REVISTA CÁTEDRA

El Aprendizaje Híbrido y la educación digital del profesorado universitario

Blended Learning and digital education of university teaching staff

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Resumen

El aprendizaje híbrido o el aprendizaje mixto es una modalidad de aprendizaje integrador que utiliza de manera combinada componentes presenciales y virtuales. Esta modalidad puede contribuir a los sistemas de capacitación y formación digital del docente universitario a través del desarrollo de competencias digitales, con el fin de mejorar los procesos educativos universitarios. A partir de una revisión de diferentes fuentes bibliográficas relacionadas a experiencias y resultados de investigaciones del uso del aprendizaje híbrido para el desarrollo profesional en línea del profesorado universitario. Entre los resultados, se percibe que los procesos de capacitación en la modalidad en línea o virtual no han sido suficientes para responder a los desafíos de la educación superior en la era digital, y el aprendizaje híbrido o mixto se constituye como una alternativa de educación digital del docente en la educación superior. Luego se presentan los resultados de una investigación de un curso de formación en Tecnologías de la Información y Comunicación (TIC) aplicada a los procesos de enseñanza-aprendizaje para docentes universitarios. Se concluye que el aprendizaje híbrido es una modalidad efectiva para los cursos de educación digital del profesorado porque el componente presencial complementa el aprendizaje virtual; además, ante los problemas de conectividad y de acceso al internet la modalidad de aprendizaje mixto es una alternativa para la formación continua del profesorado.

Palabras clave

Aprendizaje híbrido, educación digital, educación en línea, profesorado, universidad.

Abstract

Blended learning is an integrating education program that combines computer-based activities with regular classes. It contributes to the quality of higher education through the improvement of ICT training programs and the development of e-competences in higher education. There has been a literature review of different bibliographic sources related to b-learning and Teaching Professional Development. As a result of this review, it is perceived that e-learning training programs are not efficient enough to face the challenges of blended education, and Blended Learning could be an alternative for teacher online professional development. Then, research results of the incidence of an ICT training course for higher education professors are shown. It is concluded that blended learning is an effective modality for teachers' digital education courses because the face-to-face component complements virtual learning. In addition, due to problems of connectivity and access to internet, b-learning modality is an alternative for the continuing education of higher education professors.

Keywords

Blended learning, digital education, online education, professor, university.

1. Introduction

The challenges of educational quality in higher education has emerged questions about the incidence of online teacher training programs in the improvement of educational processes in the university classroom. As for the use of information and communication technologies (ICT) in the classroom, there is a digital division between the generations of teachers and the new generation of students. The training programs or systems in teaching technology for the training of professors have not proved to be effective in responding to the development of methodological and practical strategies with ICT both inside and outside the classroom. The university professor is in the midst of attention and controversy, recognizing a generalized perception of dissatisfaction with respect to the quality of educational processes, since the contents that are taught do not generate useful knowledge to understand the personal, social and professional life of individuals (Pe rez, 2010). Nowadays, professors face new challenges and contexts in the age of information and uncertainty, and perceive a generational estrangement between the professor and the student, affecting the contemporary educational processes, since this is a *knowmad* society constituted by new nomadic generations of knowledge (Cobo and Moravec, 2011; Moravec, 2013).

University professors are in a position of immersing in digital training to improve the educational process of the new generation of digital university. In fact, it is perceived that formal ICT training is not sufficient for the development of digital competencies in professors, and that it should be thought of a permanent digital training that recovers daily good practices and a continuous training with ICT (Lo pez, 2005; Valverde-Berrocoso, 2011; Valverde-Berrocoso, Garrido y Ferna ndez, 2010). Blended learning or B-learning is the learning facilitated through the efficient combination of different teaching methods and models and learning styles, and based on a transparent communication of all areas involved in the course (Heinze and Procter, 2004). Some authors consider this new trend towards mixed learning as a step backwards because they regain in-site components instead of using virtual education, and mention the failure of e-Learning (Bartolome , 2004). On the other hand, other experts see it as an innovative model that combines the

best of each modality and improves the quality of the teaching-learning process at different organizational levels of an educational institution and offers several possibilities of making combinations for the training processes (Bonk and Graham, 2004; Graham 2004; Llorente and Cabero, 2008; Penalosa, 2013).

