A Literature Review of the Factors Influencing E-Learning and Blended Learning in Relation to Learning Outcome, Student Satisfaction and Engagement

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Abstract: In higher education, e-learning is gaining more and more impact, especially in the format of blended learning, and this new kind of traditional teaching and learning can be practiced in many ways. Several studies have compared face-to-face teaching to online learning and/or blended learning in order to try to define which of the formats provides, e.g., the highest learning outcome, creates the most satisfied students or has the highest rate of course completion. However, these studies often show that teaching and learning are influenced by more than teaching format alone. Many factors play significant roles, and this literature review will look further into some of them.

The review has a special interest in professional bachelor education and teacher training, and it focusses on factors that influence learning experiences in e-learning, online learning and blended learning. Thus, the research question of the review is as follows: Which factors are found to influence e-learning and blended learning in relation to learning outcome, student satisfaction and engagement in collaboration in higher education and particularly in professional education?

The findings from the research papers included in the review show that among the many factors some seem to dominate more: educator presence in online settings, interactions between students, teachers and content, and designed connections between online and offline activities as well as between campus-related and practice-related activities. The article thus points in the direction of some significant factors, but it also discusses and questions the relevance of research focusing on comparisons between individual formats of e-learning, online learning, blended learning or "traditional" face-to-face teaching and learning. Teaching and learning are complex and are influenced by more than just the teaching format. The review is based on systematic database searches conducted in January 2017, and it includes 44 peer reviewed articles and papers published between 2014 and 2017.

Keywords: e-learning, online learning, blended learning, hybrid learning, learning outcome, student satisfaction, collaboration

1. Introduction

In the literature reviewed, a great number of studies have aimed at determining whether computer-mediated education in the form of e-learning, blended learning or hybrid learning is better than traditional face-to-face teaching in relation to, for instance, learning outcome and student satisfaction. Researchers, educators and educational decision makers alike are eager to find out which format leads to the best results for their students and the educational institutions. However, as we shall see below, comparative studies of educational formats show different results, which might indicate that factors other than the format alone influence learning outcome, satisfaction, student retention et cetera.

In this review of the literature on e-learning, we present and discuss definitions of e-learning, hybrid learning and blended learning, and we review the literature comparing different online teaching formats with traditional on-campus/face-to-face teaching. With this point of departure, we explore which factors affect students' learning experiences in different online formats in higher education, with particular emphasis on professional education and teacher training. The review serves to show that some factors are more prominent than others, and these factors, including spaces, learning community and student identity, course design and the educator's role, are further discussed.

1.1 Methods

The literature search on which the present review is based (Bryman, 2012; Creswell, 2013; Machi & McEvoy, 2016), serves the purpose of identifying papers that may contribute to answering the following research

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question: which factors are found to influence e-learning and blended learning in relation to learning outcome, student satisfaction and engagement in collaboration in higher education and particularly in professional education? A systematic search in the Educational Resource Information Center (ERIC) and ProQuest databases was carried out in January 2017, using the search keywords ["e-learning" OR "online learning" OR "blended learning" OR "hybrid learning"] AND ["innovation" OR "teacher education" OR "learning outcome" OR "collaboration" OR "satisfaction"]. To ensure that the latest findings are presented in the review, the systematic search was restricted to articles published between 2014-2017.

The database searches generated a total of 135 articles. The authors read the full articles, discussed how to categorize them and, eventually, 93 articles were selected as relevant and grouped into 13 major categories that affect e-learning and blended learning in higher education. The 13 categories were further reduced to five categories based on an estimate of which categories were most dominant, i.e. the categories that involved the highest number of hits. Thus, the review draws on a total of 44 articles and addresses the following categories: spaces, learning community and student identity, course design and educator roles. More papers are published in 2015 (20 papers) than in 2016 (13 papers) and 2014 (11 papers), but all categories are discussed throughout the period.

Below, we present the results from our reading and analysis of the articles included in the review by starting out with a discussion of the selected comparison studies on online, blended and face-to-face (F2F) formats.

