

A two-stage Model of Teachers' Training in Learning Management Systems

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Abstract

This paper aims to evaluate a blended-learning teachers' training course, using a Learning Management System. The proposed model has two stages: (i) the training course in blended-learning, which is based on: a) promoting reflection-action-reflection; b) the five-stage Salmon's model and Garrison and Vaughan's Community of Inquiry framework; and (ii) the monitoring phase – during two school years after the training course. Our aim is to enable teachers to embed the use of technology in their practices. The trainees were 33 secondary school teachers. The methodology used was a case study. The data suggested that almost all of the trainees recognised the importance of this approach, considering the training course was helpful to them. Most of them (82%) felt able to use Moodle with their students. One year later, a large majority (79%) of the trainees are using the LMS and some of them are working in disciplinary and multidisciplinary groups.

Keywords

teachers' professional development, two-stage teachers' training model, blended-learning, learning management systems

INTRODUCTION

The integration of Information and Communication Technologies (ICT) in education represents nowadays, more than ever, a priority for the educational policies. Teachers and schools face many challenges. Research on teacher development suggests that new ways need to be found that enable teachers to embed the use of technology in their practices (Darling-Hammond, 2000; Nóvoa 2009; Pombo et al., 2012). Stakeholders, involved in teacher education, must provide support for teachers' development to serve teachers so that they can provide educational opportunities for their students (Pombo et al., 2012). According to this, Darling-Hammond (2000) refers that policymakers must be more involved in school reforms. In her point of view, "this question takes on new importance since their many initiatives rely on presumed relationships between various education-related factors and learning outcomes" (idem, p. 2). Likewise, OECD (2005) defines that the main challenge, for policymakers, is to know how to sustain teacher quality and ensure all teachers continue to engage in effective on-going professional and personal learning.

LITERATURE

In order to ensure teachers' professional development, quality programs consider that affordability of learning and flexibility are the key issues (Zygouris-Coe & Swan, 2010). The development of rich learning environments as well as innovating and

motivating teaching will depend on the investment in teachers' professional development on the integration of ICT (Pombo et al., 2012). In this context, these authors suggest that knowing how to use ICT means knowing how to integrate them into professional practices (idem). Thereby, Nóvoa (2009) suggests measures that stress the necessity to promote new teachers' professional organisation models such as collegiality, sharing and collaborative cultures. This author, also considers, that it is through pedagogical movements or communities of practice that will enable them to the feeling of belonging and professional identity.

Furthermore, to take advantage of ICT integration (Carvalho, 2007, 2008; Zhao, 2007) trainees must be self-confident, engaged (Costa & Viseu, 2007) and need to believe that they have a crucial role. Trainees need time to reflect on teaching with other professionals and thus share their ideas and experiences, to develop new insights and new paths for teaching. They need a proper training and receive powerful training with technology integration strategies and its application in the curriculum (Zhao, 2007).

According to this, a study presented in 2011, the UNESCO ICT Competency Framework for Teachers project calls attention on how to use ICT in education:

“the successful integration of ICT into the classroom will depend on the ability of teachers to structure the learning environment in new ways, to merge new technology with a new pedagogy, to develop socially active classrooms, encouraging co-operative interaction, collaborative learning and group work” (p. 12).

As Zygouris-Coe and Swan (2010) refer, inherent challenges with professional development include teachers' perception of how learning happens, of technology and professional development, and how and where learning takes place. It is urgent to find teachers' training courses models in which trainees are engaged in concrete tasks of learning and teaching, develop the skills to explore and inquire about their own experience and actions (Carvalho, 2007, 2008; Costa & Viseu, 2007; Salmon, 2011). Reflection is not always an easy task. It is essential that trainees reinterpret their understandings and recognise that the reflection is the centre of reflective thought in such a way as to creatively adapt their practice to new situations (Schön, 1992). As Salmon (2011) suggests we must try out reflection-in-action (takes place during the practice) and reflection-on-action (after the practice has occurred) in our 'e-tivities' and in teachers' training courses. So, the importance of reflective practitioner and the need of those experiences must be questioned and perhaps tested and challenged to avoid the unconscious assumptions that may reduce creativity and flexibility in attempting to understand, solve a problem or explore a scenario (idem).