It is considered that a digital training proposal of university professors of the current generation will contribute to the development of digital and informational competencies. In addition, the professor will be trained to use ICT as methodological strategies in the classroom that can contribute to improving the quality of the student's learning. For this reason, this paper will present a proposal for an innovative training course for university professors.

2. Literature revision

Different difficulties of virtual training programs or e-Learning for teacher training (Schnerkenberg, 2010) must be mentioned because the effectiveness of e-learning training and the need to seek other teacher training strategies (Volk and Keller, 2010) has been questioned. In addition, the interest for this literature review is focused on knowing what have been the advances in the research around the B-learning, blended learning or mixed learning, as an alternative for the digital training of university professors (Drysdale, et al., 2013; Gu zer and Caner, 2014).

The starting point of this literary review will be the work done by Halverson, Graham, Spring, Drysdale and Henrie (2014) who carried out an analysis on the topics of the most cited articles in the first decade of research on blended learning. With regard to the use of blended learning for the professional development, these authors claim that it has been a minority trend (3.5%) in research compared to other thematic trends in research about blended learning, such as research on instructional design, learning styles and results, exploration, comparison, technology and interaction, among others. Although this study was based on the research published in English, it is opted for the thematic trend of professional development as the most akin or approximate to what is understood in Spanish as training.

Blended learning is projected as a future modality for the improvement of the university educational Quality (Wold, 2013) and for the professional development of the professor (Owston et al., 2008). In a literature review from 1999 to 2012 on blended learning, Güzer and Caner indicate that this modality is perceived as useful, enjoyable, flexible and motivating for apprentices, although it has as a challenge to generate better learning environments through social interaction and collaborative work. The study mentions that blended learning has been implemented in recent years in different school settings, including training programs. In the future, studies on mixed or blended learning will focus on how to create effective or successful experiences on their implementation, and in turn, should consider the inclusion of mobile learning or M-learning that uses new devices such as tablets, smartphones, among others (Güzer and Caner, 2014).

The study on the trend analysis in dissertations and thesis on blended learning conducted by Drysdale et al. (2013) considers that one of the trends used of this modality is in the field of professional development. Although this analysis indicates that there is a low percentage of blended-learning studies directed to professional training (7%), the authors interpret that this result does not show the potential of professional development needs, and that upcoming research on blended learning should be about the professional needs of

administrative and teaching staff in educational institutions (Bicen, Ozdamli and Uzunboylu, 2014; Drysdale et al., 2013), although research in this field has still been incipient in the first decade of research on blended learning (Halverson et al., 2014).

Within the institutional variables in education as critical factors in the success of blended learning, Valverde-Berrocoso mentions the ability to implement more flexible organizational structures in universities. Within this organizational structure should be considered professor training or support to professors (Valverde-Berrocoso, 2011). In this way, blended learning becomes an alternative modality for the improvement of the teaching-learning processes and it constitutes a tendency in the use of the ICT for the university teaching (Valverde-Berrocoso, López, Garrido and Díaz, 2004). This modality is considered ideal for the professional development of the students coursing training teaching (Fainholc, 2008).

Due to the generational gap on the use of technologies and the generation of knowledge, the need for a digital education of university professors can be raised. This formation should not only include the instrumental use of information technologies and communication through the training in office automation to the professor, but also through the development of digital competencies in which learning is generated, knowledge is managed and competencies are developed for the general scope. In this way, the professor will be capable of promoting science and technology in students in terms of the development of digital competitions (Regalado, 2013). From this perspective, some research results are raised about blended learning and its impact on the digital training of university professors.

As for digital professor training, it may be considered that ICT courses for university professor training are not enough to develop digital skills. The development of digital competencies or informational capacities Valverde-Berrocoso, 2011) are not only in function of the training, but also of the daily use of ICT (Valverde-Berrocoso et al., 2010) and of the incentives offered by the institution of higher education, such as awards for good practices in the use of ICT or expansion of virtual or online careers (Schnerkenberg, 2010). ICT-based training or certification programs should include Web Resources 2.0 for higher education, as well as tools for e-research and e-science for the university professor, as well as assess the importance of reflective learning methods for the acquisition of E-competencies (Volk and Keller, 2010).

