GOING BLENDED IN INNOVATION AND DESIGN EDUCATION: BENEFITS, CHALLENGES, AND LESSONS LEARNED

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Abstract

This paper describes the use of blended learning approaches in designing two courses in the two-years international master’s program in innovation and design education. The paper discusses the benefits and challenges encountered during the implementation of the courses in a blended way. The guiding research questions for this study are: How can blended learning approaches be applied in innovation and design education? what are key benefits and challenges in designing and implementing blended courses in this education field? The paper is based on our three years’ experiences in designing and implementing blended courses between 2016-2018. The Blackboard and Yammer micro-blog were used as the main course tools. Data was collected throughout the course periods between 2016-2018 from 55 students. The study observed following benefits with designing and implementing courses in a “blended” way: useful for learning different insights and perspectives, enables reflection and provide a good summary of face-to-face lectures, and fosters engagement and collaboration even outside the classroom. The identified challenges during the implementation of blended courses are students’ limited engagement, errors due to technical, connectivity, and interfaces, new to the course management systems and blended courses, and difficulties to keep track and to follow-up over time. Moreover, the paper discussed six lessons learned in designing and implementing the blended courses in innovation and design education. The paper contributes to the blended learning research in soft-applied fields like innovation and design, where the blended studies are limited. In addition, the paper contributes to the discussion of using micro-blogs for designing blended courses in innovation and design education.

Keywords: Blended learning, hybrid learning, innovation and design, blended course design, blended courses, e-learning, design education, microblogs, reflection in education.

1 INTRODUCTION

With the advent of information and communication technologies and social media, blended learning (hereafter referred to as BL) has become an increasingly popular teaching form using different learning theories, approaches, and methods. This shift in the education curricula from a classic face-to-face (hereafter referred as f2f) instruction to a BL format to ensure that students not only master domain-specific knowledge but also develop professional, interpersonal, cognitive, computer, and online collaboration skills [1]. Such a broad spectrum of skills could support students to equip with the new demands of contemporary employers from industrial and public sector companies in an increasingly digitized world. The research reported extensive benefits of BL approach to students. For instance, BL enhances engaged learning experience through community of inquiry, facilitates accessibility and flexibility for personalized learning, and develops students as independent learners or autonomous learners [2] [3] [4].

However, the adoption of new teaching approaches and the design of blended courses is often becoming a daunting task for teachers as most of the institutions are traditionally dominated by face-to-face instruction format [5] and students tend to avoid the online learning environments [6]. Although research advised different strategies for the adoption of blended concept, developing a new blended course in a specific educational context is still a challenge for many teachers (e.g., [7] [8]). Specifically, there is a limited knowledge on guiding teachers on how to create a successful blend [9] or how the online and f2f components can be thoughtfully combined [7], or how to decide the proportion of these two components [10]. Moreover, the intake of blended approaches is higher in a few educational contexts e.g., health care or teacher training than soft-applied fields like innovation and design education [8]. The education in innovation and design (hereafter referred to as I&D) “requires a formative and reiterative learning process, which includes qualitative, constructive, and interpretative activities...consists of a particular way of learning-by-doing and extensive project-based learning” [8, pp.31]. In particular, students in I&D education are challenged to face increasingly complex and
multifaceted problems, where traditional education models characterized by linear and siloed pedagogies might be inadequate, requiring radical/creative thinking, and working in a group or even in a globally distributed setting [11] [12] [13]. However, much to the surprise, blended studies in soft-applied fields like I&D is limited. There is a need of further studies to identify ways of working with faculty to develop successful blended approaches in different disciplines [10], and to identify the relation between delivery modes and disciplinary differences [8]. A recent study by McGuinness and Fulton [14] also confirmed the need for research in different disciplines for understanding student and instructor perceptions and experience of BL.

