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Better e-Learning for Innovation in Education

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

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Editors' Introduction

There is a perpetual challenge for all providers of Adult Education to successfully engage people who can benefit most from the intentions at the foundation of this sector. Adult Education covers a wide target audience: many are employed with fulltime work and want to be able to do the work they already carry out to a higher standard. However, this sector also seeks to engage people who are much harder to reach and motivate.

The very nature of this challenge means that it is also difficult to gain the necessary data and evidence to create successful strategies that can reach these groups – groups that include people that benefit significantly from the kind of elementary skills, which can lead to successful employment, leading to increased economic security.

It was against this background that a range of organisations and educational departments came together to create a collaborative Strategic Partnership within the Erasmus Plus Programme run by the European Union under the title *Better e-Learning for All*. This project was formed to seek out ways in which the flexibility of e-Learning as a form placed firmly in a modern and relevant context can be deployed successfully by Adult Education providers on behalf of these groups.

To follow the aim of establishing quality standards that could reduce levels at which learners within social groups characterised by a fragile involvement with educational requirements drop out of learning courses, the approach required different forms of competence and expertise to be combined. Accordingly, the research partners, mainly represented by universities and the higher education sector, joined non-governmental organisations and private companies in this joint venture.

Partners from Turkey, Greece, Italy, Portugal and the UK came together in this challenge to carry out research and deliver practical outputs that could support Adult Education providers in their efforts to effectively reach specific groups by using an e-Learning approach. This was seen to be particularly valuable as it was a learning paradigm that the

majority of the providers of Adult Education had not engaged with on behalf of their learners.

While the Partners were in charge of contributing with their expertise for the research to be carried out, they were also piloting the practical tools and seeking out ways to apply the results being achieved beyond the lifetime of the project: this was the way that Çukurova University as the project coordinator and Lead Partner envisaged for the project partners to fill the known gap under e-Learning promotion to serve people who are the hardest to reach for Adult Education providers.

Better e-Learning for All created a set of different project Outputs. These included a needs-based piece of research focused precisely on levels and definition of learner dropout, including the reasons behind it taking place and possible solutions. There were also two scientific articles addressing e-Learning as applied in the context of adult learning, and two pilot e-courses – one e-course centred on entrepreneurship for adult learners and another e-course supporting trainers to become e-trainers. The Outputs also included a simplified e-Learning platform, intended for Adult Education providers, specifically those who seek to engage people from hard-to-reach groups.

Then the output that brings a conclusion to the work of the project is this book, *Better e-Learning for Innovation in Education.* This intends to provide an overview of the most important issues that the project partners faced, highlighting the scope of the matters an Adult Education provider may be confronted with when e-Learning becomes a designated part of their pedagogical approach.

It concludes the project's cycle to facilitate the fruition of new and especially relevant variables to be considered by members of the Adult Education sector as e-Learning providers, granting them an additional set of research results and practical tool that they can apply in their work as they are stakeholders in the outcomes from *Better e-Learning for All*.

The book starts with three chapters that set the scene for the challenges being addressed. The first of these from José Carlos Bronze allows the reader to assess the combined challenge of engaging both the

potential learners as members of 'hard-to-reach' groups, in combination with convincing Adult Education providers with little experience of applying e-Learning strategies that this is an approach that they can – and essentially should – use. José Carlos Bronze represents APLOAD within the *Better e-Learning for All* project.

Then Edméa Santos sets out an investigation of the extent to which online education is a phenomenon of cyberculture, looking at the potential of digital technology to promote learning content.

Following this we go into more depth with a chapter from Anita Gramigna and Giorgio Poletti who consider the perceived risk in applying learning strategies that are heavily based on technology for learners that could be alienated from the education process, turning the sense of risk on its head by considering the potential for the liberating nature of technology's capacity to mutate, as a means of chiming with people who may have not engaged with traditional approaches.

Cláudia Barbosa, Jailma Bulhões, Yuxiong Zhang and Luís Pedro look in depth at the implications of a world that has become used to the idea that young people are instinctive multitaskers, challenging this assumption through published research and considering the implications for applying e-Learning, concluding that there could be a need for providers to elaborate specific learning strategies that help the student develop competence in establishing focused attention and avoiding multitasking behaviours.

Bento Duarte da Silva, Ana Lúcia Pereira and Laurinda Ramalho de Almeida look in detail at the place of Blended Learning (or b-Learning), which is likely to be used frequently by Adult Education providers not wishing to give up all face-to-face tuition. The authors look at Education courses that cover the application of educational technologies – such as those behind e-Learning. For this, they show results from an investigation into the intensity and frequency of any positive or negative sensations that learners experience when attending courses that use b-Learning.

Paula de Waal represents University of Ferrara within the *Better e-Learning for All* project. Here sets out one of her specialist areas of expertise in her consideration of competence-oriented e-Learning design. Her chapter shows readers that there is a risk of there being a broad acceptance of the adoption of digital technology as sufficient evidence of quality, inclusion and innovation. She provides solutions for e-Learning designers so they focus on the problem-setting stage of a course before proceeding with the production and implementation of contents and learning environments.

Giovanni Ganino looks at the world of video in the context of online provision of learning resources. He proposes that videos can fulfil rich and stimulating functions from a pedagogic point of view, providing valid support for teaching and learning processes.

Yalın Kılıç Türel, Muhammed Turhan and Mehmet Turan set out some of the detailed results that have come from the *Better e-Learning for All* project. Their research covered an in-depth survey addressed to learners seeking to uncover the reasons for learners dropping out from courses. In this, they considered factors of correlation between ratings for course quality – in the administrative procedures, course content and technical accessiblity – and (positive and negative) outcomes in the form of motivation, retention of information, levels of motivation and the likelihood of a learner dropping out from a course.

Sandro Monteiro, José Alberto Lencastre, Bento Duarte da Silva, António J. Osório, Paula de Waal, Sukru Çetin İlin and Gülden İlin present their systematic review of the design factors that can prevent attrition and the degree to which students dropout from e-Learning courses. This includes original analysis of the published research on this subject, based on the work of a team at the University of Minho, that concluded course design strategies cannot be devised without considering students and factors related to the course and program.

Nuno Queirós Rodrigues and José Alberto Lencastre present their work on the role of web-based connections between disciplines as points of reference in the regulation of learning effort by students in online

environments where they prefer to work and reflect on real-world problems, actively cooperating and collaborating in environments permanently mediated by technology. The research leads them to believe that class teachers could better regulate their students' learning effort if they knew in advance the schedule of tasks proposed by their peers.

Marco Silva and Sheilane Avellar Cilento consider the new challenges online teaching and learning present to the management of educational systems and to the well-established traditional classroom teaching and learning practice. The chapter is in the form of a case study in Brazil that examined the impact of teacher training taking place in an online environment, looking at the changes in tutoring practice as a result of taking part in such a teacher training programme, and comparing the course participants´ views on online teaching before and after the course.

The final two chapters are more reflective on the bigger picture being addressed through the subject matter of the book. Joana Viana, Helena Peralta and Fernando Albuquerque Costa look at opportunities for transformation through non-formal education. They identify the value in analysing learning instances and manners of qualification presently available beyond any 'school walls', with due reference to the evolution of social, political and cultural fields that affect education in general, and learning forms and contexts in particular.

José Lauro Martins, Liana Vidigal Rocha and Valdirene Cássia da Silva invite the reader to take a transformative look at the future of education, one that can motivate educators to leave their 'comfort zone'. They do this with a mind to education's current position where it competes with new forms of social organisations that do not depend on territories, but depend on data networks, as well as people who connect, feed, and consume information.

At the back of the book, the reader can find a set of author biographies that identify the experience that each of them bring to this book through their contributions.

As well as thanking everyone who has contributed chapters to this book, at this point, we would like to add some special acknowledgement for additional support we have received.

First, from our colleagues within the *Better e-Learning for All* project. Among the contributors, Paula de Waal, Giorgio Poletti from Italy, José Carlos Bronze from Portugal, as well as Yalın Kılıç Türel, Muhammed Turhan and Mehmet Turan have all been a part of the *Better e-Learning for All* project since the start. We want to acknowledge their work in the project as well as thanking them for their contributions here. On the same theme, we would also like to thank Robin Beecroft at Searchlighter – a partner in the *Better e-Learning for All* project – for his work copy-editing the contributions and carrying out the production duties.

Then for our institutions: Çukurova University (Turkey) and University of Minho (Portugal) have given unstinting support in the production of the book. Without them, it would not have been possible and we want to state our gratitude here.

We also want to thank the Turkish National Agency in Ankara as the relevant body of the Ministry of the European Union in Turkey for their assistance throughout the *Better e-Learning for All* project, and the European Commission for their sponsorship of the Erasmus Plus Programme 2014–20.

We hope that this collection of chapters provides appropriate food for thought, and stimulates an enhanced provision of online e-Learning elements in Adult Education courses that will be applied for the benefit of people that may not as yet readily engage with the world of education.

Gülden İlın, Şükrü Çetin İlın,

Bento Duarte da Silva, António J. Osório & José Alberto Lencastre

'Better e-Learning for All' – Contributions on Bringing e-Learning to NGOs and to 'hard-to-reach' Groups

José Carlos Bronze
APLOAD Lda, Portugal

Introduction

'Better e-Learning for All', acronym 'Better-e', is a project funded by the Erasmus+ Programme, in the scope of its Key-Action 2, Strategic Partnerships of cooperation for innovation and the exchange of good practices. The project resulted from the needs' assessment by some Institutions that had worked together in previous contexts and projects, and was successfully proposed for funding to the Turkish National Agency of the Erasmus+ Programme by Adana Vocational School of Higher Education, Çukurova University (funding contract 2015-1-TR01-KA204-021954).

Partners from five countries participate: Çukurova University (Turkey), Firat University (Turkey), Mesleki Girisimciler ve Toplum Gonulluleri Dernegi (Turkey), Searchlighter (United Kingdom), Dian (Greece), Universita degli Studi di Ferrara (Italy), Universidade do Minho (Portugal) and APLOAD Lda (Portugal). Altogether, partners represent Higher Education Institutions and research centres, non-governmental organisations (NGOs), and private companies. This article is proposed by APLOAD Lda, a Portuguese service provider, acting internationally with two layers of intervention: (a) Landscape Architecture, and (b) Evaluation and Social Planning.

The department of Evaluation and Social Planning in APLOAD, which is naturally the one addressing this project, aims to apply social intervention along with dozens of partners worldwide. It bases its interventions and methods not only in social research, but also in the previous experiences of the engaged team and consultants. In fact, the deep interaction APLOAD staff had been taking with Portuguese NGOs operating in local development, as well as cooperating for international development, was also the basis for the assumptions presented in this project.

Therefore, the reader should consider that NGOs experience additional contexts that are driven by diverse missions, and represent a broad diversity of Institutions across the globe. No scientific research was embraced for the production of this specific chapter, nor does it follow any aim of scientific validation, either while characterising the NGOs' position or any other expressed elements. Notwithstanding, the views expressed by the author are based in over 20 years of experience, both in fieldwork as well as in NGO management and direction-driven work. More recently the views of the academic partners and the achievements of implemented projects have deepened the foundations of the analysis that underlie these views.

The importance of this chapter relates to the potential of the intersection that 'Better-e' project seeks, between NGOs and e-Learning: while conceptually these references do not necessarily intersect (as NGOs might easily stand on the tail-side of most advances in e-Learning application), the pursued objective of 'Better-e' and its purpose is to generate such a link through quality and objectives achieved effectively.

One possible context for 'NGOs'

Within the characteristics of NGO activities there are two fundamental approaches that make those organisations recognisable among others that might act similarly, pursuing goals of local or global development: (i) a participatory approach (an increased sense of proximity with target-

groups) and (ii) their target-groups pursuing an increased sense of 'belonging' – i.e., citizenship.

Both characteristics – though different – are very close to each other, and both contribute to diminishing social conflict. It is important to understand, however, that a significant paradox might arise within the work of NGOs: while they work to diminish and eradicate social problems, their existence would be less important without those problems. It is common sense that a society without social problems does not exist, but while focusing on specific groups or communities, NGOs sometimes achieve the social change they were pursuing. As a consequence, they are forced to face a vacant space they might create for themselves when solving determined social problems.

In this given case, NGOs might be forced to turn to different groups, or target different objectives within the same group, or increase their geographic scope to target groups in different regions or countries. To implement such changes, there is the internal issue of funding – an issue that can just as easily be seen as an opportunity as a 'menace'. NGOs, not having any aim to make a profit, do not rely on a system of goods or services' delivered against payment. They do not exactly fit into the supply-and-demand market, so are sometimes removed from direct, regular public support.

While substituting the action of the State in some cases, this situation creates real threats to the capacity to produce quality results through the work of a regular and stable team of qualified professionals. Many workers and managers are citizens that are professionally driven by passion. While this might be of a great importance for a 'participatory' or 'belonging' approach, referred to earlier, it is also true that it might not be enough to enable results when addressing the 'hardest-to-solve' problems within the targeted groups, particularly within the 'hard-to-reach' groups.

Any NGO will easily understand, from its own experience, what a 'hard-to-reach' group might be:

- Families (particularly women and children) living with repeated domestic violence
- Migrants lacking official documents to ensure either their permanence in the country or a regular job without being subjected to human exploitation
- New-entrant women isolated due to language or cultural barriers
- Refugees with scars from physical and mental abuse in their own country
- People without even basic literacy levels so usual communication becomes difficult, or sending children to school (as legally required) is not really seen as a relevant issue
- People suffering severe economic privation – including malnutrition or even starvation
- Minorities living side-by-side with dominant (and sometimes hostile) majorities
- People living with long-term unemployment
- People with disabilities
- People living with long-term mental illness.

There are many other similar situations that could be listed to identify a 'hard-to-reach' group. Therefore, NGOs have to be creative on their approaches, but as well they must be highly professional, serious and rigorous. Their intervention is fundamental: when things 'go wrong', the consequences can be severe.

Fighting the lack of funding includes applying to many funding Programmes, both subvention-based and/or operational grant-based. All the funding Programmes have strict rules and rigorous approaches, not always aligned with that of each NGO's (i.e., their fund recipient) most emergent needs. A great sense of adaptability is required at all times.

This context would allow for a never-ending set of considerations, naturally, and ones not fitting easily into this article. Two essential elements identify where NGOs might diverge from other types of Organisation (corporation, private for profit company, governmental organisation, an agency, etc.), elements that strongly shape their activity:

- Members of NGO target-groups do not necessarily 'show-up', ready for intervention. They are certainly neither 'customers' nor 'clients'; on the contrary, they might be part of groups that are so hidden that members need to be found by searching for them. They usually demand highly

skilled negotiation processes from members of the NGO if they are to be reached. (While it is positive to consider their willingness to be a target for intervention when contact is established, but also to understand that people will always want to humanise the parts of their life that have been dehumanised. To this end, there will usually be a need to offer full context and explanations about options so that beneficiaries can make informed decisions. This is the context that should override any temptation not to engage due to initial mistrust or any lack of willingness to engage with the NGO staff that may be present in beneficiary groups.

- There is not necessarily an identifiably positive cost-benefit ratio in the intervention: many times, important features of an intervention have to be abandoned due to severe funding constraints (even resources in a Human Resources department in a 'small' NGO might suddenly vary from few dozen workers to just a few individuals.
- With this general context in mind, and assuming Education as a basis for citizenship (the full living and expression of rights and duties in a given society), better conditions of life, and for social mobility, NGOs are – in many cases – official education and training (E&T) providers. The Portuguese E&T system, where Adult Education (AE) and Vocational Education and Training (VET) sub-systems are placed, stands for an official and compulsory system of certification of providers (within the 'formal training' contexts, naturally).

Created in the 1990s as an accreditation system for initial and continuous training in the public sector, it has evolved to the present day to become a global certification system. This system is one where providers must be placed in order to have their training offer recognised by both authorities and target-group members. The system has a full range of norms, duly supported through legislation, monitoring/auditing requirements, and tax payments. Alongside training-provider organisations, trainers also have to be officially recognised by a diploma granted on the successful completion of an initial pedagogical 'training of trainers' course. The combined system (of organisations and trainers) is quite ambitious and is followed with all due seriousness in the country. Recent reforms allowed its adaptation to the most recent European achievement validations as well, and additional steps are being taken to make progress on this concerning the European Quality Assurance in Vocational Education and Training (EQAVET) and the European Credit Transfer System (ECVET).

It is therefore significantly consequential that NGOs embrace training provision as one of their axes to bolster the fight against social problems, such as poverty and exclusion. Many funding Programmes (both National as well as European) facilitate this approach whenever granting resources for training activities, willing to upscale the literacy levels of specific 'illiterate groups' (if not, of the population in general).

When able to access those funds and be in possession of the most recent trends and methodologies for training provision and pedagogically embedded actions, some NGOs soon understand their role and their importance within the system. They might eventually act as a reinforcement of the State in remote locations of the country, offering a level of public support'. This is the case of the most recent programme for recognition and certification of competences in Portugal, which is operated by both public and private organisations, some of the private ones being NGOs.

'Traditional' Training

Traditional training programmes (face-to-face, in-room classrooms) require a certain number of compulsory hours of presence in the classroom. Courses may vary from a small number of hours (particularly when addressing informal training activities or 'how-to-do' workshops) to course units of 25 hours or 50 hours (when there are specific course units identified in the Portuguese Training Catalogue – those setting out to supply a recognised skill, or enable high levels of competence as part of a VET diploma, for example). Beyond this, there can be courses of much more than 1000 hours (double certification courses for adults, for example, where adults acquire a school degree certification and a professional qualification at the same time).

This scenario soon leads us to understand the problem of attrition (absence and dropout), with a particularly high level of incidence among members of 'hard-to-reach groups'. In legal terms, absence is not tolerated for any extended period: usually an attendee might miss only 5% of the course duration without penalties or other formal consequences. Beyond

this, a compulsory exclusion might occur or the attribution of a diploma might be required to be refused, or other measures may be taken depending on the funding Programme.

Beyond the formal and the legal consequences are the real consequences for the course attendee, whose frustration and sense of 'time-wasting' might resonate with a life situation that is much worse than it was before engaging in the training course. Would this mean that absenteeism comes on top of the failure of many training programmes to facilitate social rehabilitation? Not necessarily. The problem might not be the absenteeism (which might be only a symptom), but a problem of misconfiguration of solutions for an identified social problem.

Since there are no ideal front-end solutions, the pursued solutions should seek to attenuate the problems through a combination of various actions, some of the actions being able to mitigate where other actions cannot. Most people within 'hard-to-reach groups' are not willing – or more to the point, do not have the necessary living conditions – to participate in courses with a significant number of hours demanding hard, in-classroom training (as required on a regular basis for success completion). When this is the case, other forms of training have emerged more recently and should be seen as strong possibilities.

A scenario for e-Learning: a comprehensive approach

Education & Training stakeholders (including providers, trainers and trainees) are eventually still quite sceptical about the real potential role e-Learning can play in such a domain, particularly when compared to 'traditional' processes. The reasons are numerous and have been addressed in other chapters of this book, providing precise, scientific views. However, the idea of this article, following the previous contextualisation of some possible relationships between NGOs and E&T systems, is not to repeat coverage of such aspects. The idea is rather to provide a view that offers a positive perspective on e-Learning by NGOs that deal with 'hard-to-reach groups'.

Recently, following a web search about this subject, an illustrative statement that is appropriate for this approach was found in an article by Jiyuan Yu (MA candidate, Harvard University) and Zi Hu (MED candidate, Columbia University), published in the World Economic Forum website. This stated:

> *Instead of worrying whether or not online education can ever be as good as more traditional formats, perhaps we should instead focus on how we can use it to deliver quality education for people all over the world, particularly the poor and underserved.'*[1]

This practical and thus inclusive approach to online education is the main focus of project 'Better e-Learning for All', which finds alignment with *Opening up Education: Innovative teaching and learning for all through new Technologies and Open Educational'*[2], when it states that 'Digital technologies are fully embedded in the way people interact, work and trade; yet they are not being fully exploited in education and training systems across Europe'. (This is identified as a 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions'.) This project starts from this position but also looks at the reality of the acting spheres of NGOs and of their targeted groups.

A previously published article[3], co-written by the author of this chapter, explores the issue when the so-called 'client-centred approach' was identified as appropriate for certain specific target-groups. However, in the context of this chapter, an 'individual-centred approach' would be more appropriate as a term to apply. Essentially, NGOs do not have 'clients'; rather the users are seen as 'individuals' with whom NGOs cooperate so the individual can 'serve themselves' rather than be 'served' in a defined 'client-provider' transaction. This would necessarily entail a

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[1] https://www.weforum.org/agenda/2016/09/is-online-learning-the-future-of-education/ (last time checked online , before publication 28th July 2017)

[2] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52013DC0654

[3] Lencastre, J.A & Bronze, J, 'Building (e)-Learning Bridges: uma visão Europeia das Barreiras ao e-Learning', in Peres, P., Mesquita, A. & Pimenta, P (Org), Guia Prático do e-Learning, Casos Práticos nas Organizações, Vida Económica, Porto, 2015, pp 54-70

focus on the 'trainee' and the development of any pedagogical approach in the training. Previous practices of the Organisation could still be valued and applied at least in part while still recognising that they require upgrading.

Thus, the idea of moving from 'learning' to 'e-Learning' should not be seen as picking-up previous 'learning' practices and giving them an e-Learning 'mintmark'. Rather, it is better to pick-up the 'e-Learning' as a new global paradigm, shaded as it is with its own nature and specific 'colours', so requiring a totally new set of skills and definitions of competence by training providers themselves.

Alongside the need for re-shaping skills and competence among trainers and providers in general, the financial cost of changes will also concern NGOs. However, once again the perspective should be a positive one. Of particular relevance for the subject of the 'Better-e' project, 'The Future of Learning: Preparing for Change'[4] (a report, published in 2011 by the European Commission's Joint Research Centre) stated that the impact of technology in education and training is following a number of different trends: these are duly identified and expatiated in the report. The report identifies that 'trends include increases in computing power accompanied by decreases in cost', pointing to win-win situations when adopting e-Learning by providers having to deal with financial constraints. NGOs should exploit this trend vigorously, bridging the gap between the uncertainty of funding and the need to maintain activities to engage members of 'hard-to-reach' groups.

Thus, the 'Better-e' project advocates that NGOs adopt a comprehensive approach as a way to support them in their chain of activities, from changes to their premises (context), through adaptations to their practical activities up to and including to their end-goals and impact.

This approach stands for the introduction or the boosting of e-Learning as a paradigm to embed within their activity chain. The comprehensive approach implies the value of gathering together:

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[4] Redecker, Christine et all (2011), 'The Future of Learning: Preparing for Change', JRC Scientific and Policy Reports. Seville: JRC-IPTS. doi:10.2791/64117

- Identifications of social problems
- Characterisations of the targeted communities
- Knowledge about relationships occurring among the mentioned 'hard-to-reach' groups and current stakeholders
- Perspectives on the existing educational system in place, and
- Visions of the pedagogical possibilities.

In this context, it is possible to establish a premise where target-groups are the most relevant agents of the pursued change. This is the way by which NGOs can rely on e-Learning as an important contributory factor in their work – as a technological development, but above that as a means to embed the fundamental levels of competence that are required.

In the Portuguese case, NGOs that are training providers may initiate this pathway from an established milestone, as they already possess an important asset in their pedagogical competence – levels that are officially recognised. This is a starting point for 'Better-e' whose tools and outputs will remain for further use by those organisations that may freely use them in the search for innovative pedagogical practices beyond the lifetime of the project.

'Mainstreaming ICT-enabled Innovation in Education and Training in Europe: Policy actions for sustainability, scalability and impact at system level'[5] is a report released in 2014 by the EU-JRC that contains relevant recommendations made by experts, as well as interesting info-graphics about innovative pedagogical practices. It looks at this challenge with a perspective from a point that joins the School Education and the Adult Education systems. In this way, it brings great insights over both of those domains, ones that share on a high value given to pedagogical requirements and approaches, thought specificities of each are quite different from one another. One of the objectives of the project leading to the report was:

[5] Brecko, B. N., Kampylis, P. & Punie, Y. (2014). Mainstreaming ICT-enabled Innovation in Education and Training in Europe: Policy actions for sustainability, scalability and impact at system level. JRC Scientific and Policy Reports. Seville: JRC-IPTS. doi:10.2788/52088

> *to define and classify ICT-enabled learning innovations across a range of settings and participants, including groups of learners and teachers at system level, both within and outside formal education settings*
>
> Brecko, Kampylis & Punie

This objective ties in with 'Better-e' as our project is able to use its contents as resources for the development of new practice and outputs for the project's specific target-groups.

Conclusion

The comprehensive approach that the Better-e project proposes assumes e-Learning to be a cross-cutting domain, valid as a progress-chasing mechanism in Adult Education when directed to 'hard-to-reach' groups. The project proposes to offer guidelines, tools and methodologies to be used and set up by NGOs that are familiar both with E&T systems (making part of those systems) and with 'hard-to-reach' groups: most often, these are at the core of their beneficiaries.

While profiting on their experiences and actual knowledge about the E&T system and about the target-groups, NGOs may as well benefit by acquiring new 'field competences' within the e-Learning paradigm. However, caution should be taken when adopting new methodologies being used by people living under sensitive conditions.

E-Learning is still challenged with concerns about its capacity to attract and to retain learners and consequently generate change in their lives in the way that 'traditional' learning methods are recognised. However, this challenge can be met through a new and important agenda – to adopt e-Learning as a means to move towards an educational solution where e-Learning has its own domain, with its own characteristics, own specificities, own difficulties and its own potential.

To consider e-Learning as a way merely to 'shift across' has been revealed to be a mistake. There are evident flaws in using something that is firmly and previously formatted for a face-to-face application in an online environment, just so an inhibition over distance can be removed, regardless of the means and tools that are used. This mistake has led to

attrition, drop-out and failure at the level of outcomes within the logical chain of a social intervention.

The more complex the context of reaching members of the target group may be, the more immediately the determined point of failure may be identified. The dignity of e-Learning – i.e., its potential for social change as a part of education interventions – is not based on whether it is simple or complex (characteristics that should be determined on the basis of the intervention's nature), or in any high- or low-level of technical implementation as required by the system.

Rather its dignity should be placed in its specific space, identified by assessing the capacity of education promoters to see it as a system possessing inherent and not borrowed characteristics, not ones that are easily replicable nor ones claimed by non-distance based education as simply transmutable and/or interchangeable characteristics.

While the experience of NGOs in the promotion of education might play a crucial role in the adoption of e-Learning, it is very important to consider this specific 'dignity' point as a starting point for its adoption, as well as the way that is foremost when envisaging its success.

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Online education beyond distance education: a phenomenon of cyberculture

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> *Communicating is in no way transmitting or receiving a message. That is the physical condition for communication. It is true that to communicate one must send messages, but sending messages is not communicating. Communicating is sharing meaning.*
>
> Pierre Lévy

Introduction

This paper investigates online education as a phenomenon of cyberculture. The communicational and pedagogical potential of the virtual learning environment (VLE) is investigated, taking some potentialities of digital technologies and their interfaces for promoting learning content and learning situations based on interactivity and hypertext as starting points.

Cyberculture has been promoting new possibilities for socialisation and learning mediated by cyberspace and, in the specific case of education, virtual learning environments. Cyberculture is contemporary culture shaped by digital technologies. It is not a utopia, it is the present; one experiences cyberculture as a part of daily life, whether as authors and actors who have access to (and can make creative use of) information and communication technologies (ICTs), or as the digitally excluded. Digital exclusion is a new element of the broader phenomenon of social exclusion – a political challenge.

Lemos (2003) describes cyberculture as "the new sociocultural shape emerging from the symbiotic relationship between society, culture

and the new microelectronics-based technologies that emerged with the convergence of telecommunications and computing in the 1970s" (LEMOS, 2003, p. 12). One can consider that online education is not just the evolutionary product of generations of distance education (DE), but a phenomenon of cyberculture.

It is frequently stated in the literature on education and technologies that online education has evolved from, or is a new generation of, DE. While this is possible, one can also challenge the statement as being overly simplistic. Consider Table 1.

With the arrival of the Internet and online environments, the design of many DE programs changed, but the same communicational logic of the mass media and traditional DE that separates the subject from both the processes in which the content is created and the actual didactic design of the program was retained. This observation is confirmed by the results of a study carried out by the author between 2000 and 2003 (SANTOS, 2003), in which she analysed eight online courses and found that the virtual environments could have been used to provide a more interactive teaching-learning process because of the potential offered by their synchronous and asynchronous communication interfaces. However, the educational paradigm in most courses was still based on transmissive pedagogy, the logic of the mass media, self-learning and reactive tutoring.

DE Generation	**Technologies used**
First Generation – 1850 to 1960	It started with the printed medium, which was followed years later by radio and television. Characteristics: one predominant technology.
Second Generation – 1960 to 1985	Audiotapes, television, videotapes, fax and the printed medium. Characteristics: multiple technologies without computers.
Third Generation – 1985 to 1995	Email, the printed medium, chat sessions using computers, Internet, CDs, videoconferencing and fax. Characteristics: multiple technologies, including computers and computer networks.
Fourth Generation – 1995 to 2005 (estimate)	Email, chat, computer, Internet, broadband transmission, live interaction using video, videoconferencing, fax and the printed medium. Characteristics: multiple technologies, including the start of broadband computer technologies.
Fifth Generation	Identified by James C. Taylor as the coming together of everything that the fourth generation has to offer and computer communication with automated response systems, as well as access through a portal to institutional processes. While the fourth generation is characterised by flexible learning, the fifth is characterised by intelligent flexible learning.

Generations of distance learning and the associated technologies[1]

In short, the only thing that was online was the technology. The methodology and teaching were still based on the classic logic of mass DE.

[1] Source: http://portal.webaula.com.br/noticia.aspx?sm=noticias&codnoticia=195 (accessed in April 2009).

On the other hand, in the same study there is access to the main reference works on cyberculture and to research into digital interfaces and social software: Insofar as the social aspects were concerned, people were using interfaces in cyberspace to co-create information and knowledge. This co-creation, which Lévy (1996, 1999) called "collective intelligence", shows itself in phenomena such as electronic music, LAN houses, free software and digital activism. And could education, after all, not also be based on this movement characteristic of cyberculture? This concern led us to defend the thesis that online education in tune with the dynamics of cyberspace is a phenomenon of cyberculture. This idea was developed in the author's PhD thesis (SANTOS, 2005), in which devices were created with the intention of experiencing interactive teaching practices characteristic of cyberculture in a virtual learning environment (OKADA; SANTOS, 2004).

These studies yielded important findings, which will be discussed in this chapter. One such finding is that online education is a manifestation or phenomenon of cyberculture. But at the end of the day, what is cyberculture? What sociotechnical concepts give rise to cyberculture and how does cyberculture constitute a scenario for online education? These questions will be addressed in the following sections.

Cyberculture and emergence of online education

A new type of materialisation characterises digital information and communication technologies. Information, which throughout the history of mankind had been transmitted by using physical media (wood, stone, papyrus, paper and the body), now circulates as bits – universal digital codes (0's and 1's). Information and telecommunication technologies have brought about radical changes in society as a result of this process of digitalisation. A new revolution, the digital revolution, is thus emerging.

