



ACADEMIC PERFORMANCE IN BLENDED LEARNING IN HIGHER EDUCATION

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Abstract

Institutions of Higher Education in Portugal face today unique challenges. Aware of the change, in general, these institutions have presented reform initiatives covering in their strategic plans new frames of operation, where e-learning and / or b-learning are recognized. The present study aims mainly to know the impact that b-learning and the implementation of some pedagogical models adapted to these environments may have on academic performance of students in higher education. Data analysis, referring to the classifications obtained, suggests that the creation of virtual environments, combined with complementary or face to face learning, and using pedagogical models adapted to online environments, diversified learning objects and strategies that encourage students, may indeed contribute to a significant improvement in their academic achievement. We also concluded that this b-learning modality, supported by online pedagogical constructivist and collaborative models allow effectively to equate the teaching-learning process in a different way. This (new) reality implies a very significant cultural change, as it implies rethinking the roles of teacher and student, and the relationship between them, appropriate content, in addition to the implications that must be implemented in terms of structuring and planning courses and curricula, evaluation systems and teaching and learning forms.

Keywords: Blended Learning, Pedagogical Models, Academic Results, Students, Higher Education, Learning Management Systems.

1. Legitimation

Higher Education Institutions face today unique challenges in Portugal. Aware of the change, in general, these institutions have presented reform initiatives covering in their strategic plans new frames of operation, where e-learning and/or b-learning are recognized. But, in reality, only few actually promote real alternatives based on Learning Management Systems (LMS).

Indeed, we have found, in different areas of our educational intervention, that in many cases these initiatives tend to replicate the existing policies, with examples of the use of new environments as a new environment or attractive factor, however, maintaining the usual teaching practices.

The example of the implementation of the syllabus on paper or orally to computer fields of virtual environments of online education illustrates this tendency to converge to the "traditional". It also reflects the fragmentation of knowledge, the



restructuring of the teacher' role to that of a distant tutor, often only presenting the work proposal without having found a way to participate in its design and development of the underlying project.

The "platform" is sometimes used as an information repository, offering educational material for students and where completed tasks are received or online activities are filled in for comfort and illusory modernization purposes.

Given this finding, and assuming that combined learning of face to face and virtual scenarios is an excellent strategy to face the challenges of information and knowledge society (Rosenberg, 2001; Garrison and Kanuka, 2004; Bonk and Graham, 2006; Graham and Robinson, 2007; Graham and Dziuban, 2008; Herrington, Reeves and Oliver, 2010, Moreira and Monteiro, 2010), and that the adoption of contemporary technologies in education provides a better understanding of the theories and activities in the teaching-learning process, it is essential that higher education teachers will no longer be afraid to use new technologies and invest in their training at a time when technology, information, and communication are one of the priority areas mentioned in the annual report on the European Information Society (Community European Commission, 2005).

However, it is not only up to the teachers to recognize that their role has to be different. The institution itself must recognize that the school no longer has the monopoly in transmitting knowledge and no longer holds the image it had in the past, which gave it authority and respectability.

It must simultaneously invest in the social value of the teacher' image, who although he/she is not the sole holder of knowledge, continues to play a key role in educating students, not as passive beings, but as creative and critical citizens. In order to develop a democratic education for all, or at least for a majority, the institution needs to understand that a major investment in equipment is not sufficient enough, as it can contribute to accentuate social inequalities.

It is in this context that we see e-learning becoming more widespread, with all the challenges that the use of this type of process involves (Masie, 2006). It is also in this perspective that we sought to develop our teaching practice in the teaching of courses in the social sciences and humanities area. Our exercise aimed therefore to understand the impact that methods of teaching in blended learning with a combination of different pedagogical models, promoters of interactional and collaborative constructivist learning, and different methods of teaching and learning strategies (Graham, 2006) may have on the academic performance of students in higher education. In a systematic and concept-based way, our work sought to understand whether different modes of learning in blended learning, based on a constructivist and interactionist virtual pedagogical model, can promote academic success in specific curricular contexts.

To this aim, we developed a case study in which we sought to study the teaching situation, investigating education while educating (action research), involving ourselves in our research practice as authors and actors, since this praxis of action-research potentiates collaborative and contextualized dynamics, on-going



inquiry and reflection, the opportunity to examine our practice critically and systematically and, above all, because it overcomes the usual dualism, theory and practice, that separates the researchers from the sample (Noffke and Someck, 2010).

