



# Better e-Learning for Innovation in Education

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First Published 2017  
ISBN 978-605-82219-0-1

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**Better E-Learning for All** Strategic Partnership  
acting within the Erasmus Plus Programme





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Published by Şükrü Çetin İlin  
(Çukurova University, Adana, Turkey)

Layout production by Searchlighter Services Ltd  
Bristol, UK

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*Better E-Learning for All* Strategic Partnership  
acting within the Erasmus Plus Programme

First Published 2017

ISBN 978-605-82219-0-1

Printed in Turkey at Öz Karacan Printers and Binders,  
Güneşli, Bağcılar, Istanbul

The *Better E-Learning for All* Strategic Partnership project has been funded with support from the European Commission. The contents of this publication reflects the views only of the authors and editors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

# Innovation in B-learning: Feelings Experienced by the Students of the Masters in Educational Technology

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## **Introduction**

Throughout the civilizing process Information and Communication Technologies, in each historical period, have played an important role in triggering changes in several branches of society. Technologies redefine the way that mankind relates with the world in a particular manner, stimulating and instigating change at other levels of the sociocultural system (educational, communicational, economic, political, social, religious, cultural, etc.), having a strong slant to innovation. At the educational level, we believe the changes have had effects in the development of educational contexts, in a process that evolved from home to school environments and reached the communities of ubiquitous learning, which tend to define the paradigm of Society of Information in the time of mobility and ubiquity that we are living. This is the context in which we talk about ecology of communication and education (Silva, 2008), fostered by the innovations triggered by ITC's development.

With the development of digital technologies, either computer or internet's evolution, particularly its World Wide Web system (known by its acronym WWW or simply Web<sup>1</sup>), innovation operated in education are the origin of the e-Learning concept, which according to the definition suggested by European E-Learning Project (2004-2006), is perceived as “the usage of new multimedia technologies and internet to improve learning quality, by making the access to resources, services, as well as interchange programs and distance collaboration easier” (EC, 2003, p. 3). This way, in some educational institutions during the mid-‘noughties’, the usage of e-Learning started to intensify, especially the development of courses where on-site and distance (online) learning modalities started to coexist, to which the term ‘b-Learning’ (Blended Learning) was associated to define this hybrid feature. The same has happened to the Masters in Educational Sciences, a field of specialisation of Educational Technology (MCE-TE), created in 1991-1992, which started to use b-Learning in 2009-2010.

The goal of this text is to approach educational innovation carried out on the Masters of Educational Technology, with its transition to b-Learning, showing results of an investigation that aimed to verify the intensity and frequency of positive and negative sensations experienced by the students attending to courses using this educational modality.

The text has four sections. In the first one, there is a description about the educational innovation brought to the Masters’ with the transition to b-Learning, focusing on the induced sense of disruptive innovation; in the second one, there is an explanation on our understanding of *feeling* as an integrating element of affectivity according to Wallon’s Psychogenetic Theory; the third one is about methodological

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<sup>1</sup> Created in 1989 by the English researcher Tim Berners Lee, where he was no older than 28, Web is now the 4th generation (Web 4.0), a Ubiquitous Web. This evolution was foreseen by its creator: “In the future [...] much of the information that we receive today through a specialised application such as a database or a spreadsheet will come directly from the Web. Pervasive and ubiquitous\* web applications hold much opportunity for innovation and social enrichment” (Berners Lee, 2007, p. 7) (\*emphasis added).

procedures of investigation and lastly, in the fourth section, there is an analysis and comments on the results. The text ends with some considerations fostered by the process of investigation itself.

## **1. Innovating in Education with b-Learning in the Masters of Educational Technology**

The specialisation field of Educational Technology (TE), which belongs to the Masters of Educational Science (MCE), kicked in during the academic year of 1991-1992, focusing more in making efforts to consolidate the studies on ITC in Education. This would then be developed in the University of Minho (UMinho), 17 years after its creation in 1974 (Silva and Osório, 2009, p. 14). Several punctual initiatives to use Internet and e-Learning methods in the academic activities have taken place since the end of the 90s (Gomes, Silva and Dias, 1999; Silva, Gomes, Oliveira & Blanco, 2003). These have been anchored by the creation of University of Minho's Virtual Campus in 2003 in the scope of an idea of "Fenceless University", together with the launching of an e-Learning platform (Blackboard) in the year of 2007-2008. Following these initiatives, Educational Technologies Workgroup at UMinho restructured the Masters' programme in 2008, implementing the b-Learning<sup>2</sup> method, which would be used first in the academic year 2009-2010.

