoperability, durability and affordability.

The SCORM is a reference model for E-learning content. Currently, this model is composed of 3 sections: Content Aggregation Model (CAM), Sequencing and Navigation and Run Time Environment (RTE). The main objective is to standardize the way that the contents relate to the systems that support them (LMS, LCMS). Its main features are: Organization of content migration/portability, reusability and standardization, and versatility.

In the context of this work we have adopted the following definition: a LO is a digital resource with educational purposes that has technical characteristics and which includes pedagogical aspects.

3. RESEARCH METHODOLOGY

In any research, the research strategy is a relevant decision since it communicates the expected results of a study and how the results should be evaluated. The different existing research strategies are not mutually exclusive, however, one must be able to identify some situations in which a particular strategy has a distinct advantage over other strategies [28]. According to [28], in the case study "how" and "why" are central questions about a set of contemporary

events on which the researcher has little or no control. Additionally, to [29], the purpose of the case study approach is to report the facts as they occurred, describe situations or facts, provide knowledge about the event studied and prove or contrast the effects and relationships present in the case.

As the presented research is characterized by the analysis of an event in a real environment, with the aim of clarifying, “What was the impact of the proposed approach concerning to the students success that attended the UC Web Communication?”, the research strategy adopted was the case study.

A key step in planning and conducting a case study concerns the definition of the unit of analysis, that is, the definition of the object of study [28]. And, in this reach, as referred, the research analysis unit is the implementation of an approach in the teaching learning process to the UC Web Communication.

Additionally, this research used the quantitative methodology, which can be generically defined as a method of social research that uses statistical techniques for the collection and analysis of data. The quantitative methodology is thus, with the collection of data on motivations of concrete groups, in the understanding and interpretation of certain behaviors, opinions and expectations of a concrete group of individuals. This approach aims essentially to find relationships between variables, to make descriptions using the statistical treatment of collected data, to test theories and to draw conclusions. The selection of the quantitative methodology is justified by the need to collect the opinions and attitudes of the respondents, i.e. the study was descriptive in nature, and the data collection was carried out with the use of a questionnaire.

The use of questionnaires requires special care, since it is not enough to collect the answers on the issues of interest, it is also important to perform a statistical analysis for the validation of the results [30]. The questionnaire before being submitted was submitted to the evaluation of four experts in the area.

4. PRACTICAL APPLICATION

In this section we present the module of Web Communication, of the post-graduate degree in Innova-

tion and Digital Communication. This degree began in 2011/2012. It has been functioning since the beginning in a bLearning regime and it is frequented by Portuguese and Brazilian students. (<https://www.iscap.ipp.pt/cursos/pos-graduacao>). In the year of 2017-2018, the post-graduate degree was converted in the master’s degree of Advisory in Digital Communication, with all the due alterations in the study plan.

4.1. A Course Overview

At P.Porto, at ISCAP, the module of Web Communication is a part of the post-graduate degree in Innovation and Digital Communication.

The course is made up by various modules. The modules are phased during a year and last for approximately 2 months. There are always two modules working simultaneously. Their structure is identical and it was defined by the director of the course.

In the teaching process of the module of Web Communication were done 3 classroom sessions, 4 synchronous sessions and 6 asynchronous sessions (see Fig. 4).



Figure 4. Course structure

In the first class of the module it was made available to the students its dossier. It consisted of: a brief resume of the module, followed by its general and specific objectives to reach in each one of the modules of the program, the learning outcomes required of the students (specific and soft skills), the program, the pre-requirements, the methodology of teaching/learning used, the methodology of evaluation, the bibliography of the module and of the teaching/learning activities the students will have to perform during the module. All activities were oriented by goals.

4.2. Definition of teaching objectives, program content and evaluation methodology



The structuration and definition of the CW module followed the MIPO model proposed by Peres [12].

In accordance with the MIPO “the process of teaching-learning was oriented by the objectives of learning that in this manner legitimized the same process, the process of evaluation and simultaneously the design of the strategies of the institution” [12].

The creation of a matrix structure composed by specific objectives grouped by programmatic modules facilitated the organization of the process and helped the validation of the disciplinary structure (see figure 5). The following images show the use of the model in the curricular unit of Web Communication.

Objectives	M1	MII	MIII	MIV
Understand the concepts related to the Web communication	X			
Use WEB 2.0 tools for the development of digital products.		X		
Create one SEO Strategy			X	
Develop and implement an integrated communication strategy	X	X	X	X

Legend:
M1 - General concepts of internet communication
M2 - Use and integration of WEB 2.0 tools.
M3 - SEO strategy
M4 - Integrated communication strategy definition

Figure 5. Matrix structure

In relation to each objective was defined one or more activities that the students had to do autonomously, collaboratively or in group. Each activity was built by a designation, objectives to reach, indication of the necessary e-contents to its realization, tools to use, phases, rules, results and delivery date.