Once digitalised, information reproduces, circulates, changes and is updated in different interfaces. Sounds, pictures, graphics, text – in short, an endless variety of information – can be digitalised. In this context, "information represents the main ingredient in our social

organisation, and the flows of messages and pictures between networks constitute the basic links in our social structure" (CASTELLS, 1999, p. 505). Sociotechnical flows can enhance new creative processes in virtual learning environments, which, like cyberspace, use digital structures.

Cyberspace has emerged not only because of digitalisation and the evolution of personal computers and their interfaces, but also because of worldwide connectivity between computers, now known as the Internet. From the calculator to the Internet, much has changed and continues to change in cyberspace. This change is characterised by, among other things, the do-it-yourself movement. Cyberspace is much more than a means of communication or a media. It brings together, integrates and resets dimensions for a plethora of media, including newspapers, radio, magazines, the cinema and TV, as well as a host of interfaces that allow synchronous and asynchronous communications, such as chats, mailing lists, discussion forums and blogs: networks are the order of the day.

'Network' here is taken to mean any flow or cluster of relations between human beings and digital interfaces. In this hybrid relationship, any sign can be produced and socialised in, and by, cyberspace. This way, it creates the process of network communication characteristic of virtual learning environments. In this context, a new culture – cyberspace – emerges: "(...) any means of communication or media is inseparable from the forms of socialization and culture that it is able to create, so that the advent of each new means of communication brings with it a cultural cycle that is characteristic of it" (SANTAELLA, 2002, p. 45 and 46).

This process of technological hybridisation meant that the digital artefact was not limited to an isolated machine (PC) but was transformed into a collective computer (CC), more commonly known as the Internet or the worldwide-integrated computer network (LEMOS, 2002, 2003). The idea of the network is what distinguishes the social aspect of our times, all the more so now that one has the mobile connected computer (MCC). The network gains potential as it becomes increasingly communicational and sociotechnical and is updated every time One establishes a relationship or connection anywhere on it. Time and space take on new configurations and influence new, different socio-abilities. According to Serpa (2003), with the network, one experiences the 'spatialisation' of time and the synchronicity of space. Serres talks of space and place:

> *Why have lecture rooms, classes, meetings and tutorials in specific places, indeed why have a main office if courses can be given and meetings held remotely? These examples culminate in the example of the address: over the ages an address referred to a place, a home or a place of work. Today, distance education programs or cell phone numbers do not represent a specific place: a code or a number are all that is needed. When everywhere in the world has a kind of equivalency, the duo here and now finds itself in a quandary. When Heidegger, the most widely read philosopher in present times, calls human existence "being-there", he is referring to a way of living or thinking that is in the process of disappearing. The theological notion of ubiquity — the divine ability to be everywhere — better describes the possibilities we have to hand than that funereal here lies*
>
> SERRES, 2003, p. 197

Although spaces/places are still with us and continue to fulfil their social function, it is worth reflecting on possible new ways of making use of communication networks beyond conventional spatiotemporal relationships. Digital networks allow us to be in several places at the same time, sharing signification and learning. They allow each singularity to connect and transmit messages. The transmitter is liberated, allowing the user to potentially be a transmitter and receiver. According to Lemos, "computers were born to be calculating machines, austere, individualistic machines. Information technology will be characterised by the transition from these Apollonian machines to effervescent, orgiastic, chaotic, Dionysian machines (LEMOS, 2002, p. 55).

For Serpa, these "effervescent, orgiastic, chaotic, Dionysian" machines are "propositional" machines. The genesis of "propositional technologies" (SERPA, 2000, 2003) in the modern world started with the (industrial and scientific) bourgeois evolutions during the 17th, 18th and 19th centuries. However, it was only in the 20th century that propositional technologies began to take shape – i.e., to move beyond the drawing board or exist as prototypes or simple algorithms and evolve so that they could be used in machines – in what was a technological advance characterised essentially by the evolution of microprocessors and the digitalisation of information in the second half of the last century.

In this regard, propositional technologies stand out from other technologies by their ability to bring together and converge with previous technologies, whether in terms of language, by bringing together oral skills, writing and digital content itself, or in terms of artefacts that bring together muscular, sensorial and cerebral machines (machines that substitute or act as an aid to muscular, sensorial and cerebral effort, respectively). Digital technologies are transforming all the different kinds of media into the conversion of all sorts of sounds, written texts and pictures, whether still or video, into computer-legible formats.

> *This is possible because the information in these languages can be broken down into 1's and 0's, which are processed in the computer and transmitted by telephone, cable or optical fiber to any other computer over networks that today go around the globe like a web without a center or an edge, connecting millions and millions of people, wherever they may be, in real time in a virtual world where distance has ceased to exist*
>
> SANTAELLA, 2001, p. 14

In this sociotechnical context, the cultural environment gives rise to what is known as cyberculture (Lévy, Lemos, Santaella). Cyberspace "is global interactive hypertext, where each person can add, remove and change parts of the information technology structure like a live text, a self-organising organism"; it is "the environment in which pluralist discussions circulate, reinforcing different competencies and making use of the broth of knowledge generated by community links to enhance the exchange of competencies and generate the collectivisation of knowledge"; it is the environment "that does not have any centralised control and multiplies anarchically and extensively in a disorderly fashion from multiple, different connections, allowing ordinary point-to-point groupings and forming ordinary communities" (LEMOS, 2002, p. 131, 145 and 146).

Taken in this context, the concept of cyberculture concerns the symbiosis between man and digital network technology as a process of cultural inter-production or coproduction. The next section considers specific conceptual and practical aspects of online education as a phenomenon of cyberculture.

Specific aspects of online education as a phenomenon of cyberculture

Online education is the set of teaching-learning actions or "curriculum acts" mediated by digital interfaces that enhance interactive hypertextual communicational practice. Subjects, group-subjects, companies, organisations, in short, multi-reference learning spaces have been making increasing use of this concept as an agent to promote the cultural dissemination of their ideas and enhance the democratisation of information, communication and learning among geographically

dispersed individuals in either classroom-based or distance education. The most widespread digital technologies in online education as it is practiced today are virtual learning environments (VLEs), teleconferencing and videoconferencing.

VLEs embody one of the essential characteristics of the Internet: the convergence of different media, i.e., the ability to hybridise and change between various media in the same environment. Media is the whole structure that conveys the message expressed by a multiplicity of languages (sounds, pictures, graphics and text in general). In some cases, structure and language hybridise each other. In other words, it is the union of information technologies and their applications with telecommunications and the various forms of expression and language. Virtual learning environments involve not just a set of interfaces for socialising information and teaching and learning material, but also, and above all, synchronous and asynchronous communications interfaces.

We have used the classification "content interfaces" and "communication interfaces" just for the purposes of conceptual organisation. 'Content interfaces' mean devices that allow content digitalised in various languages to be produced, made available and shared: text, sound and pictures. These formats can also be presented as a mix, i.e., a mixture of languages, like audio-visual content, which can be a mixture of pictures, text and sound. These can in turn be presented using different structures, such as hypertext, multimedia or hypermedia.

'Communication interfaces' mean those that allow the exchange of messages between the interlocutors in the group or learning community. These may be synchronous, i.e., they involve real-time communication, or asynchronous, i.e., they allow communication at different times. Examples of the former include chats and web conferences, while forums, discussion lists, blogs and wikis are examples of the latter.

In synchronous and asynchronous interfaces, content and communication are overlapping elements. We cannot consider content as merely information to be studied or teaching material developed

previously or during the teaching-learning process. Nor can one deny that content is generated from the moment that the interlocutors produce meanings and significations via synchronous and asynchronous interfaces.

By making suitable use of these interfaces, knowledge can be produced in a process of authorship and co-creation. A VLE can be considered a live organisation in which humans and technical objects interact in a complex process that organises itself in the dialogic of its networks of connections. For this, the authors recommend these steps:

- Create hypertext environments that combine inter-textuality (connections with other sites or documents); intra-textuality (connections within the same document); multi-vocality (a multiplicity of points of view); 'browsability' (a simple environment that is easy to access and has transparent information; mixing (the integration of several languages (sounds, text, dynamic and static pictures, graphics and maps); and multimedia (the integration of different types of media structures).
- Increase the potential for synchronous interactive communication (real-time communication) and asynchronous interactive communication (when the transmitter and receiver do not need to be communicating at the same time);
- Create research activities that stimulate the construction of knowledge using problem situations, where the subject can contextualise local and global questions from his cultural universe;
- Create environments for assessment that educates, where knowledge is constructed and mapped in a process of negotiation, and decision-making is constantly used in the evolving resignification of authorships and co-authorships;
- Make available and encourage game-oriented, artistic connections, fluid browsing and simulations (SANTOS, 2003, p.225).

A VLE must be an open work, in which immersion through browsing exploration and conversation can flow in "the logic of completion" (SILVA, 2000, 2005). This means that the VLE must embrace creation in the becoming; all the participants will be able to contribute to its design and pedagogical dynamics. As already pointed out, digital coding (bits) allows the subjects to modify documents and create and publish messages in a variety of formats.

In conventional DE practice, the fundamental characteristic is self-learning; in other words, the student receives the course material with instructions about the content and activities, carries out the work he is expected to do and returns it to the teacher/tutor via the channels for feedback. Learning is therefore constructed and mediated by the teaching material, which is produced according to an instructional design. The process is based upon unidirectional instruction. The subject learns on his or her own and at his or her own pace, and the static teaching material plays a very important role.

What changes then with online education? In addition to self-learning, the VLE interfaces allow interactivity and collaborative learning. The student learns from the teaching material and through dialogs with the other subjects involved – teachers, tutors and other students – in synchronous and asynchronous communications processes. Cyberculture involves new possibilities for socialisation and learning mediated by cyberspace along with, in the specific case of formal education, VLEs. It is thus essential that concern is given to the organisation of an educational

- Communication / non-linear reading / virtualisation
- Interactivity / hypertext / simulation
- Authorship / polyphony / creativity
- Contributions to online education

Four Elements with Potential in ICT

program that takes into account the potentialities of hypertext, interactivity and simulation in these new learning spaces. These potentialities are neither mutually exclusive nor emerging cyber-cultural concepts, but concepts that are enhanced by cyberculture.

The potential of ICTs in the context of the VLE constitute quality practices in online education. It should be stressed that the concepts of interactivity, hypertext and simulation did not emerge exclusively with the advent of ICTs; however, it is in the context of cyberculture that they gain potential because of the plasticity of the digital universe. The content and communication interfaces in VLEs make interactivity and authorship possible.

According to Silva (2000), interactivity is a communications concept rather than an information technology one; in other words, he considers interactivity to be an intentional attitude in the act of communicating with the other. This means that the subjects of the communication co-create the message. Each subject must intervene physically in the messages. There is no interactivity in the virtual environment if the subjects of the communication to not authorise each other. Hence it is not sufficient merely to make the interfaces available for interactivity. Rather the subjects must actually communicate. However, if one cannot make use of the potential of the interfaces, this communication is not effected when the subjects are geographically dispersed. Thus, DE built around mass media does not make use of the interactive potential characteristic of online digital ICTs. We are therefore of the opinion that there is no interactivity in conventional DE practice, but rather transmission separated from reception as the communication nodes are not connected at interfaces but separated into transmitters and receivers.

The cultural products that emerge from interactive authorship and communication are hypertexts in potency, i.e., texts connected to other texts through the polyphony of the senses created in VLE contexts. In addition to the hypertextuality built at the communications interfaces, teachers can make use of the content interfaces and plan non-linear didactic material. The content interfaces allow different languages (sound, pictures, graphics and video) and media (the printed page, radio, TV and cinema) to be combined and made to converge, and these in turn render reading and learning more effective. Instead of being closed packages, the content becomes a plural, networked semiotic universe. The links encourage the reader to enter static and dynamic content presented in different kinds of texts as though he or she were an author. Even though the hypertext content made available in the VLE was prepared for pedagogical purposes, teachers and students must consider it as a collection of pre-texts, a proposition that lives up to the propositional ICTs and the hypertextuality characteristic of human thought. Each subject who interacts with the hypertextual context incorporates into it his or her reading background, producing new connections and different implications for the content.

The learner's authorship can be rendered more effective by situations that encourage virtualisation though activities involving simulation. To simulate is to virtualise, question, invent, create and test hypotheses. With the possibility of interactivity and hypertext, the subject can simulate collectively in cyberspace with the other geographically dispersed subjects.

Interactivity, hypertext and simulation bring epistemological and methodological cuts to education. Subjects in cyberspace experience and make use of these fundamental concepts in their social practices in cyberspace. However, when faced with educational practice in VLEs, they find that there is little or almost nothing of these fundamental concepts in the didactic and curricular design of online courses. This observation is based on the fact that conventional DE teaching practices are transposed to VLEs, as educators and managers, who have little knowledge or

experience of the basic concepts of cyberculture, merely turn online digital ICTs into didactic resources dominated by the logic of the mass media. Hence, authorship, polyphony and creativity are compromised at the expense of the dynamics of VLEs and online education as a phenomenon of cyberculture.

Final considerations

Quality education is not dependent on any one type of education. It can be achieved through classroom-based education, distance education, online education or a hybrid of these. However, the exercise of distinguishing and characterising each type of education allows researchers to identify the perspective from which they are speaking or defending their ideas.

When differentiating distance education (DE) from online education, one is attempting to put online education into context and discuss it from a different perspective – a social, historical and cultural perspective – where the computer and Internet are cultural learning instruments (FREITAS, 2001, 2002). This does not exclude interactive DE, especially when its design ensures there are physical meetings between the subjects based on constructivism, interactivity and critical theory; in short, education based on parameters that go beyond rigidly designed, programmed instruction.

DE is a form of education that has traditionally been mediated by mass media (the printed word and audio-visual media in general), which do not free the transmission node. Hence, learners interact with the course design and teaching material without co-creating knowledge with their fellow learners and teachers. The mass media do not allow interactivity in the sense of being more communicational, of co-creating the message. Because of the limitations of the mass media, pedagogically, distance education favours the concepts of "self-learning" and "self-study". The subject interacts with the material and learns through this mediation. The learner does not experience collaborative learning. In this model, the quality of the processes is centred on the educational and

teaching approaches, which are generally based on instruction. Social interaction, when it takes place, is one-to-one, i.e., teacher/student and student/teacher. What there can be – if the material is well written and designed – is interaction with the author's text. There may indeed be interaction, but interactivity is not possible with the mediation of the mass media.

Unfortunately, the vast majority of DE programs are still based on the paradigm of production in an industrial society, which gave rise to the curriculum inspired by Bobbit and Taylor's ideas, the traditional curriculum. This curriculum separates the process from its products and producers and is above all concerned with transmitting content, where some produce for others to consume and carry out their processes. Even with the emergence of cyberculture, digital technologies, constructivist pedagogy, critical theories of the curriculum (denouncing processes of colonisation) and post-critical theories of the curriculum (denouncing processes of colonisation and announcing the involvement of ethnic, sexual, cultural and gender differences in the curriculum), the vast majority of curricular designs are still based on the logic of technical reproduction characteristic of the mass media and traditional curriculum.

The official documents (official curricula) of many DE programs contain suppositions that are associated with critical pedagogy based on theories concerned with history and cultural-interaction, but such programs in practice show by their "curriculum acts" (the curriculum in action) that they have not abandoned the pedagogy of the factory and school desk. One group of people (the production team) produces teaching content and materials, which are distributed en masse for others (the students) to consume, according to the logic of what is allegedly "self-learning". The self-learning pretence hides the fact that there is little or no investment in collaborative learning. In this model students do not interact with other students, and certainly not with their teachers/mediators.

Mediatory teaching is replaced by reactive tutoring; in other words, instead of designing and mediating learning paths, teachers only

answer questions about the content of the teaching material when they are asked. There is almost no investment in dialogic encounters that would institute post-critical DE curricula, even when students are face-to-face – either physically, via the Internet and its interfaces, such as the videoconference. The teaching material and the students themselves are the centre of the process rather than the dialogic relationship between the subjects involved and between these and knowledge itself. In the traditional curriculum, information and knowledge are the same, so teaching content and materials become the main protagonists for this reason. The distribution en masse of this material and content does not guarantee learning.

We know well that knowledge cannot be transmitted and that it must be constructed in the learning process. The teaching material and different technologies must be pre-texts for new texts to be constructed. Even so, these pre-texts must be works that are open to the culture of differences. For this, environments must be created in which one can collectively make everyday knowledge influence scientific knowledge in cyberspace or the city and vice versa, and thus exercise true citizenship. Digital technologies, with their content and communication interfaces, which support a view of the curriculum based on difference, will be able to institute new pedagogies in DE. For this to be achieved, one must not underutilise ICTs or eliminate teachers.

We already have available to us excellent education and communication theories (pedagogy of freedom, constructivism, interactivity, collective intelligence, critical and post-critical theories of the curriculum etc.). With the liberation of the transmitting node by digital technologies, one can put into practice new spatiotemporal arrangements to educate subjects who are spread out geographically or broaden classroom-based pedagogical practice. It is here that online education makes a difference. We now have in potency interactive media and collaborative learning that go beyond self-learning and the mass media: learning with the "other" mediated by technologies that actually allow these "others" to meet each other.

In DE the "others" only meet if the methodology is a hybrid one, i.e., if there are physical meetings at the nodes or meeting places, in which case it is no longer DE but semi-classroom-based education. The face-to-face meeting fulfils the communicational function of all-to-all interaction that the mass media does not allow. Even so, nothing can be guaranteed in terms of interactivity. Physical meetings can be opportunities for just getting questions answered or for delivering course content. They can also involve a lot of interactivity, as in collaborative group activities or interactive lectures, for example.

It is not the online environment that defines online education. The environment and interface creates the conditions rather than determining its form. All depends on the communicational and pedagogical movement of the subjects involved if interactivity and co-creation are to be guaranteed. A learner gains more when having the provocation of the 'other', when they bring their intelligence and their experience. The interfaces will allow communication through the use of free, plural speech. For these reasons, this author believes that online education goes beyond traditional DE.

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New Technologies: from Risk to Resources for the Weakest Participants

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Introduction

The new techno-logical culture is mutating the basic language, orienting it more and more to speed, interaction, and sharing. As often happens, due also to the speed of actual mutations, this process does not combine itself with a consciousness: it is neither of the thought type, which new languages convey, nor of the knowledge type, to which it contributes to the creation. The logical type cognitive approach, linear sequential, structured, argumentative and abstract, is progressively being replaced by reticular logics, linked with hypertext codes.

This deep comprehension difficulty affects the subjects at risk of socio/cultural marginalisation or, in a broader sense, the weakest ones, above all. To a major availability, the response is a substantial difficulty for choosing information, on being oriented in magno-cell stimuli, on governing the multimedia world with its suggestions. Briefly, a simple informatics alphabetisation is not enough to build digital competence on which an effective knowledge can be rooted.

Our daily life is dominated by techniques, times and spaces. Our rationality follows 'technical' (A. Broers, 2009) logic more and more. Technology is introducing epochal changes – in personal relationships, in social dynamics, in both identity construction processes and in the thought elaboration mechanisms. The consequence is that it has contributed to forging anthropology, and therefore our young people's mentality on

operative effectiveness (R. Queraltò, 2008). The thing has evident consequences for the cognitive styles and the knowledge construction processes. This means that the sense attributed to learning and knowledge depends on the satisfaction of needs and desires, more and more constrained to concreteness and the immediacy of results. Tékhne, de facto, means "art-knowledge in action": in other words, a concrete knowledge, which tends more to doing rather than to knowing, as an aim in itself. It is operative, dynamic and pragmatic. Furthermore, formation technologies draw from a vocabulary that makes their social use more fluid and constrains behaviours. Today, the distance from the knowledge that characterises the generations has become wider and wider, with evident communication and loneliness problems for both sides.

In view of these problems, it is necessary to study the reasons for fascination that new media uses on young and adult people. On the other hand, one thinks that it might be useful to look for gathering those hinge elements that enhance the motivation of learning, especially for the subjects most exposed to socio-cultural marginalisation.

These whirlwind changes affect, in the adult world of the so-called "digital immigrants", the weakest subjects above all – those at risk of socio-cultural marginalisation. In view of any hard alphabetical informatics process, one accepts the possibility of using modular formative itineraries that permit the sharing of methodologies and paths from the adults. In this regard, a MOOC can represent a fundamental resource, a sort of new learning environment, which needs to clarify epistemological premixes. Lastly, it deals with motivating the adults to access a systemic thought that allows a more conscious using of the new communication technologies.

Finally, it is worthwhile making some fundamental clarifications. Knowledge, all the Knowledge, requires an epistemological preparation, because it refers not so much to the information reception, but to its elaboration. To know a phenomenon means to comprehend it, to have a clear awareness of it, and to be conscious of the self, in relation to the problems posed by that phenomenon.

The Knowledge is content and method, since it is phenomenal, in other words it involves objects, and it is founded on process, because it accounts for methods, strategies and tactics as well. It is the 'how' and the 'what', because it is a phenomenon and movement of its own construction. Knowing a phenomenon means to comprehend it, to have a clear awareness of it, and to be conscious of the self in relation to the problems posed by that phenomenon.

Techno-logical humus

Why does the multimedia attract users and how can they use its capabilities for the purposes of formation and emancipation?

A reason for the strong attraction that the new media has needs to be researched on one side applying engaged familiarity and, on the other side, in a more distant game-based dimension often experienced. Thus, new technologies provide an important role in the imagination of young people, dealing with their attention-seeking behaviour in knowledge construction processes. All of this provides a learning motivation function, through the experience of the computer. The independent game-based elements of knowledge, along with its trigger from the imagination, its evocative dimension, and a sense of adventure and discovery, are some of the causes that explain the interest the using of the computer. The learning process, and widely gained knowledge, cannot disregard the capability to refer, evoke, and enrich, the icons of an imagination that is rooted in everyone's past.

We are inside a symbolisation of reality that is profoundly connatural, as is evident in the didactic video in an interactive scheme. The means adopted with which to face the world, in its unavoidable concreteness, are determined by the consciousness of that world, and even our own consciousness; as Socrate[1] teaches, we are all in the world. As a consequence, knowledge expresses, since the beginning, its practical

[1] The knowledge evoked in the Delphic provision implied the necessity of a deep investigation in the selves to ask the God only the essential questions, those that have an existential weight in a deep sense.

implications. One should know what kind of question to ask to face up to problems effectively – to make the right decisions, to choose what experience poses for us with awareness of the facts. Knowing a phenomenon means to comprehend it, to have a clear consciousness, and to be conscious of the self in relation to the problems posed by that phenomenon. For this reason, knowledge is content and method since it is phenomenal: it involves objects and is founded on process because it pays regard to methods, strategies and tactics as well. Due to this, its instruments cannot be exhausted even in an economic recipe book.

As Bateson reminded (1976), it is our implicit epistemology, the idea we have of the knowledge and of ourselves that allows us to solicit and guide the previous questions. For this reason, it is indispensable to possess knowledge as a way to start knowing the world and ourselves.

The reflections presented here have an epistemological mark and tend to the clarification of the formative implications inherent, not only to the technological products used in the schools but also to their hermeneutical and identity function. The conceptual cruxes on which the educational theory is based regard a language conception as an unavoidable form of interpreting and comprehending, and therefore as a trans-formative environment and the subject, intended as the interpreter who forms and contextually transforms his or her heuristic field and the world. The guidance function of this knowledge causes autonomous behaviours, which means free behaviours. Another conceptual crux acting as an important reference for our educative reflection concerns a conception of knowledge that gives substance to a meta-dimension, implying "knowledge of the knowledge" (Morin, 2007).

Since technology does not exhaust its nature in its simple application, the educative experimentation on the new technologies about instruction do not have to be resolved into their application: it is important to clarify them with the most suitable definition possible, to understand their structure, their evolutionary paths, and the vision of the world they convey. The concept of technology we think about while we use its artefacts, organises the intellectual strategies we adopt in the

teaching-learning process as well as the procedures and the educational praxes. In this sense, the organisational and operational structure of the technologies can be conceived as a sort of grammar or a linguistic expression because its planning is a composition argued with instruments, procedures and aims.

Knowing its logical-grammatical architecture means being able to comprehend the semantic by making the educative choices' constructive hierarchy, evidences, instruments, theories and values individual, coherently bonding with its guiding principle towards educative aims. A formation (A. Gramigna, 2009) that instrumentally aims at technical and circumstantial learning risks making the subject collapse in disorientation, fluctuating between enthusiasms and pessimisms, which can only generate confusion. For instance the illusion that knowledge can be exhausted may rise up, for example, in the capability of recognising the right icon to click, or the ability to remember the subsequent movements to accomplish aside from their theorisation – from triggering inside a clear metacognitive dimension. When adopting the perspective of knowing the grammars subtended to these movements – the strategies and the subsequent symbolisations – then it becomes easier to comprehend how this has interesting consequences when considering the idea of knowledge being matured.

As a consequence, the objective is to bring to the surface the speculative blueprint useful for clarifying the processes through which one can build on any kind of knowledge. In this process, we have to keep in mind that the levels and the procedure for its construction are conditioned by opinions, which are often just partially conscious. Studying these dynamics can help us to comprehend the processes through which we come to 'that' knowledge that can help one 'to know the knowledge. Each learning process is strictly connected to one's personal epistemological knowledge of people gained through a dialectic relation. Acquiring the knowledge can be supported or obstructed by the capability of recognising information and processes as important factors from a cognitive point of view. When oriented in an educative sense, this can help young people to

elaborate new cognitive maps; to multiply the possibilities and the strategies of the problems solving as well.

It deals with an hermeneutical pedagogy first of all tending to comprehend the educative phenomenon linked with the formative and the environment of educational technologies. Then to explain them, for an education that aims at the construction of orientations, guidelines and reference points, helping us to understand the present and to face risks with full knowledge of the facts. Among these, we signal:

1. Simplifying vision of the knowledge, reduced to a storage and fast consumption of information;
2. New forms of cyber-mobbing;
3. Solipsism of virtual relationships;
4. Addiction;
5. Difficulty in orientating into the virtual world.

It is possible to represent and explain the knowledge in the context of these new meanings:

1. Processes of construction, organisation, divulgation and trans-formation of knowledge;
2. Methods, meaning contexts and their construction conditions;
3. Conditions, in turn, pose the problem of those constructions' verifiability. For instance: when and in which degree does knowledge possess certain truth, efficiency and certainty criterion?[2]
4. Choice of information suggested by the experience, their interpretation and collocation inside our cognitive system;
5. Relation of such processes with our cognitive self: i.e., with the conscious and unconscious perception, which we have both in our cognitive field and in our acquisition, elaboration, as well as our invention potentialities;
6. Instruments of the control from the fundamentals of different sciences: the specific language, field of study and application, contents peculiarity, method, procedures, theoretical background, consequentiality, verifications, instrument, and the coherence of the procedural meaning in the relationships that exist among them;
7. Transverse capacities and epistemological contaminations among different disciplinary areas: transfer of metaphors, use of narrative segments coming

[2] One of the most important reflections which deals with this resides in the platonic theory of justifications, which poses the problem of the necessary condition for a knowledge to be true; Cfr. Platoon, Teeteto, in all the writtings, cured by G. Reale, Milan, Bompiani, 2000.

> from other fields, and of methodological cues. In brief: intercultural scientific competence. By competence we mean a basic knowledge that activates a series of acquisition and, for this, has a metacognitive value. The social image of encyclopaedic knowledge has been replaced by contextual knowledge. This further implied a declaratory and a sector-by-sector-storage behaviour. The latter evaluated instead the heuristic and strategic function of each subject. Nonetheless, the procedures, codes and approaches are in a metacognitive sense. In this second perspective, the pluralism of there being several points of view, different languages, a number of theoretical constructions, turns out to be fundamental. A consequence of this new way of interpreting the knowledge is that several conceptualisations take place in disciplinary areas or experimental research sectors highly different from the ones in which they are germinated. For this reason, it is important to understand the knowledge-semantic dynamic – the processes and the mechanisms – to be able to build other knowledge and to transfer competence from different areas and times.

Problem description

The knowledge our society reclaims is oriented to the ideal of science that is also technology because each develops the other, and because science makes technology its criterion of value. It is a concrete and instrumental knowledge, requiring a specialised knowledge that is fragmented, pragmatic and to some extent anti-holistic. It is right in this sense that European and US policies (U. Margiotta, 1997) have oriented themselves from the Lisbon Strategy onwards.

Knowledge is a conceptual entity that is relational and founded on process: it deals with a synergic system of dynamics that has unity and physiognomy determined by its own movement. This requires definition of the role formation technologies play in the knowledge constructing process and the educative experience, and identification of the relation between the scholastic and the epistemological praxes underlying them.

Technology is not just a reflection of the technicality; it is also hermeneutic because it represents a total matrix, not only in the judgement criteria and therefore the criteria of social value, but also in the processes determining identity, be they collective or individual. By value, we mean a judgement criterion that characterises a relationship model tracking a path of signification.

The formation technologies convey a vision of the world inherent to the technical artefact, as well as the strategies they activate. The meta-cognitive tension animating the teaching optimisation processes through new technologies has an ideological dimension, in the sense that it promotes a way of looking at things. The technological artefact – an essential condition in science – meditates on the knowing, the school and its models. Here it is the relation between educative fact and theory that appears from the beginning as a trans-formative process involving the two opposite poles of the matter – which are never motionless, neither remaining the same.

The pragmatism is the value criterion of the procedural norms that the technique applied to the formation employs as this uses normative-pragmatic formulae. This pragmatic nature is implicit in the technical rationality that is the anthropological figure of our students (Livingstone, 2101). To the digital natives the 'what-is-it-for?' is not implicit in the 'what-it-is and certainly comes before it. Instead, knowing was equal to a maturity of coherence and clarity on a phenomenon, its utility contained in its own semantic, though there was no substitution.

Now it is easier to deduce that the technical educative side leads to an empirical experience that underlies an epistemological experience: i.e., it refers to the models that are rarely explicit and conscious for those who use it. For this reason, it is evident technology draws a value hierarchy that must be explicated in order to orient in it with criticism: i.e., with full knowledge of the facts. Hence it becomes necessary to formulate an epistemological model tended to the construction of competent criticism: this means being able to compare it with the hybrid nature of the actual science and technology. The hypothesis is that knowledge abides by its semantic contents, but has a meta-cognitive tension referring to the cognitive processes as well (Margiotta, 2007).

Regarding formation technologies and their use in schools, they represent both a method and a technique for the metacognitive tension of the active strategies. By educative method we mean a coherent totality of procedures and strategies governed by norms that are held by principles.

Therefore, it deals with a conceptual system, referring to an artisanal competence in procedure that serves both conceptual instruments (e.g., executional models) and technical material supports like software.

From the epistemological studies intended as a science studying the formal structure of the scientific knowledge, there may be a tendency to exclude the contents from the (formation) discipline being studied. There is a belief that when applying educational technology, disciplinary contents – cultural in a broad sense – are intimately linked to the pragmatic logic, are a little abstract, and are differently formal from the technique. Such logic, characterised by its concreteness, abides by a cognitive approach leading to consequences for formation.

There is an argument that the content conveyed by the teaching-learning process when using technologies ends up expressing a pragmatic tension, making itself more essential and focused in relation to 'transmission' aims that appear more highly and clearly delimitated.