On this basis, this paper describes the use of the BL approaches in designing two-years international master’s program courses in I&D education and discusses the benefits and challenges encountered during the implementation of the courses, and overall lessons learned. The guiding research questions for this study are: How can blended learning approaches be applied in I&D education? what are key benefits and challenges in designing and implementing blended courses in this area? The empirical data was based on our three years’ experiences in designing and implementing courses in a blended way for five instances. Blackboard and Yammer micro-blog was used as the main course tools in respective courses. Data were collected through several reflection evaluations during and after the course with students.

2 LITERATURE REVIEW

Blended learning (BL) is the thoughtful integration of classroom face-to-face (f2f) learning experiences with online learning experiences [2]. It is an approach to use online learning to complement or overcome the shortcomings of f2f learning [4]. Researchers discussed different underlying principles for the design of BL. For instance, Lai et al., [7] discussed the consolidation principle (i.e., emphasizes designing different types of activities for supporting student reflection and student thinking) and the extension (i.e., supporting students’ self-exploration and catering for various needs of students to choose a better way to learn). In addition, Garrison and Vaughan [15] considered as integrating social, cognitive and teaching elements, and Snodin [3] noticed as the chance of providing and receiving feedback. There are different models or design approaches for developing the courses in a blended way. Osguthorpe and Graham [16] proposed three forms of models, namely, blend of learning activities, blend of students, blend of instructions, Alammary et al., [10] discussed three design approaches such as adding extra online components to a traditional course taught f2f (i.e. low-impact blend), replacing some f2f activities by online ones (i.e. medium-impact blend), and building entire course from scratch (i.e. high-impact blend). Garrison and Vaughan [15] presented three design strategies. First is thoughtfully integrating f2f and online learning, second is fundamentally rethinking the course design to optimize student engagement, and third is restructuring and replacing traditional class contact hours.

Literature proposed different tools for the adoption of BL. For instance, Cheung and Hew [4] suggested that online discussions or asynchronous discussions allow more flexibility for students to regulate their own pace of learning and have time for reflection. Lai et al. [7] used an online forum for students to discuss the concepts introduced in class, and to deepen learning and extend the conversation. The core idea was to let students think again and extend their space of learning. Pektas and Gurel [8] emphasized the use of Facebook for communication in teamwork e.g., discussing design content, sharing project files, and managing projects, etc., video conferencing for exchanging design ideas and interacting with another culture, and learning management systems (LMS) for monitoring other groups’ processes and files. Thomas and Eryilmaz [17] introduced a twitter micro-blog discussion board to support learning and found that students experienced high levels of learning, interaction and community. Our earlier study has looked into BL in I&D in the same master’s program focusing on students and companies’ use of online tools and the emerging practices during the process. The result indicated that for co-production of knowledge in I&D projects, three new social media literacies would be useful: meta communication, peak performance, and design awareness [13].

Earlier studies reported extensive benefits from various blended courses implementation. Few well-known benefits are: higher student satisfaction, enhance student engagement and learning outcomes, facilitates interaction between students and teacher staff, encourage participation of different types of students, and fulfill diverse needs of students [7] [18] [19] [20]. However, the implementation of blended courses also reported several challenges. For instance, Jia et al. [21] said that only 30% of students want to use BL because of workload. Lai et al., [7] discussed poor engagement of students for placing comments as some students are not comfortable, the demand of the time for students to gather ideas
first before posting online, technological challenges, and need of professional development for teaching staff. In addition, Pektas and Gurel [8] reported poor downloading/uploading performance of LMS and limited functions around documentation in online collaboration. To overcome challenges, literature reported different tactics need to be used by teachers to enhance student engagement. Encouraging students to share their assignment online, perform peer-to-peer review with clear instructions, students take turns as moderators, adopt integration technology to match student needs and content, give an impression that teachers are reading their posting, provide a summary of what has been discussed, embed the links of useful websites for flexible learning, and provide more timely and effective feedback online [4] [7]. Ellis and Han [6] found that the extent student engagement in blended courses and academic success was related to how integrated students perceived the online environment to be with the whole course design, the perceived amount of workload and benefits they found when engaging online and their preference for which mode of learning they chose.

