



ISSN: 2148-9955

International Journal of Research in Education and Science (IJRES)

www.ijres.net

Examining Blended Learning Implementation in Hard and Soft Sciences: A Qualitative Analysis

Minh Hien Vo^{1,2}, Chang Zhu¹, Anh Nguyet Diep^{2,3}

¹ Vrije Universiteit Brussel, Belgium

² Can Tho University, Vietnam

³ University of Liège, Belgium

To cite this article:

Vo, M.H., Zhu, C., & Diep, A.N. (2020). Examining blended learning implementation in hard and soft sciences: A qualitative analysis. *International Journal of Research in Education and Science (IJRES)*, 6(2), 250-272.

The International Journal of Research in Education and Science (IJRES) is a peer-reviewed scholarly online journal. This article may be used for research, teaching, and private study purposes. Authors alone are responsible for the contents of their articles. The journal owns the copyright of the articles. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of the research material. All authors are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations regarding the submitted work.

Examining Blended Learning Implementation in Hard and Soft Sciences: A Qualitative Analysis

Minh Hien Vo, Chang Zhu, Anh Nguyet Diep

Article Info

Article History

Received:
29 November 2019

Accepted:
11 March 2020

Keywords

Instructional strategies
Disciplinary differences
BL environments
Higher education

Abstract

Together with the rapid growth of blended courses implemented in higher education, instructors and researchers are keen on exploring the efficient models of blended learning (BL) to enhance students' achievement. While many BL theoretical models exist, robust empirical evidence confirming instructors' strategies and implementation is still scarce, particularly the possible differences as a function of disciplines. To address this lack of evidence, a qualitative study was conducted among 29 instructors in a large public university in Vietnam. Employing the Content-Construction-Communication framework as the guiding lens, the present study conducted semi-structured interviews to capture how instructors in hard and soft disciplines designed and implemented their blended courses. The findings revealed that instructors from hard and soft sciences shared both similarities and differences in their instructional strategies. Similar aspects included the alignment of course objectives with learning activities design and assessment, recognition of the importance of students' individual learning and collaborative learning, and responsiveness regarding students' questions. Yet, differences were observed in the design of both individual and collaborative online activities and instructors' online facilitation. Thus, the results provide a clear picture of different BL designs, which can be helpful for instructional designers and policies aimed at professional development support for successful BL implementation.

Introduction

In recent years, the implementation of blended learning (BL) has increasingly been introduced in higher education institutions worldwide (Graham, Woodfield, & Harrison, 2013). Empirical evidence supports that BL is more effective than purely online and face-to-face learning in terms of students' academic achievement (Means, Toyama, Murphy, & Baki, 2013; Vo, Zhu, & Diep, 2017). Besides, students report more learning benefits resulted from a BL approach (Moskal & Cavanaugh, 2014; Kelly, Lyng, McGrath, & Cannon, 2009). In elaborating on the effect of BL on students' performance, researchers consider the instructional design and practical concerns related to the method of end-of-course evaluation, levels of technology use, and subject matter (Bernard, Borokhovski, Schmid, & Tamin, 2014; Vo et al., 2017). A growing body of studies related to BL definitions, instructional models design, benefits, and limitations has been realized. For example, Owston, York, and Malhotra (2019) compare students' perceptions of four BL configurations with a different combination of face-to-face lectures, online sessions, and small group tutorial classes. The finding reveals that students most preferred the arrangement in which fully online lectures and in-class tutorials were combined. In another study, Owston and York (2018) found that students revealed more positive experiences when the amount of online component is higher than 36%. Up to now, research has been largely focused on students' perceptions of the effectiveness of BL design components and configurations. The design components vary from studies while sharing similar features at the same time, e.g., online interactions, course organization, and instructors' responsiveness. Nevertheless, studies that examine how instructors from different courses effectively implement BL are still fewer than studies that investigated students' experiences with BL. More importantly, a comprehensive BL design framework that synthesizes theoretical and empirical findings on BL implementation, which serves as a lens to scrutinize instructional practices, is still lacking.

Furthermore, while differences in epistemological beliefs and knowledge structure have been noted (Neumann, 2001), little has been studied in terms of how BL approaches in hard and soft disciplines differ. In their empirical study, Lindblom, Ylänne, Trigwell, Nevgi, and Ashwin (2006) found that instructors from different subject areas significantly display differences in their teaching approaches. Those who teach hard disciplines

(e.g., engineering, medicine) are more inclined to a teacher-focused approach, whereas their counterparts from the soft disciplines (e.g., social sciences, humanities) employ more student-centered pedagogies (Lindblom-Ylänne *et al.*, 2006). The former uses a lot of class time for lecturing (knowledge transmission), and the latter organizes class time for discussions to foster students' conceptual changes. To date, studies on instructors' approaches in different disciplines are rather scarce except for Lindblom-Ylänne's *et al.* (2006) study, as mentioned. Even fewer studies of the same type regarding BL implementation are noticed. Given that higher education institutions are increasingly implementing BL to fit better the new generation of students who are technologically adept, investigating the instructors' implementation regarding different blended course features bears both empirical and theoretical significance. Against these backgrounds, the present study aimed to examine how instructors implement BL in their respective hard and soft courses and how they differ in their BL instructional strategies. Based on an elaborated framework of BL implementation that results from a synthesis of existing literature, the study provides researchers, instructors, and course designers a comprehensive picture of different BL strategies captured under three categories, namely Content, Construction, and Communication among instructors from hard and soft disciplines.

Literature Review

Blended Learning Conceptualization and Operationalization

Initially, BL is viewed from a combination perspective. This combination includes the mix of traditional classroom practice and online learning to make use of the conveniences and flexibilities offered by technologies, e.g., providing immediate access to learning materials (Graham, 2006). Bates (2019) maintains that while we have more and more empirical evidence to understand the strength and limitations of online learning, similar insights into the effective design of face-to-face learning when implementing BL are mostly missing. Thus, it is challenging to develop a robust theory for BL. Bates (2019), therefore, points to four crucial factors that instructors should take into account when designing a BL course, namely students' characteristics and needs, available resources (e.g. technology affordance and time), preference for teaching strategies, and "the pedagogical and presentational requirements of the subject matter, in terms of (a) content and (b) skills" (p.363). This point of view echoes that from Graham and Robinson (2007). The authors suggest that to remove time and space barriers, the use of technologies for enhancing access is sufficient. However, if enhanced pedagogical and online interactions for purposes of knowledge construction and higher-order thinking facilitation, more online instructors' engagement and feedback are indispensable.

In realizing an operational conceptualization of BL to guide the meta-analysis, Bernard *et al.* (2014) propose that BL is a "mix of classroom instruction (i.e., face-to-face) and out-of-class online learning where the online work substituted for class time" (p. 91). In this study, we adopt this definition from Bernard *et al.* (2014) to examine how face-to-face and online learning are combined and facilitate each other to help students achieve the specified learning outcomes in BL courses. However, given that most definitions of BL entail a variety of designs in practices, perhaps due to instructors' preferred teaching methods, available resources, and students' characteristics, we also employ Bates' (2019) synthesis of BL designs as inclusive criteria during the data collection process. Accordingly, a course is considered as a blended one if the instructors make use of "a learning management platform to support classroom teaching, for storing learning materials, set readings and perhaps online discussion"; or the instructors make use of lectures captured for flipped classrooms; or "a shortened time on campus is spent on campus hands-on experience or training preceded or followed by a concentrated time spent studying online", or "the students can do the majority of their learning online, coming to campus only for very specific face-to-face teaching, such as lab or hands-on practical work, that cannot be done satisfactorily online" (p.365).

BL Design Framework

As a mix of face-to-face and online learning (Graham, 2006), the extent to which these two components are integrated largely varies across institutions and instructors. Besides, Twigg (2003) reviews different BL course designs and categorizes them into five categories ranging from supplementary, replacement, buffet, emporium, and fully online models. Of all the five categories, the first two are most aligned with the conceptualization of BL put forward by Graham (2006). Later Adams, Hanesiak, Owston, Lupshenyuk, & Mills (2009) distinguish four levels of BL which range from the online learning resources and the LMS provided to students as a communication tool to a complex combination of students' activities in online and face-to-face contexts. While

the categorization of Adams *et al.*, (2009) is helpful in determining how learning is blended, a pedagogical model of BL is not described.

Valiathan (2002) postulates that depending on which outcomes are aimed at, namely skills, attitudes, and competency, certain teaching and learning activities will be emphasized. Among these activities are announcements, overview sessions, self-paced learning, collaborative sessions, query solutions, demonstration of skills and procedures, practice, feedback, assessment, and closing sessions. According to Valiathan (2002), these activities can be conducted both in classroom and online, depending on the design. Being more specific about the integration of face-to-face and online components, Köse (2010) further distinguishes between online personal and collaborative activities in addition to face-to-face lectures.

Nevertheless, there is a crucial element of BL design that is missing. That is the interaction or communication between the instructors and the students. In this respect, Kerres and Witt's (2003) didactical framework for BL design is more comprehensive such that three components are realized: Content, Construction (individual and cooperative), and Communication. Thus, in this study, we will apply the didactical model for BL design by Kerres and Witt (2003) as the overarching framework to examine how the instructors implement BL in their respective disciplines. In the following section, the Content-Construction-Communication framework is further elaborated into sub-components built up from relevant theoretical and empirical findings.