The procedure abides by the learning and the teaching method, i.e., the construction and transformation of scholastic knowledge, so realising the mutual dependence of method and technique: both must be detected through an epistemological awareness framework.

From the beginning, the knowledge built with new technologies presents as a symbolic praxis – concrete and abstract – because in schools technique is a way of thinking that has to establish a formative strategy and an educative technique: otherwise it is just sterile technicality. The technique is a knowledge construction, from both symbolic and mental perspectives, and ultimately from the artefact's technological perspective. It is process and product, construction and construct, object and symbol.

As a consequence, the conceptual separation between the cultural symbolism of the object and its mental process should have only a transitional nature that is useful for clarification. Consequently, in relation to productive use of formation technologies, it can be seen that the *forma mentis* to educate should contemplate both procedure and finality.

The rigour of scientific educative knowledge emerges in the clear consciousness of the epistemological matrices from a continuous

interrogation between techniques and facts. The aim is elaborating concrete proposals, facing and solving the problems emerging from formative emergencies in the contemporary world. The pedagogical research is scientific when it is rigorously coherent among targets, instruments, methods and languages. This is useful when it helps to produce not only technical objects but also theoretical ones that improve schools, as well as building strategies to solve problems.

The study of knowledge is a practical science – useful and operational – because it allows learners to reach certain aims with a sense of tangibility, often beyond immediate contingency. However, there is also a need for a technology and a science that reveals consciousness of the epistemological, economic, cultural devices they trigger, along with an ethic going far beyond one of professional and procedural moral obligation that is standard for much contemporary research. In the light of this omnivorous pragmatism, knowledge forms us in the sense that it constructs and perfects our capabilities: it weaves the narrative storyline of the autobiographical self, conveying existential scenery.

Knowledge helps us to understand the world because it gives us the keys to interpretation, orientation and comprehension; therefore, it intervenes in the problem-solving process. In this idea, one can deduce that knowledge helps us not only to express an ethical option, so making one responsible for the many different options that exist, but also in founding a solution to moral conflicts or in meditating around a values hierarchy. This can be deduced because, through knowledge one can create and realise plans in both a contingent and an essential way: affirming it helps in the achievement of goals.

With due consideration of this, it is possible to start with identifying the needs associated with socio-cultural marginalisation among the most exposed adults. For this it is necessary to plan educative actions that would help these adults to provide themselves with communicative instruments tending to develop orientation and auto-tutoring instruments in the global world. Referring to the formative requirements intrinsic to the needs of such subjects, one can signal their difficulty to relate with

school-age pupils and the educational relationship as well. It is useful to consider the risks as much as the resources connected with the use of Internet and the consequences of applying new communication technologies, starting with awareness of new social and productive dynamics.

The grammars, developed with new multimedia languages and their virtual nature (paradoxically less virtual than the books), accommodate the need of recognising a value connecting to the individual through the instrument. It is in this subject-machinery connection that a door to immersion opens, to inclusion within a world that magically appears on the screen to open the imagination with games and actions along with a certain way of thinking. This immersion makes the level of abstraction as proposed in the computer experience even thinner: this is because the subject can be projected inside a mechanism and a process that explores knowledge. In addition, there is the narration of self-experience, and that of one's own symbolic universal construction.

Then, if the computer represents a sort of extension of the self, of a rarefied place to live at a certain time, the subject itself becomes part of that environment which can be inhabited first of all, and then lived experiences come from consented and solicited encounters that emerge through the construction of relationships with the informatics instrument.

The proposal

In the light of these considerations, as of the most recent international researches[3], the authors retain a view that the use and value of MOOCs may represent an effective proposal for weaker subjects; for learners who are at risk of cultural marginalisation and those learners who need the most cognitive support. This is due to the following:

1. The online provision allows its use in a massive and a free way for the many students who can search or enter into social networks. In such a way, they can simplify the didactic approach, and contribute to a critical attitude;

[3] Cfr. Free exchange. Massive open online forces. The rise of online instruction will upend the economist of higher education. The Economist, 8 February,2014

2. They promote the internationalisation and therefore the possibility to acquire European level recognised credits; consequently, they promote ideas and the spreading of new interactive methods;
3. They promote autonomous research activity, for which they promote multi-disciplinary interaction, facilitating the elaboration of flexible cognitive maps.

Nevertheless, weak points to monitor also exist:

1. They reduce the direct proximity of the professor and the student;
2. There is difficulty on realising laboratories or experiences requiring manual skills;
3. They easily reach students who already have a high level of motivational learning.

That is why the authors maintain that a clarification of the deep semantics linked to the formation of new technologies may be necessary for students, professors and researchers, because of the existence of these grey areas. By assuming a sort of "Guide" to the competent use of MOOCs, the authors think that it is necessary to pursue these objectives to help the subject to:

1. Identify, on the basis of his or her formative needs, a selection of the themes to explore, in the light of the plural operative approaches;
2. Analyse the starting knowledge instruments in the light of the objectives to pursue;
3. Interpret the information, on the basis of ones own life experience and working needs;
4. Meditate on the knowledge functionality and on their meta-cognitive value, with the aim to transform them into transferable competences to different contexts and situations: this reflection allows one to possess not only the contents but also the construction processes of both the knowledge and the thought models.

The hypertext dimension of a MOOC lends itself to important considerations. The hypertext is consulted from different initial points: autonomous and independent, it escapes from the book linear chapter-paragraph succession, where this is a recoverable feature only at a conceptual level. The hypertext dialogues through the graphic interface to which information is organised allow the user to choose their own reading paths, adding links or materials. Those listed here are therefore the exact same features of the paper-based support and the alphabetical, extolled by

the enormous technological potential of the interface, with its cut-paste, find-substitute, zoom visualisation, and fast-sliding functions.

The hypertext dimension transforms the book into an electronic text, into bytes, depriving it of its paper dimension, which can be recovered only by printing, or better, by downloading the document from the computer. However, at the same time, associating it to the other codes that interlace a system interrelation with a sort of formalisation 'from a formalisation'. Moreover, the hypertext allows the reader to intervene inside its own structure, transforming it into being a co-author because the informatics space transcends the bounds of physical materiality exemplified by paper. This allows each one to bring transformations that are significant for the construction of one's own knowledge pattern. In this regard, the authors identified these fundamental areas of competence:

1. Linguistic-communicative;
2. Technological;
3. So-called 'Human' sciences;
4. The 'scientific' ones;
5. Finally, that border area allowing additional communication around complex problems.

The combined intertwining of multimedia language codes on one side assumes language units strongly pertained to each other – as the image conjugated to a sound and the typical movement of television language: on the other side it leads to new conventions for the using of the alphabet. This last process implies the formalisation of a technique using the alphabet, already intensely formalised in itself, at a relevant symbolic depth and therefore strongly abstract. It deals with a curious combination that unifies opposite poles, or those poles that may seem opposite at the first sight: the connatural and the abstract, the oral and the script. Both paralinguistic elements and ideographic ones enrich the image-sound movement, the alphabet and its new use. Like emoticons, or the onomatopoeic parts that are traditionally strangers to it, they have produced the beginnings of a new language and unusual metaphors for knowledge from different philosophical approaches to knowledge. Scarce epistemic wisdom (Bateston, 1984) does not permit one to see the

relational and dynamical formational texture based on technology: the synthesis is in the analysis.

The intertwining of the multimedia codes implies a response to the nature and the complexity of these nexus. These nexus are always social-anthropological, and therefore linguistic, and intersect with each other on different planes, producing a structure that escapes from traditional reading categories. This is why today it results in "knowing the knowledge" fundamentally.

'Knowing the knowledge' (Morin, 2007) means to make values and decisions explicit. If, as Foucault (2001) affirms, "practice is a totality of elements passing from a theoretical point to the other, and the theory, the passing from a practice to the other", the praxis, regarding pedagogy in the formation acted by technology, is both practical and theoretical. The "passing from a theoretical point to the other" as well as "from a practice to the other", are determined by a judgement criterion that establishes a sense-based relationship.

In considering the consequences of these conclusive thoughts, regarding the epistemology and the educative praxes conveyed by the new technologies, the technologies result as an instrument produced by the knowledge during its construction. Each learning process acted by technologies – even those considered as immediately practical, technical and instrumental – has an existential depth, concerning our symbolic multi-verse, merging mental process with execution, representing the product and the educative content at an instrumental time. It is our scarce epistemic wisdom (Bateston, 1984) that does not allow us to see the relational factors or the dynamic, formational texture that technologies experience, as well as existing within them.

In the light of these considerations, the authors maintain that formation technologies, as well as the praxes they trigger, are both theoretical and educative fact: at the same time, they produce the one and the other. Their pragmatic logic needs firstly to be decoded through the proposition's elaboration to locate phenomena in a system that is coherent and elastic, then integrated into a hermeneutical and relational system

based in process. The following are turning points that can find further definition in disciplinary didactics.

1. To elaborate significance patterns around technology and society paradigms along with the students to facilitate an epistemological awareness framework;
2. To establish multi-relational and multimedia flexible models that reorganise disciplinary knowledge around thematic salient nuclei for the present;
3. To study linguistic rules connoting formation technologies that are the schemes through which they structure discourses: that means recognising both the grammar and the semantic, along with the formative value of their discursive conventions. This helps to explore formative potentialities of technologies intended as forms of thought reorganisation;
4. To create, along with the students, new representations structured by the knowledge in the metacognitive value comprehension of the formation technologies. Web interaction implies a logical, emotional, sensory, sensory-motor immersion for the learner, who connects meanings from a code to the other, following conceptual maps, intellectual strategies, emotional paths, aesthetic vocations, and value choices. Our human / social issue lends itself to a less univocal reading from the one suggested by the book's epistemology – a reticular reading, retrieving the rituality of the oral to extol suggestion, emotionality and rationality. Then there is the extraordinary multimedia formative valence, in its complex metacognition activity. The subject acts expertly in the informatics world, in the hypertext, where they construct the knowledge in elaboration of relational plots that unravel themselves among different languages, and therefore utilises different kinds of intelligence at the same time. The subject is open to multiple cognitive approaches; gathering information with a logical, emotional, aesthetic, sensory-motor process. The subject does not refer solely to an abstract thought, but uses different intellective strategies, which subtend to different linguistic forms. The subject utilises a connective thought in a creative way, and is ready to reconfigure their own knowledge theory in view of the new cognitive experiences. However, this refers to an experienced navigator.
5. "Knowing the knowledge", starting with an explanation of "what-is-it-for?" – because this is the on-going question our young interlocutors ask and this is the pragmatic logic that society pursues – to come to the understanding of "what-is-it-for?"

The aim of such formation is in the construction of "explanation models' manipulating capability, of execution and regeneration of proficiency systems concerning the expert development of the previously studied cultural and experience areas" (Margiotta, 1997, p. 76). In a connective thought formation and in the capability of facing different approaches to

knowledge at the same time, there are different forms of intelligence in refining a sympathetic cognitive attitude. Another proposal regards scholastics and academic curricula predisposed to the disciplinary opening, which does not rule out recurring scientific specialisms.

A teaching method, a research study that lends itself as a procedure of the reflection, and *for* reflection, that is open, generative, plural, uncertain, and relational while being based in process, because it is able to trans-form itself during the path – which means it is able to learn. Such knowledge does not offer us just the instrument to construct keys to interpretation and the orientation of maps into the real world, but it helps to automatically look for the answers to the need for identity, which young people and especially adolescents above all, express in the 'delicate' phase of their growth.

The need for identity is met through active, critical participation in the auto-determination processes, accompanying both young and less young adults to become conscious protagonists of their time.

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Media Multitasking: how does it affect learners and learning?

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Introduction

The technology evolution of electronic and digital consumer devices has penetrated our everyday lives, providing a platform to – with great efficiency and easiness – solve problems, communicate and exchange information, and participate in remote activities, among other things. This increasing popularity provides the impetus for a growing dependency (and concurrent utilisation), which affects people's behaviours and actions, and has noteworthy cognitive and socio-emotional impacts.

The versatility and accessibility of new smart products converge to satisfy the informative and affective needs of human beings and promote multitasking habits and behaviours (Hwang et al., 2014). This is due to the fact that our needs (for entertainment, convenience, communication, cognition and efficiency) increase as our life standards improve and there is a growing need for diverse types of information that, in most situations, can be provided through the simultaneous use of multiple computational functions[1] (Zhang, 2014 cited by Chang, 2016).

[1] Yang et al (2015) concluded, through the application of questionnaires, that the time spent using the computer includes at least 8 different types of tasks done in conjunction with participation in conversations or production of school activities. The 8 different forms of multitasking include: printing, producing text, sending messages or sending emails, social networking, website navigation, phone or video conversation, listening to music, watching TV or movies, and playing video games.

However, media multitasking habits may cause, in younger individuals, problems in relation to the cognitive function since the area of the brain responsible for the executive function (including multitasking tasks) does not develop fully during puberty (Yang et. al, 2015). However, the practice of doing two or more tasks that require dedicated engagement and attention simultaneously (particularly at a time when the emergence of new devices has contributed to 'multiply' the 'multiple') may also negatively affect the cognitive domain in other age groups.

Technology-mediated learning modalities are often based on the simultaneous and/or sequential consumption of various online resources. How students access these resources and, beyond that, what their behaviour is while using them, can affect their learning and the later mobilisation of acquired knowledge and skills in everyday situations.

Taking into consideration the increasing access of learners to digital devices (that can be used at anytime, anywhere) and the growing inclusion of these devices in both traditional and distance learning scenarios, this chapter attempts to assess, based on literature, the main impact of media multitasking habits on the cognitive and socio-emotional domains, and how it consequently affects the learning process of students.

Multitasking: what is it?

In order to study the effects of the multitasking phenomenon, it is foremost necessary to define the concept: multitasking has been first investigated in the scope of Cognitive Psychology, having further captured the interest of other knowledge fields, such as Education, Organisational Studies, Marketing, among others. Most of the initial research on multitasking conducted in the beginning of the 20th century had as a main objective to promote efficiency in organisations (companies, mostly factories) by assessing the workforce and organising the workers in the best way possible to suit the tasks being executed. Posterior studies conducted in the 1920's introduced the concept of "task-switching" – alternation between mental tasks –while the development of media such as radio,

television, and later the computer, originated the real birth of multitasking according to Hassoun (2012).

The American Psychological Association (2006) identifies the occurrence of multitasking in those situations when "someone tries to perform two tasks simultaneously, switch from one task to another, or perform two or more tasks in rapid succession". Although this definition does not specify the type of tasks that are conducted or the means used, it is common to consider the concept of multitasking in association with one or several media, thus originating the term 'media multitasking'.

Wallis (2010) offers the following categorisation of media multitasking: (a) between medium and face-to-face interaction; (b) between two or more media; and (c) within a single medium. Even though the development of mobile technologies has promoted multitasking behaviours, we consider that media multitasking occurs not only in situations that make use of high tech products, but also in day-to-day situations where current electronic media is involved.

Although there are a large number of studies on the effects of multitasking, there are still few on the reasons that originate it. Hwang et al. (2014) investigated the main reasons for multitasking and how these are related to the specific media used and the content in question, identifying the following motives for multitasking behaviours: information search, social interaction, entertainment, habit and efficiency (the idea that participation in two tasks simultaneously leads to a more efficient use of time by the practitioner, who becomes, in his activity, more efficient).

The concept of multitasking is not only applicable to the adolescent / young adult age group; however, most authors suggest that this group is particularly susceptible to multitasking behaviours, to consider them socially acceptable, and to feel confident in their capability to manage multiple tasks (Jenness, et al., 2010).

The characterisation of the elements of this age group as being able to multitask is confirmed at the national level by Cardoso et al. (2009) in a study on the uses of media by children and young people in Portugal where young people are characterised as having "a networked and

multitasking use of the various media. Do not ask young people to do something exclusive when they want to do various things: browsing the internet, listening to music or having the TV on, exchanging impressions on the chats or messenger about the events of a youth soap opera, or the foam of days". The authors themselves indicate that one of the objectives of this study is to study the media practices of young people "taking into account increasingly established ways of dealing with the media such as multitasking, between various forms of communication, and the integrated use of several media".

Within this age group, multiple studies also suggest a higher prevalence of multitasking behaviours in female adolescents, who will also be more successful in their execution (O'Connell, 2002 and Shellenbarger, 1996, cited by Foehr, 2006).

How does Multitasking affect the cognitive domain?

In addressing the cognitive effects of multitasking practice, we initially understand that our brain is capable of performing various cognitive tasks simultaneously, such as listening to music and driving; however, when we increase the level of cognitive complexity of tasks, what kind of stimulation does our brain suffer? And what is the impact of this simultaneous stimulation on the cognitive domain?

In what concerns the dimension of attention, the multidimensionality manifested by the practice of multitasking media allows a broader scope of attention of the individuals, which permits them to obtain more information. In addition, a higher degree of media multitasking may lead to better multisensory integration (Uncapher et al., 2015; Zhang, 2014), with individuals potentially receiving more information through many different channels than they would receive by using only one (Lui and Wong, 2012).

Uncapher et al (2015) propose a bold hypothesis: if a broader scope of attention allows the reintegration of related memories, this may allow the generation of cognitive schemes that facilitate the learning of academic content. However, a broader dimension of attention may also

cause the problem of breadth-biased cognitive control, which has a negative impact on attention control (Uncapher et al, 2015; Ophir et al., 2009; Cain et al., 2016). The definition of dispersed cognitive control was presented by Schuur et al (2015) as the style of cognitive processing characterised by scattered attention to various sources of information which has a close association on the impact of the capacity to differentiate between important information and distractions, i.e., there is a loss in information filtering (Lui & Wong, 2012). At the same time, the larger attention span also increases difficulties in the inhibitory activity, which determines the control of information processing and the focus on the main task (Baumgartner et al, 2014; Moisala et al, 2016), resulting in poor capacity of attention control. In other words, the constant behaviour of multitasking can negatively affect the ability to differentiate required information and to filter and ignore irrelevant distracting information, i.e., the long-term simultaneous use of media can influence the diversion of attention.

In addition, the loss of attention span and attention control of individuals who are constantly multitasking may have an impact on the working memory, an essential component of cognitive processes (Coser et al., 2008). As Baddeley et al. (1984) postulate "divided attention on memory encoding" (Pashler et al., 2013), and the division of attention due to the simultaneous processing of several tasks is often directly associated with a low efficiency on information processing, greatly influencing the working capacity of an individual.

Operational memory is usually closely linked with the ability to temporarily retain information that is suitable for any mental task in an accessible state (Cowan, Huizinga et al., cited by Baumgartner, 2014, p.4), which directly determines the ability to concentrate for an extended period of time, adapt to new situations and suppress inappropriate behaviours. Also Uncapher et al (2015) highlight the research conducted on the association between multitasking and memory, indicating that individuals regarded as being able to multitask with heavy media exhibit lower performance of working memory, regardless of whether or not there

are external distractions. In fact, the intrinsic characteristic of the capacity limitation of the cognitive system determines the negative influence of multitasking on memory performance (Srivastava, 2013; Coser et al., 2008).

On the other hand, and due to the relationship between operational memory and long-term memory (Uncapher et al., 2015), the influence of media multitasking behaviours on long-term memory performance is also unavoidable. The constant switching of attention between different tasks can have a decisive influence on the processing capabilities, recall and deep thinking and lack of attention, cognition and mind wandering (Cotten et al., 2014; Ralph, et al., 2013). Therefore, it can be said that the intense practice of media multitasking can directly affect the cognitive process and the executive function.

How does Multitasking affect the socio-emotional domain?

The effect of multitasking can be detrimental not only at the cognitive level but also in what concerns our socio-emotional functioning. The socio-emotional functioning is a broad concept used to highlight the connection between human behaviours of both social and emotional nature (Ochsner, 2008) that includes a whole set of capabilities of dealing with both positive and negative aspects of social and emotional living, such as the capacity to interpret emotions, the quickness and intensity of emotion generation, the efficiency in dealing with negative emotions, feelings of empathy, the capacity to fulfil social roles, among others.

Schuur et al. (2015) indicate that existing studies on the impact of multitasking behaviours on the socio-emotional domain of young people have focused, mainly on the following three aspects: emotional functioning (including, among others, depression and social anxiety), social functioning (which relates to factors such as sociability and social success), and regulatory behaviours (such as sleep).

Becker et al. (2012) analysed the association between multitasking media habits and symptoms of depression and anxiety, considering that

the increasing trend of simultaneous use of several media may constitute a risk factor for mental problems related to mood and anxiety.

Multiple studies suggest that the ability to process information, negatively affected by multitasking, is absolutely fundamental in the cognitive process and directly affects, in the long run, the ability to regulate emotions, raising socio-emotional problems (Schuur et al., 2015).

Pea et al. (2012) concluded, in their study on the effects of multitasking media in youngsters from 8 to 12 years, that habits of this kind had a negative social-emotional impact, originating lower feelings of social success and normality, leading to the formation of friendships considered to be carriers of bad influences and causing fewer hours of sleep. High levels of face-to-face communication were, by opposition, positively associated with greater social success, greater normality, fewer friendships characterised as problematic and more hours of sleep. Although the age group analysed by Pea et al. (2012) is lower than the one in this study, the authors themselves indicate that older participants in the analysed age group reported a higher frequency of multitasking behaviours, less positive feelings of belonging and lower levels of normal feeling, as well as fewer hours of sleep.

Burak (2012) studied a possible correlation between multitasking and risk behaviours in higher education students, considering 19 possible risk behaviours, that included, alcohol, tobacco, and other drug use; safety behaviours, such as seatbelt and helmet use, riding with drunk drivers, driving after drinking; sexual behaviours; suicide attempts; physical fighting; fruit and vegetable consumption; and exercise behaviour. Burak (2012) concluded that clear differences occur between students who are considered as being able to multitask at a high level (who are more prone to engage in risk behaviours) and those who are labelled as not being able to multitask well (less prone to engage in risk behaviours).

On the other hand, other authors consider the existence of a positive and significant influence in entertainment activities in the affective state related to social success and perception of normalcy (Xu et al., 2015), since a lot of individuals get involved in multitasking activities to satisfy

emotional needs. In this sense media multitasking behaviours can help achieve self-satisfaction while engaging in leisure activities. However, and as mentioned both by Yang et al. (2015) and Schuur (2012), we still have a somewhat limited knowledge of the chronic effects of multitasking behaviours on the (personal and social) wellbeing of adolescents (in addition to none in Portugal).

How does Multitasking affect the learning process?

Many research works identify the negative effects of the practice of multitasking on the learning process (especially of young people and adolescents) demonstrated through poor performance in classroom activities, difficulties in managing time to perform school tasks, behaviour in the classroom, effectiveness of the work at home, academic skills, among others. Studies such as those by Junco (2012) indicate that the simultaneous use of media that is not related to the subject of the class (such as the use of Facebook, for example) impairs the student's ability to process information from the class and to engage in the learning process, resulting in a low performance. The author states that multiple tasks that compete for the cognitive ability that the student possesses can lead to the low performance in tests related to the contents presented in the classroom by the teacher.

In addition to affecting grades and academic achievement, the amount of time needed to complete a task may also be affected. This is what studies such as Bowman, Levine, Waite and Gendron (2010, cited by Burak, 2012) point out, indicating that students who engage in multitasking take longer to complete activities when compared to students who focus only on the tasks of the class. As most of the multitasking in which young people engage are entertainment activities involving electronic devices (such as mobile phones, computers, video games, television, etc.), these end up competing with the classroom tasks which are perceived, by comparison, as boring, thus generating, most likely, negative effects on the learning of the curricular contents.

Other studies on the negative effects of multitasking on the learning process of adolescents and young students (Song, et al., 2013, Cain, et al., 2016 and Schuur et al. (2015) have been found in the literature, all of them addressing learning in formal contexts, especially in the classroom, but in an academic environment.

In what concerns the secondary education, a study of multitasking behaviour and its implications for the management of adolescent students' tasks was identified after extensive research. Machado (2014) undertook an experiment with two projects that had as focus to introduce task management in adolescent students, since in the area of video game production it is necessary to develop the habit of concentration by activity. The author points out that in the first project (in which there were several activities to be performed) the students assumed multitasking behaviours, making several mistakes and keeping poor organisation, thus obtaining poor results. In the second project (for which it was stipulated the need for a framework of activities with previous planning) the situation was reversed. With the required planning, the students recognised the necessity of hierarchy for the activities, doing them in the planned order being more successful. The author concludes that although there is a need for further studies, the preliminary results show that management techniques are effective in keeping students focused on their tasks.

Given this example, as well as the studies cited in this section, we need to recognise the belief that new generation of youngsters being able to multitask extremely well, with brains evolved to a higher level (Pashler et al., 2013), having brains shaped to perform multiple tasks successfully, is actually a myth. In this case, due attention must be paid to the effect of multitasking on the learning process, especially for adolescents whose education plays a key role in cognition.

Possible strategies to counter the Multitasking trend

Although several studies point towards the aforementioned negative effects of multitasking on cognitive processing, socio-emotional relations and the learning process of teenagers and young adults, it is important to

mention that literature also provides information on possible strategies to mitigate multitasking behaviours, especially in the classroom.

In relation to measures that can be taken in a classroom context, Burak (2012) suggests that, in order to avoid multitasking activities in class, and thus to ensure a better learning environment, the teacher should develop monitoring strategies, by adopting a strategic location in the classroom or by circulating around the room. However, these suggestions fall under the concept of "planning to try to take control of the student's actions", without taking into account the need to create new learning situations that involve the student in an active way in the classroom activities. In a similar way, Flemming, Gillespie and Snow (2014) speak of regulating the use of technological devices in the classroom in order to reduce distractions. For this, they adopt the term "tech-etiquette", coined by Hembrooke and Gay (2003) to represent the establishment of rules for the use of computers and mobile phones in the classroom. This is an interesting strategy but, again, will it be functional? If it is functional, for how long will it be so? Will it be functional in the short- or the long-term? It is necessary to take into account that, in addition to curricular training, the school aims to educate citizens to the world, who must make use of the skills and abilities developed in those years of schooling. In this sense, we believe that this approach would only foster a control attitude, with students merely following the established rules.

Considering as goal of the educational system the formation of active learners, responsible and capable of managing their own learning, we highlight the self-regulation – a decisive factor of learning, both in the traditional pedagogical methodology and in innovative didactic approaches. As Medina wrote in Brain Rules for Baby, "the best predictor of academic success is not IQ but self-control." (Tasgold, 2013). Particularly in the context of modern educational systems (including distance learning scenarios), self-regulation is becoming increasingly relevant, because of the student-centred learning trend (Delen & Liew, 2016). It is therefore of paramount importance that students understand

the relevance of being personally responsible, especially when faced with the common tendency of multitasking.

In this respect, we also emphasise that attention control can greatly affect self-regulation (Vohs & Baumeister, cit. By Tasgold, 2013): therefore, even if traditional methodologies are effective in maintaining attention (e.g., via the creation of rules, the creation of deadlines and attribution of successive assignments and simply the monitoring and supervision) the students' learning status remains at a fairly passive level. And a student passively sitting, accompanying a teacher-centred class can easily be motivated to do other tasks simultaneously. We ask: in a traditional learning scenario, where the teacher still figures as the centre of attention and is responsible for delivering ready-made content and exercises (in both face-to-face interaction or teacher-centred distance learning), are the students' interests taken into consideration? If our answer is "no", we recognise that there is another essential component of the self-regulation process – willpower.

Students, as postulated by John Medina (again quoted by Tasgold, 2013) "do not pay attention to boring things" In this sense, and as interest is the basis of school performance, it is possible that the traditional format of the class (still quite common nowadays) motivates the practice of multitasking. Therefore, we believe that digital technologies can be added to new teaching and learning practices that place the student in an active role as an architect and producer of knowledge. In a distance-learning scenario, digital devices can also be introduced in a similar way to improve learning.

As self-regulation is not an innate trait, students can improve their ability with extensive training and a growing self-awareness of the learning process (organisation and transformation, goal setting, recovery and memorisation), stimulation of the will to learn, and establishment of an adequate learning environment (Delen & Liew, 2016). In addition, the use of digital technologies can help create a supportive learning environment where students can simultaneously collaborate, share, create and

rationalise learning through information technology and internalise and automate self-regulation skills (Wu, 2015; & Liew, 2016).

The strategic redefinition (Cheong et al., 2015) can also be an effective methodology to control the digital distraction of students, who need to have appropriate rules created by teachers by means of mediated practices and functional integration of technologies in class. It is understood that in the strategic redefinition it is necessary to use verbal or gestural instructions (such as the teacher's facial expression, eye contact or gestures), when the students are using digital devices, which can contribute to establish a standard of use of these resources in the classroom and thus achieve the pedagogical objectives.

Regarding the use of computers and other resources such as mobile phones, it is important to remember that students are always more motivated and interested when these devices are introduced. Computer use can provide more entertainment in the learning process, limiting dispersion of attention, since learners are usually less distracted when the task is relatively more challenging (Tasgold, 2013). It is also important that students use the computer rationally as a tool to solve problems that arise in the learning process. In this case, one can take advantage of the forms of interaction provided by the Internet to achieve goals, such as using Google Docs to help the development of collaborative writing; the submission of task works by Dropbox, to ensure its accomplishment; and the use of forms of online assessment to elicit the incentive of completing the work.

The formulation of new teaching methodologies that focus on a process of inter and self-learning with productive and creative use of digital technologies could contribute to the encouragement of students to avoid the practice of multitasking in classes. In fact, when participating in challenging processes with the purpose of searching for information, providing solutions to problem situations, or creating products – with the consequent construction of their own knowledge – students could make use of the resources to collect data. In such situations, even if they searched simultaneously in more than one source, opening more than one

window at a time, they would remain focused because they would need to look for answers, and thus cognitively engaged in the task.

To illustrate a productive use of technologies and to avoid multitasking in the classroom, in particular, we highlight the work of Moura and Carvalho (2011) on learning mediated by mobile technologies in the classroom. The authors carried out a study with secondary school students in Portugal with the purpose to integrate the mobile phone as a learning tool in a formal context of education. With the experience, the researchers demonstrated that students could perform various school tasks through the mobile phone, reinforcing this technology as a learning enhancer when employed in a methodological process that exploits its potentialities. A device that is common in multitasking practices – such as the mobile phone – can then also assume a pedagogical function by being included in a learning situation, planned for educational purposes, thus contributing to the engagement of students in the proposed tasks.

It is clear that the best way to avoid the negative effect of multitasking is to identify the main reason(s) for the distraction or for lack of ability to concentrate in the classroom and to treat it properly and effectively through the formulation of strategies that also involve the use of digital media accessible to students. In addition, the Internet also provides more possibilities for pedagogical activities: innovation in the form of teaching is crucial to maintain the curiosity and motivation to learn and to ensure concentration.

Conclusions

Recognising the relevance of expanding knowledge on multitasking for teachers and education specialists, and based on theoretical principles pointed out in this article by scholars in the field of psychology and neuroscience (whose work discusses both concepts and implications of multitasking), we believe that this research is useful for understanding the practice of multitasking and its interference and impact on the learning process.

From the analysis of the data identified during the study and production of this document, we draw the following relevant conclusions about the multitasking dimension.