3 METHODOLOGY

3.1 Research context

This paper was based on the implementation of BL practices in two courses in a two-year international master’s program in I&D at Malardalen University, Sweden. The program is multidisciplinary, combining engineering, social sciences, and humanities, as well as perspectives drawn from the arts. The two courses are, namely, Challenges in Innovation and Design (15 credits), and Project Methodology in Innovation and Design (15 credits). These two courses were so far run five instances since 2016 as shown in the below figure 1. The course challenges in I&D is the first course in the program, whereas the course project methodologies in I&D is the fourth course in the program. The program students have so far hailed mainly from Europe, Asia, and Africa. In addition, the courses were also attended by the exchange students from the universities which have an agreement with the MDH. In total, the courses were attended by around 55 students, including the exchange students.

![Figure 1. The position of the blended courses in the time line of 2016-2018.](image)

3.2 Design of courses in a blended structure

This section briefly describes the design of two courses in a blended structure between 2016-2018.

3.2.1 Challenges in Innovation and Design

The objective of the course is to provide students with a more in-depth introduction to the field of I&D to acquire the ability to formulate research foci within the field of I&D via literature review, and to provide their own identity in the field. The course is run in a full pace for 10 weeks. The course has 3 assignments: studying the I&D journey of a company, performing a literature review on a topic of interest, and analyzing two previous assignments from an ethical, sustainability, and value creation perspectives. The first two assignments are individual assignments and students are free to choose a company and a topic based on their own interests and the latter one is a group assignment, which is usually performed in a group of 3 students. The course is divided into themes and each theme is focusing on specific aspects of I&D. The course includes traditional lectures in a f2f and in an online setting, workshops, discussion seminars, study visits to industrial and public sector companies, preliminary assignment presentations, and feedback sessions, including peer-to-peer learning. Both national and international guest lectures were planned both in f2f and online settings to provide different perspectives on I&D. Few examples of guest lectures include inclusive design, social innovation, design innovation, customer
journey mapping, rich picturing for project management, system thinking and practice, and Innovation: why, what, and how. Moreover, recorded videos from several sources such as YouTube or I&D related association webpages were used to discuss specific topics and practices in a detailed way in a f2f classroom settings. The blended activities were planned in the course to promote interactions between student-to-student and students-to-teachers, stimulating students to continuously reflect on teaching and assignment topics, and other activities including workshops, discussion seminars, study visits, preliminary presentations, and to co-create the course material and the content together with students. Since 2016, the course ran three times. Based on students’ feedback and lessons learned, extensive changes have been made in the course structure and the ways of using blended activities. For example, in 2016, Blackboard was used as a course management tool, and in the subsequent years, Yammer microblog was used for the same purpose. The form of discussions and reflection moments were also changed in the last three years. In 2016, discussion forums were used in Blackboard to post both random questions and formal reflection questions. In 2017, a moderate structure was made for reflections questions and stated their specific time of occurrences in the course study guide. In the last year 2018, a more formal structure was made for reflection points linking to course content topics, as shown in figure 2. In total, the course had 15 posts out of which figure 2 only showed 6 posts as an example. As shown in figure 2, the numbers are given for each post and connected to the given lectures, discussion seminars, workshops, study visits, and preliminary assignment presentation. Moreover, predefined tags (#tag) were introduced in Yammer in 2018 to improve the searchability and to co-create the material.

Figure 2. The planned reflection moments in the course in 2018 via Yammer microblog posts