1.2 Comparison studies on online, blended and F2F formats

Several studies (e.g., Bernard et al., 2014; Chigeza and Halbert, 2014; González-Gómez et al., 2016; Israel, 2015; Northey et al., 2015; Ryan et al., 2016; Southard, Meddaug and Harris, 2015) have compared F2F teaching to online learning and/or blended learning in order to try to define which of the formats provides, e.g., the highest learning outcome, creates the most satisfied students or has the highest rate of course completion. In the following, we make an introductory review of recent comparative studies of the three formats mentioned. The main focus will be on summing up the results developed by these studies and discussing some of the limitations said to accrue to comparative studies of teaching formats. In the literature reviewed, it is often shown that teaching and learning are influenced by more than teaching format alone as many other factors play significant roles.

Before embarking on our comparative review of the three different teaching and learning formats, we will begin by clarifying how each of them is definable according to studies of the different formats. Although there has not been complete agreement among researchers about the precise definition or meaning of the term 'blended learning' in particular (Bernard et al., 2014; Chigeza and Halbert, 2014), consensus has still built up around a sense of fairly clear distinctions between the three formats. Definitional questions do not, however, seem to haunt the terms 'face-to-face learning' and 'online learning' in the same way as they do 'blended learning' in the articles reviewed. Their meaning appears to be more or less agreed upon.

For instance, the F2F learning format is characterized as "traditional" by many of the authors, referring to the fact that this is the format with the longest history of the three formats and in relation to which online and blended learning represent a modern or innovative intervention (e.g., Chigeza and Halbert, 2014; Adams, Randall and Traustadóttir, 2015; Pellas and Kazandis, 2015; González-Gómez et al., 2016). Generally, its meaning derives from an understanding of an instructional format that involves a physical classroom and the synchronous physical presence of all participants (i.e., teachers and students). One study emphasizes that even in-class use of computers and educational technology does not affect the definition of the F2F format so as to change it into blended learning (Bernard et al., 2014).

Online learning is commonly defined in contradistinction to F2F learning (e.g., Ryan et al., 2016). Its most prominent feature is the absence of the physical classroom, which is replaced by the use of web-based technologies offering opportunities for out-of-class learning independent of time, place and pace (Bernard et al., 2014; Chigeza and Halbert, 2014; Northey et al., 2015; Israel, 2015; Potter, 2015). Ryan et al. (2016) point out that "in the context of higher education, the phrase *online learning* is often interpreted as referencing courses that are offered completely online; [..]" (p. 286). Typically, the online learning setting is launched through so-called learning management systems (LMS) or virtual learning environments (VLE) such as Moodle and Blackboard (Pellas and Kazanidis, 2015).

The terms blended learning and hybrid learning sometimes seem to be used interchangeably (Ryan et al., 2016). According to Bernard et al. (2014), who builds on Graham's definition (2005), blended learning can be defined as "the combination of instruction from two historically separate models of teaching and learning: traditional F2F learning systems and distributed learning systems" (p. 91). In some cases, blended learning is seen as the more effective counterpart to the other two formats used separately (Pellas and Kazandis, 2015; González-Gómez et al., 2016) insofar as it is, e.g., characterized as F2F and online learning being "optimally integrated" (Israel, 2015) or combining their "benefits" (Adams, Randall and Traustadóttir, 2015). Moreover, several studies seem to agree that blended learning is definable according to the relative time spent on respectively online and F2F instruction in courses. Thus, at least 50 percent of total course time dedicated to F2F instruction appears to be the lower limits of in-class components in the blended learning format (Bernard et al., 2014).

Many studies compare the effect on students' learning outcome generated by respectively F2F teaching and/or blended learning. In Bernard et al.'s (2014) meta-study of blended learning in higher education, students in blended programs have turned out to achieve slightly better than students following traditional classroom instruction programs. Similar findings have been made by other studies – e.g., Israel (2015), Northey et al. (2015), Southard, Meddaug and Harris (2015), González-Gómez et al. (2016) and Ryan et al. (2016).