BL Instructional Strategies Viewed from the Content-Construction-Communication Framework

Content

Kerres and Witte (2003) distinguish the content component as the materials and information related to students' learning in a BL environment and the manner in which these materials are presented. Thus, the content component embraces an array of both learning materials and information. The organization of learning materials in a consistent and clear manner has been considered as an important guideline for BL implementation (Grandzol & Grandzol, 2006). Students should be informed about how the different content packages are organized and updated in the learning platform so that they can proceed with learning (Grandzol & Grandzol, 2006; Ralston-Berg, 2010). Next, it comes the formats. The learning materials in blended courses are presented in varied forms, such as text-based or multimedia (Wu, Tennyson, & Hsia, 2010). In addition, the choice as to which types of learning content to be provided or uploaded should consider students' diversity, e.g. preferences for content-formats, prior learning achievement, or students' computer proficiency (Bangert, 2004; Tsai, 2009). As for course-related information, Ausburn (2004) and Milheim (2012) insisted that clear goals, learning objectives, and assessment criteria be communicated to the students from the beginning of the course. This will help create an overview of the course as well as a feeling of certainty regarding one's own learning orientation. In BL courses, the structuring of the online and face-to-face is a prominent feature that distinguishes itself from other technology-supported learning modes. Wu *et al.* (2010) suggest that learning content in blended courses can be delivered either online or in face-to-face tutorials. Therefore, how face-to-face lectures and online learning activities are designed to optimize students' understanding of the learning materials is also an important aspect to address. This is because it will give more insights into the diverse ways in which BL is implemented. In this respect, there is a lack of studies on how online and face-to-face activities are coupled to deliver the content. Owston and York (2018) are among the few to examine how the proportion of online affects students' learning outcomes. They found that for BL courses to be more effective, the online component should be more than 36% or between 36% and 50%. However, the authors suggest further research to elaborate how learning activities in each part are designed to gain more insights into effective BL implementation because it is the nature of these activities that counts rather than the deliver mode (Banerjee, 2011; Manwaring, Larsen, Graham, Henrie, & Halverson, 2017).

Construction

The construction component consists of individual and collaborative learning activities in order to help students construct knowledge (Kerres & Witt, 2003). These can be conducted by the accomplishment of learning tasks or assignments designed by different pedagogical approaches such as individual tasks or real-life problem solving (Huang, 2002). This component within the Content-Construction-Communication framework is aligned with the principles of constructivism, which underlines the importance of collaboration with peers and social interaction in fostering individuals' knowledge construction (Jonassen, 1995). Researchers have shown that during the process of collaboration, students' higher-order thinking skills such as reflection and self-regulation are

strengthened (Chen, Stocker, Wang, Chung, & Chen, 2009). As for the latter, involvement in the online community offers many opportunities for students to seek help and motivate each other, which are the two important behavioral and cognitive strategies of self-regulation (Chen et al., 2009). In turn, these skills are crucial in helping students in their individual learning trajectory, i.e. self-regulated students are higher achievers in online and BL environments (Broadbent, 2017). As for individual learning activities, Spanjers *et al.* (2015) showed that the inclusion of online quizzes in BL resulted in higher learning performance.

Next to individual and collaborative learning activities, assessment, when properly implemented, can play a significant role in fostering students' learning. To adequately and objectively assess students' learning, assessment tasks should be aligned with the learning tasks designed to achieve the course's objectives (Biggs, 2003; Huang, 2002). Also, the accompanied assessment tasks should be as diverse as the learning tasks to help learners demonstrate their achievement during the learning trajectory (Bangert, 2004). Therefore, assessment is preferably conducted during the learning process besides the final summative exams so that immediate feedback can be drawn to help the instructors (re)design the next learning activities and students develop an appropriate plan for their self-improvement (Anderson, 1998). There are a lot of studies conducted as to students' satisfaction and preferences of online individual learning, collaboration, and assessment. Nevertheless, how the instructors design and organize these activities to help students construct knowledge in BL is not largely explored, particularly how these activities are implemented differently in hard and soft disciplines. Therefore, further elaborating on this aspect is valuable to our understanding of how BL is implemented in practice.

Communication

Kerres and Witt (2003) describe the communication component as "the interpersonal exchange between learners or learners and tutors". In other words, the component refers to the two types of interactions according to Moore's (1989) typology, namely instructor-student and student-student interactions. Examining how these interactions can be designed to foster epistemic engagement, Garrison, Anderson and Archer (2001) developed the Community of Inquiry (CoI) that depicts the respective teaching and cognitive processes. The framework realizes three types of presences: teaching, cognitive, and social presences. The former refers to the instructors' course organization, facilitation of online discourses, and direct teaching (Anderson, Rourke, Garrison, & Archer 2001; Shea & Bidjerano, 2010). These involve specific behaviors that require the communication from the instructors to the students in terms of timeframes and deadlines, instructions of online activities participation, further clarification of content-related matters, and feedback to students (Shea & Bidjerano, 2010). The social presence and cognitive presence in the CoI refer to the interaction among the students for purposes of establishing a supportive and constructive online community. To realize such cohesive online communities, the facilitation of the instructors captured under the teaching presence is of crucial importance. These include observing students' (online) interactions, identifying areas of disagreements and confusion, sustaining the discussion, and motivating unengaged students (Anderson *et al.*, 2001).

As can be seen, the communication component or interpersonal exchanges in a blended course emphasizes the instructors' role in ensuring different types of information relevant for individuals as well as groups of students, including general information about the course and support during the learning process. As for the latter, feedback has been recognized as central to students' knowledge construction and students' performance (Awidi & Paynter, 2019; Tawafak, Romli, & Alsinani, 2019). For the development of an online community of learners for purposes of mutual support and knowledge sharing, instructors' facilitation is indispensable. It is, thus, well-established that instructors' facilitation of online discussion and feedback to students is desired to obtain high quality BL. Yet, how this takes place in practice is not well-described. Bringing into light the strategies that the instructors implement will help understand if there are issues occurring and the accompanied solutions that come along, particularly when implementing BL requires a higher workload from the instructors to make the online component more effective.

The Interrelationship between Content – Construction – Communication

It should be acknowledged that the categorization of blended learning instructional strategies under Content – Construction – Communication is relative. In the present paper, the categorization helps to synthesize the strategies in such a way that reflects the main actors and goals in question. For example, the Content component realizes instructional strategies that facilitate the engagement of students with the course objectives and content. The Construction component is related to strategies that facilitate the interaction among the students, and Communication the interaction between the instructors and the individual student or groups of students. It is

likely that one strategy, e.g. instructors' explanation of discussion rules can be grouped under Construction or Communication. However, the advantage of the Content – Construction – Communication framework is that it helps the researchers and later the instructors to consult which strategies they may use regarding the goals they would like to achieve.

Soft and Hard Disciplines: A Review of differences in Epistemology and Teaching Approaches

BL implementation may differ among instructors and courses. This can be explained by the nature of the course, i.e. be it hard or soft subject matter, which has not been largely examined. It is recognized that there is a difference in the knowledge configuration and knowledge advancement between hard and soft subject matter (Neumann, 2001). In the present study, to categorize the blended courses as belonging either to hard or soft disciplines, we adopted Biglan's (1973) disciplinary framework. According to Biglan (1973), subject matters can be classified, first of all, as being hard or soft disciplines. In order to realize more nuances, Biglan (1973) further distinguishes in hard and soft disciplines if they can be grouped as Pure or Applied and Life or Non-life categories, resulting in eight disciplinary clusters. However, given that the number of instructors (N=29) or courses are small, in this study, subject matters are only classified as being hard or soft. Furthermore, the course objectives and description and the faculties in which the courses are taught are also examined so as to avoid misclassification.

Courses characterized as hard subject matter have a more vertical structure regarding knowledge acquisition with an emphasis on accuracy, skills enhancement, and problem-solving. On the contrary, courses in soft discipline (e.g. finance, laws, or social sciences) have a more or less horizontal curriculum and stress the need to develop intellectual capacities such as argumentation, analysis, and synthesis of human experiences (Smart & Elton, 1975). With the differences in learning goals specific to the disciplines, the teaching approaches are also different such that a more student-centered approach is observed in soft disciplines (Lindblom-Ylänne et al., 2006). In hard disciplines, longer periods of structured learning are required (Boys et al., 1988). Thus, the instructors in these disciplines were found to spend more time on lectures, laboratory work, exercise, field trips and supervision (Smeby, 1996). In soft disciplines, as interpretation and synthesis are the goals, teaching approaches that allow for more dialogues between the instructors and students, for example seminars, are more employed next to lectures (Smeby, 1996).

The assessment approaches in both disciplines also differ. In a study of Swarat, Oliver, Tran, Childers, Tiwari, and Babcock (2017) notice that objective, focused exam, and factual questions that elicit specific knowledge and skills acquisition are more often employed in hard disciplines. On the other hand, essays, papers, and self-reflections that demonstrate students' grasp of the subject matter and complex cognitive acquisition are more observed in soft disciplines. This perspective echoes that from Smart and Ethington (1995), who notice that instructors in hard disciplines have greater consensus on assessment standards which results in more objective assessment methods. Reversely, the lower consensus in theories and methods among instructors in soft disciplines implies that assessment typically involves more elaboration, justification, and explanation of problems. Therefore, the evaluation of learning has a higher risk of subjectivity. In the context of BL, this element of discipline difference has not been substantially addressed. Most studies examined instructors' perspectives who are teaching the same program or who are teaching a variety of courses in different disciplines. Regarding the latter, such a multidisciplinary perspective will be attended to in the analysis of the interviews conducted in the present study.

Research Questions

This study aims to investigate how instructors implement BL in their courses. As such, the research questions are:

- RQ1. How do instructors implement BL in their courses?
- RQ2. Are there any differences in terms of Content-Construction-Communication instructional strategies among the instructors from hard and soft disciplines when implementing BL?

Method

This study uses a qualitative approach to allow for an in-depth and intensive examination of the researched perspectives and individual experiences. In addition, in-person open-ended interviews allow more

comprehensive understanding and meaningful contextualization (Cohen, Manion, & Morrison, 2007). To reach a good number of participants so that diverse perspectives can be scrutinized, invitations to participate in the research were sent to all instructors who reported to implement BL in their courses. This means that the research employed a convenience sampling technique. The design of the study and the interviews protocol were approved by the Ethical Committee of the Faculty of Psychology and Educational Sciences at the Vrije Universiteit Brussel and all participants indicated informed consent to participate in the study by means of completing the form provided by the first author.