### 3.2.2 Project methodology in Innovation and Design

The objective of the course is for students to acquire the ability to gather, apply and integrate knowledge necessary for planning, organizing and realizing development projects in collaboration with external partners. The course is a project-based course run in a group setting in a half pace for 21 weeks. The course has 3 assignments: performing a live I&D project from a company to develop a functional proof-of-concept prototype, writing a project report reflecting on the project planning and execution, and documenting lessons learned from the project. The course is divided into two parts, wherein the first part students were supported with lectures both in f2f and online settings, and the second part was completely dedicated to working on the project. The course was structured in a stage-gate model, wherein review meetings were planned once in a month at each group level involving an academic advisor and an industrial contact person, which was followed by a seminar at an overall class level. In total, four review meetings were planned which were followed by four seminars. Each seminar had a predefined structure, where each group had a specific time slot to present their project progress and the ongoing deliverables to receive constructive feedback from the whole class. The blended activities were planned in the course to promote interactions within each group and between cross-project groups. Two types of Yammer groups were created; one for the whole class and others for individual project groups. Each project’s Yammer group involved project members, an advisor, a company contact, and the course coordinator. These project-specific groups helped teachers’ team and company contacts person to follow the project and to provide necessary inputs and feedback in a continuous way. In addition, students were encouraged to post relevant material (e.g., reports, articles, videos, or websites) when they found any material that could help other projects or could lead to a better discussion on a specific topic. Table 1 outlines the implemented BL activities in two courses between 2016-2018.
Table 1. Blended learning activities in two master’s program courses

<table>
<thead>
<tr>
<th>Course</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenges in I&amp;D</td>
<td>-Blackboard as a main course tool</td>
<td>-Yammer microblog as a main course tool</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Discussion forums in Blackboard for discussions and reflections, distance lectures via GoToMeeting, recorded videos for discussion on specific topics, and content co-creation</td>
<td>-Posts in Yammer for discussions and sharing reflections, for polls, praise, and announcements</td>
<td>-Distance lectures via Zoom, recorded videos for discussion on specific topics, and content co-creation</td>
</tr>
<tr>
<td>Project methodology in I&amp;D</td>
<td>Not applicable</td>
<td>-Yammer microblog as a main course tool and a general course yammer group for the whole class</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-A specific yammer groups for each project groups including partner company contacts, distance lectures via Zoom, and content co-creation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Posts in general course Yammer group for conversations and feedback, for polls and praise, for announcements, and for sharing and discussing project preliminary presentations</td>
<td></td>
</tr>
</tbody>
</table>

3.3 Data collection and analysis

Data was collected throughout the course periods between 2016-2018 in different forms from 55 students. During the course, a paper-based evaluation was used at the end of each theme where specific questions were included to collect experiences about online and BL activities. At the end of the course, a final reflection evaluation was performed, where a specific section was included in blended learning activities and their contribution to students’ learning process. Some examples of questions were as follows: what are your overall impressions of Blackboard/Yammer as a course tool? What motivates you to go for online activity and add your reflections? What is good and bad in blended activities? How online posts/activities contribute to your learning in the course? In what way have you benefited? How discussion forums or yammer post helped your assignments? How do you rate blended activities in terms of effectiveness? What can be improved in blended activities? In addition, polls, yammer posts, post-it notes, and group discussions were used to collect feedback in a continuous way. At the end of each course, the statistical data was collected from the course management tool, which gave overall quantitative figures on a number of posts, views, responses, and online presence, etc. The collected data from multiple sources were analyzed using thematic analysis method [22] by coding and displaying responses from all students for each question in an excel sheet in order to draw the final results and conclusions [23]. The analysis was made by the course coordinator for these two courses.

4 RESULTS

4.1 Benefits in designing and implementing courses in a “blended” way

It was evident from two courses that designing and implementing courses in a blended way could support students’ learning process in I&D education. Below are some of the most prominent benefits observed during our investigation:

4.1.1 Useful to learn different insights and perspectives

The learning of different insights and perspectives was acknowledged by students as one of the major benefits with blended courses. Two discussion sessions that were based on recorded videos from YouTube and Vimeo received very well by students. For example, one video from Veryday explained how to use societal challenges as an engine for business innovation and other was from Business Kolding Denmark described how the municipality strengthen businesses in the region with the slogan of “We design for life”. Students reported that they watched videos once again after going home as they found the examples are very interesting and communicating novel thoughts and ideas. In addition, the courses offered various types of guest lectures and workshops through online video conference systems, such as Zoom and GoToMeeting, from the leading research groups and industrial companies from Asia, Europe, and the USA to inform different theoretical and industrial perspectives and practices of I&D management.
“I went home and googled the videos right away. I found the concept interesting.”
“The one I saw was good and brought up all kind of information”
“I really learned a lot from the guest lecture from Future Factory, India”
“I found that online workshop was encouraging and very interesting to have the point of view of
a person who is currently working on a successful company”
“Yes, it (discussion forums) helps to maintain a written record. It is reviewable, and all can read
other perspectives as well”