It should be noted that the data presented in the next item belongs to a curricular unit (CU) entitled Historical and Contemporary Perspective on Physical Education and Sports (HCPPES), which is taught in the first semester of the Physical Education and Sports course, introduced in the academic year of 2007/08. Furthermore, the data will also show the modules of the first semester of this course, in order to carry out a comparative analysis.

2. Design

One of our concerns from the 2008/09 school year, when we assumed the regency of the HCPPES CU, which was taught only in the face to face mode, was to try to implement in blended learning a pedagogical model based on collaborative, constructivist and interactionist learning. In this topic, we thus present the data for the work applicable to three years (2008/09 to 2010/11) of b-learning teaching, which has undergone adjustments according to changes in the combination of the two environments, at a learning, implementation and evaluation level.

In the CU design phase of learning, we considered some principles that can be generalized to the design of any CU in an online environment (Garrison and Vaughan, 2008; Salmon, 2000; Jonassen, 1999), namely that the design should: (i) focus on learning, being driven to achieve precise, achievable and measurable goals, (ii) focus on meaningful performance or achievements, (iii) assume that the results can be measured in a reliable and valid way through the preparation of performance evaluation tools, and (iv) be empirical and self-correcting. In addition to these, we also created structural components, such as the forums "news" and "doubts", the careful planning of multimedia learning objects, explicit from the outset in "Teaching Guide Semester (TGS)"; a video presentation, and an evaluation of the CU.

Teaching was shared between a teacher-conductor, responsible for the CU, and a teacher-tutor to supervise the students, mainly in interaction with the learning management system (LMS - Moodle).

First, the Teaching Guide Semester (TGS) was designed, being the main reference of the student in relation to content, structure and activities. In its design, we sought to establish a correct horizontal articulation among all its elements and a vertical articulation or intelligible sequence. It was mandatory that there was a clear description of aims and objectives of learning, defined in terms of expected accomplishments of students and not of content.

The TGS also included learning resources available (e.g. books, articles, videos, images, sites related to topics of study), the activities to be undertaken by students and evaluation criteria. Second, resources were made available in the LMS related



to diverse topics addressed and mini exhibitions available online (video and audio), in order to motivate students and create bonds between students and teachers (regent and tutor). Thirdly, there was a very big concern regarding the definition of tasks to be undertaken by students, or the focus on the process activities and to solve problems which were learning experiences (individual and collective).

Fourth, the structuring element of the whole educational process: the dynamics of virtual classrooms (forums) via asynchronous communication. Considering this aspect in the whole process, it has been our concern to promote a constant interaction through three types of communication patterns: (i) student-content, (ii) student-teacher, and (iii) student-student. Finally, and not necessarily in that order, selected theories and models consistent with the constructivist conceptions of learning that we advocate. Thus, we have privileged, on account of its timeliness, adaptability and relevance, the learning model for problem-solving structure called Multiple Perspectives for Learning Objects (MPLO), and the models of Salmon (2000) and Randy Garrison, Terry Anderson and Walter Archer Garrison (2000) for the construction of virtual learning communities.

The first learning model called Multiple Perspectives for Learning Objects (MPLO) resulted from the challenge launched by Wiley (2002), Ally (2004) and Nurmi and Jaakola (2006), on the need to structure learning objects according to the Theory of Cognitive Flexibility. This is therefore a model based on the theory of teaching and learning developed by Rand Spiro and his colleagues (Spiro *et al*, 1988), created in an attempt to resolve the difficulties that students have in transferring knowledge to new situations (Spiro, 1995).

The MPLO model focuses on deconstruction processes. Instead of working with several cases, the object of learning amounts to one case. The learning object structured according to this model has three components: the case, the perspectives and the deconstruction. A case may be, for example, the sequence of a film or a documentary or a book chapter (Spiro and Jehng, 1990), and so it can take any format: text, image, video or audio sequence. The student must have full prior access to the case in order to start the review process. The perspectives present the conceptual framework of the analysis of deconstruction.

It is important for the student to know the teacher's referential underlying each perspective, with the understanding that a perspective is a theory, a concept that the teacher considers appropriate to deconstruct the case. Deconstruction is the essence of learning. Through the process of deconstruction, the case is decomposed into smaller units of analysis, the mini-cases, and each mini-case offers an explanatory comment on how this is present in the mini-case. If the teacher finds it appropriate, he/she may provide additional information to help understand the mini-case, giving the student a more in-depth learning.