Research Context and Participants

Twenty-nine lecturers were selected from 36 potential faculty members who come from nine colleges of a large multi-disciplinary public university in Southern-Vietnam. The instructors were selected from College of Engineering Technology, College of Agriculture, College of Economics, College of Environment and Natural Resources, College of Natural Sciences, School of Education, School of Foreign Languages, School of Humanities and Social Sciences, and School of Law. The list of the courses and the associated colleges is presented in the Appendix along with the pseudo names of the participants.

The ages of the participants ranged from 27 to 49 years, and 51.7% of them were female. The instructors' teaching experience varied from two to 21 years, 11 of whom are in managerial positions, i.e. either head or vice-head of college or department. The instructors had taught at least two blended learning courses, and at most 12 courses. The socio-demographic information of the participants is presented in Table 1.

Table 1. Participants' Socio-demographic Information

Instructors (n=29)		Hard	Soft
Discipline		14	15
Gender	Female	7	8
	Male	7	7
Age	Mean	36.71	34.27
	SD	5.15	6.49
Professional status	Managerial position	7	4
	Teaching staff	7	11
Highest degree	MSc.	6	3
	PhD.	8	12
Teaching experience (years)	Mean	12.71	9.26
	SD	5.03	5.80
BL experience (number of courses)	Mean	7.29	8.73
	SD	5.15	3.67
Length of interview (minutes)	Mean	47.14	47.68
	SD	2.76	5.37

Interview Procedure

The first researcher conducted semi-structured interviews to elaborate instructors' BL implementation. First, a description of purposes of the current research was provided and elaborated to ensure that the participants get a comprehensive understanding of the research purpose and comfortably engage in the research. Then, the participants were asked for permission of the audio recording of the interview. They were invited to have an open discussion on BL implementation with no right or wrong answers. It was also guaranteed that their audio transcripts would be treated and reported confidentially and anonymously.

The whole interview consists of three parts: research goals presentation and informed consent, the questions related to the participants' socio-demographics and BL experiences, and the interview questions. As for the BL experiences, we noticed that it is more meaningful to ask the instructors' the number of blended courses they have taught as a relative measure of BL teaching experience rather than the length of their tenure. This is because some instructors have recently launched their courses in a BL format despite their long affiliation with the researched institution or their teaching has been interrupted for some reasons, e.g. long-term abroad academic fellowship. During the interview, the instructors were asked to reflect on one particular BL course in order to answer the interview. Nevertheless, it is also possible that the instructors teach the same course to

different groups or cohorts. In this case, a comparative view of how the instructor designed their mentioned course is also elicited. The length of the interviews varied from 45 to 65 minutes.

Data Analysis

The interview data were transcribed verbatim into Vietnamese, then translated into English. The transcripts were coded using NVIVO software (version 11). The units of meaning were considered as the unit of analysis. The researcher listened to the interview recordings and read the transcripts over and over to familiarize with the data. Based on conceptual framework, first, the predetermined coding scheme consisting of three parent codes was established: Content, Construction, and Communication. The three parent codes were employed as the overarching scheme to manage the data (Gale, Heath, Cameron, Rahid, & Redwood, 2013). Based on this scheme, open coding was conducted on five randomly selected transcripts by the first researcher. The codes generated were then grouped according to the three parent codes, thus, the coding process following a deductive approach. Next, the researcher conducted a second round of coding to refine the codes and found out the common sub-themes that were emerged from the data under each parent code. In this second round, an inductive approach was then employed. As a result of this process, the final coding scheme was established with nine sub-themes registered under the three parent codes, as presented in Table 2. A second coder was trained to code the remaining 24 transcripts. Before that, inter-rater reliability was conducted after the second coder has coded five transcripts. The agreement for the codes generated for the categories of BL implementation was $Kappa = 0.78$, $p = .001$ which shows substantial inter-rater agreement (McHugh, 2012). Afterwards, the first author and the second coder independently coded the remaining transcripts. Any inconsistencies and discrepancies were resolved through a process of discussion to help refine the codebook.

Results

The results section is organized into two parts corresponding to the research questions. The first part elaborates how the instructors in hard and soft disciplines implement their BL course, thus addressing RQ1. The second part highlights key differences in BL implementation in hard and soft-disciplined courses, hence, answering RQ2.

RQ1: The Implementation of BL in Different Courses

Content

This first dimension examines how the instructors structure learning materials, communicate course objectives, and present course content to the students.

Learning Material Organization

Multi-format learning materials. The interviewed instructors organized learning materials through the online learning platforms of their choice, which can be the institutionally provided LMSs (e.g. Edmodo, Moodle, or Dokeos), web-based support platform (Google form), or personal blogs. Regarding the formats, the instructors mentioned that they provided diverse learning materials such as hard-copy course books, e-textbooks, PowerPoint slides, supplementary articles, and video lectures. In order to ensure students' engagement with learning materials, several strategies have been reported, e.g. specifying which readings should be done before the next class or tracking downloaded file and viewing frequencies. Quinn insisted that all of her lectures are conducted in the classroom. Beforehand, PowerPoint slides have been uploaded for students' reference. Besides, students are requested to watch the videos with specific law cases in order to discuss these during the class.

Volumes of learning materials uploaded. The amount and content of the learning resources that are uploaded vary among the instructors and among the courses of the same instructor. Twenty-seven instructors reported that textbooks or course books, which constitute the structured syllabus and limit the boundary of the course, are considered as being essential and should be first uploaded. For other learning materials (e.g. quizzes, exercises, or videos), nineteen instructors reported that they organize them thematically and nine sequentially according to the course syllabus. Interestingly, the decision as to the volume of the learning materials to be delivered online differs among instructors. Eight instructors provided all the learning materials online, stating that these will be helpful for students' learning, even if their class attendance is limited. Avy (soft) revealed that "the material distribution is one of the effective factors in my course. Some students even skipped some of my face-to-face

classes, but they still got high marks in the end". However, this is not the case according to Pauly (soft), who referred to students' motivation and self-regulated learning as the influential factors when there observed a lack of student-content interaction. She reported that although her material support is "substantial, yet, students were not actively engaged in reading the recommended content. So, students' self-efficacy, motivation could be taken into account."

On a different perspective, three-fourths of the instructors maintained that he or she only uploaded selective readings, so as not to overload students with information and give them a clear orientation. For instance, Nevile (soft) described as follows:

I believe that providing a variety of resources broadens referenced learning materials, but at the same time, it makes students feel overwhelmed with all those materials. Hence, selective material distribution is very important in helping students focus on the key knowledge of the course.

Although PowerPoint slides or lecture notes are presented in most courses, not all of them are uploaded on the LMS. One instructor argued that the availability of online slides had a negative impact on students' face-to-face attendance and engagement. Thus, only supplementary materials were provided. According to Tina (hard):

I just posted the supplement documents on the system. However, I did not upload my PowerPoint slides of lectures, although they were the revised versions. I found that the students who download the slides did not cognitively engage in the face-to-face discussion.

Particularly noteworthy, the instructors demonstrated consideration of students' levels and background when teaching the same course to different classes or even groups. In this way, the instructors made use of the flexibility offered by the user rights of the online learning system to cater to diverse students' needs, as described by Tina (hard) in the following.

Depending on the students' background, it is important to appropriately provide and organize materials. With the lower groups of students, I'm supposed to offer less advanced books or topics. On the contrary, the more abstract and complex materials were uploaded for specific groups [low achievers vs. high achievers, or fully registered vs. working] of students.

The updating of the learning materials. The online learning materials are updated throughout the course, but a difference has been observed. Twenty-two instructors insisted that they often updated the online material, twelve of whom modified the learning materials every week or after the lesson had taken place in the class. For example, Tobias (soft) reported that he "provided the revision and up-to-date version of the material. After finishing one topic, I put more materials for the next topic". Nevertheless, two instructors in hard disciplines (Harry & Stajan, hard) reported that they revised their online material sometimes during the course. Perhaps, this is related to the fixed and well-bounded content specific to hard disciplines.

Course Objectives and Outcomes Delivery

Learning objectives elaboration. That the learning objectives are aligned with the whole curriculum, the course content, and the accompanied assessments is one of the critical success elements of the instructional design. More importantly, finding ways to effectively communicate these course objectives will enable students to define appropriate learning strategies to achieve their self-set learning goals for the course. Most instructors recognized the importance of clear objectives and assessment communication. They insisted that they spent a significant amount of time to guide students' through the overall learning goals, specific objectives needed to be achieved in the course, as well as the expected knowledge and competence that students should be able to demonstrate at the end of the course. Terry (hard) recounted that he spent about two hours for the orientation discussion about course objectives, assessments, and assignments in the beginning.

Yet, there are two different perspectives among the participants regarding course objectives elaboration. A few instructors supposed that it was not necessary to spend so much time explaining the objectives such that these have been clearly formulated, fixed, and approved by the department and instructional designers. Tim (soft) argued that:

The objective of my course is to learn by heart the laws and apply these in practical cases. In my opinion, the general objectives have been described in the course book. Thus, the students can consult by themselves and there is no need to further discuss.

In the same vein, Pat (soft) explained that:

My course focuses on developing general English skills including listening, reading, and writing, for students. The goal is that at the end of the course, the students can reach B1 level according to the CEFR, of which the competence description has been well-documented. I just introduced students the course structure and practical information on the blended curriculum, e.g. What lessons are conducted online and what will be taught in the class.

As noted above, the successful blended course necessitates the alignment of course objectives, learning activities, and assessment tasks. Hence, some instructors intentionally provided more examples of high-achieved performance (e.g. sample final reports, products created by former students from the previous courses). Particularly, they designed the syllabus with the detailed map of processes and expectations.