The latest researches also coincide that higher education institutions have the challenge of increasing the number of professors who know how to teach online or use blended learning modalities to organize learning to through professor training strategies that are fast, effective and lead to immediate practical results (Gregory and Salmon, 2013). Although the university professor still has difficulty in incorporating technology in the classroom, it is perceived that there is an increase in the interest of articulating technology with the contents, the pedagogy and the knowledge (Rienties, Brouwer and Lygo-Baker, 2013). There are also studies on successful experiences in candidates for professor positions, in which the results in the elaboration of multimedia projects provided better results in groups that used blended learning modality to contact in person and online with their peers and trainers (Bicen et. al, 2014) or to create blended communities for the professional development of the professor (Matzat, 2013).

One of the horizons for research on blended learning and digital teacher training is found in blended problem-based learning-blended PBL, which will allow future analyses to be

carried out for the professional development of University professors (Donnelly, 2010). In turn, blended learning provides an excellent opportunity for them to learn at work, sharing and communicating with other colleagues, and improving classroom practices and learning from their students (Owston et. al, 2008).

The creation of innovative portfolios where formal and non-formal information on professor education is included, and where professors' learning communities are developed can be an alternative for the development of digital competencies. The professor portfolio is presented as a tool for reflection, the continuous improvement of teaching practices and the development of competencies (Seldin, 2011). In this way the development of the professor's digital competencies will not depend exclusively on formal training but also on non-formal and informal training.

3. Methodology

This research has a qualitative approach and the case study was used. The case study aims to study a certain phenomenon, situation or scope in its real and own context; in turn, it allows describing, analyzing and interpreting the complexity of the case. The case study is the examination of an action example, in which specific incidents and facts are studied; it also collects selective biographical and documented information (Walker, 1983).

The object of study is a course of professor training of an Ecuadorian university, so the contextualization of the case allows situating in the reality of the university professors in Ecuador. In turn, the complexity of the phenomenon study sets it in a holistic perspective that allows having different sources of data and permanence in the field or place of the study (A lvarez and San Fabia n, 2012).

The case study is carried out in three phases. The first phase is the contextualization of the digital training of university professors in Ecuador. In this first phase, an analysis of the situational context of higher education in Ecuador is carried out. The second phase consists of the case study of the digital training course for university professors. This second phase starts with an initial description, which raises the background of the digital training course and its context. In turn, the instructional design of the professor's digital education course is described. The following is an analysis and interpretation of the results of the course. The case study ends with a third phase. It establishes the final conclusions of the study.

Phases	Code	Assesment of the case study - description
Phase 1.	1	Legal context of Higher Education in Ecuador
Context of the digital formation of university professors	2	Institutional context of the University
Phase 2.	3	Initial Description
Study case: course of digital formation for university professors	4	Problem
	5	Analysis and interpretation of the results of the course for the professor training
	6	Analysis and interpretation of the results of the

		intitutional professor evaluation
Phase 3. Conclusions	7	Conclusions

Table 1. Phase details and target of the study case

For the case study concerning the course of digital education for the university professors, the techniques of the documentation review and the learning products review were used. A representative sample of 23 university professors was used, these professors took the digital education course. As instruments, records of the documentary analysis of the evaluations and evidence of learning of the studied courses were used. This analysis was complemented by tabulation, graphing, analysis and interpretation of the results of the current study.

4. Results

From the records of the documentary analysis of the participants' evaluations of the digital education course, item 1 of the evaluation investigated whether the participant is able to use new concepts in his/her teaching after the course. 82.60% of participants fully agree on the ability to use new concepts after the course, while 17.40% agree, and no one chose the other options. It can be interpreted that a high percentage of the participants show a high degree of satisfaction because the course provided them new concepts to be applied in their teaching work.

Item 2 asked if the participant is able to use new ICT tools to facilitate learning once the course has been completed. The results showed that 73.9% of professors are fully in agreement, compared to 26.1% who agree. It is observed that there is a high percentage of professors who say that after the course they are able to use new ICT tools to facilitate learning. The fourth part of the course participants mention that they agree, proving that the course met the initial expectations of the participants.