The experiences of using the internet had revealed that students preferred the convergence of its modalities of teaching and learning:

*Between "presence" and "distance", what may be concluded is that students would like to benefit from the advantages that each modality offers regarding academic activities: the flexibility of the space-time dimension of the Web should complement the emotional richness of the face-to-face encounter. This statement confirms the observable trend of convergence between the two modalities of teaching*

Silva et al., 2003, p. 7

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<sup>2</sup> Blended learning: teaching-learning process where there is the convergence of two modalities: in-person and online. Part of the courses occur in-person (in the university/school) and another part occurs online (at home or somewhere else, as long as there a computer with Internet access).

The Masters has a duration of two years. The first one is highly focused on its curricular component (eight curricular units being taught) and the second one is dedicated to the dissertation (investigation). The first year sums up two semesters with four curricular units each, which means 30 hours of contact with teachers spread out in 15 weeks. In b-Learning, to avoid the lack of orientation that could occur because of its online nature, a modular structure was preferred, where two curricular units are taught in each seven-week module. In the first week there is a time of familiarisation with the e-Learning platform, presentation of targets, methodology and form of evaluation of each unit. Interactions, control, students' autonomy in the learning process, as well as the social presence of the learning community's members, are particularly important during online learning (Garrison, Anderson and Archer, 2000). Therefore, the online method is accompanied by several structured activities, involving weekly sessions of both synchronous communication (videoconference and chat) and asynchronous communication (forums and mail). The curricular unit's teacher enacts the mediation. In the moment of designing the Masters' curricular plan, there was a concern to integrate the Standards and Guidelines for the Quality Assurance of Higher Education (Ubachs and Konings, 2016)<sup>3</sup>, such as; flexibility (time, place, rhythm); Development of Academic Community (teacher-student; student-student; other professionals; participation in investigation); self-study materials; customised support (proximity guidance); Knowledge and competence of teachers (and students) in using digital technologies, both in the information/communication aspects and in the pedagogical ones; safe, reliable and friendly Virtual Learning Environment (using synchronous videoconference, since it provides a more close virtual presence and more similar to in-person); and the use of online evaluation processes.

The implementation of the b-Learning method in the Masters brought about changes and new challenges for teachers and students. It

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<sup>3</sup> This book's first edition dates back to 2007 and it was the one that took part in the design of the courses using b-Learning method; the edition hereby referred to is the 3rd one, which dates from 2016.

produced a deep pedagogical innovation that implied quality changes in pedagogical practices, including a critical movement towards the existing practices. This innovation also tried to respond to Digital Society's challenges, which were already in an advanced stage for the changes occurred in the Web, the so-called Web 2.0, through the development of a broad set of programs (like Blogger, Wikipedia, Moodle, Delicious, Facebook, Flickr, among others) which allowed a bigger social networking between Internet's users and, therefore, a deepening of Network Society (Castells, 2010). In the 2010 edition's preface to "The Rise of the Network Society", the author approaches this change in communication in a clear manner:

*Because the revolution in communication technologies has intensified in recent years, and because conscious communication is the distinctive feature of humans, it is logical that it is in this realm where society has been most profoundly modified.*

Castells, 2010, p. xxiv

Thus, and regarding the subject of innovating in context of change triggered by technologies, the position held by Clayton Christensen in his book named *The Innovator's Dilemma* were crucial (Christensen, 1997). The author refers that innovations generally appear in one of two forms: incremental or disruptive. Incremental innovation (also known as sustaining) develops upon existing products, processes, organisations or social systems. It may correspond to daily improvement or radical discoveries, but it is always focused in the essence of the existing. In turn, disruptive innovation is directed to people who do not possess any other solutions, happening mostly in low-demanding contexts and in exploratory frameworks. In the beginning, it has no competition (since there are no other solutions). Nevertheless, they may grow stronger in non-competitive environments, evolve very quickly and end up replacing traditional solutions. Some years later, the author, together with some associates, directed his analysis to educational innovation in a book about the disrupting class (Christensen, Horn and Johnson, 2008), in which they approach the emergence of new ways of carrying out education. One of



these forms is Blended Learning (b-Learning), widely disseminated in a book published in 2014 (Horn and Staker, 2014).

These two kinds of innovations, particularly the disruptive ones for the radical transformation associated to them, are strongly influenced by innovations in technologies in general and in Digital Technologies in particular. As we know, if in each historical period, each technology had a meaningful role in the redefinition of mankind's connection to the world and stimulated changes at other levels of the sociocultural system (Silva, 2008), then in current times, which are characterised by the Network Digital Society, the effects of digital technologies' evolution are vast and strongly disruptive in several fields, among which is the educational system. Therefore, we are aware that in the academic year 2009–2010 (in which the first edition of b-Learning Masters took place) innovation was of disruptive kind due to the depth of such change and to the challenges presented to teachers and students. However, with the evaluations that followed (Machado, 2011; Conceição, 2011), the procedures were upgraded in the two first editions, so the new learning environment became gradually more natural to the concerned members. Therefore, we believe that innovation's disruptive and sustaining facets are not exclusive, but rather complement each other: they may start by a disruptive process but the adaptations that follow turn them into ones that sustain in later stages. Besides, the cited authors state that the release of the book *Disruptive Class* originated the misinterpretation of the authors' ideas, because it is not accurate to label disruptive innovations as “good” and sustaining ones as “bad”:

*Since the publication of Disrupting Class, a common misreading of the theory of disruptive innovation has been that disruptive innovations are good and sustaining innovations are bad. This is false. Sustaining innovations are vital to a healthy and robust sector, as organizations strive to make better products or deliver better services to their best customers. The forces that propel well-managed organizations upmarket are always at work, and organizations rightly depend on them to get ahead of the crowd.*

*The distinction between the two types of innovation is not important, therefore, because it separates the good from the bad. Rather, it offers several other insights. It provides a framework for anticipating the direction in which the education sector will move over*

*the long term because education models that successfully follow a disruptive strategy are on a path eventually to replace incumbent models.*

Christensen, Horn and Staker, 2013, p. 12

Meanwhile, the development of ITC, more precisely of continuous connection technologies enhancing connectivity, mobility and ubiquity, allow us to think about new scenarios of disruptive innovation through the introduction of ubiquitous learning (U-learning). In this sense, in the academic year of 2011–13, we experimented by holding the Masters' in two locations: the Institute of Education (IE) of UMinho (Braga) and in the Casa do Conhecimento (CdC) of Paredes de Coura, 70km away from Braga. This way, we arranged a situation where two remotely located places could *be together* in learning, in spite of the distance between them. A similar scenario was designed to the 2013-2015's edition, having the Masters held in two locations, this time with a much bigger distance factor: one in the IE of UMinho (Braga, Portugal) and another in the Universidade Aberta of Brazil, in the municipality of São Francisco de Paula, in the state of Rio Grande do Sul (Brazil).

The authors made a reference above to studies that revealed crucial data for the refinement of the b-Learning model. Some of these studies were realised in the scope of Masters Dissertations and Doctor's Theses. The first edition was part of a project in a Masters Dissertation (Machado, 2011) and the studies show clearly how challenging the change into b-Learning was to teacher and students in what comes to its working method (online and in-person relation), to its modular structure and to the need for better knowledge and skill to use technologies, among other factors. Although, the conclusions by the author are quite positive in general, as follows:

*To most students, the fact that the courses were offered in b-Learning modality contributed to their registration in it. On the other hand, by the end of the courses, all students acknowledged that, using this new feature has helped them conciliate attendance with their personal or professional activities (...).*

*This study reveals that the functioning of the Masters MCE-TE in b-Learning is appropriate to the affected students. This supports the upkeep of this modality and inspires its extension to other graduation courses in the UM*

Machado, 2011, p.145 and p. 150

The Masters attracted interest at an international level (Brazil), where it was an object of investigation of a Doctoral Thesis that was being developed in the Faculty of Education in the University of São Paulo, Brazil (Conceição, 2011). The study focused on students of the second edition (2010-2011), observing class dynamics, especially the interactive dimension in the pedagogical relation provided by b-Learning's hybridism. It was cleared up that, for the "in-person component", students value the teachers' "attitude" a lot more, followed by the "affectivity", whereas online the valorisation goes chiefly to the "interaction/interactivity", because it allows "sharing/exchanging information", advantages in terms of "Space (Flexibility – one can be at home)", "Flexible Schedule" and "Comfort in communicating at any time / Rapidness of contact" (Conceição, 2011, p. 194).

The functioning of U-learning's modality was also subject to evaluation through surveys among students, from which the answers of the students attending the classes in São Francisco de Paula (Silva and Falavigna, 2016) were particularly taken into account. From the several aspects considered (the methodical and modular organisation; the materials made available on the e-Learning platform; the role of teachers to maintain motivation in high levels; the logistic conditions of virtual and in-person meetings; the usability of the e-Learning platform and interaction interfaces, like "vc – videoconference" for allowing interaction with image, sound and data), the idea that stood out was one from a student, which read "*the impression of being altogether in spite of geographical distance*", where there was "*sharing of knowledge between groups (Portugal/Brazil)*" and "*contact with classmates and teachers with new means to work and collaborate*" (Idem, p. 31).

In this Masters, and in this group in particular, very high rates of success were registered by the conclusion of Masters Dissertations: 92%,

given that 11 out of the 12 students who started the Dissertation have concluded it successfully. As stated by a student, the realisation and conclusion of this Masters represented the achievement of the “*complete fulfilment of a dream*”, since “*such important courses are rare in our region*” (idem, p. 35). *Fulfilled Dreams* is the main title of a book that encloses a review of the eleven Masters Dissertations (Silva and Falavigna, 2017).