Assessment negotiation: Possibilities of course objectives and assessment choices. A number of instructors maintained that they highly valued the clarity and consistency in objectives communication. Thus, when there was confusion arising, they allowed the possibility for students to negotiate the learning goals and assessment methods and modified these accordingly. For example, final exams can be replaced by a group project, or the assessment weights for each assessment component could also be adapted. Kevin (hard) reported that:

I offer a variety of possibilities for students to choose from. For instance, they can do field trips, participate in guest lectures, or do an apprenticeship at the farm and write a report. Alternatively, they can choose between multiple choice or written final test.

Offering students more freedom in their learning goal identification, Dane (hard) stated that:

When implementing this blended course, I asked the students to state their preferences and brainstorm the competencies that they wish to achieve. Then, I summarized these in a document of course objectives and uploaded it on the online platform for later retrieval.

It was observed that those instructors who offered such possibility of course objectives and assessment choices were in managerial positions (10 instructors), i.e. being the head of the department, or themselves the course designers within the teaching team. In this regard, they have more power in terms of decision-making when it comes to course content and assessment components.

Course-content delivery approach: in-class and online content delivery. During the interviews, the participants were asked how their teaching activities are organized on-campus and in the online learning platform. From the pilot study, the instructors in the current study reported that the proportion of course content delivery online was under 30% (5 soft, 4 hard), 30-50% (10 soft, 7 hard), 50-70% (3 hard). As revealed during the interviews, the instructors made use of both face-to-face and online moments to explain core content to the students. When this took place in the classroom (15 soft, 14 hard), lecturing by the instructors and intensive discussions were the most reported.

In the online learning environment, students were expected to take a more active role. This means the instructors (4 soft, 7 hard) requested that students do the readings by themselves to have an introductory knowledge or those types of procedural knowledge that they were assumed to be capable of understanding via a personal content delivery webpage. Another way of helping students to grasp the content is via online discussion groups on the learning platform with or without the presence of the instructors. Maurice (soft) reported that:

Although my classroom meeting is the obligatory part, however, I request the students to read the related theories which I uploaded beforehand. The classroom time is to explain and revise the content briefly, I spend more time on discussion and practice.

A flipped classroom approach was reported by three instructors from hard disciplines and two instructors from soft disciplines. For instance, the students of General English were required to learn key vocabularies and grammatical structures online before a practical session in the class. Students following the course of Invertebrates were provided with guideline questions to discuss the course content online before the face-to-face lecture in the class.

Construction

This category elaborates the pedagogical methodology enlightened by the instructors and specifies how they helped students in their process of knowledge construction.

Individual Construction: In-class Practice and Online Assignment

Most of the participants agreed that supporting individual student's learning was primary. Firstly, they followed the syllabus approved beforehand by the department's board. Then, according to a particular course, the instructors designed their corresponding strategies of the course and students' individual learning activities. Twelve instructors describe that their course commonly encompassed two major parts, i.e. theories and lab work or field trip. Students' attendance was compulsory in practical sections whereas the classroom activities could be arranged flexibly by consensus between the instructor and students.

The instructors believed that organizing online assignments broadly contributed to the achievement of the learning goals. Then, based on the feedback from the preceding assignments, students gradually improved themselves. Besides, the instructor can make use of the discovered issues to offer further support or adapt their instruction. Harry (hard) reported that he gave "the students weekly online assignments and these were obligatory activities. Besides, the students needed to perform the practical sessions so that they could attend and accomplish the practical test". Similarly, Tony (hard) shared that:

My course was designed with theory and practical sections. Additionally, the course book comprises the guidelines of the self-study part; so, my students are asked to do the weekly assignments. Observing the results of their assignments helps me to evaluate students' individual learning and further modify my course design.

Fourteen instructors preferred the online assignments to be graded, believing that this would foster more students' engagement with learning. Yet, some thirteen instructors deliberately designed online assignments as scaffolding for their students' learning, and hence, not all students, i.e. just those in need, are obliged to complete. Thus, these online assignments are not graded. Students in hard disciplines were more often supported by a teaching assistant, junior researcher, or a senior student during lab sessions. Similar instances were not reported by instructors from soft courses. This can be due to the availability of the teaching assistants and junior researchers, who were currently working under the supervision of the instructors from hard discipline. It could also be plausible that practical sessions in hard disciplines were organized for only individuals or smaller groups of students; hence more support is demanded.

Collaboration Construction: Field Works, Group Projects, and In-class and Online Discussions being Most Employed

Implementing BL affords more spaces for collaborative learning both in face-to-face classroom and online environments. Collaboration is not only helpful during the knowledge construction process of the group or individual students but can also help students develop communicative skills such as analyzing, negotiating, or facilitating. For these reasons, at least six instructors maintained that collaborative activities were notably stressed in their course. For example, Bernie (soft) asked students to work in a group in the learning management system to prepare a brochure to promote local tourism. The students were required to structure their online discussion in such a way that all predefined elements of the brochure should be present. Nevertheless, the students should present, discuss, and come to a final decision regarding the details they would include in the brochure. In so doing, Bernie was able to track the students' appropriate use of English and provide help when necessary.

The range of collaborative learning activities differs among courses. Accordingly, field works and group projects are more prevalent in hard disciplines (12 hard, 8 soft) whereas, in soft disciplines, these normally involve topic discussions and written assignments. To support students during the collaboration process, some instructors employed the online platform as a channel to support students when problems occur, i.e. the online exchanges took place spontaneously rather on a regular basis. On the other hand, some instructors specified that all online contributions should be archived in the online platform so that they or other students could easily monitor and offer support in case of misunderstanding or confusion. This is evident in Trent's (soft) class, as he stated that in the system, he designed inter-checking tasks. So, when the students finished their assignments, they were required to give feedback to others.

Nevertheless, twelve instructors considered face-to-face discussions in the classroom as more effective in facilitating students' knowledge construction process. Notably, some five instructors admitted that due to class sizes, the face-to-face discussions were opted for as a worthy solution for student-content and student-student interaction because they could manage them more effectively compared with those taking place online. As Tony remarked, "Designing face-to-face activities is somehow more effective regarding the monitoring of my

students' grasp of knowledge. For example, I assigned supplement reading and discussions in the classroom aimed at evaluating their understanding." Additionally, two instructors reported failures in organizing online discussions due to the resulting increased workload and the lack of experiences in handling the demands of the blended courses. This is the case of Tony (hard) as he stated that:

I used to organize online discussion groups, but the results were not as expected. The instructor needed to frequently follow and facilitate the group discussions and replied promptly. Additionally, due to the growing class size, the workload resulted was beyond my capacity.

As has been seen, there are instructors who could efficiently organize collaborative learning in both face-to-face and online platforms. Reversely, some were more inclined to the traditional in-class discussions referring to class size and lack of pedagogical knowledge in online facilitation as the main reasons.

Diversity of Assessment: Online Activities, Group and Field Works, and Final Exams Constituting the Course Grades across the Courses

Assessment of students' learning has been supposed to not only identify students' levels of achievement during the course and their knowledge attainment at the end but also reflecting the efficiency of the employed instructional design. Besides, the instructors should ensure the alignment of assignments with the learning objectives of the course and the grading criteria. Yet, in the current research context, several external factors were affecting their arrangement, such as the instructional rubric (the curricular regulation of the minimal weight of each proportion constituting the overall grading). Commonly, three mandatory grading components were the final exams based on written tests (50-70%), the midterm assignment or alternatively, case study, group assignment, etc. (10-30%), and students' online assignment (10-30%). Furthermore, some instructors considered online evaluation as indispensable accompanied by face-to-face assessment, including Pat (soft), who indicated that in his course, "students' performance was not only evaluated by the final exam. I especially assigned several online assignments (e.g. automated quizzes, self-reflection) from which I can have a grasp of their achievements during the learning process."

It has often been assumed that establishing an online assessment is feasible for the instructors who have implemented BL more intensively. As shown, the instructors conducted their grading procedure by structuring differently the proportion of online, face-to-face, personal performance, and group evaluation. Nevertheless, the final exam still constitutes 50% of the final course grade as specified by the institutional regulation. The analyses show that most instructors in hard disciplines tended to opt for assessment demonstrating knowledge and skill application such as field works, seminar presentation, and final project submission in either individual or collaborative assignments. On the other hand, instructors from soft disciplines required the students to engage in group discussions, presentations, and personal assigned weekly tests as evidence of learning and knowledge sharing. Yet, the weight of these online activities in the course's final evaluation seems to be only marginal.

Communication

This section identified the interaction process between the instructors and the students for purposes of supporting individual and collaborative knowledge construction.

General Communication: Online Instructor-student(s) Interactions Employed Followed by In-class Q-A Sessions when Necessary

The general communication refers to the public instructional discourses between the instructors and the students. As such, the instructors were prompted to elaborate on which types of interactions mostly used by the students. The majority of students interacted with the instructor for issues related to their subject matter. However, instructors who implemented BL more enthusiastically reported that students preferred and tended to use the LMS as a means for communicating between the instructor and the students due to the lack of class time. The advantage of the face-to-face portion in BL is to maintain traditional synchronous interaction and enhance students' sense of belonging to the cohort. Hence, most participants confirmed that direct instructor-student and student-student interactions seemed to be a dominant channel of communication. However, three instructors stated that students in their courses actively participated in the online discussion or collaborative tasks as they curiously met and discussed with their mates in a virtual environment. Sometimes, online communication was preferred by less self-efficacious students. Tony even stated that, "Some students are frightened to ask questions

that they think stupid in public, so they ask after class time or they send the comments afterwards.” Nevertheless, some instructors acknowledged that students in their courses needed more training in formulating questions in the online learning platform, as reported by Thad (soft):

I opened some topics for discussion on the LMS, so the students can involve and discuss with their peers. However, due to the weakness in posing the constructive and intensive questions, students normally asked very personal or pointless questions, regardless of my expectation.