4.1.2 Enables reflection and provide a good summary of f2f lectures

In I&D education, the greater learning experience can be achieved with a deeper reflection on specific
topics. Students experienced Yammer microblog as a rich tool with a simple and friendly interface,
providing a better form for expressing and explaining own thoughts through a short text. They
encouraged to reflect on lectures, which helped to find new ideas by reading other students’ and
teachers’ comments and perspectives. Consequently, many students acknowledged that Yammer
helped them to get a clear brief and summary of the lectures on specific topics by allowing to revisit
lecture discussions and make comments.

“It is helpful to again reflect on the topic that was on the specific lecture.”
“It’s a very good tool for remembering and completing what we leave in class
“Yes, after class you still think about it”
“Face to face activities are good but sometimes we need confirmation or visualization of the
entire image. That is what yammer have done”

4.1.3 Fosters engagement and collaboration even outside the classroom

According to students, Yammer helped to closely connect with lectures and students, and it allowed to
share and publish related interesting things faster. Students also appreciated the quick and direct
feedback and answers from teachers whenever it is needed. In this way, interaction and learning outside
the classroom can be substantially enhanced by combining different backgrounds and interests through
the use of a “social media” platform.

“It is useful, faster and keeps me connected 24/24”
“It’s my first time using it and I feel is a useful tool”
“It was easy to share our points of view when we are outside the classroom”
“It was easier to see the new updates and share our learning materials”
“Something new and innovative, I like it a lot. I think it’s good, both for students and teachers to
integrate more useful tools other than Blackboard”
“Positive is that there is a mobile app, so you get notified if someone posts something”
“Fast answers and direct feedback, which was visible for every group member on yammer”

4.2 Challenges during the implementation of blended courses

4.2.1 Students’ limited engagement

The active participation of students and teachers’ team is crucial for the successful BL experience. We
observed that students were more active on a few posts, which led to a thoughtful discussion, whereas
on a few posts they were more passive. As the course progresses, the level of engagement also
decreased in a few courses because few students felt that “it is hard to prioritize (BL activities) over
assignments”. Moreover, students pointed out that the more involvement of teachers’ in online
discussions could work as a motivation factor to enhance better students’ engagement.

“Nice exercise, but again feeling that there are different levels on students which is not motivating
when only a few do the exercise”
“I wish that more students can respond because it is good to read other perspectives as well”
“(It is important) to know if the interactions on yammer are needed. Many (students) may be
thinking that it is not necessary”

4.2.2 Technical, connectivity, and interface errors

In many instances, students reported that they experienced a different kind of errors or problems due to
the issues on technical, network connectivity, and operating system interfaces such as Android and Mac
OSX. Because of these errors, sometimes students missed notifications on new updates which caused
not writing reflections on a few discussion posts both in blackboard and in Yammer. In addition,
downloading of documents especially research articles became difficult when access through a mobile app.

“Was not very active due to delays in internet connectivity”
“We could not upload it due to some error”
“I couldn’t upload my comment in the discussion forum in Blackboard”
“I was logged out without notification. Difficulties with orienting myself around the app”

4.2.3 New to the course management systems and blended courses

Since the courses were attended by international master students and exchange students, at the beginning of the course few students were not so confident in using the course management systems for blended activities such as writing reflections to online discussion posts, etc. Our experience showed that the first 3 weeks of the course were so crucial to embed the blended culture in the course activities. However, these weeks were also used by newcomers to adjust to the new systems or style and format of education in a new country, which has implications on the blended activities.