It is necessary to promote environments that are favourable to interaction, collaboration and sharing common interests, goals, and ideas (Zygouris-Coe & Swan, 2010). Thus, we stressed Learning Management Systems (LMS) because its capabilities allow changing substantially pedagogical practices, times, and learning spaces. Therefore, they are currently used by teachers, educators and trainers.

With online learning advances and the rapid growth of virtual learning environments, new approaches are emerging and consequently new course formats. Blended-learning is part of on-going convergence of the traditional face-to-face with distributed learning environments (Bonk & Graham, 2006). Thus, we believe that blended-learning approaches can be more effective in pedagogical practices, increase access and flexibility than the traditional approach, and facilitate interactive social learning (Bonk & Graham, 2006; Carvalho et al., 2009). According to Stacey and Gerbic (2009), we also agree that the use of blended-learning approaches is gradually becoming recognized as effective strategies in establishing communities for professional learning and practice.

Blended-learning and its implementation in the field of teachers' training is a relatively new subject in primary and secondary schools in Portugal.

The teachers' training in LMS: a two-stage model

Our model of teachers' training is based on the combination of: a) promoting reflection-action-reflection (Schön, 1992); and b) a combination of the five-stage Salmon's model (2011) and Garrison and Vaughan's (2008) Community of Inquiry (Col) framework. The first approach – reflection-action-reflection – is constantly present during the training course and the second in the online sessions. Figure 1 represents the second approach.

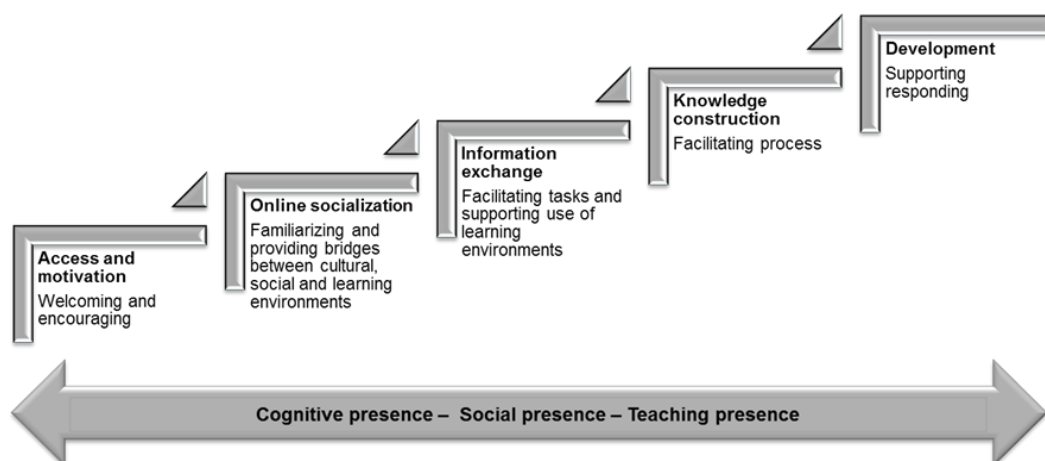


Figure 1: The online training sessions (based on Salmon's model and Garrison and Vaughan's Col framework)

According to the five-stage Salmon's model (Figure 1) we intend to support the trainees through a structured development process as well as to motivate online trainees with appropriate 'e-tivities'. Salmon (2011) presents a model which provides an example of how trainees can benefit from increasing skills and comfort in working, networking and learning online.

The Col framework (Garrison & Vaughan, 2008) stresses three key elements: cognitive presence, social presence and teaching presence, which must be considered when planning and delivering an e-learning experience. For these authors there are distinct advantages to creating a Col in an e-learning environment taking into account the reflective and explicit nature of the communication, as well as the opportunity to access unlimited data sources.

All these authors alluded to the importance of reflection and the existence of critical thinking in these environments, suggesting an intimate connection with education. Our model comprises two stages.

First stage

The first stage is the training process. We take into consideration the Portuguese official training scheme which stipulates 50-hour workshop sessions to be distributed as 25-hour face-to-face scheduled sessions and 25-hour homework unscheduled time, in our model the online sessions. We transformed the unscheduled homework time into continuous predefined work (Figure 2). The course had a total of nine face-to-face sessions, of three-hour each every two weeks (in average), and the remaining sessions were online.

Second stage

The second stage is the monitoring phase in order to continue providing backup to the training process, by giving specific support in required ICT integration (Car-

valho 2007, 2008; Costa & Viseu 2007; Zhao 2007). We intend to collaborate with the trainees to help them to feel confident, encouraging them to apply their learning. They “must know what to do and how to do it”, as Kirkpatrick (2006, p.23) stresses. The trainees contact the trainer whenever they have any questions concerning the use of Moodle or ICT integration, by email or Skype.