The development of this Masters allows one to conclude that it is possible to design innovating scenarios to education in Digital Society, while this is strongly characterised by the change of time-space relation. We live nowadays, conditioned by ITC’s development, in “hybrid spaces” (Santaella, 2013), in deep complementarity between space of places (where the people live) and space of flows (of information), as remarked by Castells (2010, p. 453). For this reason, given the capacity of current technologies to simultaneously access and share information and interactions between different places, the ubiquitous learning began to make part of contemporaneous educational ecology. Thereby, according to the positive results assessed by completed studies, namely in the edition that used not only b-Learning but also u-Learning, the students of the current edition (year 2016-2017) are living in Portugal (several locations), in Brazil (in locations that are particularly widely dispersed), in the North – in Fortaleza, Belém and Manaus, and in the South – in Nova Hamburgo, in Angola and in Mozambique. To a certain extent, we experience in this Masters what Linda Harrasim and her collaborators foresaw in a 1995 book as being the new future classroom due to the impact of technologies:

*Imagine learning with peers, expertise, and resources that are available whenever you want or need them. These “classmates” are from Moscow and Mexico City, New York and Hong Kong, Vancouver and Sydney – from urban centers and rural and remotes areas. And they, like you, never need to leave home. You are all learning together not in a place in the ordinary sense but in a shared space, a “cyberspace”, using network systems that connect people all over the globe. Your learning network “classroom” is anywhere that you have a personal computer, a modem, and a telephone line, satellite dish, or radio link. Dialing into the network turns your computer screen into a window on the world of learning*

Harasim, Hiltz, Teles and Turoff, 1995, p. 3

Citing these authors, the students of the Masters of Educational Technology's 2016-2017 edition are from Portugal (Braga, Porto, Barcelos, Esposende), from Brazil (Fortaleza, Belém, Manaus and Nova Hamburgo), from Angola (Benguela) and from Mozambique (Beira): their common classroom is in 'cyberspace', in a virtual location, using the online e-Learning platform (Blackboard) and its incorporated system of videoconference.

To the cited studies, one more can be added, which will be the main subject of this text. Recently, the Masters raised the interest of the "Program of Post-Grade Studies in Education: Psychology of Education", of the Catholic Pontifical University of São Paulo (Brazil) for an internship of a PhD degree of a student who is currently developing a thesis on the issue of "Affectivity in Distance Higher Education: possibilities and limitations". The internship was held between September 2015 and September 2016; the study focused on the students that attended the Masters in Educational Technology in its four latter editions (from 2011 to 2015), given that there has been an intensification of the online processes since then, with the adoption of ubiquitous learning, where the students come from anywhere. Thereby, in this text, we will analyse and discuss the results of an investigation that aimed to verify the intensity and the frequency of positive and negative feelings experienced by students of the Masters in Educational Science – Educational Technology.

Before approaching the methodological procedures of investigation, it is necessary to explain how we perceive feeling as an integrating element of affectivity according to Wallon's Psychogenetic Theory (Wallon, 2005).

## **2. Concept of Feeling**

Wallon's Psychogenetic Theory perceives affectivity as the movement from which the human being is affected through the intimate and the external world, experiencing pleasant and unpleasant sensations, passing through wellness and discomfort while being affected by the surroundings.

As a supporter of the dialectic method, the author defended that such perception could only happen when taking into account the functional units that compose the human psyche, which are: motor capacities, cognition, affectivity and the person, knowing that the first three act in an combined way in the constitution and evolution of the person in its innumerable possibilities (Wallon, 2005; Mahoney and Almeida, 2005).

In this study, disregarding neither the role of cognitive and motive functions, nor the fact that they all act in chain, the focus lies on the field of affectivity. Being indispensable to the success of teaching and learning processes under any conditions and circumstances, the role of affectivity gains a new perspective when it handles Online Education. Nörnberg (2011), while emphasising the potentialities of Distance Education as a booster of education's democratisation, points out the importance of building a pedagogic architecture which allows its full usage, highlighting that the issue of affectivity in virtual environments' interactions is a crucial aspect to be considered. To the author, affectivity is the "visceral link between the permanency or not of the individuals in the virtual learning environment" (idem, p. 13). Leite (2012) also emphasises that practices of pedagogic mediation are pronouncedly affective, bearing in mind that the teacher is the main mediator between the student (the subject of the learning process) and the school contents (the object of the learning process). The established relations between subject, object and mediator are never neutral because they go beyond "cognitive/intellectual domains", causing effects "of basically affective nature" (idem p. 362) in the counterparts, "that may vary between strong movements of convergence or divergence, i.e., relations of love or hate in its extremes" (idem, p. 362).