“Would have been good with an introduction, it is easy to miss things”
“The bad part is that I’m not used to Yammer and I forgot to check if there is a new post”
“Where is it in the Blackboard that I can find the round table video. I have difficulties to find it”
“Hard to find stuff….I answered all the discussions and I didn’t find some”

4.2.4 Difficulties to keep-track and to follow-up over time

Both the blended courses are 15 credits; one ran 2.5 months in a full pace and other ran 5 months long. The number of posts, documents, and related discussion around them were gradually increased over time due to being used for different purposes. Although students appreciated the tools, which enables active learning experience, they also experienced difficulties to keep track and to find things as Yammer is not so structured in organizing and managing files.

“Perfect tool but when a lot is writing some posts can be forgotten”
“You can lose the overview as soon as there are a lot of posts”
“Confusing, I think it’s too much information and discussion on Yammer”
“A lot of information. Sometimes I could not keep track of all of them or find the article that I need to read. Organizing by folders could help (if it exists)”

4.3 Our lessons learned by going blended in innovation and design education

The past 3 years’ experience taught us a lot of lessons learned in designing and implementing blended courses in I&D education. Some of our key lessons learned are described below:

4.3.1 The role of personal interest, the topic of interest, and stimulating f2f discussions

One of the main goals in developing our courses as blended is to foster reflection capability in our students, thereby enabling deep and active learning experiences. We observed that some of our online discussion posts were receiving quicker and faster responses compared to other posts. Our analysis showed that if the discussion posts are inlined to students’ personal interest or a topic of choice, it is likely more responses from students. For example, sustainability, business models, design thinking, systems thinking were a few of the hot topics in the discussion. Moreover, interesting f2f discussions or other ongoing classroom discussions can also motivate students’ to actively come and participate in the online discussions. Further, if the questions are interesting, then students are more motivated to be active in the online discussion.

“In the subject of sustainability and its development, I have developed a keen interest, so I watched a video on Adidas, so I wanted to reflect and share it with others as it was relatable”
“Good to reflect, this way you have to really think about sustainability and what is included in this “word””
“I always been interested in system thinking and connecting it with the design was a thought-provoking moment”
“If it stimulates what is currently trending with information digitization, such as social media platforms, forums, etc. or something relates to our everyday lives is more interesting”
4.3.2 The contribution of teacher(s) follow-up

Our next lessons learned is related to the extended role and responsibilities of a teacher or a course coordinator, who also need to be more active and always encourage students to realize this great opportunity to explore new ideas and solutions. Therefore, the design of a blended environment and make a good follow-up are two critical components to achieve the intended goals. According to students, “If the questions are interesting, they are more motivated (to participate)”. Hence, the design of these questions that are easy to understand, to relate to personal interests, and most importantly to fit the course content and objectives is a key.

“Improvement focus should be to interact/engage more teachers in this (blended) trend since they have knowledge that could be useful for us”

4.3.3 Complete the full learning cycle (F2f to online to F2f)

Similar to the previous lesson, the discussion should be better starting at the f2f class setting as a start, which needs to be followed with the online discussion, and finally should end at f2f class setting. This makes the learning and its related reflection cycle complete and provides the best of two worlds to students. Hence, after the end of the discussion in online activities, it is important to make a follow-up discussion in a f2f class setting. Such practice could further provide more clarifications, which could eventually enable a deep learning experience on specific topics.

4.3.4 Formal integration of blended activities in the course structure

The success of blended activities will depend on how well a teacher team can integrate blended learning activities in the formal course structure. Our repeated experimentations and observations show that the formal integration of blended activities needs to be clearer and stated in the course study guide. In addition, it is important to explicitly clarify how the blended activities will complement or benefit the learning occurs in a f2f class settings. In particular, most blended activities need to be connected to the overall learning outcomes, the course content, and more specific course moments.

4.3.5 Good balance of content management and interaction capabilities

We observed that although students found the activities around interactions and reflections as relevant and exciting, they still expect to have a more traditional content management capabilities in the course tool for organizing, storing and managing documents. For example, Yammer has limited functionalities for file management, especially when it comes to editing by multiple authors such as Google Drive.