By each asynchronous session, and accordingly with the defined contents, it was presented an activity. The following table represents an example of the activity of AS3 session.

Designation: #A3 – Search Engines Optimization

Objective:

The objective of this activity is to apply search engines optimization tools.

E-contents:

<https://online.iscap.ipp.pt/>

Phases:

- F1 – Know the tools for search engine optimization.
 - F2 – Apply the tools in the website developed.
 - F3 – Register the website in the directories and in the search engines.
 - F4 – Motorizing the Website and repeat the process
-

Observations:

The choice of the title of the website, the description and the key words, the selection of the internal and external links must be justified using SEO tools. The site must also be registered in various search engines and directories.

Support to the realization of the activity:

The students do the activity individually and the teacher/tutor oversees and explains doubts in synchronous sessions or by email (see chronogram)

Tools:

Google, addwords, WordTracker, Keywords Density, Page Rank, Allintitle, etc.

Results:

Url of the website and website development report. The proceedings done on the website must be included in a report.

Delivery date:

27/3/2016

Table 1. Course overview

The methodology of the evaluation of the module understood formative and summative evaluation. On one side the formative evaluation functioned as a process of auto evaluation in which the interference of the teacher was reduced to the minimum, meaning, the teacher promoted an interactive regulation, transferring to the students the task of being responsible for their own learning by the means of auto evaluation and the knowledge of the objectives to reach. On the other side, the summative evaluation allowed to do a gathering of what the students knew, allowing then to regulate the learnings and the teaching, but, more importantly allowed to attribute classifications.

The activities realized were integrated in an interdisciplinary project that had been developing in the module course, the component in relation the Web Communication module was presented at the last face-to-face class of the module, in the interactive classroom.

4.3. Teaching/Learning Methodologies

By being a b_learning course it was necessary to use varied technology, depending of the type of session. It was used class support technology and



technology that would allow the students to acquire skills in the taught contents. Relatively to the applied technologies, its objective was never to apply a tool X or Y but to know the functionalities of the tools and apply a tool where it was possible to implement those functionalities.

The Learning Management System (LMS) used for the availability of the contents was Moodle. For the creation of the module we used the Activities: Assignment, BigBlueButton, Forum, Glossary, Lesson, Quiz, Scorm (Sharable Content Object Reference Model) Package e Wiki and the resources: File, Folder, Label, Page e URL. The following image presents the chronogram.

Depending on the type of class, face-to-face, synchronous or asynchronous, the technologies utilized are varied; yet, Moodle was the beginning point of every class.

The classroom sessions were taught in an interactive classroom that possesses the equipment for the realization of distance classes in real time. To note that the students came bearing portable computers with internet access (see figure 6).



Figure 6. Classroom session Technologies

The existing equipment in the classroom consists of:

- **Hardware:** Interactive projector, sound mixture table, wireless lavalier microphone, wireless hand microphones, amplifier, columns, video camera, video plaque, desk computer, portable computer.
- **Software:** Blackboard collaborate ultra. At the same time, it was also used another program of videoconference namely Google hangout, Skype or Colibri, so that the lecturer and the students could see the students present in the interactive classroom in Brazil.

The classroom sessions consisted of the following:

- In the first session after the presentation of the lecturer and the students, was taught an expositive class where the topics of the module were discussed.
- In the second session after the monitoring of the activities proposed in the asynchronous classes, had place a lecture by a professional of the area in study.
- The last session was destined to evaluate the students. It was to begin with a Quiz, done in Moodle, followed by the presentation, discussion and evaluation of the project done by the students. The projects were auto evaluated, evaluated by peers and lastly by the lecturer. Figure 7 represents the structure of Classroom session #1.



Figure 7. Classroom session structure

The asynchronous sessions consisted mostly of providing the availability of the contents and the description of the activities to be done by the students. The technology utilized for this effect was Moodle and the social network Facebook (see Figure 8). Moodle was used to distribute the formal contents and through Facebook, in a private group, was done the distribution of informal contents. Frequently, at the Facebook group, there were made considerations about the contents and the activities, students could place doubts and help each other, making available bibliographic references related to the lectured contents. After a few days we verified that the largest number of interactions done by the students was through the social network. However, the use of LMS, revealed the importance for the organization of the module.



Figure 8. Asynchronies session Technologies



At Moodle the contents were made available by using learning objects in the format of SCORM, videos, files and folders (support slides) and links for web pages. In the activities were used the resources: Glossary, Assignment, Quiz, and Wiki.