Item 3 investigated whether the participant is capable of innovating didactic resources using ICTs once the course has been completed. 78.3% of professors are fully in agreement to be able to improve didactic resources in the classroom using ICT, while 21.7% agree. As a trend, it can be observed a large number of professors expressing a high degree of satisfaction, stating that the course has allowed them to innovate didactic resources with the use of ICTs, which confirms that the course fulfilled the objectives established.

Item 4 asked if the participant is able to improve his/her professional practice after the course. To this question 78.3% of professors are fully in agreement to be in the capacity to improve their professional teaching practice, while 21.7% say they agree. Therefore, it can be inferred that this course has helped all participants to improve their professional practice by incorporating the use of ICT in their teaching methodology.

Item 5 expresses whether the participant is able to reflect on the teacher-student relationship through the use of ICT. 73.9% of professors are fully in agreement to be able to reflect on the student-professor relationship through the use of ICT, while 26.1% agree, and no participant chose the other options. As a similar trend to the responses of previous items, it can be interpreted that the significant acceptance of the course by the participants

managed to consider the professor-student relationship through the incorporation of ICT in the educational process. It can be interpreted that with the use of ICT is leaving aside a vertical relationship professor-student, in which the professor was the axis of the educational process, to move to a horizontal relationship in which the student becomes the center of learning.

Item 6 addressed whether the participant is able to reflect on his/her conception of education through the use of technology. 65.2% of professors are fully in agreement to be able to reflect on their conception of education through the use of technology, while 34.8% agree. As an interpretation of the outcome to this question, it can be said that the use of ICT considers the education in the professor, although its result does not denote the same enthusiasm of the previous answers. Probably the use of technology privileges the practical and not the theoretical aspect, so that participants, although they agreed, did not express the same degree of high satisfaction in that technologies lead to a reflection on education.

Item 7 mentions whether the participant is able to apply the didactic process (start, development and closure of a class) after the course, 69.6% of the teachers are fully in agreement to be in the ability to use the didactic process when the class is started, developed and closed; while 30.4% express they agree. It can be inferred that the course provided the methodological strategies necessary for the development of a class.

Item 8 asked on whether the participant is able to exchange methodological experiences with their colleagues after the course. To this answer, 78.3% of participants fully agree on being able to exchange methodological experiences with their colleagues. However, 17.4% express that they agree, 4.3% say they do not know, and no participant chooses the other options. Most participants mentioned that the course developed the ability to exchange experiences with peers and academic peers, although it is important to mention that a minimum percentage responded "I don't know" in this question, which infers a doubt from the participant. It can be interpreted that within a small group of participants, the development of this item during the training event was not clear.

Item 9 asked whether the participant is able to develop his/her teaching portfolio. To this question, 61% of the participants fully agree on being able to begin the elaboration process of the teaching portfolio. While 30.4% agree, 4.3% do not know and 4.3% disagree. The course contemplated the reflection of the teaching experience through a portfolio as a result of learning, and the participants perceived this item given their acceptance degree. However, it is striking that a minimum percentage of participants answered that they do not know and disagree, so it could be inferred that this result of learning would have to be reviewed in upcoming courses, as they would not perceive it as a thematic integrated in the course of methodological strategies with ICT.

Item 10 asked if the participant is able to assess collaborative work using ICT of students. As a result of this question, it can be said that 65.2% of participants are fully in agreement to be able to assess the collaborative work with ICT of students, and 34.8% say that they do agree. It can be interpreted that the high satisfaction degree that appears as a result to this item evidence that the course promoted the collaborative work with ICT among the participants.

Item 11 asked whether the participant is capable of driving meaningful learning in their students through the use of ICTs. To this question, 73.9% of the participants said they were completely in agreement, while 21.8% agreed, and 4.3% responded that they did not know. Like the above questions, the majority of participants consider that the course provided strategies to generate meaningful learning in the students, although it draws attention that a minimum percentage abstained from answering this question choosing the "I don't know" option. It can be interpreted that although there was a highly satisfactory result, the use of ICT in the classroom would still be perceived as an instrument and not as a methodological strategy of the educational process.