Feedback to Individual Students and Groups: Both Asynchronous and In-class Feedback being mentioned

With regard to individual support, quite a number of participants (n=23) reported in-person interaction. At the same time, the instructors provided either asynchronous or synchronous feedback via various online communication tools. Some preferred email for keeping an appropriate distance with students while others suggested using Facebook messenger or online forum (with notification functions on mobile devices) to constantly get in touch with the students. Students mostly asked questions and received feedback via different channels like email, Facebook messenger, or online platform. However, this happened only when the questions were not so complicated or without the necessity to use formulations. As Dane indicated, it was possible to answer short or practical questions via the system. Inversely, to deal with complicated questions, he preferred to bring them into the classroom, “I frequently provided feedback on the system or via email. Nevertheless, with time-consuming explanations related to several formulas or complex graph visualization, I appointed my students to a face-to-face meeting for clarifying the issues.”

Some instructors were keen on providing answers to individual questions online so that other students could learn and avoid sending the same question. Illustrating this, Trent (soft) remarked, “Equivalently, I facilitated classroom and online forum discussions. Personally, I preferred giving feedback via Facebook group messenger. The students can find the feedback of their peer learner. It helps save time in giving feedback with the same problems.” According to the instructors, some students were more likely to ask questions when working in groups (either in the class or online). For some instructors, it is better to organize group discussions so as to easily monitor. In this way, the instructor can provide immediate support when confusions occur within the group. When noticing a common problem experienced by many students or many groups, the instructor published general notes online so that students would not encounter the same problem. Alternatively, some noted down and provided answers in the class or to the group in face-to-face meetings once the problem was important. For exam papers, feedback, or questions for individuals were mostly conducted face-to-face.

As for etiquettes, the instructors managed to respond to students’ questions within two or three days or before the next lesson or at the earliest of their convenience. Some instructors also set the rule of communication, e.g. if students did not receive an answer after [1 day], they might send the question again. Alternatively, a few instructors specify that students could only get the answers within a specific time frame of the course. As can be seen, the instructors employ different online communication tools, depending on how they found them as more efficient and comfortable ways of responding to students’ problems. For the repeated issues emerged, most instructors attempted to draw attention to the whole class in either online or face-to-face sessions. Generally, the instructors made an effort to provide prompt feedback to individual students and ensure that students were informed about the timing of the responses to be received.

Instructor's Interaction Facilitation: Bonus Marks as Incentives, Instructors' Monitoring, and Pedagogical Strategies

Most instructors maintained that having strategies to enhance student-student interaction for purposes of knowledge construction is important. Thus, a variety of encouraging strategies was used. The most mentioned was rewarding by offering extra or bonus marks for students' active participation, as stated by Tracy (hard), “I always encourage the students to interact with their peers both in-class and online. For those who participate online actively, they received 10% of the final course.” Nevertheless, there are instructors who were against such a rewarding policy, stating that it was not always effective and only worked for certain groups rather than the whole class, including Quincy (soft) who reported that, “I do not apply the use of bonus marks as an encouraging strategy. I am afraid that there are certain individual students or groups dominating the discussions.” Some instructors opted for more pedagogical strategies. Among these was to simplify the discussion questions or gradually guide the students to constructively contribute to the online discussion, as illustrated by Thad (soft) in the following:

I always start with the discussion rubrics which describe what constitute constructive comments and arguments during the discussion. Students are encouraged to play an important role in facilitating the discussions, convincing others, or challenging their peers' viewpoints. These help to create a mutually supportive atmosphere among the students and encourage students to accept or critically evaluate different perspectives being presented.

A few instructors restructured the groups and introduced role assignments when possible so that students had chances to work with as many peers as possible. To ensure the effectiveness of online interaction, the majority of instructors agreed that instructors' frequent observation and facilitation was crucial. In some cases, the instructors' online facilitation mainly revolved around fixing technical issues rather than content-related discussion facilitation. For example, Pat (soft) stated that, "Upon checking all the questions received, I found that many of the students' questions are related to how to navigate around the online platform and issues related to submissions."

RQ2: The Key Differences between Instructors in Hard and Soft Sciences

In order to answer RQ2, i.e. whether the instructors in hard and soft disciplines differ in the use of instructional strategies in their corresponding courses, the frequency of strategies reported by faculties in both disciplines was summarized in Table 2. In the following section, the differences were described according to the groups of strategies.

Table 2. Summary of Instructional Strategies employed by Instructors

Content		Soft	Hard
Learning material organization	Multi-format learning materials	9	11
	Volume of learning materials uploaded: Main material provision	15	12
	Volume of learning materials uploaded: Supplementary material provision	6	12
	The updating of learning materials: Frequent updates	11	11
Course objectives	Learning objectives elaboration	8	9
	Assessment negotiation: Possibilities of course objectives and assessment choices	1	4
Course content delivery approach	In-class lecturing	15	14
	Online content delivery	4	7
Construction		Soft	Hard
Individual construction	In-class practice	8	7
	Online assignments (scaffolding activities - non-graded)	8	5
	Online assignments (graded)	4	8
Collaborative construction	Field works	2	4
	Group projects	6	8
	In-class group discussion	13	8
	Online group discussions	7	5
Diversity of assessment	Online (individual, group) activities (10%)	6	5
	Online (individual, group) activities (20 - 30%)	2	4
	Group works, field works	8	12
	Final exam	15	14
Communication		Soft	Hard
General communication	Online instructor-student interaction	13	12
	Online group support (instructor-students interaction)	4	5
	In-class Q-A sessions	14	12
Feedback to individual students and groups	In-class feedback	10	11
	Online asynchronous feedback	8	7
Instructors' interaction facilitation	Bonus marks	5	7
	Instructor's presence and monitoring	4	7
	Pedagogical strategies	7	2

The Use of Content Strategies

In general, there are not many differences in terms of strategies in the Content category among instructors in hard and soft disciplines. A roughly equal number of instructors provided multi-format learning materials, the key learning materials of the course and maintained that they updated frequently the provided resources. Only in terms of supplementary materials, it was reported that faculties from “hard” discipline (12 instructors) tended to upload more referenced sources for students than their peers in the soft discipline (6 instructors). Regarding course objectives and assessments, the possibility to negotiate the learning objectives with alternative assessment methods was mainly observed in hard courses. On the other hand, most instructors spent a significant amount of time to elaborate on the learning objectives at the beginning of the course. The number of instructors who prioritized in-class sessions for practical sessions and lecturing was not so different in both disciplines. However, the instructors in hard disciplines seemed to make use of the online learning platform for content delivery more than those teaching soft courses (7 vs. 4 instructors).

The Use of Construction Strategies

As to the instructional strategies to help students construct knowledge on their own as well as co-construction of knowledge among the students, major differences are found when it comes to individual online assignments and online discussions. The instructors from hard disciplines seemed to be stricter, meaning that they required that individual online assignments make up a compulsory component and be completed by the students. On the other hand, more instructors in soft disciplines offered individual online assignments, but only a few made them a grading component. But regarding in-class practical session attendance, instructors from both disciplines shared the idea that this should be made compulsory. Interestingly, it was also in soft-disciplined courses that the organization of in-class and online discussions was more observed than that of hard disciplines. The use of different types of assessment revealed no striking differences, except that more instructors from hard disciplines tended to include group and field works as an assessment component.

The Use of Communication Strategies

As for the interaction between the instructors and the student(s) and among the students themselves, a lot of similarities emerged when it comes to how feedback and responses to individual students and general questions are conducted. These included the employment of both in-class and online platforms as communication channels and the use of other means of asynchronous communication tools such as emails. Whereas instructors from hard disciplines reported that they were more present and tended to monitor the online activities of the students or groups of students, instructors teaching soft courses, once present, employed more pedagogical strategies to facilitate these online collaborations and discussions.

Discussion

The present study elaborates how BL is implemented by higher education instructors across different courses, with further elaboration on disciplinary differences. Semi-structured interviews were employed to collect and interpret the data guided by the Content-Construction-Communication framework. In the following section, each component will be discussed in detail.

The Implementation of BL among Instructors

Content

Learning Materials Provision as a Function of Instructors' Belief on Effective Teaching Strategies

In BL environments, the possibility to provide learning materials in multi-format, including course books or media content, is well-recognized (Laurillard, 2012). Furthermore, the capacity to offer further or supplementary learning materials is substantially enhanced. Nevertheless, the instructors make use of these possibilities and capacity in different ways. Some instructors highly appreciate the provision of all learning materials made available to students at their convenience, stating that this is helpful for students who have missed the face-to-face lectures. On the other hand, some instructors do the uploading selectively, i.e. only providing either the

core or the supplementary materials, excluding lecture slides. These instructors believe that providing materials beforehand will interfere with students' in-class engagement. Therefore, the difference may be related to instructors' beliefs regarding the position as to what constitutes effective learning or teaching (Pratt, 2002). The former may have adopted a student-centered perspective, believing that it is the instructors' task to motivate and provide the prerequisites and scaffolding for self-construction of knowledge. Reversely, the latter possibly favor a teacher-centered approach, preferring a central role during the knowledge transmission process.

Learning Objectives Elaboration and Assessment Choices

As the interviews revealed, learning objectives elaboration from the start of the course was conducted by most instructors. In a few cases, the instructors find it difficult to elaborate or detail how one objective is related to each other. This takes place mostly in soft disciplines, e.g. law and language courses due to the abstract nature of the competencies to be achieved. In all courses, the instructors offer different components of assessment to evaluate students' knowledge and competencies. Nevertheless, it is observed that online activities have not constituted a substantial assessment weight. This can be stringent on the institutional regulation which specifies that the midterm and final exams should make up more than half of the course grades. As for assessment choices, students can negotiate or suggest the types of assessment they are in favor of. Yet, this can only be found in courses with instructors who have more agency in deciding the curriculum, i.e. those in a senior position.