In turn, the model developed by Randy Garrison, Terry Anderson and Walter Archer for online teaching (2000), and later developed by Garrison and Anderson (2005), called Community of Inquiry, is generally regarded as one of the most complete and integrated proposals, with regard to the teacher's role in this context



of teaching (Moreira and Almeida, 2011a, 2011b). The model is based on three basic dimensions: cognitive, social and teaching. The cognitive presence, according to Garrison and Anderson (2005), corresponds to what students can construct and confirm the meaning from a sustained reflection and critical discourse.

The social presence is the ability of members of a community to socially and emotionally project through the mean of communication in use. And the presence of teaching is also defined by the authors as the direction, design, facilitation of cognitive presence and social presence towards the achievement of significant learning outcomes (Garrison and Anderson, 2005). The existence of these elements and their interrelationships are crucial to the success of educational experiences. For Garrison and Anderson (2005), the model is based on a constructivist perspective of learning and the construction of individual knowledge is largely due to the social environment. That is, an environment that fosters a diversity of perspectives can promote research, criticism and creativity.

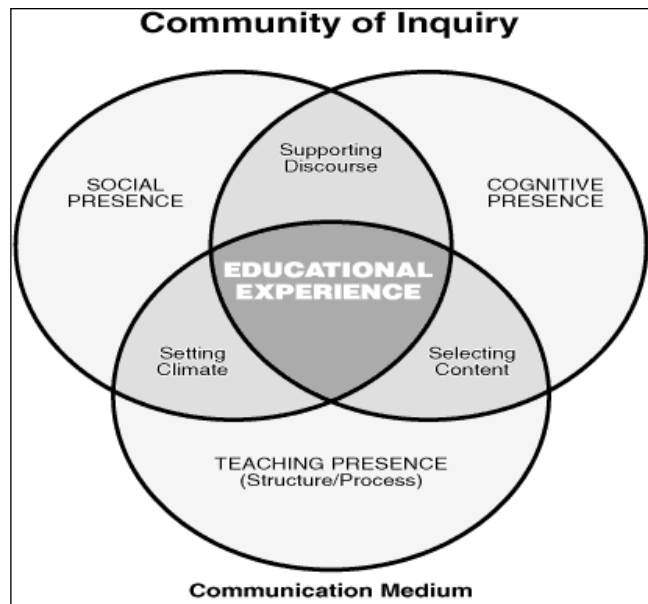


Figure 1. Community of Inquiry (Garrison and Anderson, 2005)

Finally, the model developed by Gilly Salmon (2000) named e-Moderating, is based on five levels or steps that guide the activities of the teacher-facilitator in working with students to achieve the construction of learning virtual communities. This is one of the more structured proposals for the development of learning communities, where the contribution of each student has its own meaning and the role of the teacher (e-moderator) is a basic structuring function. It is, in essence, a model that relies on the activity of the e-moderator and seeks the student's independence, in working with others in the group.

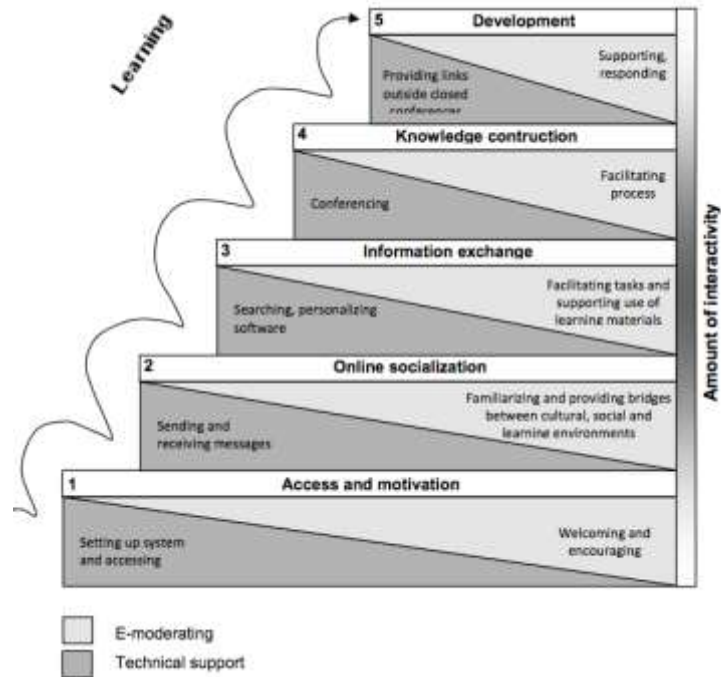


Figure 2. E-moderating (Salmon, 2000)

3. Results

At this point, we present some comparative data on final grades from the initial operation of the CU in 2007/08, in the face to face mode until the academic year of 2010/11 in terms of blended learning, which can serve as indicators for future reflections. We also present the values of all units of the first semester of the course to understand how these trends are converging or diverging results of the CU analysed.