The affected domain encloses a set of psychological phenomena that appear as emotions, feelings and passions, which stem from organic and social factors, configured in a different way. In emotion, physiological activation predominates in feeling predominance is in representational activation while in passion it is in self-control (Wallon, 2005). In other words, emotion corresponds to "exteriorisation" of affectivity by means of

its body and motive expression, feeling corresponds to representational expression of affectivity and passion to the self-control mechanism that “silences” emotion (Mahoney and Almeida, 2005; Dér, 2004).

Both emotions and feelings come together with impressions of pain or pleasure, pleasantness or unpleasantness, joy or sadness (Codo and Gozzotti, 2006), which means, positive or negative sensations. Meanwhile, feelings differ from emotions for appearing in a less intense manner, but lasting longer and for coming together with intense organic manifestations, not necessarily originating visible body changes (Amaral, 2007; Galvão, 2014). While emotions may appear overwhelming, feelings may be expressed by means of verbal and non-verbal languages, in an explicit or in a silent manner, not inducing immediate reactions like the ones that may be observed in emotions (Mahoney and Almeida, 2005).

Thus feeling (as the representational element of affectivity) ends up appearing more accessible to investigations that seek out how their participants perceive a certain situation, as is the case of the presented investigation.

### **3. Methodological procedures**

This investigation aimed to verify the intensity and frequency of positive and negative sensations experienced by the students of the Masters’ in Educational Science’s specialisation in Educational Technology, in the Institute of Education of the University of Minho. 49 students from different levels of the Masters’ were invited to take part in the investigation (beginning, reaching the middle, and finishing the Dissertation). The invitations were carried out by electronic mail, three times in fifteen days, according to the advocated processes of assessing data online (Pinheiro and Silva, 2004). In the inviting note, besides a small explanation summing up the aim of the investigation, the students received a *link* through which they could access a self-filling questionnaire online, worked out in the Google Forms tool. Before seeing the survey’s questions, students had to agree with an Informed Consent statement. 26 students accepted the invitation to participate in the investigation, which

corresponds to a return rate of 53%, significantly above of the usual in social science investigations (Pineiro e Silva, 2004).

The first set of questions is made up of variables independent from the study: gender, age, civil status, nationality, graduation, role, if they have or have not taught using distance learning methods, if they have previous experience taking courses that used the b-Learning method before. In the second set, students had a list of 40 feelings (20 of positive sensations and 20 of negative), being asked to state how intensely they felt each of them in a rising scale from 1 to 10, where 1 corresponded to “I don’t feel it at all” and 10 to “I feel it with extreme intensity”. The third set comprises the same list of feelings as the previous set, but in this one students had to state how often they felt each sensation, ‘1’ being equal to “never” and ‘10’ representing “very often”.

To elect the feelings that would make up the list used in the second and third set of questions of the survey, analysis took place on 60 Dissertations and 10 Theses that were defended in the Catholic Pontifical University of São Paulo between 2005 and 2015 about the emotions and feelings involved in several different teaching and learning processes. The feelings that appeared recurrently in the analysed works were included.

The assessment of data was carried out entirely remotely, since the participants answered to the survey accessing the following link:

<http://goo.gl/forms/AiZjJVhDp7>

Their answers were automatically entered in an Excel sheet, which is a feature of the Google Forms tool. Later on, the data were transferred to *Statistical Package for Social Sciences* Software (SPSS), which is the software used for data treatment, described in the next topic.

#### **4. Analysis and comments on the results**

According to the survey’s first set of questions, there was a descriptive analysis of personal, academic and professional information on the participants of this investigation, as well as its previous experience in taking courses that used the b-Learning method.



As it may be observed in Table 1, there is a light predominance of women (58%). The whole sample consisted of adults, where most are 36 years and older (73%) and most are married or have some sort of stable union (65%). The majority are Brazilians (69%), which is probably explained by the fact that the course in Brazil is offered in the b-Learning mode. It is also significant that out of the group of 49 students who were invited to take part in the investigation, Brazilians took up a bigger share, with 31 Brazilians (63%) and 18 Portuguese (37%). The majority had a graduate-level education. 9 out of 20 participants who have the role of teachers have already taught in distance learning courses and 54% of the participants are students who have experienced taking courses that used the b-Learning method before.

To continue the data description analysis, the averages of the values given to each feeling both in the intensity and in the frequency assessments were calculated. Following that, feelings were divided into two categories, according to their positive or negative nature and the averages were calculated over again generally for each category, in order to attain overall results of intensity and frequency for positive sensations and for negative ones. These results may be found in Tables 2 and 3.