The impact of multitasking on the socio-emotional domain is perceived predominantly as negative, however, it is important to note that several authors (Yang et al., 2015; Schuur, 2012) mention that there is still little knowledge about the chronic effects of multitasking behaviours on the social and personal wellbeing of adolescents, and therefore there is a need for more in-depth studies on this subject.

In relation to the cognitive implications, we highlight the influence of multitasking on information processing, that is, multitasking behaviour can cause a wider dimension of attention (Uncapher et al., 2015, Lui & Wong, 2012), disrupting the ability to differentiate between important information and distractions and to focus on one main task (Baumgartner et al., 2014; Moisala et al., 2016).

In the case of adolescent or young learners, we conclude that it is imperative to elaborate learning situations with strategies that help the student develop the envisaged skills and competences, thus improving attention and avoiding multitasking behaviours. To that end, we acknowledge that by citing strategies to mitigate this behaviour in school, such as the regulation of the use of technological resources in the classroom (Flemming, Gillespie & Snow, 2014); teacher monitoring (Burak, 2012); self-regulation (Vohs & Baumeister, quoted by Tasgold, 2013) and strategic redefinition (Cheong et al., 2015), we have pointed to such questions as: should teachers inhibit the use of technological resources in the classroom? Is such inhibition sufficient? Or would it be important to take into account in the planning of pedagogical activities the creation of conditions for the creative and productive use of these resources, motivating the student to become involved in the learning process?

With this document, we want to believe that we "plant" a seed, from which other stakeholders can walk the paths that have been opened or develop new research on other perspectives. In this sense, we believe

that we need to continue to investigate how technology is used in particular in the Portuguese educational context and the potential positive, negative (or neutral) effects resulting from this use. On the other hand, it is important to investigate the use that students make of technology in informal settings and its implications for learning. It is also believed that greater knowledge of how students learn will contribute to an improvement in pedagogical practices enriched by technology.

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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[1]), 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

[1] 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[2] 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

[2] 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) [3], 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

[3] 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 innumerous 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 psychical 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 Almeira, 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 (Pinheiro 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.

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

		N	%
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

Positive sensations	*Intensity*		*Frequency*	
	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
Average of the averages	**7.3**	**-**	**7.3**	**-**

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

Negative sensations	*Intensity*		*Frequency*	
	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
Average of the averages	**3.9**	**-**	**3.4**	**-**

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[4]. 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.

[4] In Europe, dropout rated 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									
					Levene Test for variance equality		**T-Student Test for average equality**		
Feeling	**Answer**	**N**	**Average**	**Standard deviation**	Z	Sig.	T	Df	Sig.
Concern	Yes	14	3.93	1.86	19.692	**.000**	-2.683	16	**0.022**
	No	12	5.58	2.02					
Frequency									
Impotence	Yes	14	2.36	1.34	7.235	**0.013**	-2.284	24	**0.048**
	No	12	4.42	3.06					
Worry	Yes	14	4.71	1.59	10.071	**0.004**	-2.384	24	**0.035**
	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 is 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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Competence-oriented e-Learning Design

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Introduction

The expression e-Learning can be adopted with many different meanings, the most frequent of which refers predominantly to the access to "online" resources such as digital contents or platforms. Such a technical oriented description, however, risks to activate a "paradox effect", if adopted in formal or non-formal educational contexts to qualify learning processes. It could favour an ingenuous acceptance of the adoption of digital technology by teachers, trainers and organisations as sufficient evidence of quality, inclusion and innovation, with a consequent diminishment of the focus on the educational sciences criteria that should foster better learning.

In the following paragraphs, I will present other dimensions of e-Learning design that hopefully can help tech savvy teachers and trainers to prevent the above-mentioned risks. A recursive method for the analysis of learning processes will be discussed as a decision support tool that enables teachers and trainers engaged in e-Learning design to focus on the problem setting stage before proceeding with the production and implementation of contents and learning environments. Discussions and examples will be limited this time to the circumscribed field of Adult Education.

Reflecting upon the goal of the project

The reason why a trainer, a teacher or an organisation opt for technology enhanced learning paths are strictly dependent on the kind of problems they are willing to solve. It could be, for example, an effort to overcome

access issues due to distance, illness, or imprisonment. Another frequent goal addressed by e-Learning solutions is connected with the flexibility in curriculums and interactions in order to allow people who work to regulate their effort and plan their time schedules. While these two examples represent social-inclusion concerns, other categories of goals can be oriented by strategic needs of employers such as training huge numbers of workers within a short period of time, without investing their time in travelling abroad or in absence from work.

A common goal in Adult Education has also a methodological nature in terms of offering scaffolding and language support to people who are probably not accustomed to study anymore. Other approaches could favour the opportunities that new media offers, such as: new content formats; asynchronous collaborative activities; research-based environments; self-paced exercises; complex simulations; interactive case studies; social networks.

In any case, instead of starting by "what learning process we need to design", we should ask ourselves "what is the goal of the overall project", which will help to define boundaries, and bring us to reflect upon the various e-Learning or web-enhanced options of activities.

Scenario Analysis: The Sociocultural Dimension

After the learning gaps or needs that gave birth to a specific Project have been analysed, stating specific learning goals is generally indicated as the first stage of activities design. However, in Adult and Inclusive learning it is necessary to dedicate time to collect data that will allow us to define accurately the Scenario in which learning will occur.

Understanding sociocultural aspects of the potential participants will allow us to build upon their potentiality and at the same time reduce common errors in e-Learning design. The main question here is: What sociocultural dimensions of the learners should be considered as resources or constraints? Some cultures or professions, for example, require adults to exercise better oral than written communication skills. The initial lack

of written communication skills could cause, for example, the inhibition of participants in asynchronous discussions.

Another recurrent issue regards the perceived meaningfulness of described situations and examples provided by learning resources, when the participants are heterogeneous groups by age, cultural background or work-related experiences. In order to engage all participants, in this case, we will probably need to provide a variety of cases and examples that can be perceived as relevant or create dialogic activities where sense-making grows from the sharing and discussions of their own stories.

Discovering the sociocultural dimensions of the scenario is the key that allows teachers, trainers and designers to contextualise their choices in order to optimise comprehension, participation and communication. Cultural backgrounds, personal experiences, professional activities should be considered in this process as well as a whole set of beliefs embedded in tradition, religion, ethical values. Moreover, previous experience and self-regulation skills could have a strong impact on "learning how to learn" in technology-mediated environments.

In traditional courses, many of these aspects of the Scenario will be observed through the course. The expert teacher or trainer will be able to quickly adapt their materials, activities and ways of communicating after his initial contact with the learners. Online courses, however, are often difficult to modify quickly due to the technical dimensions implied in content production, especially when an e-Learning course is offered as a self-paced and content-based path.

Obtaining information about each one of the participants beforehand would be certainly useful to design meaningful learning activities but collecting personal information is seen nowadays, in many countries, as an operation to be avoided due to privacy related politics or laws. When the use of surveys and questionnaires are allowed, the number of responses will be probably subject to "opt-in/opt-out" choices of the candidates. The content of the responses will probably be filtered by procedures that ensure data as being anonymous.

The sociocultural Scenario discovery will often require other sources of information when designing a new course. Some information about the sociocultural aspects of the potential participants, although not collected from primary sources, could be inferred, for example, from the goal definition of the project and the criteria for selection of participants. That's probably the reason why the definition of a more specific target characterises great part of the e-Learning initiatives. One size, as a rule of thumb, does not fit all and communicating the criteria for target definition to potential participants is one of the "good practices" of the field.

Scenario Analysis: Time and scalability

The variables that present themselves as necessary constraints in the Scenario Analysis are Time and Scalability. Time frames available, certified total time dedication and time needed to complete each activity have to be considered in order to guarantee a feasible and well-balanced learning path. Whether some types of activities are feasible (or not) can be further affected by the actual, or the potential, number of people contemporaneously engaged in a course or learning event, as well as the number of tutors/moderators assigned to the course.

Calculating the time needed to complete a set of e-Learning activities, in fact, is a task not to be confounded with the sum of the duration of media contents. One hour of well-designed video lessons, for example, could correspond to 2 or 3 hours of seat time in traditional lessons, depending on the complexity and completeness of the subject presented, due to the lack of undesired redundancy, improvisation or interruptions for clarifications. Presenting and discussing contents in presence is a communicational process modulated also by the reactions of the learners, while video lessons are frequently produced with the assumption that the main modality of interaction between the learner and the video, at the first attempt, is comparable to "reading" more than "participating".

Dialogical, interactive or collaborative activities, require different parameters of calculation in terms of time needed to completion since the

communication processes in online courses are supported mainly by asynchronous environments such as forums, wikis, blogs, and myriads of collaborative tools for media, storytelling, essays or timeline productions. In asynchronous communication, reading the contributions of colleagues and "keeping up" with discussions could be a time-consuming activity depending on the number of active participants.

Defining framework references

When the goal of the project is clear and the analysis of the scenario has allowed us to 'downsize' and contextualise our initial ideas, it's time to proceed with a more structured approach in order to define the learning outcomes of the course.

Learning outcomes are the expected results of the learning processes and activities and should be stated in terms of gained advancements in knowledge, skills and competences. These statements will help us in designing activities that are coherent with the expected results but, at the same time, will allow us to share with the learners a transparent set of descriptors that will inform assessment and evaluation.

The statement of learning outcomes is also the key for the comparison of certificates, curriculums, and personal portfolios at an international level, especially in case of students and workers mobility. Many organisations maintain collections of competence descriptors and level definitions organised as shared frameworks to be considered as standard references for educational activities or job descriptions. Therefore, before writing the learning outcomes of a specific course, path or activity, it is necessary to identify those resources that sometimes may include normative constraints as well.

Frameworks can be generic or describe a specific domain. The European Qualification Framework (EQF), for example, was developed to define the levels of competence to be obtained at the end of each of the 8 cycles of studies in European countries. It does not specify subjects or mandatory curriculums. Competences are described in terms of responsibility and autonomy. Level 3, for example, is described as: "Take

responsibility for completion of tasks in work or study; adapt own behaviour to circumstances in solving problems", while level 4 states: "Exercise self-management within the guidelines of work or study contexts that are usually predictable, but are subject to change; supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities".

Another European framework to be considered, although it's created for higher education, is the Dublin Descriptors, which distributes knowledge, skills and competences, for each EQF level, in 5 dimensions. This model reflects the responsibility of educational systems as promoters of the development of "competences for life", beyond the acquisition of static domain-specific knowledge. Such knowledge, due to the permanent state of social and scientific changes, could suffer the effects of obsolescence. Learning outcomes, in this framework, will comprehend the following dimensions: Knowledge and Understanding; Applying Knowledge and Understanding; Making Judgements; Communication; Lifelong Learning Skills.

More specific frameworks could define European regulated professions, regional qualifications, and national curriculums. Domain-related frameworks are also developed by professional associations or non-profit initiatives, for example: the European Language Portfolio, the international WONCA family doctor's core competencies, the OECD Job Families framework.

Stating course-specific learning outcomes

Learning outcomes are stated using appropriate verbs. The basic idea is to respond to one single question: "At the end of the course, which advancements in knowledge, skills and competence will be obtained by the learners through engagement in the learning processes proposed?"

Stating Learning outcomes is a task that implicates many revisions. There is a huge difference between ideal learning outcomes and realistic learning outcomes. Considering scenario variables and other constraints as regulating criteria, will help us to define the boundaries in

which learning can occur, but it is also important to understand if in order to reach an outcome it will be possible to design appropriate activities.

It is possible to understand this classical dilemma of instructional designers and teachers considering the following case: the goal of the project is to let participants communicate effectively in the workplace. The course is supposed to be offered online, with a maximum of 4 hours of dedicated time. Since it is a mandatory course in the curriculum, there will be hundreds of participants. The quick and budget solution would be apparently a self-paced course format, with rich video content, support forums and interactive quizzes… but in reality, this would allow the participants only to acquire some concepts about communication. They would not learn how to communicate, since they are offered no opportunity to "communicate"! There could be some effort from the designers to build highly interactive simulation environments – which require huge budgets – or the students could be organised in small groups and followed by moderators that would debrief and organise short role-playing activities – which require specialised staff. If neither one of these two hypothetical results is feasible, the teacher could conclude that the learning outcomes would regard only the comprehension of theoretical content or some level of skills connected to the analysis of cases.

Concluding, in order to refine the statements for the learning outcomes of a course, it is useful to proceed after the first draft, with a cycle of "proofs of concept". The proof of concept, in this case, should demonstrate that certain assumptions are feasible. Well written learning outcomes are built upon the type of cognitive, relational or communicative actions that should be activated by the learner.

Balancing learning outcomes and learning activities

Learning design requires coherence in balancing learning outcomes and online learning activities. Coherence is the principle that enables educational effectiveness in all educational settings. However, teachers and trainers generally perceive the orchestration of meaningful e-Learning activities and events as an ill-structured problem with too many

indefinable variables. Helping teachers and trainers to overcome these uncertainties is one of the goals of The Project Better-E, supported by 2015 Erasmus+ EU funds. One of the outputs of the project is a decision support tool for Competence-oriented e-Learning design. It comprises also a section of reminders selected by the research team in order to support teachers and trainers in quick prototyping decisions and fine-tuning of the learning outcomes.

Table 1. A section of Better-e Competence-oriented e-Learning design tool

- A learning activity can contribute to develop one or more dimensions of a competency or of a group of competencies, depending on the methodologies chosen.
- Chose appropriate environments and tools to enact EACH PHASE of the process.
- Consider the learning curves before using new or complex environments.
- For each learning activity, plan the actions taken by the learners (autonomous study of resources, structured tasks, unstructured tasks, formative evaluation, summative assessment).
- Adult learners need some level of flexibility in time schedules and choices of activities.
- For each learning activity, plan the actions taken by the teacher and or the tutors (orientation, scaffolding, regulation, moderation).
- Personalisation strategies require also well-defined boundaries.
- Learning resources that present content should be coherent with the learning activity planned.
- Learning resources that activate collaborative tasks should define clearly the schemes of interaction and/or phases of production.
- Automated interactive resources should provide meaningful reactions (beyond manipulation), embedded motivational features (feedbacks, advancement), immediate analysis of results.
- Formative evaluation should enable learners to reflect upon how to bridge their gaps.
- Summative assessment processes and tools should be coherent with the kind of learning processes activated.
- A pedagogical approach to analytics and monitoring tools should prevail instead of simplistic accountability reports.

The list is available online as an output of the *Better e-Learning for All* project, published in 2017: it can be used autonomously by teachers and trainers or as a canvas for teamwork.

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Better-e Competence oriented e-Learning design tool – https://docs.google.com/forms/d/1Urkk9KMTowDPueJSaHN8srQ-ZJ0PiwqNFkk8mFpxFP8/edit?usp=sharing

EQF Framework
https://ec.europa.eu/ploteus/en/content/descriptors-page

Dublin Framework
http://ecahe.eu/w/index.php/Framework_for_Qualifications_of_the_European_Higher_Education_Area

European Language Portfolio
http://www.coe.int/en/web/portfolio

WONCA family doctors core competences
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Video pedagogy and online courses

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Introduction

The use of moving images in didactics is not a new phenomenon. Starting from the 1960s, research straddling communication science and education science dealt with the relationship between didactics and images according to the double declination, of education "on media" and "with media". Reference is made, in the former case, to the semiotic paradigm based on the central role of languages and meanings (media as a subject of analysis and study: education on film, television and images); and in the latter, to a technological paradigm, functional to the use of audiovisual codes in the representation and transmission of didactic contents to support and enrich teaching/learning processes (with scientific films, educational or didactic TV programs, etc.). However, when we go back critically through the use of the classic forms of audiovisual communication *for educating*, we realise how, alongside the initial enthusiasm that accompanied educational film and subsequently educational TV, this did not then lead to their systemic application in schools and universities (Ranieri, 2011).

Due to its characteristics – simplicity of use, low cost, integration with multimedia tools, etc. – digital video seems more suitable for use in didactic processes. Between the 1970s and 1980s in Italy, the debate on the use of the analogue video as an educational resource testifies the interest of the scientific community in this technology (Bettetini, 1979; 1984; Laeng, 1980; Galliani, 1984). Today, potential is clearly higher and there are signs of a change taking place. Our idea is that, if guided with

didactic awareness, videos can fulfil rich and stimulating functions from a pedagogic point of view and provide a valid support for teaching and learning processes.

To ensure that this happens, it is important to be aware of a series of principles and guidelines based on scientific work performed in the area of cognitive psychology and instructional design:

- The cognitive load theory (Sweller, 1988; 2010),
- The cognitive theory of multimedia learning (Mayer, 2009),
- The work of Clark and Lyons (2011) on the communication and psychological functions of the different types of images for didactics, and
- Research by Allan Paivio (1990) on the dual-coding theory, relating to the different coding of verbal and non-verbal information by the human cognitive system.

The theory references resulting from the integration of these areas can provide useful indications for instructional design or for lecturers intending to make use of video and multimedia resources in their work. Aware of the fact that it is not possible to summarise the aforementioned theories, to which reference should be made for necessary in-depth understanding, the chapter will provide a series of useful indications for the *Better-e* project.

Videos and didactics

In current educational practices, the use of video communication has increased greatly from a quantitative point of view. The digital contents for interactive whiteboards, video lectures and tutorials that get millions of viewings on YouTube, the new visual "Esperanto" comprising multimedia presentations, and the students themselves who use videos to communicate what they have learnt, testify the key role of educational videos in didactic processes, in formal and non-formal contexts. The importance of the use of digital videos in quantitative terms must however be supported, as mentioned, by scientific evidence that can also guarantee qualitative use, in order to prevent the disappearance of pedagogy and the transformation of the students into users of online video contents. A series of indications is provided below

If didactic videos are connected to specific learning objectives, unlike popular videos, they must have, on the one hand, less spectacular and more didactic language and, on the other, a thematic and single-concept-based structure. A linear presentation is recommended that steers away from digressions that could lead off the track.

It is also necessary to watch out for the use and combination of different communicative codes: a high cognitive load, determined by high quantities of information presented simultaneously at high speed, could reduce learning potential (Tversky, Morrison & Betrancourt, 2002). Videos are texts rich in meanings, the understanding of which requires observational and inferential skills that depend on personal skills and therefore vary from person to person. The evolution of research on the cognitive load offers clear indications so as not to overload the working memory of the learners (Sweller, 2019; Mayer, 2009). For example, the communicative elements that are used to attract attention on TV could prove to be distracting in a didactic video. The excessive use of spectacular images and animations could attract students, but without giving them any benefits in terms of learning. More generally, in the indications provided in literature, there are various functions of visual communication in the learning processes functional to the construction of the "making of pedagogical meaning":

- Visually describing facts and experiences;
- Offering diagrams and symbols to shape concepts;
- Guiding the thought process and interpretation to shape principles;
- Replacing mental operations;
- Presenting models to promote performance and skills;
- Providing external stimuli to feed the imagination and creative thought;
- Stimulating intuitions, representing different points of view and the complexity of situations;
- The possibility to simplify abstract and complex concepts through the visualisation of concrete examples, simulations and behavioural models;
- Provoking questions and promoting cognitive processing;
- Varying the degree of formalisation according to the type of message to be transmitted;

- Increasing the degree of attention and participation through: a) contact between students and experts in the subject featured in the video; b) more immediate understanding than that based on the verbal communication that audio-visual language possesses;
- Stimulating perceptive and visual/spatial intelligence.

From a technological point of view, digital videos have a series of characteristics that promote the possibilities in didactic processes:

- Potential for using resources from numerous online databases;
- Digital players allow teachers and students to perform slow-down, pause, and acceleration operations. This allows more analytical and in-depth viewing and a personalised result functional to the understanding capacity of the individual students (Lowe, 2004);
- Editing software allows: a) short video fragments to be isolated containing significant didactic information; b) the most significant parts of different videos to be assembled;
- Potential for personalising self-produced videos or archived with interactive functions (video annotations);
- Potential for self-producing audio-visual didactic resources with the use of accessible technologies in terms of costs and use.

Methodological indications

The didactic potential of the video is naturally only exalted through a clear methodological framework. According to Bell and Bull (2010) pedagogical videos must depend on the relationship between the specific contents of the different subjects and clear methods of related use. The stimuli offered by audio-visual representation to be transformed into the acquisition of significant knowledge and then contribute to the construction of complex meanings must be subject to reporting/reasoning processes through constructive discussion and debate with the class (in face-to-face situations) or in extended groups (in situations open to network logics) (Pontecorvo, Ajello & Zucchermaglio, 2004).

The applications developed over recent years such as the ones that allow *video annotation* are helping to move in this direction. Video annotation is a technology that is widely used in North America allowing the passive and transmissive use of video with an active, participative, reflexive mode, through the addition of a series of hypertext functions,

synchronised in time. Data can be found in literature on the didactic effectiveness of video annotation in the field of training, highlighted by scientific findings (Tsiatsos et al., 2010), and by the commitment of many universities to the development of technologies and tools able to guide observation and promote critical thought (Rich & Hannafin, 2008). Rich and Hannafin have drawn up a critical collection of tools in that area for the purpose of supporting the training of teachers, but there are many fields of application and the phenomenon is in the early stages[1].

Video lecture

A video lecture is a kind of video designed especially for use in teaching and learning settings, as a didactic text to support or replace a lecture. The natural application setting is the e-Learning setting, but these texts are increasingly being used in face-to-face education as extra material or in *flipped classroom* situations. The advantage of this didactic format is immediately clear in that the authoritativeness of the contents due to the presence of the lecturer in the video are combined with the visual exemplification of the concepts covered, which reinforces their communication. The didactic limits of video lectures, unless performed according to clear methodological principles to overcome fashionable technological suggestions, also appear to be just as clear. Video lectures as multimedia texts must not depart from the indications provided by the research activities mentioned in the introduction.

Structure (format) of the video lecture and methodological aspects

In the spirit of the article, functional to supporting the didactic material construction process for the *Better-e* project, we will attempt to provide a series of methodological instructions on the preparation and use of video lectures. The template of the video lecture normally relates to a digital adaptation of the classic didactic setting, providing a picture of the

[1] Some tools for video annotation: dotSUB for subtitling, VideoANT for inserting comments in videos, Vialogues, for launching and managing discussions on a video, TED-Ed Lessons Worth Sharing, for personalising videos and including assessment tools.

lecturer and, alongside him/her, a screen that acts as a multimedia board. Sometimes, the picture of the lecturer may disappear to allow the student to concentrate on the multimedia presentation and the narrated text. Other object enhanced didactic materials may be associated with the video lecture, which allow more in-depth features to be used such as video annotation. The advantages are identified below:

1. *Personalisation of the learning processes.* Personalisation can be two-fold: internal to the video lecture, through different levels of interactivity: pause in the video to think about what is being studied, possibility to see parts of the lecture again, possibility of hypertext and participative methods; and external to the video, through the restricted use of space and time barriers.
2. *Planning by the lecturer* The communication activated through the video lecture (in its transmission part) is one-directional in the same way as a text book. The advantage of this method depends on the possibility to plan it completely, hence allowing repetitions to be eliminated, more objective and synthetic structuring, richer and more appropriate vocabulary and completeness in terms of information.
3. *It reduces exposure times.* Better communication in the presentation of the contents of the lecture, along with better concentration by the student, allow the knowledge transfer times to be reduced: a 45-50 minute classroom lecture can normally be concentrated into about 15-20 minutes. Naturally, regarding the duration of video lectures, alongside the didactic/communication problem there is a legislative issue.
4. *It facilitates memorisation.* The study strategy is based on seeing the video more than once, according to personal requirements; pausing to think, take notes, summarise, research in greater depth by consulting other sources; reviewing for a first and personal self-assessment process. These techniques are strategies to facilitate both self-assessment and understanding of content, and the transfer of information from working memory to long-term memory.
5. *It facilitates concentration.* Video lectures are watched very close up and involve physical involvement (to navigate, listen, take notes, do further research) and a high degree of participation. The screen occupies most of the visual field since the video is watched at a distance of about 50-70 cm. Watching the video at a desk, particularly using headphones, promotes concentration and eliminates many elements of disturbance in the classroom
6. *The simultaneous use of various codes of communication makes the didactic message more effective*. Oral, immediate, spontaneous and transparent language leads to involvement and possible codifications that specify the meaning of a presentation. Visual examples of abstract concepts, visualisation of practical examples through using graphs, photographs, animations, etc. increase didactic communication. Images have such clear didactic potential that no-one can consider doubting (Garito, 2008).

In practice, if well planned, video lectures enable original and special learning methods to be applied by combining the linearity and organisation of the written text, with the subjectivity and personal involvement typical of oral communication (Garito, 2008), and the potential in terms of greater reflection and critical skills determined by the hypertext tools. Below is a series of methodological indications on using video lectures:

A – Video lecture (introductory)

The lecturer introduces theirself to the student and introduces their course, with the aim of:

- Emotionally involving students so that they can promote their interest in the subject and their active participation in the didactic process; for that purpose colloquial language is recommended;
- Providing detailed information on the objectives of the course and any pre-requisites; in this case, it is recommended to use synchronised lettering (lecturer's text and full text or lecturer's text and key words). The communication of the didactic objectives allows the student's energy to be directed towards a defined task, offering the possibility to check the skills acquired through self-assessment tools;
- Contextualising the study of reference texts and/or any more detailed didactic material within a general framework in order to prepare the student's cognitive matrix for the learning process. In a distance learning course, it is important to direct the student towards a correct method;
- Presenting the didactic units that comprise the whole module.

B – Subsequent video lectures

- Introduction by the lecturer of the objectives and contents of the lecture, also indicating the right study method and references to extra materials;
- Covering the subjects of the lecture with the possibility to view the general structure of the lecture;
- Conceptually and graphically highlighting the passage from one subject to another;
- In the conclusions, summarising the subjects covered and presenting any questions for self-assessment of learning.

Finally, it is recommended to use the video lecture, naturally with the classic instruments used in e-Learning situations, but also with some web

conference sessions, for each module. Web conference sessions determine communication processes marked by rich and complete information, thanks to the possibility to reduce the risks of misunderstandings that can arise with asynchronous communication. Its potential for interactivity, use with different types of language, and above all the presence of social indicators, make web conferences a very similar means of communication to face-to-face ones.

The combination between asynchronous video lectures and web conferences in synchronous mode can make the didactic process equivalent, if not superior, to classroom lectures. Face-to-face didactic communication is marked by a series of characteristics that, through feedback and relationships with students, lead to the continuous reformulation of the knowledge construction process. Asynchronous didactic communication typical of video lectures does not allow mistakes to be handled in the absence of discussion at the time of the transmission of contents, therefore, the lecturer moves based on hypotheses. According to some studies (Garito, 2008) what appears to be a didactic limit in media processes can lead to a series of advantages, as long as interactive tools are used alongside the asynchronous use of the didactic materials.

In university classrooms where highly formalised rules of communication are in place, the authoritativeness of lecturers does not stimulate relations, especially for students who are particularly shy. These relations are even more complex in situations where there are numerous students. According to a series of research work (in Garito, 2008) interactivity during a face-to-face lecture is very low – only 5% of the lecture comprises student participation. In a situation where there is no immediate interaction, students, particularly those with fewer skills, can prepare better for dialogue. They can independently study the contents of the lecture and then take part with more confidence and awareness in the relational and interactive moments.

Conclusions

It has been seen in this article how, through the use of audiovisual resources in their different forms – educational videos, video lectures, web conferences – video pedagogy can make an important contribution to the e-Learning sector. This is true as long two conditions are satisfied. The first refers to the production and use of scientific evidence that has been investigated over recent years. The second refers to the lecturing profession: video pedagogy must be accompanied by changes to teaching methods if we want to ensure that the methodology has a significant impact on learning processes. This aims to be the reference context of the *Better e-Learning for All* project.

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A Multicultural Examination of the Dropout Problem for e-Learning Courses

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Introduction

While the number of online programs is increasing all over the World, new problems, such as student dropout still occurs in these programs. High dropout rates, which are acknowledged as one of the main concerns of e-Learning settings (Yükseltürk, Özekeş, & Türel, 2014), refer to high proportions of students not completing an online course. Thus, for many researchers, examination of the factors that provoke dropout in e-Learning has been a popular topic for the last two decades.

According to Lee and Choi (2011), learning environment, institutional support and characteristics of learners are the main components to explain or predict the reasons of students' dropout from online courses. Similar studies also grouped those components as internal and external factors of dropout. Lee and Choi (2011) found that more than 55% of the dropout reasons stem from students' personal issues. Deci (1996) stressed the importance of motivation, which is essential to follow a learning goal or address particular learning tasks. Also, lack of motivation is regarded as one of negative predictors of continuation of an educational program (Deci & Ryan, 1985). In his study, Gonzalez (2015) used a survey comprising four factors: intrinsic motivation, extrinsic motivation, lack of motivation, and retention of e-Learners. Gonzalez found that intrinsic and

extrinsic motivations have positively correlated with retention while lack of motivation has negative effects on retention.

Learners' dissatisfaction about the learning environment is another essential element while examining the dropout of online students. Sun et al. (2008) have attempted to explain learner satisfaction with a model and revealed that learners' satisfaction was affected by several factors, including e-Learning course quality, perceived ease of use, instructor attitude, perceived usefulness, and computer anxiety among learners. Taking these factors into consideration leads to higher levels of student satisfaction, which is vital for successful e-Learning programs with fewer dropouts.

In various studies, researchers have focused on a variety of factors that influence students' persistence in e-Learning programs. To exemplify, Lee, Choi, and Kim (2013) concluded that metacognitive self-regulation skills and academic locus of control are the most substantial factors affecting students' dropout behaviours. One should keep in mind that factors may differ based on the characteristics of an e-Learning program and the learners. In this study, we mainly focused on the motivational factors asserted by Gonzalez (2015) and students' satisfaction introduced by Sun and his colleagues (2008). For this study, we determined the following research questions:

1. Do learners' views about lack of motivation, retention, and dropout intention vary by gender?
2. Do learners' views about lack of motivation, retention, and dropout intention vary by their marital status?
3. Do learners' views about lack of motivation, retention, and drop out vary by their countries?
4. What are the correlations between learner attitude toward computers, learner Internet self-efficacy, instructor response timeliness, lack of motivation, retention and dropout?
5. What are the correlations between course dimension, e-Learning course quality, technology quality, lack of motivation, retention and dropout
6. What are the correlations between internet quality, perceived usefulness, perceived ease of use, lack of motivation, retention and dropout intention

Methods

In this study, a quantitative survey method was preferred. In total, 208 adult e-Learners (83 male and 125 female students) participated from Turkey, Italy, and Portugal. The proportions of participants according to each country are provided in following table (Table 1).

Table 1. Proportion of the participants according to countries

Country	Frequency	Per cent (%)
Italy	83	40
Turkey	100	48
Portugal	25	12
Total	**207**	**100**

Data were collected by an online questionnaire form comprising eleven demographic questions, including gender, marital status, monthly income, number of online courses taken, drop-out history, age, educational level, number of hours spent in online courses, and the cost of e-Learning programs.

In addition to demographics, two reliable and valid surveys were implemented. The first survey developed by Gonzalez (2015) with 22 items and four dimensions including intrinsic motivation, extrinsic motivation, lack of motivation, and retention were used. Cronbach Alpha reliability coefficients were reported as 0.97, 0.89, 0.85, and 0.92, respectively. The second survey was developed by Sun et al. (2008) to determine the students' satisfaction in an online setting, which comprised 36 items and 14 sub-factors. Cronbach Alpha coefficients were calculated around 0.70 that can be regarded as a reliable survey.