What leads to a better learning outcome among students in online and blended learning programs is, however, a question that is not answered in the same way by all the studies mentioned. Bernard et al. (2014) conclude that the element of technology integration in blended learning courses seems to lead to very low, though significant improvement in student achievement – particularly when technology yields cognitive support (e.g., simulations) or facilitates student interaction (i.e., with other students, content and teachers). In González-Gómez et al.'s study (2016), it is the adoption of a flipped classroom model of blended learning in a general science course that results in higher grades among teacher training students when compared with those achieved by students following a traditional classroom setting. Though no specific predictor is mentioned by Israel (2015) or Potter (2015), the former still observes modest positive impacts on students' learning outcome resulting from the adoption of the blended format, while the latter records grades "significantly higher in the hybrid option than for the traditional face-to-face format" (p. 7).

Despite widespread agreement that the blended learning format produces better learning achievement among students, other studies have shown the exact opposite. In a comparative study by Adams, Randall and Traustadóttir (2015) the overall finding is that university students following a hybrid introductory course in microbiology were less successful than their peers following the same course in a F2F version. Less interaction with the material or a sense of isolation arising from less class attendance are counted among potential reasons for the hybrid students' lower success. Similar findings are mentioned in Powers et al.'s study (2016) of students' performance in respectively hybrid and traditional sections of an introductory psychology course where a significant decrease in exam grades throughout the semester was observed for students in the hybrid section. A suggested reason for this negative difference in achievement for students following the hybrid program is that these students had to deal with difficult concepts independently and without sufficient explicit F2F teaching. In contrast, another study reaches the opposite conclusion and points to similar circumstances as a way of explaining. In fact, a better academic outcome for students in a blended education program is precisely attributed to the opportunities given to them for working independently through participation in student-centered asynchronous collaborative learning activities supported by Web 2.0 media such as Facebook (Northey et al., 2015).

On the whole, our review of studies comparing F2F teaching to online and/or blended learning reveals that no inherent features of any of the three teaching formats produce either better or poorer learning outcomes for students. Rather, what leads to either is not the format itself, but is circumstantial and context-dependent. What one study counts as inhibiting for students' learning, another finds conducive to it (cf. Powers et al., 2016; Northey et al., 2015). Therefore, as, for instance, Ryan et al. (2016) conclude in their comparative study of community college students in traditional classroom-based and blended courses, "[..] blended learning opportunities are carefully designed to capitalise on both technological advances and multidisciplinary knowledge about academic content, as well as learning and instruction" (Ryan et al., 2016, p. 296). In other words, student learning in online and blended courses appears not "[..] to arise from technology alone but from the combined influence of implementation, context, and learner characteristics as these factors interact with technology (Ryan et al., 2016, p. 296).

Thus, below we explore the first of our contextual categories which has emerged as one of the factors that significantly influence e-learning and blended learning in higher education, i.e. the category of spaces, learning community and student identity.

2. Spaces, learning community and student identity

In this part of this review, we look into teaching and learning environments, student identity and learning communities, putting particular emphasis on the aspects highlighted by the reviewed literature to be of specific importance for professional education students' learning experience in online and blended programs. Several studies have noted that the online element of blended learning education has important implications for students' experience of the learning setting (c.f. Saghafi, Franz and Crowther, 2014), the learning community and their own learner identity (Baxter and Haycock, 2014).

Some research emphasizes the extent to which the absence of the F2F environment in asynchronous online teaching reduces the possibility of in-person interaction between students and instructors (Saghafi, Franz and Crowther, 2014) despite the importance that is still attached to F2F communication in students' learning experience (Tambouris, Zotou and Tarabanis, 2014; Israel, 2015; Bolsen et al., 2016). Nonetheless, the same and other research has pointed to the advantages that the online teaching environment offers – e.g. in terms of "shifting the learning environment to a more social, flexible and personal space" and thus promoting a student centered, problem-solving and social constructivist approach to learning (Westermann, 2014; Saghafi, Franz and Crowther, 2014, Gonzàles-Gómez et al., 2016). The latter is, moreover, increasingly becoming a feature said to characterize contemporary learning settings in general.