Figure 9. Asynchronous session structure

The synchronous sessions were used to clarify the students about the lectured contents and about what they had to do.

For the realization of these sessions we used several tool of videoconference Skype, DimDim, Anymeeting and in the last edition BigBlueButton. The sessions were recorded and the access link to the recording was made available through Moodle so that the students could later access the recording.

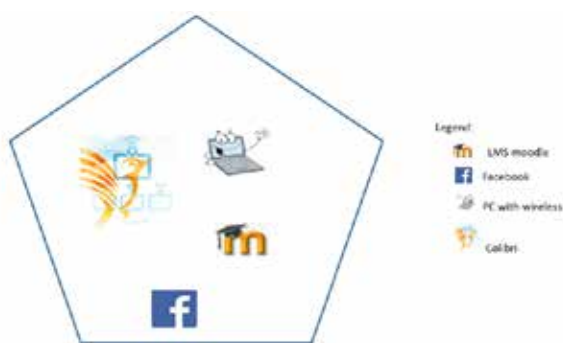


Figure 10. Synchronies session technologies

With the utilization of videoconference platforms, we built collaborative documents online, share documentation, screen, use chat, etc. the access link to the videoconference was available at Moodle, at the Facebook group and by email (see Figure 10). During the sessions it was verified that the students used various mobile devices to access and intervene in the session.

In the lecturing of the module it was privileged

the use of free tools. The students were stimulated to research and use such tools. Along the years we verified that during a period the tools were free and then after some time had to be paid. The use of this strategy enabled the students of research skills and a portfolio of various tools, useful for the activities they had to perform. To note as well the fact that in the same year the students worked with different tools for the same objective. Because all the activities in the module were all presented, discussed, and evaluated by peers and the lecturer, the students had the possibility to know and learn how to use various tools (see Figure 11).



Figure 11. Synchronous session structure

4.4. Course Assessment

In the years of 2014-15, 2015-16 and 2016-17, the department responsible for the lecturing of the training courses and post-graduates of ISCAP, proceeded to the evaluation of the module using the following methodology.

In was sent the week prior to the end of the module, a questionnaire of evaluation of the modules to the students, in relation to these criteria:

- Addressed topics and utility of the curricular unit;
- Performance of the lecturer;
- Satisfaction level of the expectations towards the curricular unit;
- Global Appreciation of the curricular unit;
- Recommendation of the curricular unit to another person.

The questionnaire was built with closed answers that used ordinal scales such as:

- “Extremely inadequate”, “Inadequate “, “Neither adequate nor inadequate”, “Extremely adequate”;
- “Poor”, “Fair”, “Neutral”, “Good”, “Very good”,
- “Not at all”; “Slightly”; “Extremely”.
- And also, with open answers where the students could complement their analysis, by including observations and suggestions that they deemed pertinent.

Analysis and discussion of results

These answers were revealed important because during the various editions were incurred proposals by the students, namely the realization of an interdisciplinary project.

In the following graphics we can visualize the results obtained by the requirements 3, 4, 5.

In the years 2014-15, 2015-16 and 2016-17 were done two requests of fulfilments of the questionnaire to the students that frequented the module however the answering rated varied between 33, 3% and 44, 4%.

The graphics represent the opinion of the students in the referred years.

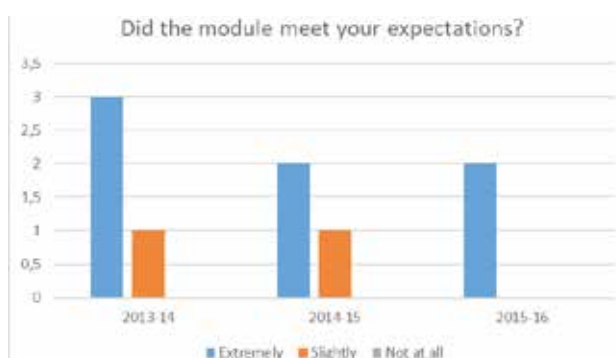


Figure 12. Module expectations

Even though the rate of answer to the questionnaire was low, it is verified that in the course of years the modules corresponded to the expectations of the students (see Figure 12).