Descriptive analyses such as frequency and percentages were used for demographics. For the comparison of two variables, an independent sample t-test was preferred with mean and standard deviations. Also, Pearson correlations were used to calculate the correlations among factors.

Findings

Findings of the study were provided according to the research questions below.

1. Learners' views about lack of motivation, retention and dropout intention based on their genders

Table 2 presents the t-test results conducted to explore the differences between learners' views about lack of motivation, retention and dropout intention depending on their genders.

Table 2. Independent Groups t-test Results of the Gender Variable

	Male N=83		**Female** N=125			
Variables	**Mean**	**Sd**	**Mean**	**Sd**	**t**	**p**
Lack of motivation	2.35	1.15	2.20	0.93	1.02	0.30
Retention	4.10	0.70	3.88	0.67	3.07	*0.00
Dropout	2.63	0.81	2.63	0.76	0.69	0.49

Table 2 shows that learners had similar views about the lack of motivation and dropout. On the other hand, the t-test results revealed that a significant difference existed only in retention. According to the mean values, although both male and female learners are agreed with retention, male learners' scores for retention were found at a higher level.

2. Learners' views about lack of motivation, retention and dropout intention based on their marital status

Table 3 displays the t-test results applied to determine the differences between learners' views about lack of motivation, retention and dropout intention depending on their marital status.

Table 3 shows that marital status did not affect learner views about the lack of motivation and dropout. However, t-test results revealed that there is a significant difference between married and single e-

Learners. According to the mean values, although both married and single learners are agreed with retention, married learners' scores for retention were higher. Based on this, married learners tend towards higher retention in e-Learning courses compared to single learners.

Table 3. Independent Groups t-test Results of the Marital Status Variable

	Male N=88		**Female** N=105			
Variables	**Mean**	**Sd**	**Mean**	**Sd**	**t**	**p**
Lack of motivation	2.12	1.04	2.38	1.04	-1.76	0.07
Retention	4.17	0.66	3.81	0.69	3.66	*0.00
Dropout	2.56	0.80	2.65	0.77	-0.74	0.45

3. Learners' views about lack of motivation, retention and dropout intention based on their countries

Table 4 presents the ANOVA results applied to determine the differences between learners' views about lack of motivation, retention and dropout intention based on a country-based variable.

Table 4. Independent Groups t-test Results of the Marital Status Variable

	Italy N=83		**Turkey** N=100		**Portugal** N=25			
Variables	**Mean**	**Sd**	**Mean**	**Sd**	**Mean**	**Sd**	**F**	**p**
Lack of motivation	1.84	0.78	2.51	1.11	2.67	0.90	13.2	*0.00
Retention	4.06	0.65	3.99	0.72	3.57	0.55	4.57	*0.01
Dropout	2.67	0.87	2.63	0.72	2.50	0.65	0.44	0.64

According to Table 4, learner groups from different countries have similar levels of dropout intention. It can be said that e-Learners from Italy,

Turkey and Portugal have a low level of dropout intention. However, there are meaningful differences between learners' lack-of-motivation level and retention in terms of country. Considering mean values of learners, it can be said that e-Learners from Italy have low level of lack of motivation compared to e-Learners from Turkey and Portugal. Additionally, e-Learners from Italy and Turkey have high level of retention compared to e-Learners from Portugal.

4. Correlations between learner attitude toward computers, learner Internet self-efficacy, instructor response timeliness, lack of motivation, retention and dropout

Table 5 shows the correlations between learners' scores for attitude toward computers, learner Internet self-efficacy, instructor response timeliness and lack of motivation, retention and dropout.

Table 5. Correlations between learner attitude toward computers, learner internet self-efficacy, instructor response timeliness, lack of motivation, retention and dropout survey

	Learner Attitude Toward Computers	**Learner Internet Self efficacy**	**Instructor Response Timeliness**	**Lack of motivation**	**Retention**	**Dropout**
Learner Attitude Toward Computers	1.000	—	—	—	—	—
Learner Internet Self efficacy	*0.381	1.000	—	—	—	—
Instructor Response Timeliness	0.081	0.119	1.000	—	—	—
Lack of motivation	**0.402	**0.229	*0.152	1.000		—
Retention	**0.280	**0.269	**0.230	**0.265	1.000	—
Dropout	**0.300	**0.218	**0.303	**0.434	**0.196	1.000

Correlation values on Table 5 shows that learner attitude toward computers, learner Internet self-efficacy, instructor response timeliness have meaningful and positive correlation with retention. On the other hand, learner attitude toward computers, learner Internet self-efficacy and instructor response timeliness are associated with lack of motivation and dropout intention negatively. Based on this finding, as scores of learner attitude toward computers, learner Internet self-efficacy and instructor response timeliness increase, retention also increases while lack of motivation and dropout intention decrease.

5. Correlations between course dimension, e-Learning course quality, technology quality, lack of motivation, retention and dropout

Correlations between course dimension, e-Learning course quality, technology quality, lack of motivation, retention and dropout are shown on Table 6.

Table 6. Correlations among course dimension, e-Learning course quality, technology quality, lack of motivation, retention and dropout

	Course Dimension	**e-Learning Course Quality**	**Technology Quality**	**Lack of motivation**	**Retention**	**Dropout**
Course Dimension	1.000	—	—	—	—	—
E-learning Course Quality	**0.516	1.000	—	—	—	—
Technology Quality	**0.455	**0.360	1.000	—	—	—
Lack of motivation	*****0.278***	****0.161***	*****0.162***	1.000	—	—
Retention	*****0.391***	*****0.327***	*****0.422***	**0.265	1.000	—
Dropout	****0.166***	*****0.204***	*****0.187***	**0.434	**0.196	1.000

Correlation values in Table 6 shows that course dimension, e-Learning course quality and technology quality have meaningful and positive correlation with retention. On the other hand, course dimension, e-Learning course quality, and technology quality are also associated with negative levels for lack of motivation and dropout intention. Based on this finding, as scores of course dimension, e-Learning course quality, technology quality increase, retention also increases while lack of motivation and dropout intention decrease.

6. Correlations between Internet quality, perceived usefulness, perceived ease of use, lack of motivation, retention and dropout intention

Correlations between an e-Learner's scores for Internet quality, perceived usefulness, perceived ease of use, lack of motivation, retention and dropout intention scales are shown on Table 7.

Table 7. Correlations between internet quality, perceived usefulness, perceived ease of use, lack of motivation, retention and dropout intention.

	Internet Quality	**Perceived Usefulness**	**Perceived Ease Of Use**	**Lack of motivation**	**Retention**	**Dropout**
Internet Quality	1.000	—	—	—	—	—
Perceived Usefulness	*0.177	1.000	—	—	—	—
Perceived Ease Of Use	*0.161	**0.465	1.000	—	—	—
Lack of motivation	*0.162	**0.206	**0.270	1.000	—	—
Retention	*0.159	**0.580	**0.524	**0.265	1.000	—
Dropout	*0.116	**0.205	**0.273	**0.434	**0.196	1.000

Table 7 shows those e-Learners' scores related to Internet quality, perceived usefulness and perceived ease of use have meaningful and positive correlation with retention. On the other hand, the perception of learners related to Internet quality, usefulness and ease of use correlate with lack of motivation and dropout intention negatively. Based on this finding, as scores of Internet quality, perceived usefulness, perceived ease of use increase, retention also increases while lack of motivation and dropout intention decrease.

Results and Suggestions

Current research revealed the following results:

- Male e-Learners tend towards higher levels of retention within e-Learning courses compared to female e-Learners.
- Married e-Learners tend towards higher levels of retention within e-Learning courses compared to single e-Learners.
- E-Learners from Italy have low levels of lack of motivation compared to e-Learners from Turkey and Portugal. Additionally, e-Learners from Italy and Turkey have high levels of retention compared to e-Learners from Portugal.
- Learner attitudes toward computers, learners Internet self-efficacy and instructor response timeliness have meaningful correlation with learners' lack of motivation, retention and dropout intention.
- There are meaningful correlations between course quality, technology quality and lack of motivation, retention and dropout intention.
- Internet quality, perceived usefulness and perceived ease of use are each associated with learners' lack of motivation, retention and dropout intention.

Based on results mentioned above, following suggestions have been developed for decision-makers, online course developers and instructors.

- Involved work should be done to increase the retention level of female e-Learners to e-Learning courses.
- The reasons for the low retention level of single e-Learners should be investigated.
- E-learning courses in Italy should be investigated in terms of their pedagogic and technical aspects and benchmarked with other courses. Outstanding features of e-Learning courses in Italy should be disseminated to improve quality of e-Learning.

- E-learning course developers should take into account learners' attitude toward computers, internet self-efficacy and instructors' response timelines during the development and implementation of courses. Necessary measures have to be taken to increase positive attitudes toward computers and Internet self-efficacy of learners.
- Course quality and the quality of technology for e-Learning courses should be taken into account while e-Learning courses are developed.
- One should take precautions to improve Internet and technology quality for e-Learning courses.

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A Systematic Review of Design Factors to Prevent Attrition and Dropout in e-Learning Courses

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Introduction

E-learning's characteristics fulfil the requirements for learning in a modern society and have created great demand from businesses and education (Wu, Tsai, Chen, & Wu, 2006). E-Learning as a learning paradigm is also directed towards Lifelong Learning (LLL) and responds to the challenges of the Europa 2020 strategy, namely in achieving the goals of social inclusion and cohesion (Official Journal, 2011). E-Learning facilitates the access to LLL opportunities to adult learners who prematurely abandon formal education (second chance education). The e-Learning approach is user-centred, is in accordance with the student's needs, availability and specific learning rhythm. This methodology breaks down barriers of time and space. It is anytime, anywhere. It is the ideal situation for those who live far from formal schools, work during the

school opening hours, live with disabilities and cannot relocate to attend school, live in secure institutions, or live with recurring illness.

Worldwide, the e-Learning market has been growing faster than ver (Sun, Tsai, Finger, Chen, & Yeh, 2008), but not without some disappointments (Lencastre, Bronze, Ilin, & Ozonor, 2014). According to Monteiro, Lencastre, Osório, and Silva (2016), one of the biggest setbacks regarding e-Learning is that related to the high rates of attrition (Wang, 2003) that leads to frustration (Wu et al., 2006) (Arbaugh & Duray, 2002) (Thurmond, Wambach, Connors, & Frey, 2002) and to dropout. Dropout rates for e-Learning courses are 15–20% higher than traditional face-to-face courses (Angelino, Williams, & Natvig, 2007).

The problem with high rates of attrition in e-Learning courses has been argued over at length without a clear understanding of what factors contribute to learners dropping out, withdrawing or not completing e-Learning courses. The available research suggests that attrition among adult online learners can be classified into two broad categories: (i) factors related to the learner and his/her context, and (ii) factors related to the course design.

'Better e-Learning for All', an Erasmus+ Strategic Partnership project for adult education, aims to enhance the knowledge about e-Learning as a primary environment for adult education. Thus, the partnership has been studying the e-Learning dropouts and dropout reasons reported in literature in order to identify a suitable 'state-of-the-art' concerning dropout and attrition: this chapter presents the review process and the data obtained.

1. Method

As a methodological approach to gaining the state-of-the-art, the authors followed a systematic review (Gough, Oliver, & Thomas, 2012). A systematic review is a "literature review that is designed to locate, appraise and synthesise the best available evidence relating to a specific research question to provide informative and evidence-based answers" (Boland,

Cherry, & Dickson, 2014, p. 3). Systematic reviews follow well-defined and transparent procedures and always require the following:

1. Definition of the question or problem,
2. Identification and critical assessment of the available evidence,
3. Synthesis of the findings, and
4. The drawing of relevant conclusions.

Systematic reviews aim to find as much as possible of the research relevant to the particular research questions, and to use explicit methods to identify what can reliably be said on the basis of these studies (Gough et al., 2012). Methods should not only be explicit but systematic with the aim of producing varied and reliable results.

1.1. Performing scoping searches, identifying the review question and writing the protocol

As said before, systematic reviews are attempts to review and synthesise existing research in order to answer a specific research / review question. Once a question is formulated, and its theoretical foundations are established, the protocol is written. This protocol describes the steps that will be followed for the review. A protocol describes: (i) the way existing studies are found; (ii) how the relevant studies are judged in terms of their usefulness in answering the review question; (iii) how the results of the separate studies are brought together to give an overall measure of effectiveness. Different questions and different theoretical bases will require different methodological approaches (Gough et al., 2012).

We decided to slightly adapt Boland et al. (2014) nine step systematic review process. While Boland et al. (2014) proposes only one moment for applying the inclusion and exclusion criteria, after screening titles and abstracts and before selecting full-text papers, we argue that having two moments significantly reduces the necessary time for completing the review, especially when having a great amount of initial citations.

The first moment, after literature searching and using Endnote reference manager, quantitative data collected like peer review, published

year, publication type, language will be filtered. That allows a considerable reduction of citations for title and abstract screening, the moment where the remaining inclusion and exclusion criteria will be applied. The following 9 steps will be followed:

1. Performing scoping searches, identifying the review question and writing the protocol;
2. Literature searching;
3. Applying inclusion and exclusive criteria in quantitative data;
4. Screening titles and abstracts;
5. Selecting full-text papers;
6. Quality assessment;
7. Data extraction;
8. Analysis and synthesis;
9. Writing and editing.

The first 6 steps are described in chapter 2 of this paper, step 8 in chapter 3 while step 9 is present in the entire paper, including chapter 4 and 5, Discussion and Conclusion, respectively. Studies included in the review are screened for quality, so that the findings of large studies can be combined. Peer review is a key part of the process; qualified independent researchers control the author's methods and results. For this research, we developed a protocol for the systematic review by following the guidelines and procedures of Boland, Cherry, and Dickson (2014), and consultation with e-Learning specialists on the topic. This protocol specified the review question, search strategy, inclusion, exclusion criteria, quality criteria, data extraction, and methods of synthesis.

1.1.1. Review question

According to our research goals, we established the following review question: "What is the relationship between course design with attrition and dropouts in e-Learning?"

1.1.2. Inclusion and exclusion criteria

Studies were eligible for inclusion in the review if they presented empirical data.

Inclusion criteria:

- Published since 2011
- Reviewed by experts, peer-reviewed (to reduce bias)
- Addresses course design in e-Learning courses and relates with dropout and/or attrition
- Written in English
- Full text

Exclusion criteria:

- Books, book parts, e-books and magazine articles
- Published before 2011
- No original data
- Does not address course design in e-Learning courses and does not relate with dropout and/or attrition
- Not written in English
- Not a full text

1.2. Literature searching

After consulting a specialist, we were given a list of the most reputable databases in Educational Technology:

- ERIC
- ISI Web of Science
- Taylor & Francis Online
- ACM Digital Library
- Science Direct
- SCIELO – Scientific Library online
- B-On portal
- Open Research Online (Open University)

Figure 1 shows the systematic review process and the number of papers identified at each stage. In Stage 1, the titles, abstracts, and keywords of the articles in the electronic databases that have been included were searched using the following keywords:

(1) ("dropout" OR "drop-out" OR "persistence" OR "completion rate" OR "attrition" OR "graduation rate" OR "success rate")
(2) ("distance education" OR "distance learning" OR "elearning" OR "e-learning" OR "electronic learning" OR "computer assisted instruction" OR "virtual classroom" OR "online learning" OR "online course" OR "online education" OR "web-based education" OR "web-based instruction" OR "blended learning" OR "b-Learning")
(3) (("course" OR "units of study" OR "thematic units" OR "subject units" or "instructional") AND ("design" OR "plan" OR "development" OR "creation" OR "evaluation" OR "assessment" OR "quality"))
(4) ("MOOC" OR "Massive Open Online Courses")
(5) 1 AND 2 AND 3 NOT 4

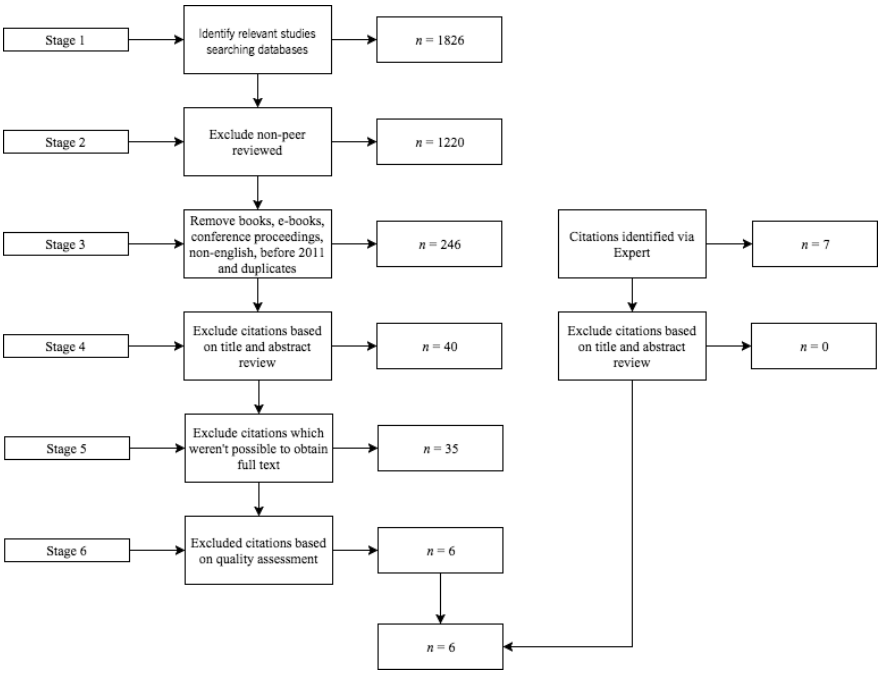

Figure 1 – Stages of the study selection process.

1.3. Applying inclusion and exclusive criteria in quantitative data

After applying each individual search strategy to all selected databases, results were exported and then imported in Endnote X7, using a unique folder for each database. We then looked at each folder for missing record type, author, year and title fields and completed them when required.

Table 1 shows an overview of the results collected on Stage 1, Stage 2 and Stage 3. The data in Table 1 below accord to the criteria stated and number of citations identified in Figure 1 above.

Table 1 – Number of citations found by database and filters.

	Stage 1	Stage 2	Stage 3
ERIC	238	94	14
Web of Science	157	157	38
Taylor & Francis Online	4	4	4
ACM Digital Library	53	22	8
ScienceDirect	24	24	6
SCIELO	4	4	0
B-On portal	985	554	125
Open Research Online	86	86	17
SCITEPRESS Digital Library	275	275	47
Total (N)	1826	1220	259

Total unfiltered results (Stage 1), with no inclusion and exclusion criteria applied, was 1826 citations, while peer-reviewed had a total of 1220 citations (Stage 2). Whenever possible we exported only the results that were peer-reviewed, by choosing that option at the database search. For Stage 3, aggregating most of the inclusion and exclusion criteria resulted in 259 citations.

In Endnote, a smart folder named "1. Stage 3" was created in order to apply as much as possible of the inclusion and exclusion criteria. The following settings were used:

Name	**Description / Settings**
1. Stage 3	NOT 2. Book AND NOT 3. Conf. Proc. AND NOT 4. Non Peer-Reviewed AND NOT 5. Non English AND 6. Since 2011
2. Book	Books, e-books, book parts and book sections Reference type contains the word "Book"
3. Conf. Proc.	Conference Proceedings Reference type contains the word "Conference Proceedings"
4. Non Peer-Reviewed	Publications which are not peer-reviewed Reference type contains "Magazine" OR Journal/Secondary Title is "Commun. ACM" OR Journal/Secondary Title is "SIGCAS Comput. Soc." OR Journal/Secondary Title is "SIGCSE Bull." OR Journal/Secondary Title is "SIGGROUP Bull." OR Journal/Secondary Title is "eLearn"
5. Non English	Publications which are not in English Language containing Spanish OR French OR Korean OR Serbian OR Portuguese (manually added to field at each identified citation)
6. Since 2011	Published since 2011 Year is greater or equal to 2011
7. Systematic and Literature Review	Search for Systematic and Literature Review in Titles and Abstracts Title contains "systematic review" OR "literature review" Abstract contains "systematic review" OR "literature review"

In the next step, we removed duplicates using the Endnote built-in function, then sorted by titles and searched manually for similar and equal titles, as Endnote default settings compare references by Author, Year, Title and Publication Type, so some duplicates come through the Endnote function. A total of 248 unique results were found for Title and abstract screening.

Without this step, and following the Boland et al. (2014) original process, a total of 1826 citations would have to be screened for titles and abstracts, around seven times more than what we had obtained.

The smart folder 7. Systematic and Literature Review allowed the identification of Lee and Choi (2011) literature review, which we would then use in our initial analytical data extraction categories.

1.4. Screening titles and abstracts

An Excel sheet was created containing the title and abstracts for the 248 results. Two articles were removed from the review as they were duplicates that were not identified in the previous stage. Two copies for assessment were made, one for each researcher involved in this process, so no prior knowledge of the assessment was known by any of the researchers in order to prevent decisions based on bias. Each researcher evaluated all 246 titles and abstracts and assigned one of three possible outcomes: 'Exclude', 'Include' and 'Unsure'. The remaining inclusive and exclusive criteria, the ones directly connected with the review question, were taken into consideration.

For the 246 titles and abstracts assessed, the number of observed agreements was 0.587 (58.7%). We also computed the Kappa coefficient, which corrects for chance agreement (Cohen, 1960). The Kappa coefficient for Stage 4 assessments was 0.15, which is characterised as "slight agreement" by Landis and Koch (1977). All disagreements were discussed and resolved by the two researchers, before proceeding to the next stage. As a result of this discussion, 40 citations were considered suitable for further review.

1.5. Selecting full-text papers

Out of the 40 citations, one was in Japanese and therefore excluded. For seven of them, we could not download the full text as they were not Open Access or we did not gain access credentials. For those seven, we asked our project partners for their help at the first phase, about a week after we sent an email to the main authors requesting the citations. After a waiting period of a month, we obtained four results: one of each was a poster and therefore excluded. We also received a citation after the agreed waiting period, so it was also excluded, making a total of 35 citations for the detailed quality assessment.

1.6. Quality assessment

While on the quality assessment process, Researcher 1 exported the list of the final 35 citations from Endnote, using Endnote Export Output Style and saving as XML file type. This file was then imported to nVivo using Data – Endnote: this method insures that data from Endnote – like title, author, abstract, and so on – is imported by adding a memo to each record in nVivo. For the tool, we decided to adapt two versions of the **Critical Appraisal Skills Programme (CASP**), Dyba and Dingsøyr (2008) and Qualitative Research Checklist version 31.05.13 (CASP, 2013).

Researcher 1 started open coding as a way to assist the quality assessment process, but also to save time during a later content analysis. The quality assessment was performed by three researchers for a total of 35 citations using Microsoft Excel and Word. Researcher 1 assessed all the citations, while Researcher 2 did sixteen (16) and Researcher 3 assessed nineteen (19). Results were discussed and the criteria for selection was agreed on citations with only one 'NO' across all the parameters, as none of the citations were answered as 'YES' across all of them. A final number of six (6) citations were selected for content analysis.

Additionally, another seven citations were sent by experts, the research partners, as they believed that these articles could enrich the state-of-the-art (which is in accordance with Boland et al., 2014). For different reasons, all the citations were excluded.

1.7. Data Extraction

After the conclusion of the quality assessment, we started with the data extraction. During quality assessment, there was some preliminary coding based on the study characteristics to assist the process, but also to help understand some trends and tendencies for future data extraction. As mentioned by Boland et al. (2014), this is one type of data needed for a systematic review, descriptive data, the other being analytical data.

As so, we created two folders in nodes at nVivo, one for 'Descriptive Data' and another for 'Analytical Data' categories. For **Descriptive Data** we extracted

- Title,
- Year,
- Author(s),
- Reference type, and
- Research methodology.

For **Analytical Data,** we decided to gather

- Modality,
- Goal/objective,
- Scope,
- Action,
- Results,
- Limitations/recommendations,
- Dropout factors, and
- Strategies to overcome dropout factors.

These were based on the Lee and Choi (2011) review of online course dropout research, covering implications for practice and future research.

2. Results

After data analysis, the results were synthesised in 'descriptive data' (see Table 2) and 'analytical data' (see Tables 3 and 4) on the following pages.

Table 2 – Summary of descriptive data

Short Citation	Full Citation	Ref. type	Methodology
Deschacht (2015)	Deschacht, N., & Goeman, K. (2015). The effect of blended learning on course persistence and performance of adult learners: A difference-in-differences analysis. *Computers & Education, 87*, 83-89.	Journal article	Quantitative
Flynn (2015)	Flynn, A. B. (2015). Structure and Evaluation of Flipped Chemistry Courses: Organic & Spectroscopy, Large and Small, First to Third Year, English and French. *Chemistry Education Research and Practice, 16*(2), 198-211.	Journal article	Quantitative
Gaytan (2013)	Gaytan, J. (2013). Factors Affecting Student Retention in Online Courses: Overcoming This Critical Problem. *Career and Technical Education Research, 38*(2), 145-155.	Journal article	Qualitative
Kalet (2013)	Kalet, A., Ellaway, R., Song, H., Nick, M., Sarpel, U., Hopkins, M., Hill, J., Plass, J., & Pusic, M. (2013). Factors influencing medical student attrition and their implications in a large multi-centre randomised education trial. *Advances in Health Sciences Education, 18*(3), 439.	Journal article	Quantitative
Leeds (2013)	Leeds, E., Campbell, S., Baker, H., Ali, R., Brawley, D., & Crisp, J. (2013). The impact of student retention strategies: an empirical study. *International Journal of Management in Education, 7*(1/2), 22.	Journal article	Quantitative
Robinia (2012)	Robinia, K. J., Maas, N. A., Johnson, M. M., & Nye, R. M. (2012). Program Outcomes Following Implementation of a HYBRID CURRICULUM at the CERTIFICATE LEVEL. *Nursing education perspectives, 33*(6), 374-377.	Journal article	Quantitative

Analytical data was classified in eight categories: (i) modality, (ii) goal / objective, (iii) scope, (iv) action, (v) results, (vi) limitations / recommendations, (vii) dropout factors, and (viii) strategies to overcome dropout factors. Due to the large extent of data collected, we only present the last two categories.

Table 3 – Analytical Data. Summary of (vii) dropout factors

Citation	Evidence	Dropout
Gaytan (2013)	**Course/Program Factors – Institutional Supports** "By "institutional support," experts meant that students must receive adequate support from the educational institution regarding admissions, registration, financial aid, tutoring, programs, policies, and procedures."	Expert knowledge and experience
	Course/Program Factors – Interactions Quality of faculty and student interaction	
	Student Factors – Psychological attributes Self-regulation/self-discipline	
Kalet (2013)	**Student Factors – Psychological attributes** Self-Efficacy, Self-Regulation	Correlated
	Course/Program Factors – Course Design Exam weight of the course overall grade (correlated as weight increased)	
	Student Factors – Psychological attributes Mastery goal orientation Performance approach – goal orientation Performance avoidance – goal orientation	Non-correlated
	Environmental factors – Institutional characteristics Urban/Non-Urban	
Leeds (2013)	**Course/Program Factors – Course Design** Required workload	Student survey

Table 4 – Analytical Data.
Summary of (viii) strategies to overcome dropout factors

Citation	Evidence	Dropout
Deschacht (2015)	**Course/Program Factors – Course Design** Online self-testing Screencast	Increased
	Course/Program Factors – Institutional Support Provide students greater flexibility Establish institutional student support infrastructure	
Flynn (2015)	**Course/Program Factors – Course Design** Repetition of activities every week Structured course format **Course/Program Factors – Institutional Support** Extra, outside class learning support Classroom management experience Facile Access to technical support Establish institutional student support infrastructure	Decreased
	Students Factors – Psychological attributes Student's openness	
Gaytan (2013)	**Course/Program Factors – Course Design** Mandatory self-discipline and time-management training prior to the beginning of an online course Student self-discipline and adequate computer skills screening	Expert recommendation
	Students Factors – Skills Self-discipline Time management Computer Skills Self-regulation	
Leeds (2013)	**Course/Program factors – Course Design** Syllabus quiz Course contract Student services	Neutral
	Course/Program factors – Interactions Email reply Ice Breaker Personal phone call Learning community	

Table 4 (cont.) – Analytical Data.
Summary of (viii) strategies to overcome dropout factors

Citation	Evidence	Dropout
Robinia (2012)	**Course/Program factors – Course design** Embedding of instructional support materials into online modules Gradual addition of online learning applications in a face-to-face environment Iteration based on knowledge and experience	Decreased
	Course/Program factors – Institutional supports Provide staff trainings to qualify them to provide guidance and support in online courses Establish institutional student support infrastructure Universal laptop program Faculty consistency Faculty freedom to (re)design online lessons to meet course objectives Faculty commitment in keeping 50% of content online	

3. Discussion

Out of the six citations, half mentioned dropout factors and five mentioned strategies to overcome dropout factors. Leeds (2013) and Gaytan (2013) were the only citations that had both categories. In Leeds (2013), students were provided with a survey in order to assess the reasons for them not persisting after the implementation of strategies to overcome dropout, while in Gaytan (2013), experts recommended several strategies to overcome their previously pointed factors for dropout.

Only one citation (Kalet, 2013) found a tangible relationship between dropout factors and dropout rates, where correlation was found with two factors, one related with a Psychological attribute of the student, another with Course Design, and no correlation with three Psychological attributes of the student and an Institutional characteristic. As for the other two citations, their results require validation in order to relate them to dropout rates. In Gaytan (2013), a panel of 15 experts identified critical factors affecting student retention in online courses, while Leeds (2013) results were based on a student's survey after they had dropped out.

Out of the ten dropout factors found in three citations, four were related to Course/Program factors, five with Student factors and one to Environmental factors, but only three were correlated or was attributed with the increase of dropout based on empirical evidence. From those three factors, two were related with Course Design: exam weight of the course overall grade (Kalet, 2013) and required workload (Leeds, 2013); and one related with the Students' Psychological attributes: Self-Efficacy, Self-Regulation (Kalet, 2013).

As well as dropout factors, there were strategies to overcome dropout factors that did not produce a positive effect on retention. Deschacht (2015) strategies had a negative impact on course retention, Leeds (2013) strategies had no statistically significant impact, while Gaytan (2013) provided expert recommendations. The other two citations (Flynn, 2015; Robinia, 2012) found that their strategies were successful in reducing dropout/attrition.

All of the 34 strategies used to overcome dropout factors were different; none of the strategies in any of the citations were notably similar to one another.

Of the 12 Course/Program Factors – Institutional Support strategies, two had a negative effect in dropout (dropout increased) and 10 contributed to the decrease of dropout. From the 12 Course/Program Factors – Course Design strategies found, three had a neutral effect (no statistically significant results), two were related with an increase of dropout and five of the strategies had a positive effect in dropout (dropout decreased). All of the four Course/Program factors – Interactions strategies had a neutral effect in dropout, all from Leeds (2013). Finally, there was one strategy related with Students Factors – Psychological attributes, student openness, that contributed to a decreasing dropout.