Students' Self-regulation being Important for Content-delivery in BL

Regarding content delivery, most instructors reported lecturing in the classroom as the main method. However, BL has offered more possibilities to reduce the talking-time of the instructors. Accordingly, when there are fundamental concepts and background content that students should be capable of studying on their own, e.g. learning vocabularies by videos or doing introduction readings, the instructors require that these should be prepared in advance. In this way, content and knowledge are delivered in two modes: face-to-face and online which substantially reserves class time for more in-depth explanation and discussions. Nevertheless, some instructors postulate that this requires high self-regulation on the part of the learners, which sometimes is not the case. Therefore, students' self-regulation is an important factor for their learning and also for the success of teaching in a BL environment, which echoes a lot of studies (Broadbent, 2017; Zhu, Au, & Yates, 2016). Among the self-regulated strategies, time management was found to be a prominent factor positively related to students' performance (Broadbent, 2017). To help students better organize their learning, the instructors can help them to create a plan with prioritized tasks during the course and provide weekly tutoring sessions to support the realization of the specified learning goals (Broadbent, 2017). It is inevitable that students may possess varied self-regulation skills. Thus, organizing a training session on self-regulation in the beginning of the course is worthwhile. Additionally, assigning students of varied self-regulation levels into one group can help the less-abled to learn from the more-abled peers.

Construction

Individual Knowledge Construction

In order to help the students to construct their knowledge, the instructors organize both online and face-to-face activities. As revealed during the interviews, the instructors design online activities for purposes of preparation for in-class lectures. Additionally, assignments such as quizzes are provided as a means to help reinforce the newly gained knowledge or advanced learning tasks, which are mostly required and monitored by the instructors. It should be noticed that these types of activities are quite different from those taking place in the classroom. Accordingly, the face-to-face sessions are reserved for individual skill practice such as lab sessions or presentation on a given topic. Sometimes, random group discussions are preferred by some instructors because this helps to immediately figure out the problem that students are encountering. Also, group discussions in the classroom help enhance students' confidence in raising questions, rather than doing this on their own. As can be seen, the advantage of BL lies in the capacity to support individual learning process, so that students are better prepared, remediated, or further extend their knowledge. For skills that need the observation from the instructors or peers for further improvement, the face-to-face sessions remain an important role. In this way, BL particularly demonstrates its pedagogical value in supporting students to make progress on their own pace with

the online assignments (Smyth, Houghton, Cooney, & Casey, 2012) and receive useful feedback from the face-to-face sessions on their performance at the same time.

Collaborative Knowledge Construction

It is evident from the interviews that collaborative learning is present in all blended courses. The instructors opine that these collaborative learning activities are helpful in such a way that students can mutually support each other, which is in line with a number of studies on the effect of collaborative learning (Tsai, 2011). Additionally, this collaborative knowledge construction is not only a source of peer support but also viewed as a means to develop skills that are stated in the learning objectives such as negotiation, evaluation, and presentation of perspectives. There observe different types of collaborative learning tasks across different courses. Hence, how they are organized in the BL environment also differs, which will be further elaborated when disciplinary differences are discussed in the following section.

It is also noticed that learning from each other does not limit within one's own group. This means instructors from both hard and soft disciplines provide more learning opportunities by giving students access to the output or final works of other groups. The learning process is facilitated by requesting one group to give evaluation and constructive feedback to others. This possibility of having access to peers' output has been advocated by Laurillard (2012) as one of the most crucial ways to activate internal feedback that trigger the monitoring, reflection, and self-improvement of students or groups of students' learning process. Given the affordances of the online learning platform, this aspect of cross-group learning is further enhanced with the instructors' clear guidance of how such constructive feedback can be formulated and communicated online to the other groups as mentioned by the instructors.

Diversity of Assessment

Thanks to the possibilities to organize a variety of learning activities in face-to-face and online contexts, the evaluation of students' learning also reveals different components. Due to the institutional regulation in the research context that the final exam should constitute at least 50% of the course grade, other components such as mid-term exams, individual assignments, and group works do not exceed the remaining 50%. Based on the interviews, it appears that most instructors require that online learning tasks, either individual or collaborative types, be assessed. This makes up from 10% to 30% for individual works and 20-30% for either group works or a combination of individual and group works. The nature of the assessment, be it formative or summative, differs in both hard and soft disciplines. Some instructors could be able to follow and facilitate the students during the collaborative working process, e.g. developing a plug-in for a computer program. Therefore, he/she could help the group continuously improve the end products. Some instructors have certain constraints in terms of class sizes; hence the evaluation mainly relies on the final output. Although one of the advantages of implementing BL is the possibility to track and facilitate students' progress (Laurillard, 2012), this is not so evident in the study sample. Probably, the institutional policy that does not allow for the decrease of face-to-face meetings of blended courses compared to those of the traditional courses of the same credits has a role to play. It is plausible that both the instructors and students have not equally recognized the online learning activities as part of the formal curriculum. Therefore, the implementation and assessment of the online activities are not as intensive as expected.

Communication

Instructional Support regarding Individual Learning and Collaboration: Students' Questions and Feedback

It has been proved in a number of studies that instructors' responsiveness is a significant factor affecting students' learning in BL courses (Diep, Zhu, Struyven, & Blicek, 2017). This is in line with the instructors' perspectives and reported strategies in the study. All of the instructors reported that they acknowledge the importance of prompt responses to students or groups of students' questions and attempted to respond within one to three days in multiple ways (e.g. email, chat forum, telephone, in person, etc.). In most cases, etiquettes of the communication between the instructors and students are clearly established, which further enhances students' confidence and motivates them to ask questions when needed (Martin, Wang, & Sadaf, 2018). This clear protocol is not only helpful to students' learning but also foster a positive relationship between the instructors and the students in a BL environment (Pelz, 2010). The instructors also differ in their communication

preferences. Some find synchronous communication as the most efficient way to address students' questions while others favor asynchronous tools such as email, stating that they would like to keep an appropriate distance. In this regard, recent findings also reveal that students' preference for synchronous and asynchronous communication differ, of which the latter is perceived as more valuable to their learning (Martin *et al.*, 2018). Therefore, it is suggested that there is no absolute answer regarding which type of communication is superior. The choice is probably contingent on how the instructors and students feel most comfortable during their exchanges.

Instructors' Online Facilitation

In order to facilitate students' individual and collaborative learning in both face-to-face and online environments, the instructors employ a wide array of strategies. These include encouragement by giving extra marks, monitoring of students' task completion, and the presence of the instructors during the discussion process. Additionally, pedagogical tactics such as role assignments, i.e. one student is assigned to review and respond to a priori specified peer, are also introduced to enhance the collaborative knowledge construction process. The online involvement of the instructors reveals differences among the instructors. In some courses, the instructors are more active in facilitating the online activities. In other cases, the lack of instructors' online facilitation is explained by both situational constraints (time shortage) and personal preferences. Therefore, in order to realize high instructor presence, which has proved to be significant in students' online knowledge construction (Garrison, Anderson, & Archer, 2000; Arbaugh, Bangert, & Cleveland-Innes, 2010), these personal constraints and perspectives should be shifted to yield enriched BL experience for students. In this respect, institutional support to reduce the constraints in terms of time shortage and professional development programs to help instructors move beyond the preferred (less active) manner of online facilitation should be in place.

The Key Differences between Instructors in Hard and Soft Sciences

Course Objectives, Content Organization and Delivery

From the interviews, it appears that students in hard-disciplined courses are provided with more supplementary learning materials than their peers in soft disciplines. This, on one hand, can be explained in light of the instructors' perspective regarding how students' learning can be optimally supported as discussed in the above section. On the other hand, it can be that the knowledge in soft disciplines does not really have a clear boundary. Therefore, to help students focus on key knowledge of the course, the instructors may be more hesitant to overload students with a lot of referenced materials; otherwise, the students may undertake a surface approach to learning (Fry, Ketteridge, & Marshall, 2014). Nevertheless, this speculation should be verified so as to gain a more insightful view of this decision in terms of how much and in which manner supplementary content should be provided. This can be done by mapping the instructors' pedagogical beliefs and their implemented teaching strategies in a blended course so that a prominent pattern can be unraveled.

Also, there are more instructors in hard disciplines employing the online platform for content delivery. It has been expected that there would be no differences or that instructors from soft disciplines would have made more use of the platform regarding online content delivery because of a higher amount of reading that should be done in advance. The unexpected finding can be explained by the observation of instructors from soft disciplines that students' self-regulation is a prerequisite when such independent online learning is implemented. On the other hand, it is perhaps more important in hard disciplines that students should have grasped basic concepts and procedures before in-class sessions to yield high-quality learning. Therefore, the instructors in hard disciplines not only decided to deliver part of the content online, they also made these compulsories as found in the following section.

Knowledge Construction

One of the most prominent pedagogical advantages of BL is to maximize face-to-face sessions for in-depth theories presentation or practical or hands-on exercises. This results from and indeed requires students' effort in completing online learning activities designed by the instructors. The finding reveals that instructors in hard disciplines are more demanding, i.e. specifying that online assignments are compulsory to complete in advance. This can be due to the vertical nature of the knowledge development of the discipline. According to Neumann, Parry, and Becher (2002), knowledge should be built up step-by-step and has a more continuous progression in

hard compared to that of soft disciplines. Thus, this decision to make online assignments a compulsory task may have been underpinned by a disciplinary epistemology held by instructors from hard disciplines.

In most hard-disciplined courses, the collaborative learning tasks involve field works and group projects that necessitate more face-to-face contact and practical arrangements. Therefore, the instructors employ the online learning platform as a channel to support the group's working process. In other words, the process through which the final group product is finished is not completely being visible or monitored online. In soft-disciplined courses, the collaborative tasks usually involve discussions of a particular topic or preparation for an in-class presentation, which are normally accompanied by a written report. Thus, most instructors require that these discussions should be taking place online as evidence of participation and evaluation. Therefore, it seems that in terms of collaboration, the use of online learning platforms is more pronounced in soft disciplines.