Our proposal for teachers' training course in using LMS was submitted and approved by the Pedagogical Council of Further Education, subordinated to the Ministry of Education.

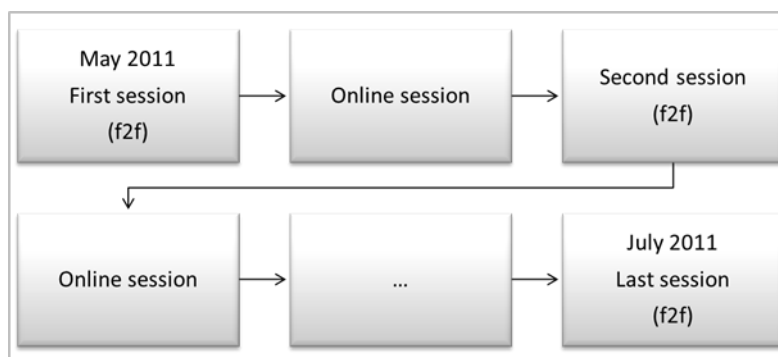


Figure 2: Training sessions' distribution

METHOD

The aim of this research is to investigate the integration of LMS in secondary school education: from teachers' training model to teachers' professional practices. The main research questions are:

- How did the trainees evaluate the training model?
- What was the impact of the training model on trainees' practices?

The research in progress is a longitudinal case study (Merriam 2009; Yin 2009). The first stage occurred from May to July 2011, the second stage is in progress.

Two questionnaires were developed to collect data about trainees' academic, professional and digital literacy characterization (filled in the first session) and trainees' opinions about the training course (applied at the end of the training). The second questionnaire had two parts and evaluated the training model based on Kirkpatrick, (2006), the use of the Moodle and three constructs of Unified Theory of Acceptance and Use of Technology model – UTAUT – (Venkatesh et al., 2003): performance expectancy, effort expectancy and trainees' attitudes toward using technology. During the follow-up phase we will interview the trainees. We intend not only to assess changes in trainees' behavior but also in using the LMS (Kirkpatrick, 2006). To assess our model we use The Four Levels Kirkpatrick's model – reaction, learning, behavior and results. This model represents a sequence of ways to evaluate training programs (Kirkpatrick, 2006). The data collected were treated using SPSS and WebQDA software.

Participants' characterization

The trainees were 33 secondary school teachers including 22 female and 11 male, ranging from 29 to 56 years old. The majority (76%) was school staff. Concerning the initial training of the trainees, they were teachers of languages (12), Mathematics (5), Computing (3), Philosophy (3), Geography (3), Biology and Geology (3), Physics and Chemistry (2) and Design (2). In respect to the training course's approach, 85% prefer blended-learning, 9% face-to-face sessions and 6% e-learning.

ICT in teaching

Regarding to their experience in ICT, some trainees use computer and Internet, daily (31 and 24, respectively). 32 participants use ICT in their classes, 94% use

Internet but only 27% of them use LMS in their teaching. The majority of the trainees use mainly browsers or Google software and that LMS are rarely applied by the participants (Table 1).

Table 1: Web tools used by participants

Web tools	Participants (n=33)	
	f	%
Wikis	8	27
Podcast	2	7
Applets	1	3
Software package	7	23
Google software	21	70
Social software	17	57
Browsers	25	83
LMS	8	27
Other: <i>Escola Virtual</i> *	1	3

* *Escola Virtual* is a Portuguese Learning Content Management System (LCMS) from 1st to 12th grades

With concern to LMS tools, the results (Table 2) make it possible to conclude that only a few participants are elementary Moodle users, since they use it as a repository or for a workshop.

Table 2: LMS tools used by participants

LMS tools	Participants (n=8)	
	f	%
Repository	7	88
Wikis	2	25
Forum	3	38
Blog	2	25
Glossary	0	0
Survey	2	25
Workshop	6	75
Test	2	25
Lesson	2	25
Activity	3	38
Referendum	1	13

PRESENTATION OF RESEARCH

The study

The study was conducted in a Portuguese secondary school in Vila Nova de Gaia. A total of 33 secondary school teachers participated in the training course (first stage model), during the 2010/2011 school year.