According to Saghafi, Franz and Crowther (2014), the online learning setting will not, however, replace activities taking place in F2F environments in higher education. Rather, their research shows that both the F2F and web-based learning environments have their respective uses – but also their limitations. Therefore, they conclude that both settings work together in complementary ways for students if a holistic model for blended learning is adopted. Especially in professional education, opportunities for practice-related workshop activities are important for students' learning experience. Principally, it is the accessibility and flexibility of workshop spaces 24 hours – virtual or F2F – that is recognized as critical for students. According to Saghafi, Franz and Crowther's comparative study, the F2F synchronous workshop provides a learning space for students supporting hands-on skills training, peer learning and spontaneous feedback, while the virtual asynchronous workshop turns out to be better suited for constructive discussion, archival of design development and review of individual or peer progress.

Similar insights are generated from studies done by Westermann (2014) and Gonzàles-Gómez et al. (2016), who note that one of the advantages of the dual classroom setting involving online as well as F2F learning is that it supports the development of specific skills. In Westermann's study, students experienced that their critical thinking skills were stimulated because the online setting was used for preparing oral peer discussion in the F2F classroom environment through postings of written peer and teacher response in an online discussion forum (Westermann, 2014). In Gonzàles-Gómez et al.'s study, students found themselves better equipped for solving general science problems during F2F classroom and laboratory activities when online video lessons and instructions outlining the theoretical and practical aspects of laboratory work can be watched at any point in time prior to or after in-class sessions.

The visualizing potentials of the online element in blended learning are investigated in studies by Tambouris et al. (2014) and Olsson, Mozelius and Collin (2016). Both studies emphasize the extent to which online technologies can be used for creating a learning environment that through visual support represents an added value in students' learning experience. Graduate students' execution of the different steps in a problem-based learning project is, for instance, shown to be experienced as cognitively enriched through the latter's graphic representation via the use of Web 2.0 tools in an online learning platform (Tambouris et al., 2014).

As mentioned earlier, students' experience of the learning community and their own learner identity appears to be significantly affected by the online element of blended learning education. Several studies point to the paradoxes that inhere in "the incorporation of information and communication technologies into the learning and teaching experience" (Joksimovic et al., 2015, p. 638). On the one hand, it is pointed out that online LMSs – often used in online and blended education – create new opportunities for interactivity between student and

content, between student and teacher and among students themselves (Cheng and Chau, 2014). On the other hand, the digital learning environment offered by LMSs is also one in which students' geographical dispersal, asynchronous participation and limited visual contact are taken for granted (Joksimovic et al., 2015). Therefore, the sense of belonging to a meaningful learning community is stressed as an important factor in online/blended learning students' learning experience especially because it is difficult to make their social presence perceptible in the online environment (Joksimovic et al., 2015; Barber, King and Buchanan, 2015; Fletcher and Bullock, 2015). Moreover, studies have related students' sense of belonging to meaningful online learning communities to their engagement and learning achievement (Joksimovic et al., 2015; Tomas et al., 2015). Nevertheless, although seen as a crucial factor, student-student interactions and collaboration activities are not necessarily the sole prerequisite for online/blended learning students to feel part of a learning community. The presence of engaging academic content and a strong teaching presence are considered just as important for creating this feeling (Tomas et al., 2015; Joksimovic et al., 2015).

Since the establishing of meaningful learning communities is a distinct challenge in online/blended learning education because of the partial or complete lack of F2F interaction between student and teachers and among students, many studies have investigated how and the extent to which digital learning technologies can be used to support students' sense of partaking of a community of learners.

Closely related to the question of students' sense of belonging to a meaningful learning community in online and blended learning environments is the question of students' experience of their own learner identity (Baxter and Haycock, 2014). According to Baxter and Haycock building on Lave and Wenger (1991), the formation of learner identity is bound up with agency and feelings of being in control resulting from feelings of belonging to a learning community. They further claim that the development of "a strong and salient online identity" plays an important role for student retention and motivation in online learning programs. For the same reason, their study looks into how successful online learning forums contribute to social and academic integration as a means of consolidating students' learner identities. Their findings reveal that students' prior experience with social media sites such as Facebook tended to be transferred to the academic online learning forum and thus to impact both negatively and positively on their learner confidence and agency. For instance, the public nature of the online forum made some students feel their postings assume an air of authority and expertise, which, on the other hand, led other students to refrain from posting due to feelings of lacking knowledgeability. Finally, lack of peer response or teacher moderation seemed to be detrimental to students' learner identity because they felt isolated from and peripheral to the academic community of the forum.