Conclusion

The diversity of the results obtained can be explained by the wide notion of 'course design' expression as used in the review question. This was intended to explore several possible outcomes and not to over-direct the research or limit the results and their interpretations.

Recovering our review question – "What´s the relationship between course design with attrition and dropouts in e-Learning?", the results showed that there is in fact a relationship. Robinia (2012) and Flynn (2015) were able to reduce dropout rates in blending face-to-face courses and Kalet (2013) found correlated and uncorrelated dropout reasons: these included elements in course design. But some were not that successful: Deschacht's (2015) attempts to blend a face-to-face course led to increased dropout rates and Leeds's (2013) strategies for online retention had no statistically significant impact.

We argue that, based on the results, course design strategies or factors cannot be devised without the consideration of several other aspects, including students and course/program factors. A single measure, an isolated strategy, or a course design change without carefully considering all other factors will be insufficient to reduce significantly existing dropout rates as we cannot assume the causal effect from any of the factors exposed, or the strategies implemented, as none of the authors actually did so. Most refer to the high number of existing variables and the fact that they can only track a few. Some found correlations, others measured the extent to which some strategies affected the dropout rates.

The infinite possible combinations of a student's context and course design in each e-Learning scenario highlights the importance of having models and methods to predict dropout, to assess learning effectiveness and to profile dropouts and completers rather than just simply identify the reasons for dropout. We believe that this finding is as important as understanding the reasons and strategies used to overcome dropout and attrition.

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The Regulation of Learning Effort in Online Environments

The Role of Interdisciplinary Articulation

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Introduction

The incessant evolution of Information and Communication Technologies has changed in a truly disruptive way the mode and the means by which we communicate and access information that is increasingly more horizontal and dispersed. The communication provided by the *network society* became global and free (Castells, 2007) – a circumstance that facilitated the emergence of new paradigms and emphasised the importance that lies in the permanent learning of new skills and abilities (Meirinhos & Osório, 2014). In fact, we have to learn throughout life, obtaining digitally stored information, recombining it and using it to produce knowledge for the desired purpose in each moment (Castells, 2007). Education has become a strategic asset, truly capable of ensuring our survival in a global market that is increasingly more volatile and competitive.

Aware of this new reality, most higher education institutions have sought to engage new public communities – more heterogeneous, geographically distant and temporally diverse between themselves and the *campus*, through the increasing offer of undergraduate and postgraduate courses conducted partly or entirely at a distance (Costa, 2012), thus providing truly ubiquitous and transversal learning.

Higher education teachers have therefore been assuming new roles in the teaching and learning process; immersed in a technological environment increasingly more inseparable from their lives and the lives of their students. On the other hand, students have also assumed new behaviours and responsibilities in this field. With more and better access to information, today's students prefer to work and reflect on real-world problems, actively cooperating and collaborating in environments permanently mediated by technology. In this context, teachers began to assume increasingly the role of facilitators and moderators of their students' learning, becoming more centred and self-regulated by them.

This chapter presents a currently active project that is reflecting on the role of interdisciplinary articulation in the regulation of the learning effort by higher education students in online environments. The authors present the research problem, the questions and the goals, as well as the adopted methodology. The results and the concluding remarks will be published at a later stage.

Background

In this new technological and educational paradigm, teachers tend to adopt new pedagogical models facilitated by digital technologies, proposing to their students the accomplishment of tasks outside the formal context of the classroom. This is an example of a flipped learning model, which inverts the method traditionally used in the teaching and learning process, aiming to promote the students' prior reflection and autonomous learning of the contents later addressed in the different subjects.

The project researchers (henceforth, the 'researchers') know, however, that the majority of these activities are nowadays based on researches conducted on the Internet. This should imply additional concerns from the students, particularly regarding the validation and the confirmation of all the data obtained online (Hargittai, Fullerton, Menchen-Trevino, & Thomas, 2010). Indeed, the work conducted in online environments requires from today's students the possession of new abilities, attitudes and literacies, either in the development of their critical

thinking, or in their self-regulation, self-motivation and time management skills. As Meirinhos and Osório (2014, p. 49) illustrate, *the online student becomes a non-linear sailor in an endless information sea*.

In this context, *time* has assumed a truly fundamental role, capable of conditioning, both positively and negatively, the learning strategies adopted by students (Bowyer, 2012; Thorpe, 2006). As Meyer (2003, p. 57) explains, "it is obvious that thinking and time are related, since thinking occurs in time and for some, the passage of time is crucial to improving one's thinking". Karjalainen, Alha, and Jutila (2006) also highlight this relationship in one of their statements: "learning inevitably takes place in time, in the student's time" (p. 13). Students appreciate online learning environments, "as they allowed [them] to reflect on what was said and to take their time to develop a useful response" (Meyer, 2003, p. 61), and recognise that asynchronous methods "have the advantage of providing time for reflection essential for higher order cognitive thinking" (Barber, 2011, p. 2). In spite of this, several studies seem to conclude that in these new scenarios some students need more time to reflect and deepen their learning (Fabro & Garrison, 1998; Shearer, Gregg, & Joo, 2015). Metzger (2007) also emphasises the role of time in the consolidation of students learning, affirming that while recognising that "they 'should' critically analyse the information they obtain online, yet rarely have the time or energy to do it" (p. 2087).

Based on this problem, we designed a conceptual framework that proposes a sequential relationship between the dimensions of Time, Reflection and Deep learning[1] in online environments (Figure 1).

[1] In this chapter, we consider *Deep learning* as the grounded consolidation of students' learning and the inherent solid construction of their knowledge.

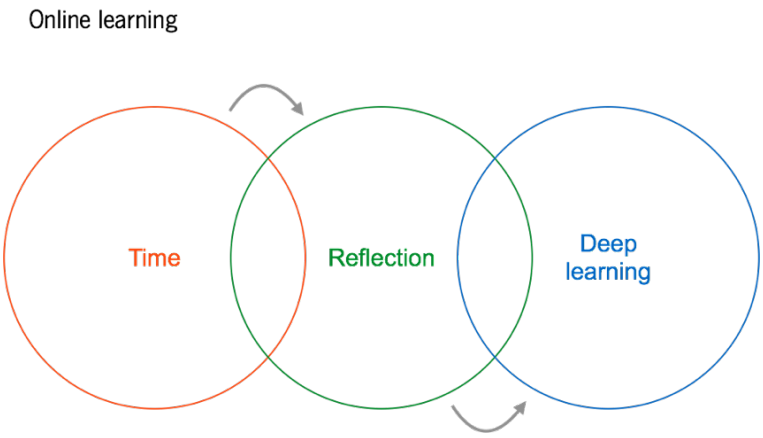

Figure 1. Sequential relation between dimensions Time, Reflection and Deep learning in online environments.

All tasks comprise a certain learning effort and a given schedule. However, we know that these tasks – especially when involved in a continuous assessment model – are often proposed by class teachers in an isolated manner, without realising that in that moment they are competing for the same resource: their students, or more precisely, the *time* of their students. In fact, *students are a resource shared by class teachers* (Figure 2).

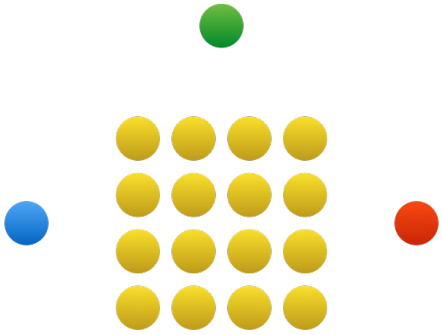

Figure 2. Students are a resource shared by class teachers.

Yet, as questioned by Lublin (2003, p. 6):

> *You know what you expect of a student in this class, but do you know what all the other teachers this student encounters in the semester require of that student? For instance, do you know the total assessment requirements this student must undertake in all their subjects during the semester?*
>
> Jackie Lublin

In this context, if the proposal and the schedules of tasks are planned by class teachers in an isolated, concurrent, and non-articulated manner (Figure 3), we believe that the potential for a (frequently unnecessary) high simultaneity of tasks may demand an excessive learning effort from *some students*[2] (Figure 4), restricting their necessary time to research and validate the reliability of all online sources consulted.

This situation may naturally influence the quality of the rationale and the depth of their participation in these activities (Baeten, Kyndt, Struyven, & Dochy, 2010; Bowyer, 2012; Karjalainen et al., 2006), defrauding their own and their teachers' expectations, as well as conditioning the consolidation of their learning, and inherently, the solid construction of their knowledge. As referred by Karjalainen et al. (2006, p. 13), "if a student is given a learning assignment and no time to do it, it would be absurd to even talk about learning or teaching".

Teachers frequently only become aware of this situation after communicating the tasks and schedules to the students in the classroom – often through feedback from the students leading to an evaluation in that moment whether or not they agree to change the proposed deadlines.

In this context, we believe that class teachers' prior knowledge of the schedule of all tasks proposed by their peers (Figure 5), could promote and facilitate the regulation of their students' learning effort, namely by allowing teachers to analyse and eventually adjust the schedule for those activities, even before announcing it formally (Figure 6).

[2] These students appear symbolically highlighted in the following figures.

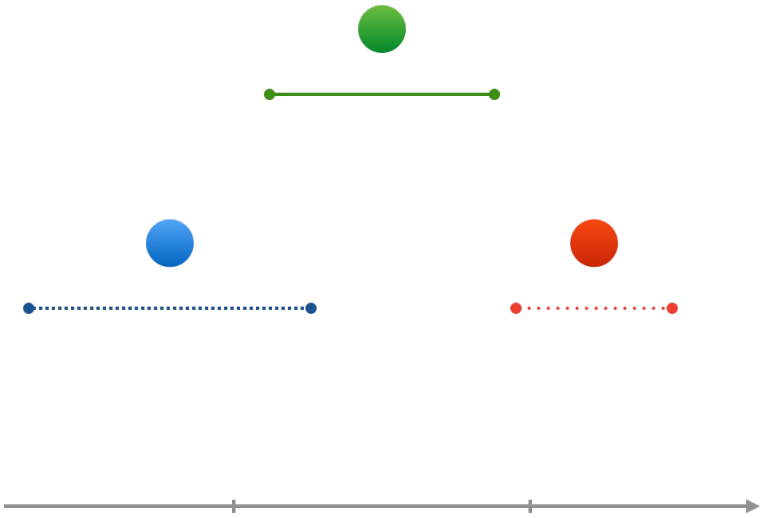

Figure 3. Class teachers scheduling their tasks in an isolated manner

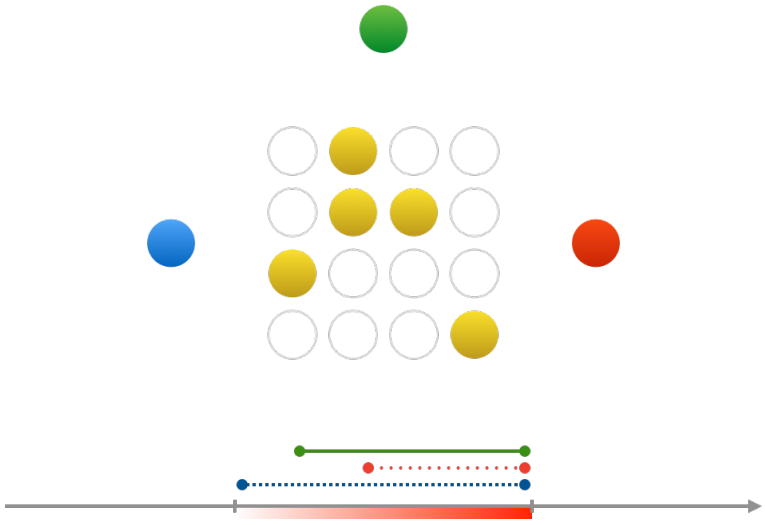

Figure 4. Excessive learning effort for some students due to a high simultaneity of tasks.

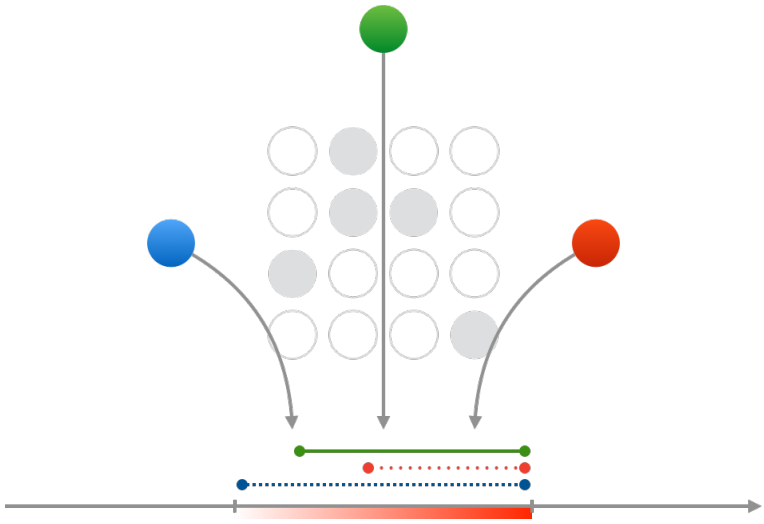

Figure 5. Prior knowledge of the schedule of all tasks proposed by class teachers.

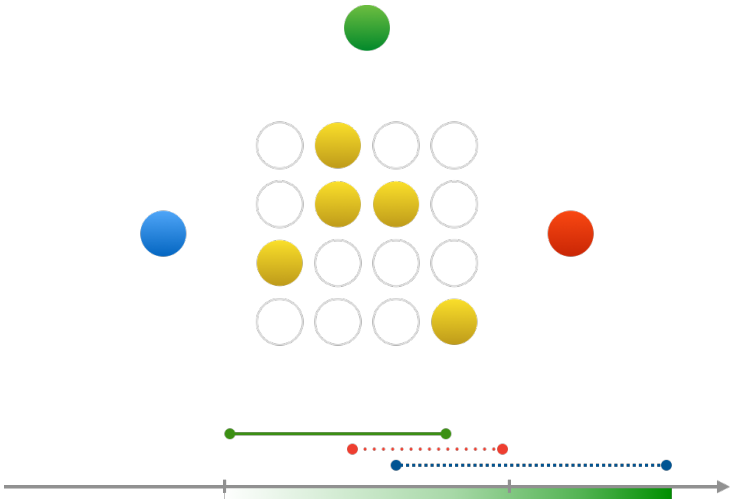

Figure 6. Learning effort regulation by adjusting the schedules.

Method

We believe that the involvement of teachers, namely through the analysis and identification of possible solutions capable of providing an adequate and efficient response to the raised problem, ensures more guarantees of success. We consider that the best way to solve a problem is strongly dependent on its recognition and early acceptance. Such approval can only be achieved if we obtain the receptivity and active support of its key stakeholders (Scaife, Rogers, Aldrich, & Davies, 1997): in this case, the stakeholders would be higher education teachers. It was therefore in this context that the researchers decided to conduct a set of focus group interviews with a group of teachers and students seeking answers to the following question: *What is the perception held by higher education teachers and students on this problem?*

Participants

The definition of the criteria for the selection of the participants in the present study resulted from an objective and systematic process based on three fundamental principles: (a) the objectives of the study, (b) the specific characteristics of the participants, and (c) the time and resources available (Krueger & Casey, 2015). Table 1 presents the selection criteria of the three categories of participants considered: 'MSc teachers', 'Teachers' and 'Students'.

In the process of selecting the participants, it was our concern to assure their homogeneity, "but with sufficient variation among participants to allow for contrasting opinions" (Krueger & Casey, 2015, p. 81). We also sought to make sure that teachers did not have any hierarchical ascendancy as a part of their group, to avoid possible institutional constraints and to promote the free sharing of perspectives and experiences on the subject under study (Krueger & Casey, 2015; Morgan, 1997). On the other hand, considering the nature of the problem, the researchers also found an evident need to invite teachers with experience in multi-teacher courses conducted in blended learning format (Lencastre, 2013; Lencastre & Coutinho, 2015) since only in this

specific context teachers would be able to perceive an effective competition for the same resource – the students. Finally, it was fundamental for us that the invited teachers and students had not been approached by the first researcher about the problem under study before the respective interviews (with the exception of the MSc teachers, who for this reason assumed a very particular role in this research[3]).

Table 1. Selection criteria of the three categories of participants.

Category	Selected criterion
MSc Teachers	• Teachers of the Masters in Educational Sciences – Field of Educational Technology, Institute of Education of the University of Minho. • Teachers with no hierarchical ascendancy among themselves. • Teachers approached by the first researcher on the problem under study before the interview.
Teachers	• Teachers of post-graduation courses. • Teachers with no hierarchical relation to one another. • Teachers experienced in multi-teacher courses using *blended learning* methods. • Teachers involved in the initial and continuous teacher training. • Teachers not approached by the researcher about the issued matter before conducting the interviews.
Students	• Students of post-graduation courses using *blended learning* methods in the Institute of Education of the University of Minho, in the school year of 2015/2016. • Students who could be in person in the University of Minho. • Students not approached by the first researcher on the problem under study before the interview.

Based on the above-mentioned criteria, five teachers participated in this study from the Masters in Educational Sciences – Educational

[3] However not addressed in this chapter due to text length constraints.

Technology programme at the Institute of Education at University of Minho, along with a further thirteen teachers from four higher education institutions (Polytechnic Institute of Porto, University Portucalense, University of Aveiro, and University of Minho), and two students from the University of Minho (Table 2).

Table 2. Number of participants sorted by category and higher education institution.

Category	Institution	Abbreviation	Nº Part.
MSc Teachers	University of Minho	UMinho	5
		Total	5
Teachers	Polytechnic Institute of Porto	P.Porto	3
	University Portucalense	UPT	3
	University of Aveiro	UA	4
	University of Minho	UMinho	3
		Total	13
Students	University of Minho	UMinho	2
		Total	2

Data collection

Given the nature of the problem under study, we applied the survey method implemented using focus-group interviews as a technique. This type of interview seemed to be the most appropriate data-collection technique for this study, as it promotes interaction and free sharing of perspectives and experiences among all participants on the problem presented (Courage & Baxter, 2005; Morgan, 1997). This interaction was an excellent opportunity to observe and gather evidence about how all participants became involved and aware of their similarities and differences in relation to various topics of mutual interest (Morgan, 1997; Morgan & Spanish, 1984).

The design of the focus group sessions was based on the Multiple-Category Design model, proposed by Krueger and Casey (2015) because the researchers considered three categories of participants. This model allows the realisation of a different number of interviews in each category according to its relevance for the study (Krueger & Casey, 2015). In this sense, as teachers represented our main source of data and the time available for organising and conducting focus group sessions was given, the researchers decided to make as many interviews as possible with these participants (Krueger & Casey, 2015). Figure 7 presents the scheduling of the five focus group sessions conducted between March and July 2016.

Group	MSc Teachers	Teachers			Students
Session	1st session	1st session	2nd session	3rd session	1st session
Institution	UMinho	P.Porto & UPT	UA	UMinho	UMinho
Date	3-Mar-2016	21-Mar-2016	7-Apr-2016	16-May-2016	12-Jul-2016

Figure 7. Scheduling of focus group sessions.

Based on the proposals of Krueger and Casey (2015) and Morgan (1997), we always sought to have a minimum of five participants in each interview. However, we were not always able to meet this purpose: in the case of teachers, due to various schedule constraints and last-minute contingencies, and in the case of students as a result of simply not responding to invitations, there was a natural limitation to the amount of material available for later analysis and interpretation. Table 3 presents the number of teachers and students invited and the number of those effectively present in each focus group session.

Focus group sessions were highly exploratory, relatively unstructured (Morgan, 1997; Morgan & Spanish, 1984) and were conducted with a semi-directive format: it was our purpose to enable

interviewees to freely develop their discourse about the topics that we were addressing (Esteves, 2006). In this sense, the focus group moderator sought to minimise his involvement in the discussion, conceding to the participants so they had sufficient opportunities to engage and discuss the topics that most interested them. This tactic also promoted free interaction among all participants, while the moderator refocused discussions when they became irrelevant, and resumed the debate whenever themes seemed to be running out (Morgan, 1997).

Table 3. Number of teachers and students invited and present in each session.

Category	Focus Group Session	Invited	Present
MSc Teachers	1st session	5	5
Teachers	1st session	6	6
	2nd session	7	4
	3rd session	5	3
Students	1st session	24	2

Data analysis

In the analysis of the collected data, we undertook a content analysis based on the proposals of Bardin (2014) and Ghiglione and Matalon (1997), as well as in the texts by Esteves (2006) and Vala (2009). Given the nature of the study, it seemed to us especially appropriate to use this technique of data analysis as the researchers intended to gain understanding beyond the immediate meanings of communications. The researchers also intended to discover units of meaning in the messages that could lead us to a description of mechanisms that *a priori* we did not understand (Bardin, 2014).

Based on the objectives of the study and the nature of the collected data, we decided to conduct a content analysis of a *categorical* (Bardin, 2014) or *thematic* (Ghiglione & Matalon, 1997) type, adopting as a unit of registration each *theme* or opinion, independent of the word or words used to express it in the message (Esteves, 2006). Also referred to in

the literature as 'unit' or 'element of meaning', the theme is commonly used in content analysis, namely in the analysis of group interviews to study the motivations of opinions, attitudes, values, beliefs, tendencies, etc. (Bardin, 2014).

The thematic analysis combined both quantitative and qualitative approaches with distinct purposes. In the quantitative approach, we chose the frequency of appearance of each theme in the *corpus* (Bardin, 2014) as an enumeration rule. In turn, in the qualitative approach, we privileged the presence of the theme and not the frequency of its appearance, as we did not consider relevant the measurement and the interpretation of this parameter.

On the other hand, the thematic analysis assumed the *administrative proof* and *heuristic* functions described by Bardin (2014). In the first case, this was because we proposed to verify two initial hypotheses formulated in the form of provisional statements from our intuition (Table 4). In the second, this was because we have also developed an exploratory essay explicitly focused on the free discovery of patent or latent themes in the messages, excluding any preconceived ideas from the outset.

Table 4. Initial hypotheses formulated from our intuition.

Category	**Initial Hypothesis**
Teachers	Class teachers plan their activities without knowing the schedule of the tasks proposed by their peers in the same period.
Students	Students find more difficult to consolidate their learning when they face a high simultaneity of activities proposed by their teachers.

In accordance with the intended directions for the analysis, the definition of the category system, along with its systematic organisation into precise and secure indicators (Bardin, 2014), were developed following a *closed* and then an *open* (or *exploratory*) set of procedures (Bardin, 2014; Ghiglione

& Matalon, 1997). Indeed, the researchers initially defined *a priori* a set of dimensions, categories and indicators based on the conceptual framework of the study, on the questions and the objectives of the research, on the formulated hypotheses, as well as on other variables that we intended to investigate (Miles & Huberman, 1994). As a response to this, the researchers prioritised the construction of new hypotheses (Bardin, 2014). At this stage, the categories emerged from the texts without referring to any pre-established theoretical or empirical framework (Ghiglione & Matalon, 1997), remaining provisional or unstable until all relevant data had been apprehended (Esteves, 2006) as the researchers incorporated new material.

When categorising, we isolate the meaningful units in the transcripts to classify them before placing them within categories that were either defined *a priori* or taken from the corpus (Bardin, 2014; Ghiglione & Matalon, 1997). At the end of this process, we extracted from the texts a set of indicators that helped us to understand better the meaning of each category (Esteves, 2006). We then proceeded to its operational definitions, seeking to write a precise and objective explanation of the criteria used in the assignment of the different units of meaning in each category of analysis.

The final setting of the categorisation came after a long and complex process, and it was essential to reread the material, create new interpretations when appropriate, and distrust the evidence, operating by successive approximations (Bardin, 2014), until it was possible to obtain its final version.

Reliability and validity of the content analysis

According to Ghiglione and Matalon (1997), the reliability of a content analysis is associated with the coding process, which is why reliability tests should be based primarily on the coder and the categories of analysis used by them. Based on this assumption, the researchers sought to determine the intra- and inter-coder reliability indexes, as well as to evaluate the reliability of the defined categories.

In the calculation of the intra-coder reliability index, we obtained a reliability index of 89.3%. This result came after discovering the total number of units of meaning classified in the same (432) and in distinct categories (52) in the coding and recoding operations conducted by the first researcher on November 2016 and February 2017 respectively. The researchers consider this value to be highly positive considering that following a first attempt the reliability index should be close to 80% (Miles & Huberman, 1994).

On the other hand, in the determination of the inter-coder reliability index, after randomly selecting one of the three interviews conducted with the teachers[4], the second researcher codified the 146 units of meaning identified[5] in the selected transcription in an independent way and using the same category framework. After finding the total number of agreements (123) and disagreements (23), we obtained a first value for the inter-coder reliability index of 84.2%. This value can be considered highly satisfactory, especially regarding how difficult it is to obtain inter-coder reliability indexes above 70% in a first exercise (Miles & Huberman, 1994).

We analysed the 23 divergences found, trying to interrogate the causes of this disagreement and take the necessary actions. Such actions could include an improvement of the code itself (Ghiglione & Matalon, 1997), as well as the elimination of possible ambiguities, and/or the redefinition of some of the categories of analysis (Esteves, 2006). In this way, it would be possible to aim at obtaining an inter-coder reliability index equal to or greater than 90% (Miles & Huberman, 1994). After this second exercise, we obtained an index of 97.3%, corresponding to 142 agreements against only four disagreements.

According to Esteves (2006), the reliability of the categories of analysis is more probable when these are operationally defined in an explicit, objective, and most of all, unambiguous way, allowing the

[4] We decided to exclude the interview conducted with the students considering the small number of units of meaning codified.
[5] Corresponding to 32.2% of the total units of meaning codified in the three interviews conducted with the teachers.

classification of the units of meaning without major difficulty (Ghiglione & Matalon, 1997). In this context, the researchers believe they have ensured the reliability of the categories used, a reliability that may have contributed to the intra- and inter-coder reliability indexes obtained.

Finally, the problem of validity must follow all phases of the content analysis process, from the constitution of the *corpus* to the choice of the units of analysis and the enumeration system (Vala, 2009). According to Vala, there are no problems of validity specifically related to content analysis, only reminding us that as in any research procedure, including this one, the researcher must be sure and must assure their readers that they measured what they intended to measure. In this sense, the researchers also consider the validity of this thematic analysis to be assured, as they believe that they have measured what they were really trying to measure.

Preliminary Remarks

The preliminary reading of the literature seems to suggest a positive correlation between time, reflection and deep learning in online environments, which is in line with the studies of Barber (2011), Meyer (2003), and Shearer et al. (2015). Besides that, we also found evidence that the regulation of students' learning effort seems to have a positive influence on their learning outcomes (Karjalainen, Silvén, & Wennström, 2008; Kyndt, Dochy, Struyven, & Cascallar, 2011).

Based on the analysis of the collected representations, we observed that the generality of teachers understood the rationale and the relevance of the presented problem (*I wanted to start by saying that I think the theme is very pertinent* [T6]; or *This worries me very much because there is a whole logic here that is relevant* [T12]). We also obtained explicit references where teachers emphasised the role of time for reflection in the consolidation of students' learning (*We know that they ... need to think, to reflect, to reformulate and this requires time* [T12]; or *There is no way to understand anything without time* [T8]), especially in online environments where *this problem of time almost hyperbolises, becomes denser, more complex* [T6].

Most teachers have admitted that students are effectively a shared resource (*We are actually sharing a resource there* [T6]), although they do not always perceive this condition (*From the teacher's point of view, I think we do not have this perception* [T3]). In addition, the analysis of representations made by teachers and students also seems to confirm our initial hypotheses (*It's often true, it's a bit in the dark, each one in his discipline* [T8]; or *It is very difficult for me to manage and make the opportunity to dedicate myself in the most convenient way that I might need* [StB]).

Lastly, several teachers recognised that the prior knowledge of the schedule of all tasks proposed to class students *is absolutely crucial, and I do not know any online tool that help us with that vision* [T12]. As mentioned before, the analysis and interpretation of all the data, as well as the conclusions and final reflections of this study, will be published at a later date.

Conclusions

In online environments, students need more time to read critically and validate the credibility of all consulted sources. However, if the class teachers conduct the proposal of the tasks in an isolated way, the potential high simultaneity of activities may require an excessive learning effort from some students, limiting their time to reflect, deepen and consolidate their learning.

This study aims to contribute to the understanding that *students are a resource shared by class teachers*. In this sense, we believe that class teachers could promote the regulation of their students' learning effort if they knew in advance the schedule of all tasks proposed by their peers. Supported by a set of focus group interviews conducted with higher education teachers and students, we sought to validate this issue at the start of the project. From the analysis of the interviews, we verified that the majority of the teachers understood and confirmed the pertinence and relevance of this problem.

During the interviews, teachers proposed some possible communication channels capable of providing the prior knowledge of the schedule of all tasks proposed to students in the different subjects. For this

reason, in a later stage of this project, the researchers aim to materialise a solution capable of providing class teachers with this global vision.

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Teacher Training for Online Teaching in Brazil: Considerations on a Case Study

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Introduction

In Brazil, online teaching and learning can still be considered a recent educational model. Nevertheless, it is gaining attention from the higher education sector, and therefore requires academic research that should focus on the new challenges it presents to the management of educational systems and to the well-established traditional classroom teaching and learning practice.

In digital culture, or cyberculture, (LEMOS, 2007; 2010; LÉVY, 1997; SILVA, 2008), where there's a symbiotic relationship between society, culture and new technologies based on advanced microelectronics connected to the internet, online teaching requires more than just having access to and knowing how to use a computer, tablet or mobile phone connected to the internet. An online teacher needs to develop specific teaching skills that are in an ongoing dialog with the knowledge built from face-to-face teaching. In addition, there is a need for further investment in research in order to boost the enhancement and provision of training programmes for online teaching. Online teachers should be able to transform their traditional teaching practice, developing a new professional identity that meets the social, cultural and professional demands of the digital world.

This new professional identity involves the overcoming of teaching and learning practices based on the transmission and/or

distribution of information. In order to do so, the teacher must be part of the digital-culture context, developing attitudes, ways of thinking and interactive communicational practices in cyberspace, by engaging with various authoring and collaborative interfaces, such as e-mails, wikis, social networks, blogs and chat rooms.

The instrumental use of digital technologies and of the web results in the traditional distribution of information and in the **bureaucratic** administration of feedback from course participants. In order to overcome these issues, the use of information and communication technologies by online teachers should be in line with an open and flexible curriculum, as well as with an interactive and hypertextual pedagogical design (SANTOS; SILVA, 2009).

In the digital culture, it is expected that teachers know how to handle hypertext information and how to explore communication networks based on interactivity, which is understood as an articulation of the emission and reception of the message and the construction of knowledge. Teaching strategies are expected to be in line with the dynamics of the interactive hypertext web and with the affordance of online interfaces, in order to provide meaningful learning experiences to students who are culturally immersed in the new socio-technical scenario.

Online interfaces are interactive interlocutory spaces that allow interpersonal mediation, socialisation and collaborative construction of knowledge, despite the geographical distribution of the participants involved. These interfaces (e.g. forums, chat rooms, wikis) empower a dialogical and collaborative educational practice. However, they demand specific teaching skills that can be developed by teachers during continuous professional development programmes in line with the socio-technical changes emerging from a digital culture (SILVA, 2005, 2014; APARICI; SILVA, 2012).