Communication Strategies: Instructors' Facilitation Markedly Differs

One of the important differences found in the online facilitation is that instructors in soft disciplines, once being present, employed more pedagogical tactics such as simplifying questions, prompting, and encouraging students' involvement. On the other hand, instructors in hard disciplines report their role as monitoring to check if students are on track or solving confusions. This may be contingent on how knowledge is constructed in soft disciplines such that in order to bring about cognitive changes, students should make their thinking explicit and be challenged by different perspectives. In other words, it is through social interactions and negotiations that perspectives and new frames of references are established (Neumann *et al.*, 2002; Mezirow, 2008). Nevertheless, research has shown that the process through which high-quality online discussion is achieved is not likely to occur without skilled facilitator and trained participants (Thomas & Thorpe, 2018). Thus, the involvement of faculty from soft disciplines in facilitating these online discourses is of critical importance so that students' online knowledge construction is optimized. In this respect, the instructors can make use of the comments and notification functions of the online platforms like Canvas, which is very much alike the google doc to constantly be involved and get students involved in the discussion at hand.

Limitations and Suggestions for Future Research

Employing a qualitative approach to data collection, it should be acknowledged that the results cannot be generalized to a larger population. Thus, either a replicated study with the same approach or a quantitative study based on the findings presented in this paper is worthwhile to triangulate the results. Although the sample size is quite sufficient for such a qualitative study, it should be recognized that the intensiveness or levels of BL implemented in hard and soft courses may vary. This results in the differences in terms of the design of online knowledge construction and instructors' facilitation in hard and soft disciplines. Therefore, future research can focus on how instructors from hard and soft disciplines differ in their strategies and design when BL is implemented at either different levels or only at a high level, e.g. transforming blend (Graham, 2006). In so doing, more insights regarding the possible effects of disciplines, instructors' beliefs, and institutional policies (e.g. assessment component weights) on BL implementation will be further enlightened.

Finally, instructors' characteristics may have affected their BL adoption and implementation. Factors such as age, gender, professional identity, BL professional development and personal innovativeness have not been tackled in the present study. Therefore, these factors are suggested to be present in future studies to gain more understanding of the different formats of BL designs being implemented in higher education. As such, recommendations for institutional innovations and policies for higher education instructors' professional development programs will be more intensively formulated.

Implications

By investigating how BL is implemented by instructors from different disciplines, the present study describes in detail the different instructional strategies captured under three categories, namely Content, Construction, and Communication. Furthermore, differences among instructors from hard and soft disciplines in terms of BL implementation are identified. Reflecting on the findings, there are three major implications that can be conveyed to instructors, instructional designers, and institutions.

First of all, despite the possibility of BL in facilitating students' individual learning, self-regulation is still the main concern. This can affect the instructors' decision regarding how to organize and design online learning activities aimed at individual or group study. However, students' self-regulation has been proved as being subject to change and contingent on how students perceive that they are supported to achieve the learning goals by instructors' scaffolding. In other words, students' self-beliefs like their perceived control of the learning and self-efficacy are important in their activation of self-regulation strategies (Zimmerman, 2000). Thus, the instructors may consider and embed in the designed learning activities different types of scaffolding, particularly those that can help enhance students' academic self-efficacy. This means that the students should experience a feeling of being able to have a control over their learning and in case of course-related issues, are well-informed of how to seek for help. In so doing, the instructors are more likely to capitalize on the strength of BL, i.e. facilitating learning outside the classroom boundary. For example, during the undergraduate course Research Methodology, the instructors can provide available formatted tables and data format, which the students can easily fill in after the calculation process based on real or fictional data. Thanks to this, in their subsequent assignment, the students can confidently process their own data.

Due to differences in the disciplines and a variety of reasons, the extent of instructors' online presence and facilitation in the online learning platform varies. Not taking into account personal reasons, discipline has an important role to play. Co-construction of knowledge and particularly the active engagement in the disciplined discourses play a more important role in soft courses. Thus, to successfully facilitate these online exchanges, the instructors' use of pedagogical strategies to enhance group discussions is strongly recommended. On the other hand, hard disciplined instructors provide immediate support when students are in need. It is undoubted that both approaches in facilitating students' (collaborative) learning have their own rationale and fit for the purposes at hand. Thus, depending on the learning goals and the underpinned pedagogy, the instructors can attempt different facilitation approaches which are most applicable to the learning tasks. Research has shown that students feel more obliged, motivated, and satisfied with the instructors' online presence (Lee, 2018; Martin *et al.*, 2018; Ouyang & Scharber, 2017). Thus, despite playing different roles when being present online, this engagement of the instructors is highly recommended.

The finding in this study reveals that online learning activities have not constituted an important part or bearing a heavy weight of the whole instructional design. In addition, employing these online learning activities as part of the assessment components is also limited due to the institutional regulations. The link between assessment and students' learning has been widely confirmed such that students are believed to learn the assessed curriculum rather than those that are not considered as part of the assessment (Biggs, 2003). Therefore, to encourage the instructors' attempt and effort in designing more innovative BL design harnessed by interactive technologies, the institutions are recommended to assign more flexibility in terms of decisions regarding assessment and course structures, e.g. percentage of face-to-face and online components. In so doing, the instructors and students will be more committed to engaging in both face-to-face and online learning activities.

Conclusion

Employing the Content-Construction-Communication framework, the present study elaborates in detail how BL is implemented by instructors in hard and soft disciplines from a multidisciplinary higher education institution. The findings reveal that BL implementation varies among the instructors despite their shared purposes of content delivery and support for students' knowledge construction. Disciplinary differences seem to entail differences in how face-to-face and online individual and collaborative learning activities are designed. Also, the online facilitation of the instructors differs qualitatively with instructors from soft disciplines tending to be more pedagogy-oriented. Furthermore, institutional policies and the instructors' professional status have a certain influence on the relaxing of course objectives and the respective assessment components negotiated among the instructors and the students.

In general, the present study illustrates how the instructors support students' individual learning and collaborative knowledge construction by a range of instructional strategies captured by the Content-Construction-Communication framework. The findings, therefore, can be helpful to instructors and institutions who would like to have a disciplinary perspective regarding BL implementation. At the theoretical level, the findings presented are among the few to realize a concrete account of BL implementation, which facilitates further development of BL design framework. In this respect, the study contributes to the operationalization of BL so that it is not a "buzz" word or a pedagogy that is open to interpretation or conceptualization.

References

- Adams, J., Hanesiak, R. M., Owston, R., Lupshenyuk, D. & Mills, L. (2009). Blended learning for soft skills development. New York: Institute for Research on Learning Technologies, York University.
- Anderson, R. S. (1998). Why talk about different ways to grade? The shift from traditional assessment to alternative assessment. *New directions for Teaching and Learning*, 1998(74), 5-16.
- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing environment. *Journal of Asynchronous Learning Networks*, 5(2).
- Arbaugh, J. B., Bangert, A., & Cleveland-Innes, M. (2010). Subject matter effects and the community of inquiry (CoI) framework: An exploratory study. *The Internet and Higher Education*, 13(1-2), 37-44.
- Ausburn, L. J. (2004). Course design elements most valued by adult learners in blended online education environments: An American perspective. *Educational Media International*, 41(4), 327-337.
- Awidi, I. T., & Paynter, M. (2019). The impact of a flipped classroom approach on student learning experience. *Computers & Education*, 128, 269-283.
- Banerjee, G. (2011). Blended environments: Learning effectiveness and student satisfaction at a small college in transition. *Journal of Asynchronous Learning Networks*, 15(1), 8-19
- Bangert, A. W. (2004). The seven principles of good practice: A framework for evaluating on-line teaching. *The Internet and Higher Education*, 7(3), 217-232.
- Bates, T. (2019). *Teaching in a Digital Age: Guidelines for Designing and Learning*. Tony Bates Associates Limited. Retrieved from <https://pressbooks.bccampus.ca/teachinginadigitalagev2/>
- Bernard, R. M., Borokhovski, E., Schmid, R. F., & Tamim, R. M. (2014). An exploration of bias in meta-analysis: the case of technology integration research in higher education. *Journal of Computing in Higher Education*, 26(3), 183-209.
- Bernard, R. M., Borokhovski, E., Schmid, R. F., Tamim, R. M., & Abrami, P. C. (2014). A meta-analysis of blended learning and technology use in higher education: From the general to the applied. *Journal of Computing in Higher Education*, 26(1), 87–122. <http://doi.org/10.1007/s12528-013-9077-3>.
- Biggs, J. (2003). Aligning teaching for constructing learning. *Higher Education Academy*, 1-4.
- Biglan, A. (1973). The characteristics of subject matter in different academic areas. *Journal of applied Psychology*, 57(3), 195.
- Boys, C., Brennan, J., Henkel, M., Kirkland, J., Kogan, M., Youl, P., (1988). *Higher Education and Preparation for Work*. Jessica Kingsley Publishers, London.
- Broadbent, J. (2017). Comparing online and blended learner's self-regulated learning strategies and academic performance. *The Internet and Higher Education*, 33, 24-32.
- Chen, S. W., Stocker, J., Wang, R. H., Chung, Y. C., & Chen, M. F. (2009). Evaluation of self-regulatory online learning in a blended course for post-registration nursing students in Taiwan. *Nurse Education Today*, 29(7), 704-709.
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education*. Routledge.
- Diep, A. N., Zhu, C., Struyven, K., & Blieck, Y. (2017). Who or what contributes to student satisfaction in different blended learning modalities? *British Journal of Educational Technology*, 48(2), 473-489.
- Fry, H., Ketteridge, S., & Marshall, S. (4ed). (2014). *A handbook for teaching and learning in higher education: Enhancing academic practice*. Routledge.
- Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology*, 13(1), 117.
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2-3), 87–105.
- Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, 15(1), 7-23.
- Graham, C. R. (2006). Blended learning systems. In: D. C. J. Bonk & C. R. Graham, *The handbook of blended learning: Global perspectives, local designs* (pp. 3–21). San Francisco, CA.: Pfeiffer.
- Graham, C. R., & Robinson, R. (2007). Realizing the transformational potential of blended learning: Comparing cases of transforming blends and enhancing blends in higher education. *Blended Learning: Research Perspectives*, 83–110.
- Graham, C. R., Woodfield, W., & Harrison, J. B. (2013). A framework for institutional adoption and implementation of blended learning in higher education. *The Internet and Higher Education*, 18, 4-14.
- Grandzol, J. R., & Grandzol, C. J. (2006). Best practices for online business education. *The International Review of Research in Open and Distance Learning*, 7(1).
- Huang, H. M. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology*, 33(1), 27-37.
- Jonassen, D., Davidson, M., Collins, M., Campbell, J., & Haag, B. B. (1995). Constructivism and computer-