We applied a blended-learning approach (Carvalho et al., 2009; Stacey & Gerbic, 2009) to a training course held on Moodle adapted for the official training courses' context.

The second stage comprises monitoring teachers' practices, during the school years of 2011/2012 and 2012/2013, providing support to teachers in the use of ICT (in general) and Moodle (in particular).

During the first stage, in the face-to-face initial session the trainees were introduced to the learning objectives of the course, the contents and the course's assessment. Then, they learned about LMS functionalities, particularly how to access and the interface, the exploration of different dimensions of work, communication facilities, interaction and collaboration. The participants were engaged in increasing interactivity and skills acquisition.

During the online sessions, the trainees practiced what they learned in the face-to-face sessions. They got information about working online. The convergence of face-to-face settings is characterised by human interaction, as well as ICT based settings. Furthermore, face-to-face discussions would build relationships and cultivate a sense of community in the classroom (Garrison & Vaughan, 2008).

Each face-to-face session was followed by individual or group work, participation in chats and debates in forums. All trainees had access to different kinds of support material, videos, eBooks, case studies, information and guides, as well as screen-casts to help them carry out the tasks demanded in the LMS. After each face-to-face session, a document with all tasks to be accomplished for the next face-to-face session was posted in the Moodle. Two different kinds of working spaces were set up: one to support face-to-face sessions (trainees as learners in the online environment) and another to support online activities (trainees as teachers in the online environment). All of them created courses to teach their students. They had to do two tasks:

- individual – which implied the creation of a course in the LMS (with or without interactive applications) for teaching their students;
- in group – which developed, in large majority, multidisciplinary teams who built and continue building multidisciplinary courses using interactive activities to use with their students. Here, we stressed the peer coaching process.

Thus, in this training course, we promoted different modes of interaction: trainee-trainee, trainee-trainer and trainee-contents.

In the second stage, we organize workshops and non-formal training to consolidate and deepen skills, contributing to improve self-confidence of teachers; we will monitor the trainees' practices and promote the establishment of communities of practice (Wenger, 2006) to accomplish teaching and learning objectives.

Data analysis

With regard to the Opinion Questionnaire, 94% of the trainees considered that the item promotion of the interaction among trainees and trainer aimed at providing motivation, interest and participation in the training course was considered "excellent", whereas the remaining trainees considered that it was "good".

The trainees considered as "excellent" the documents available on Moodle and that these were adequate for increasing their professional development (82%) as well as for the training course pedagogical objectives and contents (91%). The trainees consider as excellent the adequacy of the methodology adopted (Table 3).

Table 3: Assessment of the adequacy of the methodology adopted (n=33)

The adequacy of the	Null	Inadequate	Adequate	Good	Excellent
pedagogical objectives and the training course's contents for the needs of the teaching practices	0 (0%)	0 (0%)	0 (0%)	5 (15%)	28 (85%)
training course's methodologies and the strategies adopted for the proposed aims	0 (0%)	0 (0%)	0 (0%)	5 (15%)	28 (85%)
training course's methodologies and the strategies for the promotion of interaction, communication and cooperation among the trainees	0 (0%)	0 (0%)	1 (3%)	5 (15%)	27 (82%)
training course's methodologies and the strategies adopted for the development of interaction, communication and cooperation among the trainees	0 (0%)	0 (0%)	0 (0%)	5 (15%)	28 (85%)

The adequacy of the assessment of the methodology adopted was appropriate for all of the trainees (Table 4).

Table 4: Assessment of the adequacy of the assessment methodology (n=33)

The adequacy of the assessment methodology adopted for the	Null	Inadequate	Adequate	Good	Excellent
development of interaction, communication and cooperation among the trainees	0 (0%)	0 (0%)	1 (3%)	5 (15%)	27 (82%)
training course's objectives, strategies and contents	0 (0%)	0 (0%)	0 (0%)	8 (24%)	25 (76%)
trainees' professional and scientific profiles	0 (0%)	0 (0%)	0 (0%)	7 (21%)	26 (79%)

The following data report trainees' scale of agreement. The mean and the standard deviation (SD) were quantified, for each question, of trainees' answers for data analysis. We calculated the percentage of agreement (score ≥ 4) for each question.

Regarding our model training approach [blended-learning], almost all of the trainees (97%) considered that their learning had benefited with this approach, only one (3%) answered "not really".