*Innovation in B-learning: Feelings Experienced by the Students of the Masters in Educational Technology*

**Table 1 – Personal, academic and professional info about the participants**

|  |                   | <b>N</b> | <b>%</b> |
|--|-------------------|----------|----------|
| Gender   | Feminine          | 15       | 58%      |
|  | Masculine         | 11       | 42%      |
| Age range  | 20 to 25          | 3        | 12%      |
|  | 31 to 35          | 4        | 15%      |
|  | 36 to 40          | 9        | 35%      |
|  | Over 40           | 10       | 39%      |
| Civil status   | Single            | 6        | 23%      |
|  | Married           | 14       | 54%      |
|  | Stable union      | 3        | 12%      |
|  | Divorced          | 3        | 12%      |
| Nationality  | Brazilian         | 18       | 69%      |
|  | Portuguese        | 8        | 31%      |
| Graduation   | Educational Field | 20       | 77%      |
|  | Other Fields      | 6        | 23%      |
| Role   | Teacher           | 20       | 77%      |
|  | Other role        | 6        | 23%      |
| Has taught using distance learning methods               | Yes               | 9        | 35%      |
|  | No                | 11       | 35%      |
|  | Not applicable    | 6        | 31%      |
| Has taken courses that used the b-Learning method before | Yes               | 14       | 54%      |
|  | No                | 12       | 46%      |

**Table 2 – Simple average of intensity and frequency with which participants said to experience positive sensations**

| <i>Positive sensations</i>     | <i>Intensity</i> |                    | <i>Frequency</i> |                    |
|--------------------------------|------------------|--------------------|------------------|--------------------|
|                                | Average          | Standard deviation | Average          | Standard deviation |
| 1. Joy                         | 7.3              | 2.0                | 7.8              | 2.0                |
| 2. Relief                      | 5.9              | 2.4                | 6.3              | 2.1                |
| 3. Excitement                  | 7.0              | 2.0                | 7.3              | 2.0                |
| 4. Self-fulfilment             | 8.0              | 2.1                | 7.5              | 2.0                |
| 5. Self-confidence             | 7.5              | 2.1                | 7.5              | 1.8                |
| 6. Calm                        | 6.3              | 2.1                | 7.2              | 1.6                |
| 7. Disposition                 | 7.4              | 2.0                | 6.8              | 1.9                |
| 8. Delight                     | 7.0              | 2.5                | 7.1              | 2.4                |
| 9. Enthusiasm                  | 7.7              | 2.2                | 7.4              | 2.1                |
| 10. Hope                       | 7.6              | 2.0                | 7.6              | 2.1                |
| 11. Happiness                  | 8.0              | 1.8                | 7.8              | 2.0                |
| 12. Gratitude                  | 6.3              | 2.6                | 6.7              | 2.7                |
| 13. Motivation                 | 7.8              | 2.0                | 7.6              | 2.3                |
| 14. Pride                      | 7.7              | 2.1                | 7.3              | 2.5                |
| 15. Optimism                   | 8.0              | 1.9                | 7.9              | 1.8                |
| 16. Persistence                | 8.2              | 1.8                | 8.1              | 1.9                |
| 17. Satisfaction               | 7.9              | 2.0                | 7.6              | 2.2                |
| 18. Security                   | 7.1              | 2.3                | 6.8              | 2.1                |
| 19. Serenity                   | 6.8              | 2.1                | 7.1              | 2.2                |
| 20. Tranquility                | 7.1              | 1.7                | 6.9              | 1.9                |
| <b>Average of the averages</b> | <b>7.3</b>       | <b>-</b>           | <b>7.3</b>       | <b>-</b>           |

**Table 3 – Simple average of intensity and frequency with which participants said to experience negative sensations**

| <i>Negative sensations</i>     | <i>Intensity</i> |                    | <i>Frequency</i> |                    |
|--------------------------------|------------------|--------------------|------------------|--------------------|
|                                | Average          | Standard deviation | Average          | Standard deviation |
| 1. Boredom                     | 3.7              | 2.2                | 2.7              | 2.1                |
| 2. Anxiety                     | 6.5              | 2.4                | 5.0              | 2.7                |
| 3. Apathy                      | 3.4              | 2.4                | 3.1              | 2.3                |
| 4. Unease                      | 5.8              | 2.7                | 4.3              | 2.1                |
| 5. Discouragement              | 3.6              | 2.7                | 2.8              | 1.7                |
| 6. Frustration                 | 3.4              | 2.2                | 3.1              | 2.3                |
| 7. Impatience                  | 3.5              | 2.2                | 3.6              | 2.3                |
| 8. Impotence                   | 3.7              | 2.4                | 3.3              | 2.5                |
| 9. Concern                     | 4.7              | 2.1                | 4.1              | 2.5                |
| 10. Insecurity                 | 4.2              | 1.9                | 4.5              | 2.5                |
| 11. Dissatisfaction            | 3.2              | 2.0                | 3.1              | 2.3                |
| 12. Annoyance                  | 3.2              | 2.4                | 2.8              | 2.3                |
| 13. Fear                       | 3.4              | 2.4                | 3.2              | 2.1                |
| 14. Worry                      | 6.3              | 2.3                | 5.7              | 2.4                |
| 15. Rage                       | 2.7              | 2.1                | 2.3              | 1.6                |
| 16. Resentment                 | 2.3              | 1.9                | 2.4              | 2.1                |
| 17. Insurgency                 | 2.1              | 1.5                | 2.1              | 2.2                |
| 18. Loneliness                 | 4.7              | 3.2                | 3.0              | 2.4                |
| 19. Tension                    | 4.5              | 2.4                | 4.3              | 2.5                |
| 20. Sadness                    | 2.3              | 1.8                | 2.2              | 1.6                |
| <b>Average of the averages</b> | <b>3.9</b>       | <b>-</b>           | <b>3.4</b>       | <b>-</b>           |