“I would use a platform where you can make folders to make a neat and clear structure. It (Yammer) is not formal enough to take it seriously”

4.3.6 The role of good introduction of blended activities

A good introduction to BL activities including clarifying the expectation of teachers in the early phase of the course is vital. At the time of writing, we were also discussing a potential possibility to run a short introductory course or a module in the first weeks of the arrival of international masters and exchange students. Such kind of introduction will boost up the confidence and thereby enhancing active participation in BL activities. For example, in the last course challenges in I&D, we provided guidelines on how to publish, store and search documents in Yammer using a predefined set of hashtags (#).

5 DISCUSSION AND CONCLUSIONS

The paper describes our research efforts in designing and implementing blended courses in innovation and design education. Although some fields are very dominant in applying blended education, there is limited knowledge in the education related to I&D. We believed that the nature of innovation and design processes is iterative, reflective and dynamic, for which the blended way of approach could really fit well. Our three years of experiences show that the benefits of using blended activities could compliment f2f settings and sufficiently support the nature of innovation and design practice. According to one student: “online learning without the pressure of time and place a normal class gives, learning and reflecting at my own pace is important, especially for deep learning.” This means that students really perceived BL activities as an enabler for providing more flexibility in their learning process. It is clear from our observations that it is necessary to develop methods for BL and from a teacher’s perspective be more explicit on how the students can/will benefit from BL. After three years of practicing blended courses, the teacher team is more mature than the first year. The relation between f2f and online
lectures, seminars, etc. needs to be described in advance for the students. By describing/explaining how the f2f lectures, seminars, and discussions are linked to online activities the teachers are forced to have a distinct pedagogical design of the course or part of the course.

The paper has several theoretical and practical implications for BL theory and practice. Specifically, the paper made the following theoretical contribution. Firstly, the paper provides insightful blended course practice in I&D education. There are limited studies applying blended learning in the area of I&D. Often, design thinking or other innovative ways have been applied for developing blended courses in different domains, but not used blended approaches a lot in teaching in the area of innovation and design education. Secondly, the study along with details of the course design shows how to blend of learning activities [16] or thoughtful integrating f2f and online learning [15] to deepen reflection and provide different perspectives from national and internationally leading researchers. This is especially significant for I&D students since they have an opportunity to learn I&D practices and case stories which are evolving in different contexts or geographical regions such as Asia, USA, or the UK. In particular, the study shows how to use online activities to complement f2f lectures and moreover how to extend the f2f discussions outside of the classroom [7] and create a community of inquiry [4]. Thirdly, the paper contributes to the current research on using microblogs for designing blended courses [17]. Our study pinpoints the benefits, challenges, and lessons learned of using Yammer as a course tool especially in the area of I&D education, which could guide other researchers as recommendations while designing I&D courses with using microblogs. Additionally, the suggested recommendations can be beneficial for the providers of learning management systems to design effective tools and systems for enhancing BL in education.

The paper has several practical implications. Firstly, the paper provides hands-on lessons learned to teachers who are aspiring to design blended courses. Our lessons can be helpful in understanding what works well or not work well. Secondly, universities can use our findings to develop a BL strategy for their institutions. We are not recommending any time consuming or expensive blended solutions. Rather suggesting a simple hands-on approach to deploy in the traditional f2f form of teaching. In this way, our blended approach follows the consolidation principle suggested by [7]. Thirdly, our findings can be helpful for universities to understand what kind of pedagogy training future teachers may need. In the future, we will continue our blended experimentations in I&D education. In particular, we will examine how to turn the identified challenges into benefits, or which mitigated actions would be useful to solve the challenges. We also recommend researchers to conduct detail studies on the role of reflections and its contribution to deep or active learning [7]. Specifically, we suggest researchers look into what kind of pedagogy and skills will be needed to perform the complete learning cycle in the education, i.e., f2f teaching to online discussions to f2f discussions. There are also possibilities to conduct different forms of learning cycles. For example, one can start with an online activity which follows with a f2f activity and finally end with the online activity. Finally, researchers can investigate Yammer functionalities and perform more tests to identify what works well in an education context, specifically, how to improve the file organization and management, etc.

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REFERENCES