Online teachers need to draw their attention to the particularities of digital culture and its communicational practices which include emails, blogs, social networks, online journalism, webcams, chat rooms and new businesses that form groups which share the same interest (e.g. cybercities,

games, open source software, cyberactivism, digital art, etc.). Technology has opened doors to new ways and modes of communication and handling of information, which are expanding and increasingly requiring the use of our senses (vision, hearing, voice and touch), and, therefore, providing more opportunities for teacher/students´ engagement. Students can take part in an educational process in which they can develop and express their authorship in a participative and collaborative manner, sharing with others based on the interactive exchange of knowledge or on the collective intelligence (SILVA, 2010; 2011).

Teachers, who are not engaged with the pedagogical use of radio and television as teaching resources, face an even bigger challenge of incorporating online laptops, tablets and mobile phones into their practice. The television and the radio are teaching resources based on a mass unidirectional transmission model, and therefore are expected to be easier to be incorporated in the classroom environment, as they conform with the traditional classroom communication paradigm: the transmission pedagogy. On the other hand, digital media could be considered more complex resources, as their use is based on user authorship and on the interactivity logic, thus, demanding from the teacher a new communicational approach and the overcoming of the traditional unidirectional teaching practice. This challenge increases even more in the online classroom, where the management and teaching and learning environments – e-Learning platforms or LMS (Learning Management System) – have unique characteristics, very different from the face-to-face traditional classroom. The transition to this new educational environment has not been straightforward and easy for teachers who are digitally excluded and/or accustomed to the traditional transmission pedagogy. This issue reveals the need of specific teacher training programmes that discus and address digital culture knowledge or cyberculture, as well as the development of content and best practices that are in accordance with the new socio-technical scenario (SILVA, 2012a; 2012b, 2012c).

This article aims at presenting and discussing the results of an investigation on a recent online teacher training course for online teaching

offered by a large private university in Brazil[3]. The research aimed at investigating the course participants´ attitudes during the course, as well as analysing the resulting effects on their teaching practice during other subsequent online graduation courses offered by the same institution. The main objectives were to: a) identify the changes occurred in their tutoring practice after taking part in the referred teacher training programme; b) compare the course participants´ views on online teaching before and after the course, and; c) offer suggestions for the improvement of online teaching based on the course participants´ opinions after their participation in the course. The present article initiates with a brief description of the research context and the research methods employed. The discussion covers main theoretical subjects, such as digital culture, teachers´ knowledge, online teaching in higher education and teacher training for online teaching. The main issues and best practice are described in the conclusion, as well as suggestions for the improvement of the quality of teacher training for online teaching.

Research context and methodology

The "Teacher training for online teaching" course was offered to 330 teachers of the cited university, who were separated into 10 groups of 33 course participants. The course schedule included 40 hours of online classes distributed along three months and 10 hours of classroom teaching split into two face-to-face meetings of 5 hours each. One of the meetings was held at the beginning of the course and aimed at motivating and introducing the programme to the learners; the second meeting was held at the end of the course for assessment purposes. At the conclusion of the course, 100 participants were referred by their university coordinators – according to their performance during the course – in order to take part of the group of specialist teachers responsible for the development of the content and for the teaching of their specific online disciplines offered by the university´s virtual campus. The specialist teachers were expected to dedicate 10, 30 or 40 hours per week of their time to work at the institution together with the staff responsible for the distance learning

coordination, management, implementation and support. The fact that the specialist teachers were working on-site favoured the *in loco* investigation of the objectives set for the course conclusion research period, in the sense that it allowed for face-to-face contact with these teachers and the direct observation the expected changes in the mediation of learning that was happening in the virtual campus of the studied university.

The research process began with the detailed observation of the course participants´ actions in the various interfaces of the university´s e-Learning platform and was followed, after the course completion, by individual and focal group interviews of the working specialist teachers. The research, therefore, sought to understand the *modus operandi* of online teaching, enabled by a specific type of teacher training programme in a specific type of institution. For the above reasons, the research was considered a case study.

A case study is a specific methodology applied to support the research of a particular, individual, well delimited and contextualised (in time and place) situation. The most usual types of case studies focus on a unity of research. However, there are some case studies in which multiple studies are conducted simultaneously, referring to individuals or institutions. The present research can be characterised as a specific or intrinsic case study (ANDRÉ, 1989; YIN, 2009), since it focus on a group of higher education teachers who were selected to take part as specialist teachers at the university´s virtual campus, according to their participation in the teacher training course offered by same institution.Research data were collected through the application of questionnaires, before and after the course. The questionnaires aimed at identifying the course participants´ opinions about online teaching and any possible changes that may have occurred in their practice after the course completion. The course participants´ questionnaire answers were recorded and mapped and their access to the course platform interfaces and participation were also registered. In addition, their testimonies and reflections collected during the two face-to-face course meetings were also considered. The

specialist teachers selected for the development of the content and tutoring of their specific online disciplines offered by the university´s virtual campus were interviewed individually and as part of focal groups during the semester just after the course completion. The interviews occurred during the academic semester, just after the teacher training course. On that occasion, the university´s offer of online disciplines – supported by Brazilian law which authorises the offering of up to 20% of the disciplines of undergraduate face-to-face courses as online disciplines – was still at its initial stage. In order to fulfil their working hours´ using the e-Learning platform, the physical presence of the online teachers at the university´s "virtual campus" was required. This requirement was justified as "on-site" continuous professional development. The requirement of the physical presence of the specialist teachers at the university favoured the interviewing of the individuals, the establishment of the focal groups and even the observation of the online teaching and learning process occurring through the computer screens of some specialist teachers during their online lesson.

The participative observation enabled a closer contact with the university´s reality, and therefore, allowed the observation of conflicts and tensions, uniting the object to its context in an attempt to identify the motivation for the intended and necessary changes (QUEIROZ et al., 2007).

Higher education teaching

The structural organisation of higher education in Brazil has, since its origin, privileged the mastery of knowledge and the experience in the profession as sufficient requirements for university teaching (MASETTO, 2008). This structure privileges the transmission of knowledge and experience from a teacher to an inexperienced and unknowledgeable student. The belief is that those who hold knowledge can teach. Nevertheless, there has been growing awareness about the need for change in higher education teaching. Like in any other career, higher education teachers need specific and adequate teacher training courses

which "is not limited to having a bachelor´s degree, a master´s or a doctorate, or even just having the professional experience practice" (MASETTO, 2003, p. 13). Higher education teachers lack the pedagogical skills to mediate learning.

The *modus operandi* of higher education teaching follows basically the traditional teaching model inherited since primary school. This model, according to Vilarinho (1984), can be characterised as: a) the main purpose of teaching and learning is the mastery of the content studied; b) teaching is a synonym for knowledge transmission; c) the teacher is the main element in the process, as he/she represents the main authority who possesses all the knowledge and is the only one capable of assessing students; d) students receive, accept and reproduce the transmitted content; e) the content is an end in itself, and is organised according to the teacher´s logic in order to be memorised by the students; f) the teaching method is lecturing, i.e. it has a verbal transmission characteristic directed at the students´ intellect; g) individual learning needs are not accounted for, as teaching is directed to the collective.

Higher education teachers, as well as school teachers, need to change their teaching practice. Practitioners who transmit their knowledge need adequate teacher training in order to act as mediators, thus promoting the construction of communication and knowledge in the face-to-face and in the online classrooms. According to Masetto (2003), the focal point of transformation rests in the teacher´s practice itself, which changes from a teacher-centred to a learner-centred (comprising both: the teacher and the student) model of teaching and learning practice. It is therefore necessary that the teacher and the students establish a partnership and a mutual participation in this process.

This transformation requires teacher training programmes in which the participants are instigated to reflect on the necessary skills for higher education teaching. In addition to pedagogical and technical skills, higher education teachers should develop the following skills: a) socio-affective skills which allow for the establishment of interpersonal relationship with the students, favouring an ideal environment for

learning; b) time-management and course-management skills, and c) technical skills which will guide the inclusion of the student in the specific dynamics of the learning platform. Equally important to the skills listed previously is the attention given to the students: individually, in small groups or as part of the whole group. Higher education online teachers will also need to be prepared for dealing with students who are very familiar with the use of hypermedia, and whose most common way of dealing with text is through links and keywords, as hypertext. Therefore, higher education online teachers need to be closer to their students´ digital knowledge and to their quicker forms of understanding. At the same time, they should consider the students´ experience and their digital culture, so that they can meet their aspirations, and solve their curiosities and doubts, narrowing the gap between the world of the teacher (here also including the institution) and the world of the student.

A society immersed in the dynamic, open, networked and interactive media landscape requires pedagogical processes which should also be dynamic, open, rhizomatic and interactive. In order to address this socio-technical demand, higher education teachers need to be very familiar with authoring, sharing, connectivity and collaboration, enabling students to relate to and situate themselves in this cybercultural environment. Higher education online teachers could supply the classroom with an assortment of communicational strategies capable of addressing the communication profile of the *new viewer*, allowing students to develop effective interactivity with them, which is understood as a living articulation between emission-message-reception that promotes the collaborative construction of knowledge and communication.

The media landscape in the digital age expands cultural markets and is responsible for the increase and the creation of new consumption habits. Computers, tablets and mobile phones are, thus, the medium that enable the conversion of text, sound, image and video message into a language accessible to all. The digitisation, compression and convergence of digital media favour the handling, storage, reproduction, modification and easy distribution of data. Therefore, there is a change from the

unidirectional receptive relation with the television to the interactive and multidirectional mode of the digital screens connected to the web (SANTAELLA, 2008).

Immersed and resourceful in this scenario, students are capable of watching a video, sending a text message to different recipients and chatting in real time at the same time. They like playing new games, participating in online social networks, visiting blogs and websites and like sharing data and chat via MSM, Hangout, WhatsApp, Skype etc. This expertise favours their performance in the e-Learning platform, although the level of engagement required is differentiated, demanding from the teacher more attention, familiarity and similar digital knowledge associated to the specific teachers´ knowledge. However, teachers are still becoming familiar with digital media and many still do it with limitations. In this context, understanding the transition from the audiovisual culture, characteristic of mass media, to the interactivity of the digital culture is a decisive factor when managing and dealing with the communicative and cognitive profile of the student, as well as to reinvent the continuous teacher training for online higher education teaching.

Teacher training for online teaching

When teaching online, teachers naturally bring with themselves the teachers´ knowledge acquired during their face-to-face classroom practice. Tardif (2007), a renowned researcher of "teachers´ knowledge" does not address the extension of the face-to-face classroom *modus operandi* in the online mode. However, it is possible to infer that, when teachers do not have specific teacher training for the online mode, they will certainly put into practice their experience acquired during their face-to-face classroom experience. According to the author, the teachers´ knowledge built along their careers leads to a progressive knowledge on how to dominate the environment in which they work. Teacher´s knowledge is primarily consolidated during classroom personal practice, being linked to the person, their identity, their life experience and career path. The present research noticed that the teacher training course – focus of the

investigation – took this approach into consideration and used it as its theoretical framework in order to encourage the dialogue between the teachers´ knowledge consolidated in the face-to-face classroom and those demanded by the online mode.

Experiential, social and pragmatic, the teachers´ knowledge acquired during the face-to-face classroom experience of a teacher cannot be transferred to the online classroom. In order to avoid the trend of this simple transposition which fatally adapts itself to the online mode, teachers are required to continually inquiry about their socio-technical environment and their role in the e-Learning platform. Therefore, it is necessary to establish an ongoing dialog between different types of knowledge in order to avoid the underutilisation of the communication potential of the e-Learning platform, the underestimation of the communication profile of students, and to avoid compromising teacher training and education.

The communication and collaboration interfaces used during the "Teacher training for online teaching" course were important channels for addressing and discussing with the course participants about the aspects summarised in the preceding chapter and about the importance of the dialogue between teachers´ knowledge. The questionnaires, the interviews and the focal groups revealed that the course participants who successfully completed the teacher training course felt more challenged and motivated with regards to three of the learning contents studied: 1) online teaching means to be personally and collectively engaged with the authorship of a new style of mediation of learning; 2) communicating is not just about distributing learning content and asking for a lonely student reply, but is offering multiple paths for the engagement of the speaker, who participates as a co-author of the message and of the learning process; and 3) knowledge is constructed through interlocutions, transformations and enrichments between teachers and students, since both teach and learn collaboratively and in joint authorship.

The teacher training course drew attention to the fact that traditional classroom teaching should not be excluded, but there should

be a dialogue between it and online teaching in order to reshape teachers´ and students´ actions in the face-to-face and in the online classroom. The course participants were able to experience important teacher training aspects through the pedagogical design of the course – hypertextual architecture that articulates content, activities and assessments – and through the course teachers´ mediation of learning. The quality requirements most emphasised in the course were:

- Hypertext: it is important to draw attention to hypertext, which in its non-sequential form enables: 1) the articulation, in the interfaces, of the hypermedia content and learning activities, i.e. the convergence of various media supports open to new links and additions and many languages – sound, text, images, video, maps; 2) the transformation of reading into writing through networked authorship connections.
- Interactive teacher mediation: it is important to recognise that mediating the learning process is not merely distributing content and setting learning activities; it is not merely asking questions and collecting feedback from course participants; mediating the learning process is to empower its collaborative authorships in the various interfaces by formulating problems, instigating questioning, coordinating workgroups, organising experiences and knowledge which are built based on a dialogue between interlocutors.
- Continuous formative assessment: is necessary to overcome the learning assessment model based on a single assessment in favour of a continuous formative assessment, which happens in the collaboration and communication interfaces and is based on previously negotiated criteria, indicators and instruments, resulting in a qualitative leap in all-all communication, in learning and in citizen education.

The analysis of the course participants´ performance (who successfully completed the "Teacher training for online teaching" course) lead to the conclusion that they had the opportunity to experience the challenges of teaching and learning in the digital culture, by dealing with students who required a new *modus operandi* from them. The course participants were repeatedly alerted to the risk of being caught by the force of habit grounded in teacher´s knowledge which makes them repeat in the online classroom the same and already questioned face-to-face classroom teaching strategies, resulting in their existential and professional dissatisfaction, as well as causing concerning damage to the training and

education of students. They also realised that a teacher can and should encourage their students to be part of the digital culture and to establish a dialogue with it, criticising its uses and abuses in conventional and inconsequent consumptions, building from the competent interlocution on the e-Learning platform, a cyber-citizenship that is about the construction of participatory democracy in space and in cyberspace.

It is therefore necessary that the general educational system, and each educational institution, organise themselves structurally so that it is possible to invest in the continuous professional development of their teachers in order to engage them in the new classroom scenario which is based on forums, chats, wikis, blogs, web conferencing etc.., and to include them in the digital culture and to foster the development of the expertise necessary to the interactive dynamics of online teaching. In short, it is necessary to acknowledge that continuous professional development for online teaching is essential. Nevertheless, the last word will always be with the watchful teacher, who is restless and engaged in carrying out the dialogue between knowledge, in line with the past, present and future socio-technical scenario.

Conclusion

This conclusion finalises the processing of the research data that investigated the "Teacher training for online teaching" course and its subsequent semester, i.e. the teaching performance of the course participants at the university´s "virtual campus" during the semester immediately after the course. The present article has, so far, explored the main topics of the theoretical framework adopted by the course: digital culture, teachers´ knowledge, teaching in higher education and teacher training for online teaching. By doing so, it assumes its relevance with regards to the discussed topic and generates expectations about its effect on the course participants´ performance during the course, and about the expected new strategies incorporated in their online teaching practice. The following description on the course impact and achievement is related to the research objectives presented at the introduction.

The testimonies of the course participants at the beginning of the course showed the typical profile of underprepared teachers for the online model of teaching. Three statements revealed their main common issues: “I miss the presence of the student"; “just the contact with their photographs in the virtual environment is not sufficient “; “I have no confidence that my students are actually learning the content, since I cannot look into their eyes and closely monitor their assessments."

These statements reveal, beforehand, that these teachers were underusing the interlocutory and collaborative interfaces of the e-Learning platform. It reveals that they did not know how to build the possible “eye-to-eye contact” through the forums or chat rooms. Certainly, the face-to-face classroom is irreplaceable. However, it is necessary to consider that quite often in the face-to-face learning environment visual contact can be extremely shallow and distant. Whereas, in a classical written letter exchange, one can experience an intense proximity. The need for seeking control of students through visual contact has been inherited from the face-to-face classroom. It reveals the challenge faced by teacher training programmes in building the cybercultural inclusion that enables the being-together online in a more profound way than that of the most common social networks. The online teacher will need to: a) create a friendly and close atmosphere among students, which allows the coexistence of interlocutors in a communication and learning community; b) motivate students to establish partnerships and collaboration which are essential to the collective construction of knowledge. The same can be stated with regards to the face-to-face classroom, when authentic education is intended.

The results of the questionnaire distributed at the beginning of the course also revealed that the teachers, who were responsible for online disciplines at the university for the past two years, were in various difficulties. The interpersonal mediation and collaboration between students were incipient. Their disciplines were offered through content and learning activities developed for individual work, following the logic of task completion and without any mediation of learning.

The e-mail was the interface most used by the teacher (36%) for sending and requesting activities, solving questions, remembering about pending tasks and for being used as the discipline chronogram. The forum was the second most used interface by the teachers (35%). In the majority of cases, based on the logic of interaction without articulation, there was a forum statement and several messages that were individually related to it. The dialog between course participants was not usual. Interlocution, collaboration, collective construction of knowledge were also rare. The most concerning was that the messages piled up in response to a statement, and the teacher did not always take part in the forum and discussed these posts with the students. The result was a decrease in interest of the students in participating in the forums, and the underutilisation of a powerful interface as a teaching mediation resource. In relation to the use of chat rooms, 40% of teachers did not use this synchronous communication interface, where a real time contact with the whole class or with individual groups could have been established. In addition, there was the "personal diary" resource, where students could record their individual learning path and their personal reflections. The "personal diary" could have even become an interface, if it had been opened for access of other course participants for reading, interlocution and co-creation of its contents. Only 39% of teachers used this fourth resource.

The most frequent justification given by the course participants for the low usage of the interactivity resources available in the e-Learning platform was the high amount of work resulting from the large number of students in each of their classes. In fact, many large classes resulted in a large volume of posts on the interfaces, which made the teacher's mediation impracticable. Teachers on ten hours per week teaching hours were responsible for five classes totaling 300 students. Those on 30 hours per week were responsible for 15 classes and up to 900 students. And teachers on 40 hours per week teaching hours were responsible for 20 classes and 1,200 students. An absurd! However, the biggest nonsense was the justification for the excessive number of students per teachers, given

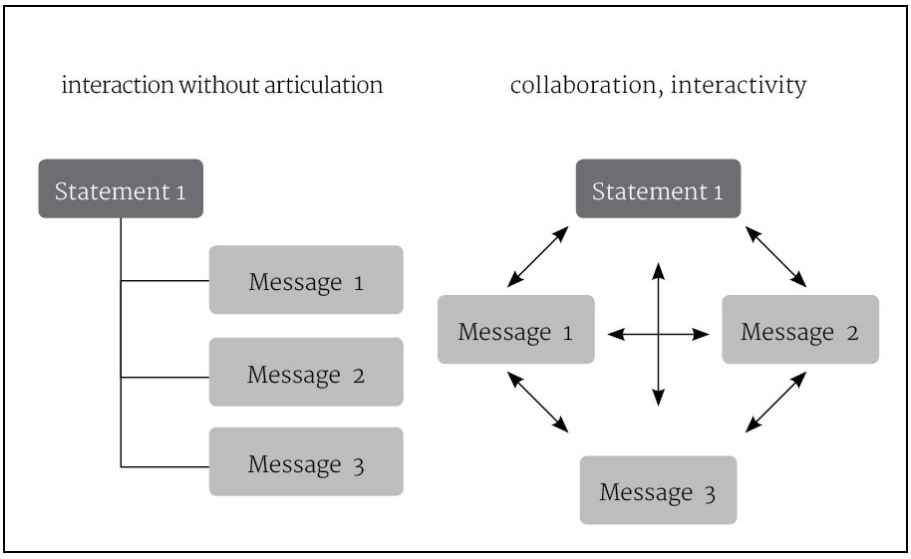
by the "virtual campus" coordination: "Few students participate." This means that the university legitimated the non-participation of students and teachers, and even took financial advantage of that!

Problems of usability and functionality of the e-Learning platform were the second most frequent justification given by course participants for their low use of the interactivity resources. Associated with this, they also claimed that the centralised management of the infrastructure of the online classroom was in the hands of the "virtual campus" technical team. The opening and closing of forums and chat rooms or any other adjustment to the learning content was of the responsibility of the technical team. This team, however, was always extremely busy with the demands of the teachers, and, therefore delayed in presenting solutions, which generated an accumulation of damage to the mediation of teaching and to the learning process.

Facing and overcoming the weaknesses of teacher mediation became therefore the main focus of the "Teacher training for online teaching" course. The course participants were encouraged to debate and reflect on their difficulties addressed (or not) in the first questionnaire. In relation to the excessive number of students per teacher, the course set the example: the 330 course participants were divided in ten groups of 30 individuals in the same e-Learning platform, which was intended to develop their appropriate use of the e-Learning platform. At the same time, it was noticed that the lack of teachers´ autonomy with regards to the pedagogical design of their course disciplines weakened the teachers´ mediation.

In addition to the specific attention given to the weaknesses of the teacher´s mediation, the most worked course topic, based on the convergence of the items of the research theoretical framework, was teacher's mediation based on collaboration and interactivity as a way of overcoming interaction without articulation, as illustrated in the following figure. Ten course teachers were invited to take part in the teacher training course. These course teachers were professionals who possessed the necessary skills to overcome interaction without articulation. Each

course teacher was responsible for a single class with just over 30 course participants and demonstrated in practice how to develop collaboration and interactivity in the forum and chat room interfaces.



Interaction models in the forum and chat room

The course teachers implemented a set of actions aimed at creating a very accurate communicational environment. These actions were all previously agreed during meetings with the course coordinators.

The actions were:

- To provoke situations of creative restlessness.
- To promote situations where students were encouraged to participate and give their opinions even if these were contrary to those of the group or of some individuals.
- To encourage efforts of collaboration between participants, with the joint establishment of respectful attitudes for diversity and solidarity.
- To encourage the engagement of course participants in solving the presented problems in an autonomous and collaborative way.
- To develop challenging situations that caused course participants to constantly present, defend and, if necessary, reformulate their views.

- To formulate problems aiming at the development of skills which enabled the student to reframe ideas, concepts and procedures.
- To implement learning situations that took into consideration the experiences, knowledge and expectations that students already have.
- To develop activities which not only fostered the free expression, the exchange of ideas and the collaboration among students, but which also developed a more acute observation and interpretation of the attitudes of the involved participants.
- To reply to course participants´ posts within 24 hours.

The research found that these actions promoted the development of knowledge on how to overcome the *modus operandi* with which course participants were familiar. During the subsequent semester (the post-course phase), the questionnaire, the individual interviews and the focal groups revealed that the course participants who successfully completed the teacher training course started to question and critically reflect on interaction without articulation and were enthusiastic about the leap in quality made possible through collaboration and interactivity, as illustrated in Table 1.

Table 1. Teacher´s mediation models

	Interaction without articulation	***Collaboration and interactivity***
Teachers´ mediation in the e-Learning platform interfaces	***Based on instruction, transmission and tasks.*** ***Learning is based on the individual student's performance and on vertical asymmetric relationships: author /transmitter separated from learner /receiver.*** ***There is low student-student interaction. One to all connections worsened by physical-geographical distance.***	***Based on construction, interaction and collaboration. Horizontal relationships open to collaboration and co-authorship.*** ***The teacher´s role is to make the learning environment challenging and motivational. Together with the course participants, he/she promotes the co-creation of communication and***

		knowledge. ***All to all connections reinforced by virtual presence in the interfaces.***

Not all course participants concluded the course satisfactorily. The assessment criteria were defined in agreement with course teachers and course participants, and were based on the quantitative and qualitative participation in the forum, chat room, personal diary and email interfaces. High quality participation was considered when there was a high correspondence with the teacher's mediation in relation to collaboration and interactivity. Course participation above 70% was considered as a high achievement; between 50 – 70% was considered an average achievement and low achievement was considered when course participation was between 20 – 49%. Therefore, only 25% of course participants achieved a high grade, 14% achieved an average grade and 42% achieved a low grade. 19% of the 330 enrolled teachers did not access the course even once.

The justifications for the average and low participation grades, which together added to 56%, ranged around complaints that can be summarised in the speech of one of the course participants: "During informal conversations with other course participants, I have noticed that as students, we are failing to keep up with the proposed activities, because as teachers, we also have many urgent duties to fulfil. Like me, I hear many participants regretting for not being able to dedicate more attention to the course, for not doing more careful readings, and participating more in the forums and chat rooms, because they cannot meet the deadlines for posting on the forums, for example". The course teachers respected this type of justification, given that, during the course, the teaching hours´

system remained at 10, 30 and 40 hours, with classes totaling respectively 300, 900 and 1,200 students. Given this unthinkable scenario, almost all course teachers showed admiration for the strong will of the 25% who showed the highest participation rate. Even so, they were engaged in what became known as "rescue operations", resorting to sessions known as "cheese and wine chats" for online festive gatherings, motivational videos and personal e-mail.

In the negative course assessment reviews, made by the course participants, other explanations for the average and low participation rates could be observed. For some, there was an overload of assigned readings in the first lessons which, in addition to faculty affairs in the "virtual campus", hindered their participation. Others criticised the instability of the e-Learning platform, claiming they could not access, navigate and/or use their interfaces during weekends, when the platform was "offline" for maintenance. Finally, those who criticised the e-Learning platform´s low functionality or usability could not count on the helpdesk team to address practical and technical issues related to the use of chat rooms, forums and the personal diary. This complaint surprised the course teachers, because the course participants had been online teachers at the university for at least two semesters and, in addition to that, received at the beginning of the course step-by-step instructions on the use of the e-Learning platform interfaces.

The teachers who did not access the course represented 19% of the enrolled participants; i.e. 63 participants. At first sight this seems quite a high number, considering that it was a free and online course offered by the university, with only two face-to-face meetings. However, among these course participants, some were registered as observers of the institution, and others were members of the technical team of the "virtual campus" who were closely monitoring the functionality of the e-Learning platform. In addition, there were also some teachers enrolled well after the start of course and did not feel motivated to carry on as they had missed quite a lot already.

Course participants´ achievement could be observed through the implementation of new teaching and learning strategies put into practice in the "virtual campus" or through suggestions for the improvement of online teaching given during the testimony of the course participants who satisfactorily concluded the teacher training course. The questionnaire, the interviews and the focal groups results gathered after the course revealed an enthusiastic and substantial improvement in the course participants´ skills with regards to fostering the collaborative construction of all to all communication and of learning in the e-Learning platform interfaces. They highlighted the collaborative process, their individual experiences´ narratives and the discussions held in the various thematic forums, therefore, demonstrating that interactivity is possible when there is horizontality, proximity and co-creation. The forums, inspired by the *modus operandi* of collaboration and interactivity, motivated the course participants to reflect on their practice and to overcome, when teaching online, their own bureaucratic and solitary replies to a statement. The chat rooms, in turn, brought together small groups of course participants during alternative hours, and allowed them to experience, in real time, the all to all multi-direcionality when making decisions or giving explanations. The chat rooms were perceived as key spaces for building a sense of belonging and establishing ties of affection.

We can say that the course teachers´ performance set the practical example, through the forums and the chats, on how to mediate an online learning environment. The course offered clear guidelines for the course participants´ performance, encouraged and monitored group work, encouraged and guided cooperation during the submission of projects and during the execution of challenging tasks and case studies, respected the diversity of talents and learning styles, valued participation, highlighted posts from course participants and turned them into situations for learning, encouraged student contribution with regards to improving the course´s pedagogical design, valued the expositions of different points of view on controversial issues and showed the importance of trying to establish provisional agreements. Finally, and based on its principles, it

motivated the active participation and the co-authorship of the course participants for the establishment of the course criteria, the assessment of learning and for the teacher training for online teaching itself.

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Digital Non-formal Education as an Opportunity to Transform School

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Introduction

School is a reference about what the educational process for people in general, groups, communities, institutions and cultures is (or can be).

However, nowadays, we acknowledge a big variety of other learning situations and contexts, which allow us to alternate between several learning means, conciliate diverse learning experiences, articulate acquired knowledge and developed skills, mobilise means, resources and conditions for available learning methods, enriching and substantialising the educational process in which we find ourselves and the personal learning path we build along our lives.

Presently, many learning situations, whether formal or informal, are remarked for the use of digital technologies, particularly the Internet. Its development definitely broke space and time limits in what comes to learning. Quick mutations brought to society in the last decades allowed a global and generalised access to knowledge, which turns the present context into a reality, new in its features related to the available learning methods. To sum up, it is a reality characterised by giving sense and expression to notions of knowledge society (Hargreaves, 2003), learning society (Pozo, 2004) and *learning with technologies* (p. ex. Jonassen, Papert, Laurillard, Costa).

In these contexts and learning scenarios, which are new or different in its features and ways to access information and knowledge, carrying out learning processes demands, among others, skills of autonomy, self-regulation, personal learning management (Biggs, 1999; Duarte, 2012) and decision making, in a higher and deeper level than in formal learning contexts because, despite the generalised equal access to the latter, through formal and face-to-face educational processes, one needs to be able to organise to learn, define what one intends to learn and how to do it, independently of a teacher who guides and conducts the learning process.

Thus it is believed that formal education assumed a crucial role promoting competence and literacy development, in what is considered essential, so that anyone can later benefit from (other) learning opportunities, coming up in non-formal ways. On the other side, this brings us to the need to overcome the 'schooling model', recurring to processes and methodologies that allow stimulation, acquirement and mobilisation of different skills, directly related to research, analysis and reflection on one's own learning processes.

In this sense, and within a strongly ICT-based society, it has been claimed that School – the ideal and, for centuries, the only place to teach and learn – needed to transform, rethink roles, levels of skill competence, learning models and curricular organisation. This claim also implied the need to consider student profiles, the environments in which the students move around and when they feel motivated to take part, so making their interests outside school be able to find a proper place in formal education (Weigel, James and Gardner, 2009; Coutinho and Lisbôa, 2011).

Therefore, it is important to analyse other learning instances and manners of qualification presently available beyond 'school walls', and characterise the context of living in most societies. This context is marked by significant changes that have been triggered by technological revolution, development, as well as evolution in social, political and cultural fields – fields that inevitably affect education in general and learning forms and contexts in particular.

Learning instances and contexts beyond school walls

Along with school, it is acknowledged that there are multiple learning instances and ways to qualification that are part of children's, youngsters' and adults' lives, in a diversity of learning contexts. These are characterised by a significantly informal nature, standing out while being typical of non-formal contexts, free of formalisation and learning structure.