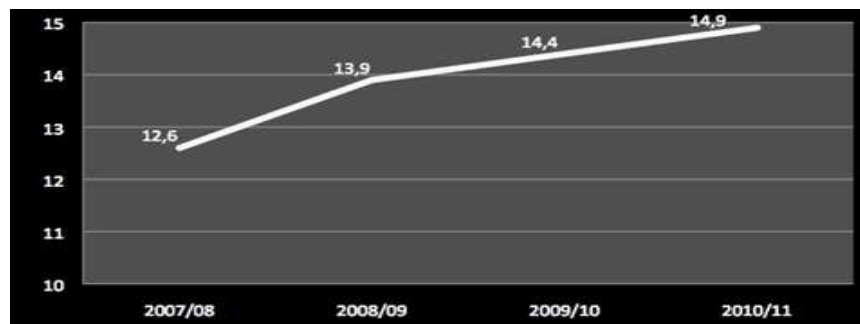


Figure 3. Mean ratings obtained at HCPPEs CU since 2007/08



Figure 3 presents the data for the 168 students enrolled in the Bachelor's Degree in Physical Education and Sport in the HCPPEs CU, since it first started, with a total of 25 students in 2007/08, 36 in 2008/09, 47 in 2009/10 and 36 in 2010/11. For these four school years, we used different combinations of type of education. In the first year, 2007/08, the CU was only taught in classroom environment, in 2008/09 a virtual environment was introduced, but only as a supplement to face to face sessions; the scenarios in 2009/10, face to face and virtual were balanced (50% online and 50% face to face), and in 2010/11 we used a b-learning methodology, in which the online environment focused non-attendance (75%).

For the analysis of Figure 3, we can see that there is a clear improvement of academic results since the beginning of the course in 2007/08, from 12.6 to 14.9 marks in 2010/11. We can also see that there seems to be a relationship between academic performance and the increase of the online component, as if we analyse data from different academic years, we conclude that, in all, there is a gradual increase as the online component grows.

Indeed, with the introduction of the virtual environment in 2008/09, only as a supplement to face to face sessions, we found that the average ranking rose from 12.6, a value that normally corresponds to a satisfactory level of quality to 13.9, a value already considered qualitatively as good. Note that this virtual environment this year, supported by the learning management system Moodle, was not limited to function as a repository of contents, but mainly as an extension of the physical classroom, to the extent that students were "guests" on the one hand, to carry out activities to consolidate knowledge, exploring resources provided by teaching staff, and secondly, to extend the discussion of contents in a virtual classroom, discussion forums, which worked in an asynchronous way, allowing the creation of a virtual community of learning and practice.

In the following year, 2009/10, we abandoned the model of the complementary virtual environment and we bet on the combination of two environments with a workload distributed evenly between the two scenarios. Given this distribution, we carried out reformulations in the TGS, creating activities and e-activities that would make the two environments, face to face and virtual, complementary. It was our intention, therefore, to integrate these two spaces, and the underlying pedagogical models (face to face and virtual) to make them subsidiaries and dependent on each other. The strategy seems to have been adequate, because the careful analysis of the evolution of the ratings shows us, again, an increase to an average of 14.4 marks. That is, comparing the average marks for 2007/08 (only face to face environment) and 2009/10 (combined environment), we have an increase of approximately 2.0 marks.

Finally, in 2010/11, we decided to take it a step further, focusing more on the online component (75% of contact time) and working on the model of research communities and e-moderation in a more systematic way, and the results did not alter the trend; however, we found, once again, an improvement of ratings to an approximate mark of 15.0, more precisely, 14.9, which corresponds to a 2.5 rise in marks since 2007/08, at the beginning of the CU-face environment.