As for item 12, participants were asked if they are able to incentivize self-activities with ICT among their students. With regard to the analysis of the answers to this question, 78.3% of the participants fully agree and 21.7% disagree. It can be inferred that the course trained professors that the use of ICTs fosters the student's self-activities, not only synchronously, but asynchronously.

Below is a bank of short questions whose choices were satisfactory, unsatisfactory and not satisfactory. Item 13 refers to whether at the beginning of the course the objective was announced. 95.7% of the participants consider it satisfactory that at the beginning of the course their objective was announced. 4.3% consider it unsatisfactory. As for the organization of the course, there is an acceptance of the majority of participants of the course that indicates that the objectives were announced at the beginning of the class.

Item 14 asked whether the themes were consistent with the learning results of the course, 91.3% of the participants considered satisfactory, 8.7% think they were unsatisfactory. In this item the majority of participants agreed that the course themes harmonized with the learning results and their evidence, even though there is a minimum percentage of participants who disagree.

Item 15 asked whether the contents of the course were developed with logical order, 91.3% of the participants consider that the logical development of the contents was satisfactory, while the 8.7% believe that it was unsatisfactory. It can be inferred that the majority of participants agree that there was a logical and concatenated development of the contents of the course, although there is a minimum percentage of participants that indicate that the logical order of the subjects of the course was not satisfactory.

Item 16 asked if cooperative work was promoted in the course. 87% felt that it was satisfactory, while 13% believed it was unsatisfactory. It can be inferred that there is a degree of satisfaction about the group activities that fostered cooperative work, and that it allowed an interaction between the participants, although question ten showed a high degree of satisfaction in relation to the question sixteen.

Item 17 asked on whether the climate in which the course was developed allowed its participation. 78.3% stated that the climate of the course was satisfactory, while 21.7% said the climate was unsatisfactory. It can be interpreted that there was a significant percentage of participants in the course who perceived an unfavorable climate. It should be asked what is meant by unsatisfactory climate, and in this it can be inferred that there were problems in the facilitators-participants relations, and even among the participants themselves.

Item	Description	Fully agree	Agree	Do not know	Disagree
1	The participant is able to use new concepts in his/her teaching work after the course	82.6%	17.4%	0%	0%
2	The participant is able to use new ICT tools to facilitate learning	73.9%	26.1%	0%	0%
3	The participant is able to innovate didactic resources using ICT	78.3%	21.7%	0%	0%
4	The participant is able to improve his/her teaching practice after the course	78.3%	21.7%	0%	0%
5	The participant is able to reflect on the professor-student relationship through ICT	73.9%	26.1%	0%	0%
6	The participant is able to reflect on his/her conception of education through the use of technology	65.2%	34.8%	0%	0%
7	The participant is able to apply the didactic process (start, development and closure of a class)	69.6%	30.4%	0%	0%
8	The participant is able to exchange methodological experiences with their colleagues after the course	78.3%	17.4%	4.3%	0%
9	The participant is able to develop his/her educational portfolio	61%	30.4%	4.3 %	4.3%

10	The participant is able to evaluate collaborative work using ICT	65.2%	34.8%	0%	0%
11	The participant is able to promote meaningful learning through ICT	73.9%	21.8%	4.3%	0%
12	The participant is able to encourage self-activities with ICT	78.3%	21.7%	0%	0%
13	The point of view of the participants was respected	100%	0%	0%	0%
14	Trainers showed knowledge on the topics addressed	100%	0%	0%	0%
15	Participants were encouraged to participate	100%	0%	0%	0%

Table 2. Evaluations of the university professors on the training course in ICT

It can be perceived the satisfaction degree of the participants of the digital education course from these seventeen items. Item eighteen allowed participants to express the positive aspects they found in the course. Among them can be highlighted the willingness of the facilitators, the number of tools addressed in the course, the mastery of the topic by the facilitators. In addition, they considered it very useful to learn new theories and technologies. It is noted that the course was interesting and there was interest and dedication of the participants.