- mediated communication in distance education. *American Journal of Distance Education*, 9(2), 7-26.
- Kelly, M., Lyng, C., McGrath, M., & Cannon, G. (2009). A multi-method study to determine the effectiveness of, and student attitudes to, online instructional videos for teaching clinical nursing skills. *Nurse Education Today*, 29(3), 292-300.
- Kerres, M., & Witt, C. D. (2003). A didactical framework for the design of blended learning arrangements. *Journal of Educational Media*, 28(2-3), 101-113.
- Köse, U. (2010). A blended learning model supported with Web 2.0 technologies. *Procedia-Social and Behavioral Sciences*, 2(2), 2794-2802.
- Laurillard, D. (2012). *Teaching as a design science: building pedagogical patterns for learning and technology*. New York and London: Routledge.
- Lee, A. R. (2018). Korean EFL Students' Perceptions of Instructor Interaction in a Blended Learning Class. *Senior Editor: Paul Robertson*, 122.
- Lindblom-Ylänne, S., Trigwell, K., Nevgi, A., & Ashwin, P. (2006). How approaches to teaching are affected by discipline and teaching context. *Studies in Higher Education*, 31(03), 285-298.
- Manwaring, K. C., Larsen, R., Graham, C. R., Henrie, C. R., & Halverson, L. R. (2017). Investigating student engagement in blended learning settings using experience sampling and structural equation modeling. *The Internet and Higher Education*, 35, 21-33
- Martin, F., Wang, C., & Sadaf, A. (2018). Student perception of helpfulness of facilitation strategies that enhance instructor presence, connectedness, engagement and learning in online courses. *The Internet and Higher Education*, 37, 52-65.
- McHugh, M. L. (2012). Interrater reliability: the kappa statistic. *Biochemia medica: Biochemia medica*, 22(3), 276-282.
- Means, B., Toyama, Y., Murphy, R., & Baki, M. (2013). The effectiveness of online and blended learning: A meta-analysis of the empirical literature. *Teachers College Record*, 115(3), 1-47.
- Mezirow, J. (2008). An overview on transformative learning. In *Lifelong learning* (pp. 40-54). Routledge.
- Milheim, K. L. (2012). Towards a better experience: Examining student needs in the online classroom through Maslow's hierarchy of needs model. *Journal of Online Learning and Teaching*, 8(2), 159.
- Moore, M. G. (1989). Editorial: Three types of interaction. *The American Journal of Distance Education*, 3(2), 1-6.
- Moskal, P. D., & Cavanagh, T. B. (2014). Scaling blended learning evaluation beyond the university. *Blended learning: Research perspectives*, 2, 34-51.
- Neumann, R. (2001). Disciplinary differences and university teaching. *Studies in Higher Education*, 26(2), 135-146.
- Neumann, R., Parry, S., & Becher, T. (2002). Teaching and learning in their disciplinary contexts: A conceptual analysis. *Studies in Higher Education*, 27(4), 405-417.
- Ouyang, F., & Scharber, C. (2017). The influences of an experienced instructor's discussion design and facilitation on an online learning community development: A social network analysis study. *The Internet and Higher Education*, 35, 34-47.
- Owston, R., & York, D. N. (2018). The nagging question when designing blended courses: Does the proportion of time devoted to online activities matter? *The Internet and Higher Education*, 36, 22-32.
- Owston, R., York, D., & Malhotra, T. (2019). Blended learning in large enrolment courses: Student perceptions across four different instructional models. *Australasian Journal of Educational Technology*, 35(5).
- Pelz, B. (2010). (My) three principles of effective online pedagogy. *Journal of Asynchronous Learning Networks*, 14(1), 103-116.
- Pratt, D. D. (2002). Good teaching: One size fits all? *New directions for adult and continuing education*, 2002(93), 5-16.
- Ralston-Berg, P. (2010). Do quality standards matter to students? In Paper Presented at the 2nd Annual *Quality Matters Conference*, Oak Brook, IL.
- Shea, P., & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments. *Computers & Education*, 55(4), 1721-1731.
- Smart, J. C., & Elton, C. F. (1975). Goal orientations of academic departments: A test of Biglan's model. *Journal of Applied Psychology*, 60, 580-588.
- Smart, J. C., & Ethington, C. A. (1995). Disciplinary and Institutional Differences in Undergraduate Education Goals. *New Directions for Teaching and Learning*, 64, 49-57.
- Smeby, J. C. (1996). Disciplinary differences in university teaching. *Studies in higher education*, 21(1), 69-79.
- Smith, G. G., Heindel, A. J., & Torres-Ayala, A. T. (2008). E-learning commodity or community: Disciplinary differences between online courses. *The Internet and Higher Education*, 11(3-4), 152-159.
- Smyth, S., Houghton, C., Cooney, A., & Casey, D. (2012). Students' experiences of blended learning across a range of postgraduate programmes. *Nurse Education Today*, 32(4), 464-468.

- Spanjers, I. A., Könings, K. D., Leppink, J., Verstegen, D. M., de Jong, N., Czabanowska, K., & van Merriënboer, J. J. (2015). The promised land of blended learning: Quizzes as a moderator. *Educational Research Review, 15*, 59-7.
- Swarat, S., Oliver, P. H., Tran, L., Childers, J. G., Tiwari, B., & Babcock, J. L. (2017). How disciplinary differences shape student learning outcome assessment: A case study. *AERA Open, 3*(1), 2332858417690112.
- Tawafak, R. M., Romli, A. M., & Alsinani, M. J. (2019). Student Assessment Feedback Effectiveness Model for Enhancing Teaching Method and Developing Academic Performance. *International Journal of Information and Communication Technology Education (IJICTE), 15*(3), 75-88.
- Thomas, G., & Thorpe, S. (2018). Enhancing the facilitation of online groups in higher education: a review of the literature on face-to-face and online group-facilitation. *Interactive Learning Environments, 1*-10.
- Tsai, C. C. (2009). Conceptions of learning versus conceptions of web-based learning: The differences revealed by college students. *Computers & Education, 53*(4), 1092-1103.
- Tsai, C. W. (2011). Achieving effective learning effects in the blended course: A combined approach of online self-regulated learning and collaborative learning with initiation. *Cyberpsychology, Behavior, and Social Networking, 14*(9), 505-510.
- Twigg, C. A. (2003). Improving learning and reducing costs: New models for online learning. *Educause Review, 38*(5), 28-38.
- Valiathan, P. (2002). Blended learning models. Learning Circuits, Retrieved October 17, 2009 from <http://www.learningcircuits.org/2002/aug2002/valiathan.html>.
- Vo, H. M., Zhu, C., & Diep, N. A. (2017). The effect of blended learning on student performance at course-level in higher education: A meta-analysis. *Studies in Educational Evaluation, 53*, 17-28.
- Wu, J. H., Tennyson, R. D., & Hsia, T. L. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers & Education, 55*(1), 155-164.
- Zhu, Y., Au, W., & Yates, G. (2016). University students' self-control and self-regulated learning in a blended course. *The Internet and Higher Education, 30*, 54-6.
- Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology, 25*(1), 82-91.

Author Information

Minh Hien Vo

Vrije Universiteit Brussel
 Pleinlaan 2, 1050, Brussels, Belgium
 Contact e-mail: minh.hien.vo@vub.be

Chang Zhu

Vrije Universiteit Brussel
 Pleinlaan 2, 1050, Brussels, Belgium

Anh Nguyet Diep

University of Liege
 Bât. B23 Simulation en santé publique, Quartier Hôpital
 Avenue Hippocrate 13
 4000 Liège, Belgium

Appendix. List of Blended Courses and the Respective Pseudo Name of the Instructors

	Instructors (*)	Course
Hard	Dane	Electrical circuits
	Diana	Integrated ICT in Mathematics teaching
	Dorian	Industrial Enterprises
	Harry	Introduction to Civil Engineering
	Henry	Quantum mechanics
	Hubert	Mechanical Engineering
	Kevin	Biology of Domestic Animals
	Lora	Thermodynamics
	Stajan	Manufacture and Materials
	Terry	Probability and linear algebra
	Tina	Polymer
	Tony	Invertebrates
	Tracy	Food Microbiology
	Tyron	Industrial Project Management
Soft	Avy	General English
	Bernie	English in Tourism
	Hugo	Urban policy
	Maurice	Library Information Management
	Nevile	Literatures and Culture
	Nigel	Justice and Law Administration I
	Noah	English in Aquaculture
	Pat	General English
	Pauly	Linguistics and Culture
	Quincy	General English
	Quinn	English in Geography
	Thad	Pedagogical Method in Physics Teaching
	Tim	Constitutional & Administrative Law
	Tobias	Principles of Financial Systems
	Trent	General English

(*) Pseudo name