At the end of the 20th century and the beginning of the 21st, "the tendency for educational systems not to be limited to their organised levels was clearly manifested" (Gaspar and Roldão, 2007: 175). The visibility of non-formal educational processes "occurs and asserts itself progressively from the second half of 20th century on, and it corresponds to a phenomenon that stems from the inside of an emerging field of educational practices, directed to adult audience" (Canário, 2006: 196). According to Rui Canário (2006:197), it is in this framework, settled by the movement of permanent education, that "distinctions between different levels of possible formalisation of educational situations gain visibility: in an educational *continuum* covering the whole living cycle, *formal* processes are integrated and articulated (whose prototype is the education offered by schools), as well as *non-formal* (marked by time, program and location flexibility, regularly of voluntary nature, without any worries of certification and adapted to different publics and singular situations) and *informal* processes (corresponding to all potentially educational situations, even if little to no organised or structured at all)".

Thereby, "two parallel concepts – formal and non-formal – which can alternate, complement but not annul each other" (Gaspar e Roldão, 2007: 175) have appeared.

In this context and according to the work document *Memorandum on Lifelong Learning*, which resulted from March 2000's Lisbon European Council, the expression "lifewide dimension brings the complementarity of formal, non-formal and informal learning into sharper focus. It reminds us that useful and enjoyable learning can and does take place in the family, in leisure time, in community life and in daily worklife.

Lifewide learning also makes us realise that teaching and learning are themselves roles and activities that can be changed and exchanged in different times and places." (Commission of the European Communities, 2000: 9).

These movements and the recurrent adoption of said expression lays on the understanding that, independent of spending the largest part of the time taken up by formal learning contexts in situations (i.e., school, work, continuous training courses, among others), the input received as a part of life is mostly of an informal nature, i.e., developed in informal contexts or situations (Cross, 2003; Harrison, 2006; OCDE, 2010; European Commission, 2016). There are several ways to "naturally" learn in a contemporaneous scenario (Lemke, 2002) – reading a book, surfing the Internet looking up information, asking a friend or an expert to explain something to us, observing others doing and later trying to do it ourselves, exploring new territories, writing, drawing, building diagrams, questioning, among other activities.

It is settled in this premise that, in the last few years, political and social measures in the educational field have been taken, particularly in Europe, with the intent to increase the acknowledgement of competences[1] and abilities acquired outside of school, with the creation, by the Member States of European Commission, national systems of validating non-formal and informal learning, and its valorisation both in fields of youth action and in the development of a working skills agenda (European Commission, 2016; UNESCO, 2012). This is a result of the awareness that global education demands a holistic vision, where formal, non-formal and informal education should complement each other.

[1] Competence is understood as "the knowledge at use", expression that origins in Philippe Perrenoud and Guy Le Boterf's theorisations (Roldão, 2011: 33), in a constructivist perspective of competence, as an integrating and complex concept, very distinct from the behaviorist and atomistic conception of skill, with great influence in Portugal, particularly in qualifying teacher in the 1970s (Roldão, 2011). Philippe Perrenoud emerges as one of the main supporters of guidance through competences at school. In his opinion, the concern about competences should be perceived as a surplus, where a new dimension is added: "a capacity of using knowledge to solve problems, build strategies or make decisions" (Perrenoud, 2003: 13).

Information and Communication Technologies too can no longer be ignored, especially within any educational ecosystem, once its use allows and fosters the construction of knowledge in different areas and domains, a co-construction or collective construction of knowing as defended by, for example, George Siemens (2005), Dave Cormier (2008), among others. Its generalised use enhanced the realisation of new kinds of activities, whether in professional, personal or academic levels, as well as new work, teaching and learning habits.

Digital transformation: knowing how to learn with technologies

Most people have access to the Internet, and the ratio of people who use it regularly is high. Various statistical studies from different sources show this (Eurostat, 2015; INE, 2015). However, knowing how to use digital technologies and learning to take advantage of their potential, treat information, manage knowledge, communicate and interact with others requires knowing where information is, having the capacity to access it, and being able to turn that information into knowledge. One expects that each single individual develops a set of cross-cutting competences and literacies, considered necessary in 21st century, while earlier these were expected to be mostly instigated along the school journey or through other means of qualification.

UNESCO (2012) and OECD (2010) have claimed that all educational systems should not stick to their own goals and internal evaluations, but should also develop in their students the ability to identify, understand, interpret, create, communicate, calculate, question and solve real-life concerns in distinct contexts, in order to fit themselves perfectly in society. In 2010, the European Commission determined some of the cross-cutting competences that are important to promote and valorise, such as creativity, innovation, critical thinking, problem solving, productivity, leadership and responsibility, decision making, communication, collaboration, research capabilities, initiative and self-determination (European Commission, 2010; CNE, 2011). Several studies

have been carried out in recent decades, where a different categorisation of competence types was set down according to each perspective (e.g., Murmane and Levy, 1996; Wagner, 2008). In compliance with a release named *Partnership for 21st Century Skills* (P21, 2007), competences to develop in this century may be grouped into four kinds:

1. Central or nuclear subjects: artistic languages, world languages, arts, economy, mathematics, science, geography, history, governance and civic education, among others);
2. Learning and innovation: critical thinking and problem solving, communication, collaboration, creativity and innovation;
3. Information, media and technology: informational literacy, media literacy, ICT literacy;
4. Life and career skills: flexibility and adaptation, initiative and self-regulation, social and cultural skills, productivity and accountability, leadership and responsibility.

Nevertheless, since the 1980s, the most developed countries have surrendered to new evidence – the problem in the lack of literacy competence within adult population[2]. In Portugal, in spite of low literacy rates still showing up, the problem of illiteracy is no longer a concern as significant as it has been in the past. Now the issue is on levels of literacy and on people being excluded from information, especially in association with low digital literacy[3] among the general population and information exclusion within specific groups in particular[4]. For example, in Portugal, significant inequalities regarding access to ICT still exist (e.g. Costa, Cardoso, Coelho e Pereira, 2015), restraining democratisation of access to information, knowledge and learning opportunities.

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[2] According to the last national Census, there are still around half a million illiterates in Portugal, among which the most party corresponds to women older than 70 years old (PORDATA, 2015).

[3] Digital literacy is a key concept of current societies. It actually appears on UNESCO's, OECD's and EU's guidelines as one of the essential competences for learning throughout life, necessary to self-realisation, to active citizenship, to social cohesion and to employability in the society of knowledge (Avila, 2005; CNE, 2011; Patrício, 2014).

[4] Generally, we witness the division or separation between two groups: the ones who have access to information and knowledge through technological and digital means and the ones who do not have that access and are thereby excluded due to the lack of knowledge and mastery of digital environment (Costa, Cardoso, Coelho and Pereira, 2015).

Literacy is "one of the factors that restrain the proficiency of individuals in mastering the ICT" (Ávila, 2005: 142), as without literacy competence, even learning these technologies becomes jeopardised as their use will be seriously limited. Digital competence was, as a result, recognised in the European Reference Framework as one of the eight essential skills for learning throughout life, laid down by the Recommendation of the European Parliament and the Council (EU, 2006).

The Internet presents itself as a simplifying means for learning competence development (Weigel, James and Gardner, 2009), along with the rise of new learning styles supported by ICT and the increasing informal learning communities (Sefton-Green, 2004). This represents a source of strong pressure on education institutions. Universities are summoned to identify the referred cross-cutting competences, to develop adequate methodologies to their achievement and to put a new teaching model into practice, contributing to the formation of one Europe full of clarified, intervening, enterprising citizens, who master information and literacy competences, in order to be able to read the reality of their surroundings. It is considered that formal learning can have the role of ensuring that individuals develop the essential skills to use technologies in an effective way, so that they can learn and solve problems through digital means and resources (Luckin *et. al.,)*. We do not refer to 'technological skills' as they relate to the technical mastering of digital technologies, but rather to 'general and ICT crosscutting skills' (Costa *et. al.*, 2012).

Learning opportunities created by digital technologies

Using digital technologies in the learning process implies clarifying and justifying the principles to consider about learning. To this, the systematised and well-founded proposals of Seymour Papert (2000, 2005), David Jonassen (2000) and Diana Laurillard (2002) on learning with technologies stand out. These are based on theoretical principles of a constructivist or a socio-constructivist nature, in which the guideline is to

use technologies to think, supporting individuals' cognitive development and to promote significant learning.

The results achieved in last years' studies on the use of ICT, at both national and international levels in educational and training contexts, show that practice and living experiences in contexts enriched by technologies or in virtual environments foster and promote the realisation of authentic and meaningful learning. Further, this learning takes place in an autonomous or collaborative manner, through activities such as research, communication, collaboration and production (Atwell and Costa, 2008; Duarte, 2008; Luckin *et. al.*, 2008; Redecker, Ala-Mutka and Punie, 2010; Sharpe, Beetham and Freitas, 2010).

Different concepts and notions have transversally been standing out, tending to keep pace with technological evolution and to clarify the means and circumstances in which people live and learn in current society. The regular, natural and spontaneous use of the Internet, especially through mobile devices, prevails. Also the notions of mobility, flexibility, connectivity[5], ubiquity and serendipity[6], among other elements, may be taken into account. These contribute to the characterisation of general contemporaneous contexts, as well as the learning contexts that originate in several dimensions. By using mobile devices to learn, the notion of ubiquitous learning arises, which is distinguished for being spontaneous, unintentional, chaotic and fragmented, inadvertent and non-deliberate. It does without the education-learning equation and brings together a new process of learning (Santaella, 2014).

It is important to highlight the relevance in pondering how technologies are effectively used from their pedagogical point of view,

[5] Very often associated with the premises of connectivism (Downes, 2006) and with the perspectives on learning in network (Downes, 2006).

[6] Serendipity is a word that sums up a complex idea, that is, it expresses a non-hazardous hazard. It refers to a state, a feeling, a moment or a situation which is defined by some randomness or uncertainty, when one runs into something advantageous, although there is at first no awareness of that, i.e., not having deliberately searched for it. After happening (if it gets to be found, felt or experienced), eventually, one understands what has been achieved and how it all turned out. This is one of the ways of informal learning, resembling and somehow overlapping the previously referred notion of ubiquity.

given that one recognises the potential in that use to engage the students actively in the educational process, while it is also common to face situations where technologies are used to replicate the traditional educational model based on transmission and knowledge streaming.

Analogical education in a digital society

An equivalency may be established between school, or the classroom itself, and the informal online contexts made possible by the Internet, regarding them as favourable environments for learning. Formal education is essentially distinguished for being organised, structured, intentional and having a limited time and space. School has been kept working in a closed way since its origin in 18th century, where the school model was built up (Nóvoa, 2009). It has remained and resisted the changes that have occurred in 20th century and in the beginning of 21st, independent of its openness to the world, of innovation and scientific and technological evolution. It is in school that each individual performs most of their learning, acquires knowledge and develops crucial skills for their development as well as their social, personal and professional formation. Knowledge and competence are selected and stipulated by others (political decision-makers, career builders, teachers …). On the other hand, the Internet is an open environment, a mirror of society, culture and history, a context that pictures knowledge and innovation while including experiences and learning practices, built by "many multi-decorated walls", which keep being replaced in a quick way.

The informal online contexts are, thus, very different from the ones in the classroom: the intervening parties are not pre-defined, neither are the activities or the contents, at least not in their whole or specificity. The goals keep being determined by each single individual who chooses the resources and the proper tools for their intentions and defines the strategies and the methods that allow them to access the desired information and what they need to gain knowledge and learn. The informal online contexts iron out differences between those who teach and those who learn, between those who decide and those who build a career.

Nonetheless, both in face-to-face educational contexts, and in the several known proposals and experiences of online learning and teaching that approach distance teaching arrangements (such as open online courses – internationally known as MOOC), traditional educational visions still prevail. This is the case as they are mostly based in closed-study plans, of a normative and prescriptive tendency, a technological and systematic nature, as if the context could never be altered. Still, context is substantially different as the opportunities to build more open and flexible study plans are gathered, both in face-to-face and online contexts.

Online contents exist and are available on the Internet. The questions asked are about how many people have access to them and how to evaluate their quality. These can be accessed to obtain some kind of information and then quickly jump on to other content. Otherwise, procedures may be created that allow the deepening and solidification of strategies, and ways of grasping other contexts. This would imply that the learner had the ability to reflect on their own processes, that they were capable of casting the successful strategies, i.e., capable of self-regulating their learning in an autonomous and independent educational journey, knowing how to organise to learn and how to manage that process.

Concluding remarks

Evidently, the resources, tools, models and perspectives that have been developed and tested on what emerges from the use of digital technologies to learn, such as the conducted research, have had an impact. From a theoretical and empirical point of view, this effect has brought reflection on the pedagogical use of technologies in formal contexts of learning, particularly in school, as well as on the different (and new) ways to organise and develop learning processes that take place in them. These represent specific contributions to the construction of knowledge in the educational research field.

Studies show that the changes in education have been scarce, in terms of practice and methodology. We know this way that the change in the educational process may not be limited to installing computers and

providing multimedia resources to students and teachers, supposing a change of paradigm in pedagogic practice. ICTs are still not being used in a manner that takes full advantage of their potential for learning, and they have not been integrated in school activities in a way that creates opportunities for students to learn differently than traditionally expected (Cuban, 1993; Twist and Withers, 2007; Means, 2008), and also, they have not valorised and promoted the development of skills and behaviours in areas of learning where students usually show difficulties.

Learning in non-formal online contexts demands the development of a set of skills and literacies determined for learning carried out in such locations: namely, skills such as digital literacy, including competence related to informational literacy, literacy for media, and the use of Internet (Ávila, 2005; Luckin *et. al.*, 2008; CNE, 2001; Patrício, 2014). School will be able to assume a crucial role in promoting the development of such skills for its students (as has been proposed by several authors). These skills are considered essential for the students to benefit from (other) learning opportunities, showing up in non-formal contexts.

School transformation is necessary. Defended by various authors (eg. Grundy, 1987; Marsh and Willies, 1995; Wenger, 1998; Anderson, 2004; Weigel, James and Gardner, 2009), we are witnessing a rise of new paradigms in education that allow framing the current learning practices, especially the ones developed or triggered in informal online contexts. This transformation requires change. However, the changes are neither related to the introduction of new technologies in schools and the provision of technological equipment, nor to the use of certain new and innovative technologies like platforms of technological applications. Rather they are related to changes in teaching and learning practices, namely the means and strategies harnessed to learn, the environments and contexts created to learn, or even changes in the models – perspectives on learning – that educational practice can engage. A change in pedagogical thinking is expected.

School transformation demands a change of paradigm, with consequences for conception, design and implementation of the study

plans, and even on the reconfiguration of the concept of curriculum in the current context and circumstances (Viana, 2017). Hence, it is not about designing another set of curricular reformulations, as has been the case throughout the history of school education in Portugal for the last 30 years.

It is necessary to rethink school and its configuration. It is necessary to reconfigure education ubiquitously incorporating the different learning contexts, their instances and the range of ways to learn, promoting open and network driven educational practices, turning them into a digital education, where authentic and meaningful learning is carried out.

Digital education integrates and articulates formal learning contexts, in which the learning paths of its actors are globally outlined, where there is a pedagogical figure who guides and manages the inherent processes and educational practices. These contexts also provide a space where the learners have the opportunity and are prompted to develop said skills – skills that allow them to learn later independently and autonomously in non-formal contexts. This space should enable them to assume the managing of their own practices and educational processes, making decisions and defining what to learn, as well as what to do to learn continuously throughout life.

In order to transform, School may start to consider effectively the learners' point-of-view and their role in curricular co-decision, namely in the conception, design and development of the study plans. They can also promote a sense of participation in students, with autonomy, accountability, innovation, creativity and ability to improvise. Teachers can also benefit from readdressing their own roles in these areas.

Ultimately, School as an educational ecosystem must be able to (re)think, ask questions and reinvent itself – rethink and transform their own conception of what it is to be a School.

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Online Education: A Conundrum in this Contemporary Puzzle

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Introduction

The society dynamic intends a social life in all its aspects. It is a script in permanent construction of a spectacle in which we are the actors. Some of us are supporting others, invisible actors in the management of the show even when we choose to be spectators. This condition becomes clearer when we access the web and as the digital world became part of the human condition. It is no longer a spectacle at a distance, it is natural information that awakens our senses as life becomes a mixture of social-digital-life. The music comes to me, the work of art in the world's most famous museum takes place in front of me. The tip of fashion or the best wine appears as a magic trick.

What causes us an aesthetic awe can also question our value scales. What was inaccessible, so it did not cause any risk, is suddenly in the palm of the hand.

How not to change when almost everything changes? There are many ways to resist the changing, the best known is the modernisation of the old, that is, to give a new face to what has already been eroded by time. This is a common practice in education. We can provide a new feature, change the name, add a fashion concept and call this a new methodology. We change not to transform, we drag the old as a burden

too heavy to carry and recognise it as too important to be abandoned. Largely it is preferable to compromise the future rather than question what supposedly worked in the past.

We invite the reader to look at the future of education from every new window that has been open in past decades. The main purpose in the reflection that follows is to provoke a transformative look that can motivate us to leave our comfort zone. Education competes with new forms of social organisations that do not depend on territories, but on data networks and people who connect, feed and consume information. We form networks of subjects, sometimes more present or even less present; We form learning communities and give directions to information. Information, social networks, communities set in digital-virtual environment may be important for the quality and extensiveness of education.

Contemporary education: Social networks

The education has been strongly questioned by societies for the mismatches of educational structures and their methodologies in relation to social transformations. The education theories are constantly confronted with theories of other areas that can subsidise the temporisation of education. Education must be thought of in times when everything changes, adjusts, accommodates, recreates, and consumes information (Bauman, 2011) that circulates in virtual networks. Less personal and more connected to the unknown.

In 1996, Manuel Castells presented the concept of a networked society whose social structure is based on networks fed by information and communication technologies. For Castells (2004), the social structure can be understood as “the organisational arrangements of humans in relationships of production, consumption, reproduction, experience, and power expressed in a meaningful communication coded by culture". Networks have taken an effective place in both economics and culture, and are part of the society. Castells (2004) says that social networks deal

with a set of interconnected nodes, which do not have a center, but rather ties that feed and increase their importance.

However, the idea of social networking predates the Internet itself. In 1934, the sociologist Jacob L. Moreno introduced the idea of using visual images to reveal important characteristics of the social pattern, and for that reason he is considered the pioneer in the use of social networks. It was a method of exploration that enabled the structural analysis of a particular community – that is, to understand and explain how subjects interact in a web of social networks (Freeman, 2002). One of the first definitions of social networks was coined by James Clyde Mitchell, who advocated that social networks would be an integral part of human society and that they would have the potential as a tool to "examine the structure of social relations in modern societies" (Mitchell , 2014).

Looking a bit at social networking theories, it is seen that in the 1970s and 1980s, Mark Granovetter proposed that social relations could happen at different levels, being considered strong, weak and absent. For the author, strong relationships had more rigid norms and many attempts would be necessary to meet the expectations of individuals. Granovetter understood that these are important instruments that individuals possess for social cohesion; that is, people with a higher number of weak connections end up having more opportunities due to their mobility (Braga et al, 2008). This showed the value of weak relationships due to the importance of their connection between social network elements that are not directly connected, giving rise to the concept of the bridge. The subject that makes the bridge is responsible for the relationship between the subgroups of the network, so the bridge subject is strongly connected to a group that interacts with a subject from another group (Grosser, 1991). Therefore, educational organisations are typical of weak links, what we need is to continually work on strengthening connections, but in a spontaneous and less artificial way.

As we have seen, it is not a question that precedes the emergence of digital technologies and the concept of social networks supported by Internet technologies. Our goal is to bring this potential into the provision

of education. The Internet and social networks are present in the lives of educators and learners, therefore, it is not an innovation from the point of view of the use of digital technologies, but the methodologies that can integrate the strategies of social networks in the educational processes.

All agents of learning are actors in the learning process. However, following the guidance of learning management, learners should be at the centre of attention in the organisation of the educational process, as they are the main actors and they are all intended to act in the process. We take a theory of social networks as a reference to understand the relationship of learners and the network of learning. In 1979, Linton Freeman dealt with the actor's centralities, intermediation and closeness. The degree of centrality focuses on the importance of an actor in the simple connections that he establishes with the neighbouring actors, and it is quantified by the degree of the vertex. The idea is that a central vertex is the one that is able to interact more rapidly with all others (Scott, 2002; Hanneman and Riddle, 2005).

The centrality of intermediation evaluates the dependence of non-adjacent vertices of others that act as a kind of a bridge to the effective interaction between them (Freeman, 1979). According to this author, the shorter distances have a smaller number of intermediaries, a shorter time of information transmission and consequently a more efficient communication due to the high level of familiarity with the other members of the network, which would ensure a greater flow of information. This information can be easily associated with e-Learning as it allows a more efficient learning of the learner, since he is the one responsible for the organisation of the time, the rhythm of study and the use of the content. Tutors, on the other hand, can be seen as the intermediaries between the learner and the content, using technology as a promoter of closeness.

In the 1990s, Bruno Latour, along with Michel Callon and John Law, developed the Actor-Network Theory (TAR), (2004.). In general terms, the theory argues that human beings establish social networks not only with people, but also with animals, institutions, architectures,

machines, etc. "The TAR allows us to verify a multiplicity of heterogeneous materials connected in the form of a network that has multiple entries, is always in movement and open to new elements that can associate in an unexpected way" (Melo, 2011, p. 178). In the case of e-Learning, in dealing with technological resources, it can be inferred that the learner establishes relationships with non-human beings, becoming more closely involved with machines.

In addition, the interaction between learner and mediator, learner and learner, learners and communities (virtual or expert) and learner and content – specific information to the training process. These theories deal with expensive phenomenas also for educational processes, such as networking and the circulation of information in networks. This should be a fundamental concern especially in e-Learning where static information and low dynamic environments make it difficult to flow information in learning networks.

Virtual communities: another challenge for education

Another interesting challenge for education is to look at the formation of communities in social networks. Later we will see a little about theories that seek to understand virtual communities and approach online educational practices. From what we saw in the previous topic, we can understand that a social network is a set consisting of actors (individuals, groups, organisations, communities, etc.) that are interconnected to each other through a set of social relations (connections), then constituting communities.

These new social architectures do not coexist harmoniously with the traditional structures of education. The learners are in social networks, they participate in strongly horizontalised virtual communities, but even in e-Learning the verticalised social structures that are centered in the management of teaching prevail. Traditional models of education were strongly linked to territory and the domain of information. In e-Learning or in schools that adhere to the use of the web as a source and means for the circulation of information, it is necessary to consider that "social

interactions [become] deterritorialised, due to the mechanisms and technologies of connectivity, among them, the digital social networks" (Teixeira, 2014, p.21). In a complex movement of image, social actors participating in the network do not perceive the physical spaces and the digital ones as being disconnected.

In virtual communities, actors are responsible for building spaces of expression and establishing connections with other actors. While the roles in traditional education are formal and hierarchical, in social networks these roles are defined by the constructed narratives, which, in addition to their significant nature as constituting history, bring an intention and a materialised action in the doing and knowing how to do it that only make sense in the information webs of social networks (Teixeira, 2014). These same actors when participating in an online course, submitted to a hierarchical order with established limits and previously defined contents, do not have the same interest in establishing connections with the other actors. Here is an apprenticeship: we need to value spontaneity, connections and interest in appropriating interactions, as they are part of the psychological condition that attracts participants to the network and enables stronger connections.

Perhaps what we need is to favour a learning management so that courses are closer to virtual communities. An enrollment in the course must be successful or equivalent to creating a profile on a social network. By creating a profile, people act as if the profile were their extension, a complement to their own identity. That is, identities are re-signified and subjectivities pass from a state of passivity to an active subjectivity, through effective communication traffic (Colodel, 2016), which materialises in the learning communities. These, built or supported through networks are based on autonomy and methodologies needed to participate and promote the connections between the actors as part of the basic learning for a new pedagogical model.

For the studies of virtual communities, the web enhances the communication between geographically separated individuals and can generate situations of cooperation. The difference appears when

compared to the traditional models of education referenced by physical proximity. However, society has new models of social interaction that happen because of the use of technology, either individually or jointly. We come to belong and interact with new and different groups that are called virtual communities. They are models that encourage educators to rethink the ways of organising educational processes.

According to Rheingold (1993), the internet would reinvent the concept of community from the emergence of virtual communities. This change is due to the reduction of public spaces considered real (non-virtual) associated with the intense use of digital technologies. The virtual community is a set of actors and their relationships that, through social interaction in a given space, constitutes bonds and social capital in a cluster structure, over time, associated with a type of belonging.

In communities you also learn

Communities translate a reference for autonomous learning and innovation into the educational process, no longer centralised in the teacher in which the learner/learning becomes part of an information and collaborative/cooperative training network. In this context, they can comprise learners of the same institution, of the same class or totally geographically separated, as is the case of e-Learning. This type of community may require mediators who will lead learners through the learning process based on collaboration (social relationship) and content sharing (Henri & Pudelko, 2003).

The concept of a learning community has been discussed for decades as a phenomenon essentially of digital networks. However, the existence of learning communities does not necessarily depend on digital technologies, it is enough that there is a group of people who are prepared to learn together and are already a learning community (Paz, 2015, Catela, 2011). However, it is a concept that needs to have its meaning investigated as far as digital technologies make it possible to bring together people interested in the same subject, animated and mediated in a virtual environment.

Learning communities are constituted as a network, but with a differential in relation to other social networks particularly used for entertainment. The purpose of the learning community is the production of knowledge (common goal) and for this it is necessary to organise studies, to facilitate access to information. In this case it supposes the passage from the traditional model based on the oral distribution of information to a process in which the learner becomes the author of its own learning (Shea, 2006).

In our view, two axiomatic expressions convey the meaning of the learning community. Paulo Freire (1987) translated this meaning into the famous statement: "No one educates anyone. No one educates himself. Men educate one another, mediated by the world". We can say that there is no absolutely authorial learning. Learning is always social and goes beyond the exchange of information, including the good or bad experiences shared that identify each subject in the community. Another important axiom for understanding the learning community was presented by Pierre Lévy (2003) when discussing collective intelligence: "nobody knows everything, everyone knows something, all knowledge is in humanity". Thus we can say that the digital networks connect the solitary intelligence of each learner to cyberspace and starts to compose a solidarity of intelligence with unlimited potential for collaboration.

This is a movement that allows cultural criticism and cultural transformation based on knowledge built from and within the space of (re)configured social practices, thus forming Communities of Sense. These territories are also possibilities of socio-cultural constructions, constituted in a globalising dimension, in which actors map and experience certain values, exchange ideas, make new choices, expand contact networks, experience other tastes and affections (Silva, 2013).

From this relation, predetermined models are consumed, but they undergo a process of (re)construction and (re)signification, in an autonomous space permeated with contradictions. These circumstances favour the constitution of "emotional communities" (Mafessoli, 2006), allowing a collective experience of knowledge construction and solidarity

with their peers, which according to Silva (2013), form social ties that bind them. In this context, any process of knowledge construction goes beyond the simple fact of receiving, decoding and assimilating. It is based on a dialectical process of information sharing that becomes knowledge and vice versa, involving peers materialising the community of meaning. What is set is another temporality, spatiality and empowerment of the act of teaching and learning.

Virtual learning environments are born in the past

When we point to educational processes using technologies and virtual networks on the Internet we submit to the challenge of thinking limited in the unlimited. Because learning processes have human, cultural, economic and pedagogical boundaries supported in virtual networks in which users of any age, with mobile devices and Internet access, can have access from anywhere to anything available on the network. Our challenge is to create access with high potential for learning so that users have the possibility to learn what society considers necessary in a limited environment and strategically structured according to methodologies and theories of learning.

This challenge did not exist in the traditional school reference for the management of teaching: this is because in addition to the obligation of the student to be in school, the amount of resources was also very limited and was largely directed to the use of the teacher. Now learners are users of resources about which teachers are unaware, but which apply to the context of learning. In this case, we bring to the centre of the scene the learner who needs to configure the space and the educational strategies through the management of the learning (Martins, 2014).

In the traditional school, which heroically resists the power of the present, it had the past as an undeniable reference, as John Dewey (1998) said: "Education can be conceived retrospectively or prospectively. That is, it can be treated as a process of accommodating the future into the past or as a use of the past as a resource for developing the future." However,

within a century, the future came to be represented as something more natural than a social concern.

The traditional school could refer back to the past because the transformations were slow enough so that could be a concern about an abrupt break-up of movements with the past. Our challenge is more than accommodating the future to the past, but the facing the future. The present dissociates itself from the past, like a sphere rolling up its shadow leaving a trail of dust. The construction of knowledge depended on what was in the memories and in the writings, having a difficult physical circulation and a high financial cost. Taking a book to the learner was not always enough and needed access to a teacher who helped to understand the information needed for learning. Already it was constituted as a network of people and books with the physical limitations that went from the space to accommodate the book to the time in which the teacher had to help the learner.

Rolling the sphere of the present, we position ourselves in the condition of being lost amid the excess of information that frees us from the energy expended by the ancestors to go to the sources of information. Our challenge is to access and organise them so that we can use them in reading the world and creating the present / future. It can no longer ensure the traditional place of the teacher and the school; for to adhere to this challenge, one can count on innumerable unknown participants of networks that are configured according to their interests, but to a great extent, not personalised.

The management of learning in the networks of learners has two structures: network participants and content. It is a network that is organised for the purpose of learning together. There is the possibility of a third structuring element: a moderator – not necessarily a teacher, but usually exercised by a member of the network who exercises a leadership recognised by the members. What constitutes a network is not more connoisseurship, but intelligence that can dynamise information and transform it into knowledge (Lévy, 1993).

Personal knowledge and the encyclopeadic volume of information so cultivated by modernity have lost their place to the intelligence that allows us to enjoy the information and knowledge available in networks, Sometimes this is structured in social media, now present in communities that are not structured but organised around Common interest. The challenge of the virtual environment constituted for learning is to bring the dynamics of the virtual communities to refer to them as a community of meaning, personified and with learning. In the learning communities (Paz, 2015; Catela, 2011), the participants, in general, know each other, do not have the freedom in which the impersonality provides, and have limits on resources and content. However, we can not replicate the traditional classroom in a virtual environment. To do this, we tell our learning about the success of social media and the diversity of communities spontaneously instituted in social networks.

Pointing to technology structures and making a value judgment is not always the right attitude. These are ways in which information circulates and people communicate. Technology supports, but also limits, directing the design of the content so to produce the content we need to consider available resources and supported languages. It should not be an obstacle, or offer unjustified difficulties that limit learning. Teaching needs, in addition to understanding, content that can master the technology and methodology that serves as mediator between learners, content and technology. A good online course needs a technology adequate to what it proposes: i.e., that it has the necessary resources to communicate the contents to the learners. The content must meet the objectives of the teaching proposal, but also be available in languages – and with resources that allow access and expected levels of understanding.

Final considerations

We have seen that virtual environments are not just a fad. They are part of the socio-educational structure. We have technologies and examples of what works with young people. Virtual communities and social networks are present in people's lives; what we need is to reinvent education and empower ourselves with methodologies that take over the strategies and technologies used by learners. It is not wise to refuse them; we need to make education viable from new teaching to help learners in learning management.

The learners are autonomous people and we have no right to dismiss them from this autonomy. Instead of denying the quality of relationships in social networks or virtual communities, our role as educators is to understand what happens in these virtual environments and bring it to pedagogical practice. Acting as partners in learning management, we can situate ourselves as social managers of information dedicated to learning.

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