Curriculum Units 1 st semester	School year 2007/08		School year 2008/09		School year 2009/10		School year 2010/11	
	Modality	Mean	Modality	Mean	Modality	Mean	Modality	Mean
HCPPEs	presential	12,56	b-learning	13,92	b-learning	14,39	b-learning	14,93
AG	presential	7,6	presential	10,9	b-learning	12,4	b-learning	11,2
PDELc	presential	9,1	presential	9,8	presential	13,1	presential	9,9
AP I	presential	9,4	presential	10,7	presential	12,5	presential	10,1
DESES	presential	13	presential	15,2	presential	13,8	b-learning	10,8
PPES I	presential	15,2	presential	15	presential	15,2	presential	14,6

Figure 4. Means of the first Semester Curricular Units of Physical Education and Sport Course

As noted above, we examined also the results of students in all units of the first semester, present in the syllabus of the course, and found some interesting data. Firstly, and according to the reading of Figure 4, we found that the results of courses taught in a face to face-only mode, such as Psychosociology Development: Epigenesis and Life Cycles, Anatomy and Physiology I and Practice of Physical Education and Sports I do not have a similar trend to that of HCPPEs CU. Except for the 2009-2010 academic year, in which the results are higher, other years have very similar averages.

Take the example of AP-I with 9.4, 10.7 and 10.1 marks, in 2007/08, 2008/09 and 2010/11, respectively. These results seem to suggest that it was not the intrinsic characteristics of the class that led to the growing trend of the results of the HCPPEs CU. Secondly, we found that the results of the Anthroposociology - General and Developmental Education and Structure of Educational System - which were taught in a blended learning mode are also distinct from the results of the HCPPEs CU. This is because both ratings were downgraded. For example, at DESES CU, the results dropped sharply, from 13.8 to 10.8 marks, in the year that the combined mode was introduced. Given these results, it becomes evident that the introduction of a form of b-learning, supported by a learning management system, in the educational process itself is also not synonymous with good academic results.

4. Conclusions

Among other aspects, this exercise confirms the national and international research already developed by other teachers and researchers in this area (Paiva et al., 2004; Jones, 2006; Jung and Suzuki, 2006; Owston et al., 2006, Moreira and Monteiro, 2010). However, we feel that is enough; and, that many procedures have to be improved so that this paradigm of teaching-learning approaches becomes the paradigm we want.

Comparing the data obtained in the evaluation of the CU in 2007/08, where the model adopted involved 100% face to face sessions in the following years, in various forms of blended learning, we think that the explanation for the results (final evaluations higher with the increase of online component) may lie not in



more intensive use of an LMS, but in the assumption of new roles for students in the CU, and we, as a teaching team, were taking these modalities, making use online pedagogical models, diverse strategies and motivating resources and also changing the very nature of the assessment.

Indeed, this process, which had the use of a capital element LMS, reshaped not only the role of students, allowing them to assume more the burden of their learning, but also our own role, as it sought to assume the duties of an (e)-moderator, of an (e)-facilitator, of an (e)-a counsellor or (e)-motivator, aiming to provide the "scaffolding" that supports student learning, accepting their autonomy and initiative, fostering discussions with the teaching team and among each other, motivating them to solving problems and to assume responsibilities. In turn, the evaluation we sought to implement in these online environments during these years was seen as a continuous and participatory process. We believe that the collaborative e-activities we promoted, where dialogue, debate and collective thought were a constant feature, brought about social, emotional and cognitive gains, the results of which were obvious in the final evaluation. Therefore, we consider that the improvement of academic performance is mainly a result of the adoption of a modality that combines the use of two learning environments – face to face and virtual- and the adoption of pedagogical models based on the development of skills and on student-centred learning.

So we conclude that these modalities in blended learning, supported by constructivist pedagogical and collaborative online models currently allow us to equate the teaching-learning process differently. However, the change should not be seen only from a technological standpoint, since the use of an LMS is no guarantee of success, as we have seen, but should mainly be seen in terms of change in mentality and practice.

This (new) reality implies a very significant cultural change, as it implies rethinking the roles of teacher and student, and the relationship between them, appropriate contents, in addition to the implications that must be implemented in terms of structuring and planning courses and curricula, evaluation systems and forms of teaching and learning.

It seems, therefore, that in the current framework of knowledge society and information, based on new technologies, which addresses the continuing challenges of a rapidly changing society, online education is becoming increasingly important and central, and is assumed as a credible alternative to merely teaching presence. Thus, combining the best of these two complementary pedagogical "worlds", of these learning environments, face to face and virtual, could be the major pedagogical challenges of this century.

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