A large majority of the trainees (85%) agreed that the online sessions promoted their participation, 15% "not really". Most of the trainees (82%) felt able to use Moodle with their students, 15% "not really" and 3% indicated incapacity to use it.

During the training course we promoted asynchronous and synchronous communication. The trainees considered the forum as an important space for asynchronous communication (Table 5).

Table 5: Assessment of the use of the forum (n=33)

Forum was an important space to ...	Mean	SD	Score ≥ 4 (%)
discuss different themes	4.5	0.71	94%
share ideas	4.7	0.52	97%
clarify any questions	4.2	0.90	82%
reflect	4.6	0.56	97%
publish news	4.2	0.79	91%

We created small groups to facilitate conversation in chat. Regarding synchronous communication we verified that the trainees were also very satisfied with the use of the chat (Table 6).

Table 6: Assessment of the use of the chat (n=33)

With regard to the chat I consider that ...	Mean	SD	Score ≥ 4 (%)
access to netiquette rules have facilitated communication	4.6	0.62	94%
it is a space to socialise	4.3	0.67	88%
it provides immediate support	4.0	0.98	73%
the creation of small groups facilitated conversation	4.4	0.70	88%
it helps to create a sense of community	4.3	0.88	79%
it promoted a close contact between all participants	4.2	0.97	82%
the rules of procedure defined in face-to-face sessions have eased conversation	4.4	0.75	91%

The use of glossary was highlighted by the trainees (Table 7).

Table 7: Assessment of the use of the glossary (n=33)

Glossary promoted the ...	Mean	SD	Score ≥ 4 (%)
creation of database with specific terms in the scope of the training course	4.7	0.53	97%
collective building of meanings	4.5	0.80	88%
collective authorship	4.5	0.79	88%
[a] channel of communication	4.3	0.76	88%
construction of shared knowledge	4.7	0.53	97%

Table 8 show us the high degree of trainees' satisfaction concerning the plan and organisation of work in Moodle.

Table 8: Assessment of the plan and organisation of work in Moodle (n=33)

Items	Mean	SD	Score ≥ 4 (%)
Moodle access allows for the defining of different users profiles, allowing a more wider view of the roles each one can play	4.6	0.56	97%
The Moodle course organisation made navigation or access to different sections easier	4.3	0.80	85%
Visual icons (titles, illustrations and labels) helped the identification of different sections	4.5	0.67	97%

A large majority of the trainees agree with the type of communication, except in relation of the favourite channel of communication (Table 9).

Table 9: Assessment of the type of communication (n=33)

Items	Mean	SD	Score ≥ 4 (%)
The type of forum message positively influenced my participation (email feedback to all participants, the possibility of visualising the participation of the other trainees, ...)	4.6	0.56	97%
My favourite channel of communication to obtain online support was messaging	3.2	1.00	52%
Warnings sent by email by the trainer led me to participate more	4.4	0.74	91%

All trainees agree with the applied methodology on face-to-face sessions as well as the type of the collaborative work (Table 10).

Table 10: Assessment of the collaborative work and the applied methodology on face-to-face sessions (n=33)

Items	Mean	SD	Score ≥ 4 (%)
Face-to-face support helped in overcoming my obstacles and difficulties in task performance	4.8	0.39	100%
Support by trainees who had more experience helped me in becoming acquainted with the Moodle environment	4.4	0.56	100%
The presentation of the Moodle course, done during face-to-face sessions, was useful in the tasks that were performed (frontpage, blocks, navigation bar and navigation block, type of tools, ...)	4.7	0.47	100%

The interest of Moodle activities for teachers' curriculum was assessed on a scale from 1 to 10. Thus, the trainees' interest in these activities is evident (Table 11).

Table 11: The assessment of the interest in Moodle's activities (n=33)

Moodle activity	Min	Máx	Mean	SD
Book	1	10	6.8	2.72
Chat	1	10	6.6	2.52
Forum	5	10	8.6	1.54
Inquiry	4	10	8.5	1.52
Lesson	3	10	7.9	2.01
Referendum	2	10	7.7	1.92
Slideshow	1	10	7.7	2.47
Test	1	10	7.5	2.70
Workshop	3	10	8.7	2.10
Wiki	1	10	7.3	2.62
Glossary	7	10	9.2	1.04

Regarding to the UTAUT model's constructs we estimated the Cronbach's Alpha for each dimension of our questionnaire. All these constructs have a good degree of reliability, with values above 0.7 (Table 12).