Considering that, on a scale from 1 to 10, the highest represent feelings experienced most intensely and most often, a primordial interpretation of the averages of positive sensations (Table 2) and negative sensations (Table 3), as well as general averages of each category, show that students have been experiencing positive ones more often and more intensely. The average value given by the students is 7.3 both in intensity and in frequency in what comes to positive sensations, whereas negative values are 3.9 for intensity and 3.4 for frequency.

Tassoni & Leite (2013) state that in the middle of the classes there is a constant exchange of feelings of different natures and nuances, which affect both teachers and students: joy, sadness, anxiety, confidence, insecurity, shame, enthusiasm, pride, dissatisfaction, indifference, regard, etc. How much such feelings will change into more positive or negative levels depends, not just but considerably, on teaching methods. Given this, the fact that positive sensations identified the highest averages suggest the existence of good condition at this level, according to the perception of the students who took part in this investigation.

When feelings are regarded separately, we may find higher averages among positive feelings for self-fulfilment (8.0 and 7.5), happiness (8.0 and 7.8), optimism (8.0 and 7.9) and persistence (8.2 and 8.1). These results are promising, bearing in mind that they comprise important feelings for the commitment of the students to the course. Specifically, persistence is a crucial variable to mitigate dropout, one of the biggest problems in distance education<sup>4</sup>. For negative feelings, higher averages can be seen for anxiety (6.5 and 5.0) and worry (6.3 and 5.7). Although anxiety and worry are common feelings among post-graduating students, these are still a focal point that educational institutions can monitor better.

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<sup>4</sup> In Europe, dropout rates vary from 20% to 30%, whereas in Asian countries they may reach 50% (Xenos, Pierrakeas and Pintelas, 2002; Shin and Kim, 1999). In Brazil, when compared to in-person courses, the dropout is reported to be about 10-20% higher in students that attend courses using distance learning methods. (Santos and Oliveira Neto, 2009)

Faro (2013) mapped eight worries, in a study that aimed to identify the main causes of stress among 2,157 post-graduating Brazilians (including Masters' and Doctoral): high levels of self-charging related to performance; interference of studies' demand in others aspects of life; fear of not reaching the expected performance of evaluation agents; financial issues due to the fact of studying in part-time or full-time; time to finish their theses or dissertations; schedules and deadlines of the academic activities; and eventual deception by the time of employability after concluding the studies.

In the belief that it is important to verify eventual significant differences between averages of sensations and some personal features of the participants in the survey, these also had to undertake the Levene Test for variance equality and the T-Student Test for the average equality. The averages of sensations in intensity and frequency were considered dependent variables. As independent variables, gender, nationality, having or not having had previous experience as a teacher in distance learning courses and having or not having had previous experience as a student in courses that used b-Learning methods were considered. In all tests the level of significance was considered to be under 0.05 (5% of possibility of the shown differences having been influenced by other factors than the independent variables that were surveyed).

Through the Levene Test, the homogeneity of variances was checked for the application of sensations where variances in both groups showed a differential significance under 0.05. In this case, one could see the values that would be calculated in T-Student Test of equally non-assumed variances considered. In gender, nationality and experience as a distance learning teacher variables, sensations have not reached the level of significance under 0.05 in the Levene Test: that is, no significant differences were reported between groups of men/women, Brazilians/Portuguese and teachers who have/have not taught in distance learning. Given this, the result of T-Student Test for these variances were disregarded, because they were assumed as homogenous. To the variable "previous experience as a student in a course that used the b-Learning

method”, significant differences were observed in Levene Test; in the T-Student Test, the differences happened most to the following sensations: concern in the intensity value, impotence and worry in the frequency values. In Table 4, it is possible to observe the averages of sensations and the result of Leven Test and T-Student Test, both indicating significance under 0.05.

The results that appear in Table 4 allow two conclusions: (1) the significant differences between averages, both in intensity and in frequency, occur in negative sensations; (2) the highest averages in intensity of concern and in frequency of impotence and worry are seen among the students whose first experience in b-Learning occurred in the Masters of Educational Science – Educational Technology.