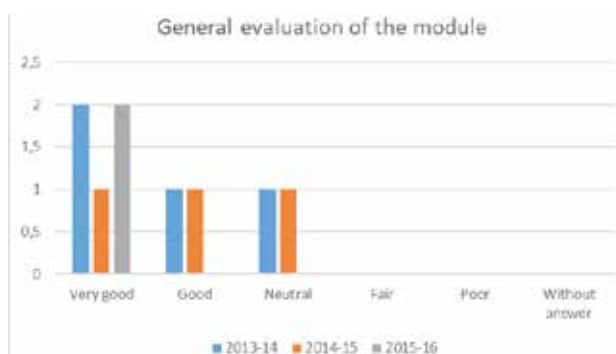


Figure 13. Module general evaluation

Relatively to the global evaluation of the module it is verified that in the course of the years the evaluation of the module was positive being that the majority attributes the evaluation of Very good in the years 2013-14 e 2015-16 (see Figure 13).

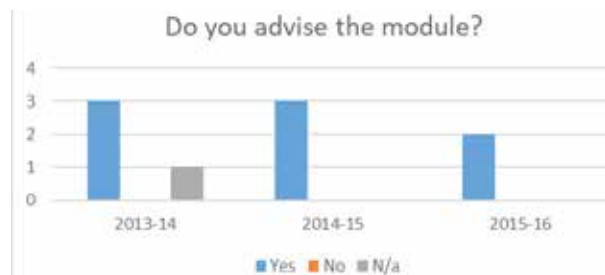


Figure 14. Module advertising

In relation to the module reputation, it verifies that in all the editions the students recommend enlisting in the module advertising (see Figure 14).

For many years, e-learning has been a tool in the training toolbox; however, some organizations still struggle to determine the best uses of e_learning. Proof of this fact is the percentage of students that finish successfully e/b/m_learning courses.

Relatively to the presented course, throughout the years, it was verified that the percentage of students who completed the module is 96%. In all the editions there was only 1 post-graduate student who quit.

Another fact to stand out is that the percentage of students who finish the course with success. Being that the majority of student finish the modules though continuous evaluation with pretty high grades (see figure 15).

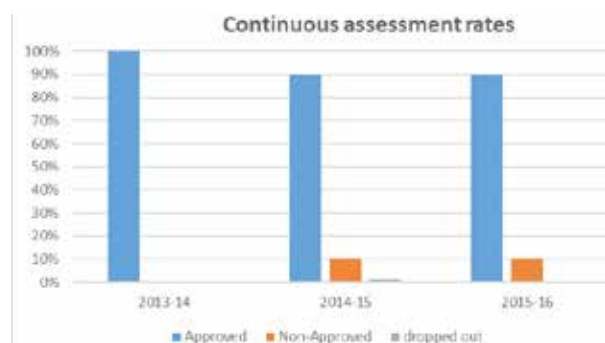


Figure 15. Scale with grades by period 2013-14 to 201516

The fact that the students finished a varied set of activities during the module that they developed autonomously or in group, revealed itself pretty fruitful. After so much investment in the module (number of total hours of work being that the biggest part was autonomous work) contributed to the stimulation of the students, to help them finish the module with success.

During the lecturing, especially in periods of evaluation of the previous module, the students understood that the course was very demanding relatively to the work required of them. However, the



concretization of the activities exceeded the effort put in. The proof of this fact are the results obtained in the questionnaires answered by the students.

In our opinion, during this course, we have given best use case for learning courses. We adopted strategies, methodologies, techniques and didactic content that made this course a success.

with the improvement of some aspects, the tools to use, since every day there are more wide-ranging tools that could increase students' productivity, interest and engagement.

5. CONCLUSIONS AND FUTURE WORK

In the actual context of higher education, the traditional classes, consolidated in the XIX century continue to be the prevailing style (expository method). However, this approach is seen more and more as one of the problems of today's teaching and it is offering resistance to the adaptation of the demands of the XXI century. Therefore, in the sense of meeting the need of change, e/b/m/uLearning has managed to attract a lot of attention, since it stimulates the motivation to reach more competences on the part of the students. And yet this change requires an attitude change on the part of the teachers relatively to the methodologies used in the process of teaching/learning.

To answer the needs mentioned previously, it was developed an innovative project in a pedagogy standpoint, in the context of the Innovation and Digital Communication Post graduation. Therefore, it was developed and implemented a module built by active learning methodologies in the framework of the Web Communication curricular unit.

Based on the results presented and discussed in the previous section it is verified that the questions related with the individual evaluation and the success in the curricular unit were broadly achieved under the student's point of view. The change in the part of the lecturer, adapting the profile of the teacher, in detriment of transmitter, was very positive in the learning process of the students. Yet, the results obtained evidence a limitation, which is the reduced number of students.

In final conclusion we can affirm that the results obtained show that it is possible to take risks (controllable) and diversify the teaching methodologies making the utilization of various, creating new approaches, in a way of permitting an improvement of the learning of the students. In this context, the proposal will be applied in other courses



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