In this part of the review, the aspects that have proved most prominent in terms of their importance for education in online and blended learning programs include the following:

- appropriate teaching and learning spaces online as well as off-line
- engaging and meaningful learning communities as a means of supporting students' social relations and their learning experience
- a strong and salient sense of learner identity

3. Course Design

In this part of the review, we look into the overall course design and the elements and activities that researchers find to be of relevance and importance when designing a successful blended/online course in higher education. As we have a special interest in the online part of blended learning course design in professional education, a specific focus is kept here.

Course design influences student satisfaction (Lee, 2014) and their perceived learning (Gray and Diloreto, 2016), and many elements can contribute to good results here. An overall contribution might be found in the suggestion that variation in (online) teaching and learning activities are necessary (Cheng and Chau, 2016; Fedynich, Bradley, and Bradley, 2015), but the activities and suggestions for specific course design can be numerous when research is to give an answer.

Blended learning design can successfully mix online activities with practice in the field and thus prepare pre-service teachers for their future work in the profession. Here, inclusion of digital collaborative tools and work with digital literacy of the pupils are - or should be - parts of everyday practice. Hunt (2015) focuses on

exploiting blended learning for introducing authentic learning in teacher education, and she concludes that through deliberate course design and the use of relevant digital tools, blended learning can offer pre-service teachers a digital platform for collaborative and inquiry-based learning related to practice in the field. Chat sessions supplement the group work and the teachers are present and active during the students' field work period.

In professional education, it is of high importance that the online as well as the on-campus activities relate to the professional life to come, and as profession programs have both content and skills as part of the curriculum, course design should consequently be developed to support knowledge transmission and skills acquisition (Heinerichs, Pazzaglia, and Gilboy, 2016). Heinerichs and colleagues find that this could be facilitated by the use of digital technology in a flipped classroom or in a blended format of online and offline activities. Also in a study (Sidebotham, Jomeen, and Gamble, 2013) among midwifery students, a blended learning design was created for F2F meetings, with focus on practice-related activities, roleplays, narratives and reflection, and online sessions with synchronous discussions, "home-grown" learning recourses and active and present teachers. An innovative aspect was found in the double blends of both online-offline activities and of theory-practice activities.

Many agree that it is important to engage especially pre-service teachers in developing their capacity to use emerging technologies to develop teaching approaches that support interactive, engaging and collaborative learning (Chigeza and Halbert, 2014), and several researchers (Rivers, Richardson, and Price, 2014; Simpson, 2016) focus on the pedagogical value of dialogue to strengthen pre-service teachers' reflective practices and improve their knowledge of the value of talk for learning. Rivers et al. (2014) trace the use of various social networks in a blended learning setting as a means of incorporating more interactive discourse through web 2.0 tools. Their article concludes by stressing the positive impact that dialogue as a pedagogical tool had on the students' learning experiences (Rivers et al., 2014). Moreover, a study by Forbes and Khoo (2015) explores the potential of student-generated podcasts as a form of interactive formative assessment at a distance. The findings show that the experience empowered the teacher training students to develop the skills and confidence to initiate more independent inquiry into technologies to support their pedagogical purposes.

It can, however, be challenging to create sufficient learner support and link the online activities to campus resources (Fedynich et al., 2015) in order, for instance, to avoid students' evaluation of online activities as less valuable than on campus ones (Chigeza and Halbert, 2014). An answer to this challenge may be found in teachers' scaffolding of activities (Barber, King, and Buchanan, 2015) and the relation between them. Some suggest that an overarching pedagogical frame, explicit scaffolding of learning activities (through podcasts or online tutorials), appropriate use of media, hands-on assessment tasks and student-staff communication are vital for students' learning experience in a blended learning setting (Tomas, Lasen, Field, and Skamp, 2015). Moreover, it is found that teachers may need to scaffold online forum discussions in details in the beginning, set rules for them (e.g., when, how and how much to post to the forum) and contact the non-participating students (Beth, Jordan, Schallert, Reed, and Kim, 2015). As some students find that online meetings and teaching is less valuable because of less demand in the online participation, it is important to highlight interpersonal dialogues, interactions and scaffolding of the online activities. Thus, Chigeza and Halbert (2014) find that there is a need for several pathways of support to enable some of these pre-service teachers to be enabled online learners (Chigeza and Halbert, 2014), and a need for ways in which students can interact reflectively with content (Donnelly and Hume, 2014).