On the basis of these positive aspects, it is possible to highlight the experience, disposition and motivation in person on the part of the facilitators of the course, which allowed the course to develop in a good environment. It also highlights the design of course activities in the virtual classroom that allowed achieving collaborative and autonomous learning of participants through the practice during and after the course.

Item ten allowed participants to express the negative aspects they found in the course. The following are the negative aspects of the course:

- Lack of clarity in the explanation of the tasks.
- The peer knowledge level was uneven.
- Allow discussion without respect among peers.
- There were assistants who were not satisfied with the course.
- Lack of time.
- Many topics to cover.
- Time was somehow lost by the lack of participation of the participants.
- Lack of coordination in the communication on the activities. Confusion in the

instructions.
• The level of knowledge of the participants was heterogeneous: those who already knew were bored and those who did not know considered the course developed very quickly.
• Lack of opening of some participants on new pedagogical criteria.
• Some issues were taught quickly.
• Little time for practicing the activities.
• The evaluation of activities should be individual and not in public.
• Work evaluations should be more qualitative and non-quantitative.
• Trainers related to the technological area are required.
• Unpunctuality of the participants.

From these negative aspects, it can be inferred that there were no negative aspects of the course about the content and the methodology. It is perceived that the weakness of the course settled in its organization, evidenced in elements such as problems in the enrollment to the course, unpunctuality of the participants that affected the development of activities, problems with the virtual applications of the course and lack of time.

The last items in the questionnaire suggested the participants to mention the interesting aspects that they found in the course. The following points of interest are mentioned:

• The importance of classroom tutoring.
• Technological tools updated in the virtual classroom.
• ICT is a necessary tool for professors.
• Teamwork of the instructors.
• New ICT concepts.
• The collaborative dynamics of the course.
• Human and technological growth.

5. Conclusions and recommendations

It can be concluded that must be considered the models of professor training in ICT towards a continuous digital formation, synchronous and asynchronous, formal and non-formal, in-site and online, autonomous and collaborative of professors. This digital training should seek the development of e-competencies or digital competencies for the ICT practices of the university professor both inside and outside the classroom (Gregory and Salmon, 2013). The use of blended learning as an effective modality for the professional development of the professor is relevant for the promotion of digital competencies in order to improve the teaching strategies through the use of information technology and communication (Drysdale et al., 2013; Halverson et al., 2014; Owston et al., 2008; Wold, 2013).

Blended learning can be an alternative to integrating ICT into professional professor development not only as information and communication technologies, but also as technologies for knowledge and learning management (Gu zer and Caner, 2014). The use of information technology and education in higher education makes it possible to improve the learning of university students, considering that the new information and communication technologies are part of everyday life. Its forms of interrelation, knowledge management, thought development, and behaviors are mediated by the use of

ICT). This implies the study and analysis of new modalities to achieve meaningful, strategic and relevant learning; moreover, the university professor has as a challenge to immerse himself/herself into new digital logic and look for alternative spaces and programs for their digital education and training (Valverde-Berrocoso et al., 2004; Perez, 2010).

Digital professor training is a challenge for the university professor in due to the vertiginous advancement of technology. For this reason, blended learning is considered as an alternative for the development of the professor's digital competencies, from the presence of a formal training course, to the synchronous and asynchronous use of digital tools that complement digital Training (Regalado, 2013). In turn, the use of blended learning can be a digital training alternative in countries where connectivity levels are still incipient or limited: face to face can complement the university professor's digital education.

Blended learning is a virtual educational modality option integrating traditional and innovative, virtual, formal and non-formal, synchronous and asynchronous components of different languages, teaching approaches and learning styles. Thus, the promotion of research on blended learning is a challenge for researchers in educational technology (Valverde and Balladares, 2017). Moreover, given the versatility of this modality by the blended and combination criteria it has, it is important that the forthcoming research and educational practices incorporate elements of mobile education (mobile learning or M-learning) from the mobile devices such as smartphones and tablets and their corresponding applications (apps), as well as the elements of the ubiquitous learning (U-learning) that breaks with the traditional patterns of space and time in education, and incorporates new technological tools such as interactive television, satellite television, or cloud Learning or C-learning, which is the learning that emphasizes communication, collaboration, the community and the connection taking advantage of the potential of the clouds.

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