Although the limited number of participants does not allow generalisations, such results give hints on the importance of experience and the consequent familiarisation with b-Learning practices and resources for decreasing the intensity and the frequency of those three negative sensations in the students: concern, impotence and worry. It is common that new events instigate such feelings, which very often are related to another more complex one, anxiety, which has its own manifestations and the presence of concern, diffused worries and insecurity towards unknown situations, with which the individual feels impotent (Lafortune and Saint-Pierre, 2001). Given this, it should also be noticed that anxiety obtained the highest average in intensity and the second highest in frequency, among negative sensations (see Table 3).

The human being tends to have the feeling of impotence raised in intensity and/or frequency inversely to the possession of knowledge to enable reaction to a certain situation or event. As an example, we would feel unable to support someone who was doing badly right in front of us inversely to the knowledge we had about the main first-aid techniques. That is, in ordinary conditions, in the absence of anxiety-generating events *per se*, such unpleasant feelings tend to decrease gradually in frequency and intensity, as long as individuals familiarise with previously unknown situations. Given this, pedagogic strategies that aim to

“demystify” the “mysteries” of the tools and specificities of courses using b-Learning methods (online component) may collaborate in the decreasing of intensity and frequency of such uncomfortable sensations. Equally important is the investment in actions that favour the creation and the maintenance of positive sensations that benefit learning processes.

Remember Nörnberg’s already mentioned opinion (2011), considering affectivity as the “visceral link between the permanency or not of the individuals in the virtual learning environment” (idem, p. 13). Almeida (2003, p. 79) also points out that, more than “providing pertinent info in an organised manner and in the right moment”, it is indispensable to “create an environment that benefits the substantial learning for the student”. Such work can only be achieved by establishing relationships that favour the collaborative construction of knowledge.

**Table 4 – Levene Test and T-Student Test to the answers of the question: Besides the Masters in Educational Technology, have you ever before taken part in a courses that used the b-Learning method?**

| Intensity |        |    |         |                    |                                   |              |                                     |    |              |
|-----------|--------|----|---------|--------------------|-----------------------------------|--------------|-------------------------------------|----|--------------|
| Feeling   | Answer | N  | Average | Standard deviation | Levene Test for variance equality |              | T-Student Test for average equality |    |              |
|           |        |    |         |                    | Z                                 | Sig.         | T                                   | Df | Sig.         |
| Concern   | Yes    | 14 | 3.93    | 1.86               | 19.692                            | <b>.000</b>  | -2.683                              | 16 | <b>0.022</b> |
|           | No     | 12 | 5.58    | 2.02               |                                   |              |                                     |    |              |
| Frequency |        |    |         |                    |                                   |              |                                     |    |              |
| Impotence | Yes    | 14 | 2.36    | 1.34               | 7.235                             | <b>0.013</b> | -2.284                              | 24 | <b>0.048</b> |
|           | No     | 12 | 4.42    | 3.06               |                                   |              |                                     |    |              |
| Worry     | Yes    | 14 | 4.71    | 1.59               | 10.071                            | <b>0.004</b> | -2.384                              | 24 | <b>0.035</b> |
|           | No     | 12 | 6.75    | 2.70               |                                   |              |                                     |    |              |



## Concluding remarks

The descriptive analysis of data allowed to conclude that, for students who took part in investigation and for those who attend a course that uses the b-Learning method, the averages of positive sensations are significantly higher than those of negative sensations related to intensity and frequency factors.

The highest averages reported positive sensations were in self-fulfilment, happiness, optimism and persistence, considered important to the commitment of the students to the course. These results show a favourable attitude from students towards educational innovation currently being used in the Masters (b-Learning and u-learning).

For negative sensations, the most remarkable ones are anxiety, worry, concern and impotence. Anxiety and worry had the highest averages among this category. Worry, concern and impotence had their averages significantly higher among students whose first experience in b-Learning was in the Masters in Educational Technology.

We believe these results will turn out to be very useful in warning those responsible for pedagogical coordination of the Masters' to the particularities of b-Learning, in the sense of refining the processes that educational innovation always provokes, especially when it has a disruptive nature towards traditional pedagogical practices. For example, when one notices that *anxiety*, *concern*, *worry* and *impotence* have the potential to decrease in intensity and frequency, as long as students become more familiar with the b-Learning tools and the specificities of the graduation, a possibility to minimise such feelings can be the realisation of small introductory modules of capacitation before the first curricular units of the Masters', aiming mainly for the inexperienced students in such methods.

One cannot overlook the fact that online pedagogic relations include technical and human dimensions, where the first ones are important but not sufficient to guarantee learning's success, given that, along with technology, pedagogic strategies focused on communicating and educating in our time are indispensable. In this way, without understating the importance of the studies that have been focusing on the

most appropriate methods and technologies to carry forward b-Learning education, there is a highlight on the need to discuss the main individuals involved in the learning process – teachers and students.

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