Likewise, some students find that peer-to-peer support is less valuable (Baxter and Haycock, 2014), and the impact of peer assessment seems to vary according to students' learning levels: low- and average-achieving students showed significantly improved performance but less impact on the performance of high-achieving students (Li and Gao, 2016). However, research often finds that peer-to-peer learning leads to satisfaction among students in online learning environments (c.f. Choi, 2016), and that social interaction and networked learning among peers should be included in effective online learning, for instance, in order to support self-reflection and not only to give access to information (Cheng and Chau, 2016).

Not only is social interaction found to create engaging learning in blended settings, so can online resources when used right. Several researchers (Martín-Rodríguez, Fernández-Molina, Montero-Alonso, and González-Gómez, 2015; Montrieux, Vangestel, Raes, Matthys, and Schellens, 2015) find that students consider web-based lectures to be an added value, especially when they function as course preparation (Montrieux et al.,

2015) and as a means of consolidating knowledge and improving learning across ethnic groups and gender (Lancellotti, Thomas, and Kohli, 2016).

Several studies also find that opportunities for interaction among students and among students and their educators is very important (Chiero, Beare, Marshall, and Torgerson, 2015; Fedynich et al., 2015) both to their satisfaction and learning outcome.

To sum up, the most important elements we find in this part of the review are related to interactions, links and scaffoldings

- between online and offline activities
- between campus-related and practice related activities and
- between students, teachers and content

4. Educator roles and relations

In the last part of the review, we look into educator roles and relations, with particular emphasis on the dimensions that are reported in the reviewed literature to have significant influence on student learning in professional programs offered through blended or online formats.

Several studies find that strong educator presence along with quality course content are essential elements in courses that successfully facilitate online student engagement and learning (Moore, 2014; Swan and Shih, 2014). Establishing educator presence in online courses can be achieved in a number of ways, such as through regular communication with students, consistent feedback and critical discourse modeled by the educator (Gray and DiLoreto, 2016). Online students need to feel connected to the educator, to other students in the course and to the course content (Southard, Meddaugh and France-Harris, 2015; Martín-Rodríguez, Fernández-Molina, Montero-Alonso and González-Gómez, 2015), which can be achieved in a supportive learning environment in which educators strategically combine audio, video, synchronous and asynchronous discussions, practical activities and other online tools to engage students (Gray and DiLoreto, 2016). Southard, Meddaugh and France-Harris (2015) found the use of high-impact videos featuring the educator and/or the course content particularly useful in promoting a strong educator presence and in cultivating students' interest in the topic under study, in particular in pure online courses where there is little or no synchronicity between the student and the educator. In the study carried out by Southard et al. (2015), introductions to undergraduate history lessons were filmed on the location of historical sites, and props as well as stop motion videos where static objects were brought to life and moved as the educator narrated were successfully used to strengthen students' feelings of connectedness to the educator and the content (Southard, Meddaugh and France-Harris, 2015).

Research indicates that online learning communities can help to create a feeling of connectedness to fellow learners and can help to establish trust in other students as a resource for knowledge construction and knowledge growth (Cho and Tobias, 2016). However, it is also clear that such engagement does not occur automatically; developing a learning community takes time and is only accomplished with conscientious effort (Beth, Jordan, Schallert, Reed and Kim, 2015). Moreover, participants need to feel that they are engaging in human-to-human interactions that will allow them to cultivate their professional as well as personal relations, and the presence of an educator can be a key factor in student engagement (Cho and Tobias 2016). A number of researchers find that the educator plays a crucial role in scaffolding students to successfully participate in asynchronous online discussions by providing clear guidelines for how to initiate and take part in online discussions that facilitate learning (Beth, Jordan, Schallert, Reed and Kim, 2015; Cho and Tobias, 2016). In a study on how responsibility and generativity were enacted in asynchronous online discussions in a hybrid course, Beth et al. (2015) conclude that educators can successfully scaffold students' online discussions in terms of both quantity (e.g., online discussion were scheduled at regular intervals and students were required to post a minimum number of posts) and quality (e.g., students were instructed to use a conversationally inviting tone, to provide contextual information and to address academic questions and comments to their peers). Others have found that in blended courses involving few F2F classes, synchronous online classroom sessions involving interaction and discussion can contribute positively to students' feelings of connectedness to their educator and fellow peers (Sidebotham, Jomeen and Gamble, 2014).