Table 12: Reliability results

UTAUT construct	Cronbach alfa	Number of items
Performance expectancy	0.72	4
Effort expectancy	0.75	3
Attitude toward using technology	0.85	4

The trainees perceived many advantages concerning the use of Moodle and its implications on their practices. They reported some main advantages:

"higher interactivity both among students or students and teachers (T9)"

“students are more autonomous and responsible (T1)”

“it is [Moodle] an excellent tool for working with other colleagues and promoting collaborative work, sharing and more interest ... a closer relationship among teacher and students (T6)”

“it [Moodle] gives us an excellent pedagogical contribution ... we [teachers and students] speak the same language (T19)”

In contrast, one trainee reported that Moodle “has no influence” on his practices.

In 2011/2012 and 2012/2013 we realized that the majority of the trainees were using Moodle with their students (Table 13).

Table 13: The use of LMS at the monitoring phase (n=33)

Using LMS or not	2011/2012 school year	2012/2013 school year
Using Moodle	19	19
Not using Moodle	9	5
Not teaching	5	9

Not all of the trainees are using Moodle for different reasons. Some of them are teachers on temporary contracts and they are not working, 5 in 2011/2012 and 9 in 2012/2013 school years. Others (9) have not used it due to other reasons such as: technical problems with Moodle (4), personal reasons (4) and by school decision (1) [school only used Virtual School, a Portuguese LCMS] in 2011/2012 school year, and 5 – in 2012/2013 school year, due to personal reasons. Thus, the Moodle user's group is reduced to 19 teachers in both school years.

CONCLUSION

A large majority of trainees considered the documents available during the training course as excellent as well as the adequacy of the training course and the assessment. They recognized the importance of training courses in blended-learning. The face-to-face interaction was crucial in the interpersonal relationships, in the building of the communities and in the sense of belonging, as also reported by Pallof & Pratt (2007), Pombo et al. (2012) and Wenger (2006) among others. The trainees' evaluated the plan and organisation of work in Moodle, the communication and the collaborative work applied in face-to-face sessions as positive. The empowering tools present in Moodle (e.g. forum, chat and glossary) were also highlighted by the trainees to enhance the importance of social interaction in learning environments. Thus, the results suggest that the trainees had a favourable reaction to the training course.

One of our aims was to promote a reflexion about teachers' practices and an ICTs' effective integration which must help to develop subjects who are active in their own development as argued by Nóvoa (2009).

We conclude that the peer coaching process has many benefits such as fostering collaborative work and improving teaching performance, promoting a better understanding of best practices and a deeper sense of efficiency.

Thus, it is important to find new patterns and bring meaning to the teachers' training courses. Teachers have to play a new and more active role, creating conditions that lead to the development of innovative and intervening skills as effective users of ICT (Carvalho, 2007; Costa & Viseu, 2007; Nóvoa 2009; UNESCO, 2011). In this context, UNESCO's report refers that “[t]eacher professional learning will be a crucial component of this educational improvement. However, professional learning has an impact only if it is focused on specific changes in teaching.” (2011, p.8).

As limitation we would like to refer the training course's schedule because initially it had been scheduled between February and June but, for compelling reasons it was changed from May to July. Due to this fact, some trainees could not apply their training course activities with their students, as planned. Besides, these technical problems with Moodle hindered certain activities.

Some of the trainees who did not use the LMS with their students during the school year 2011/2012 showed willingness to use it during the present school year. So, we decided to extend the monitoring phase for another year. We also made an upgrade of Moodle's version in order to solve its technical problems.

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Biographies



Maria Idalina Santos is a PhD student and she has a grant from Science and Technology Foundation. Her research is about teachers' training model in using LMS and the following monitoring process. She has a degree in Mathematics and a Master degree in Educational Sciences – Educational Technology. Her main research interests are teachers' training, blended-learning, learning communities and LMS. She has published papers about interactive whiteboards, LMS and teachers' training.



Ana Amélia Carvalho is a full professor at Faculty of Psychology and Education Sciences, University of Coimbra, Portugal. She has published books, chapters of books, and papers in journals and conferences related to educational technology, teacher education and training. She has coordinated several research projects. She has organized conferences and she was a member of the Programme Committee of WCCE'2009 and of WCCE'2013. She is the TC3 Secretary and the National Representative for Portugal in TC3.

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