In blended courses, the educator must facilitate students' learning in the online environment as well as in the F2F classroom, which calls for a unique combination of roles and responsibilities. In a study investigating the perspectives of teacher training students about the instructional activities of blended courses, Hall and Villareal (2015) found that in F2F class sessions, educators should stress active participation and provide plenty of opportunities for students to interact and collaborate with their fellow peers and the educator, whereas specific and timely feedback as well as individualised responses to online assignments are of primary importance in the online environment. Research further shows that in F2F sessions of blended courses designed for professional bachelor programs, educators should create opportunities for students to apply the theory studied and to discuss and train the practical dimensions of the profession that may not translate well online (Sidebotham, Jomeen and Gamble, 2014; Hall and Villareal, 2015). Above all, educators must be easily available for students both online and, if possible, in person to avoid feelings of isolation (Hall and Villareal, 2015; Israel, 2015; Hunt, 2015).

Facilitating teaching and learning in an online environment poses a number of challenges to educators, who often struggle with adapting the practices they have found effective in F2F classes to an online environment (Mills, 2015). Fletcher and Bullock (2015) argue that in this respect, teacher educators are particularly challenged because asynchronous online environments may impede the fostering of positive relationships between the educator and her students, a relationship that is considered central to meaningful teaching and learning by most teacher educators. Their results indicate that, ideally, professional teaching programs should not be based on asynchronous teaching only, but should be blended with synchronous online class sessions and F2F interaction as well.

To sum up, the factors that have proved most salient in relation to the educator's role in e-learning, blended learning and online learning in the literature reviewed include:

- establishing strong educator presence in online settings and
- building online learning communities that foster positive relations

5. Conclusion and discussion

Many studies, and education institutions alike, are concerned with comparing different formats of e-learning, online learning, blended learning or F2F courses to find out which format is most effective in terms of, e.g., learning outcome and student satisfaction. However, research shows that teaching and learning are complex and are influenced by more than just the teaching format. For this reason, we should look into the many different factors that influence teaching and learning in different formats and in different contexts. This literature review has focused on the factors that affect students' learning experiences in e-learning, online learning and blended learning in higher education, with particular emphasis on professional education and teacher training. The findings from the research papers included in the review show that among the many factors, some seem more salient than others: educator presence in online settings, interactions between students, teachers and content, and deliberate connections between online and offline activities and between campus-related and practice-related activities.

More specifically, the reviewed literature offers numerous suggestions for specific course designs that are found to be effective in a particular context. Across studies, it is found that e-learning/blended courses should be designed to foster coherence between online and offline activities, between campus-related and practice-related activities and between students, teachers and content.

In relation to educator roles and relations, the dimensions that are reported in the literature reviewed to have significant influence on student learning in professional programs offered through blended or online formats include the educator's role in establishing strong educator presence in online settings and in building online learning communities that foster positive relations.

As for the students, research indicates that a number of factors influence their learning experience in e-learning/blended/online courses. The factors that are highlighted by the literature reviewed to be of specific importance for professional education students' learning experience and their learner identity include the presence of appropriate teaching and learning spaces online as well as off-line and the presence of engaging and meaningful learning communities that support the students' social relations.

In conclusion, the literature review confirms that there is an intense interest within the field of educational research to determine which factors affect learning outcome and student satisfaction in e-learning, online learning and blended learning in higher education, but further research is needed to better understand what influences students' learning experiences in the online formats of professional bachelor programs.

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