A Holistic Model for Blended Learning

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While the studio environment has been promoted as an ideal educational setting for project-based disciplines, few qualitative studies have been undertaken in a comprehensive way (Bose, 2007). This study responds to this need by adopting Grounded Theory methodology in a qualitative comparative approach. The research aims to explore the limitations and benefits of a face-to-face (f2f) design studio as well as a virtual design studio (VDS) as experienced by architecture students and educators at an Australian university in order to find the optimal combination for a blended environment to maximize learning. The main outcome is a holistic multidimensional blended model being sufficiently flexible to adapt to various setting, in the process, facilitating constructivist learning through self-determination, self-management, and personalization of the learning environment.

Introduction

There is increasing support today for the constructivist approach in learning and teaching in responding to the changes and challenges facing higher education; an approach that is particularly suitable for architectural education and design studio pedagogy. Like higher education in general, design education is not responding to cultural, technological, and organizational changes as responsively and effectively as many believe it should due, in part, to the absence of innovative and flexible pedagogical models. While online learning and the implementation of ICT (Information and Commu-
communication technology) are attempts to solve those challenges and address demands of flexible education, like the traditional f2f mode, online learning on its own is severely limited. Unlike other learning environments, the design studio by its very nature offers opportunities to really examine the role of virtual learning and how it can be integrated with f2f modes and methods. Innovative teaching methods should be developed to respond to the demands of social change and opportunities afforded by technological advancement (Riguet et al., 2008). Presuming that there should continue to be the need for on-campus face-to-face interaction, what would a blended learning model look like? The aim of blended learning is to enhance learning experience through selecting appropriate learning activities that optimize the benefits and reduce the limitations of the f2f as well as the virtual design studio (Saghafi, Franz, & Crowther, 2012). Unfortunately much of this has happened without any research to inform or explore its potential.

Background

Learning settings of today are increasingly collaborative and socially peer-to-peer oriented (Fisher, 2004). Universities require more flexible individual spaces and clusters of facilities enabling learners to adapt various learning styles (Jamieson, 2003). Graham (2006) explains how f2f learning environments benefit from the strength of developing social presence while suffering from limited time, lack of in-depth discussion, and the participation of all members. Comparably, time and place flexibility, opportunity for participation of all learners, and deeper reflection are dominant strengths of web-based learning (Graham, 2006). Web-based learning has shifted the learning environment to a more social, flexible and personal space (Shao, Daley, & Vaughan, 2007).

According to Bonk, Kim, and Zeng (2006) the most effective pedagogical technique for online learning predicted in the future will be based on group problem-solving, collaboration, and problem-based learning with the least benefit from lecturing and Socratic questions. The design studio as a problem based learning approach is closely aligned to constructivist theory and courses that emphasize team working, and are process focused, practice based, and interdisciplinary (Eilouti, 2006). Most of the activities that characterize university learning such as critical thinking, research, and professional education are accommodated in the design studio (Hashimshony & Haina, 2006) making it of relevance to higher education in general (Bose, 2007; Glasser, 2000; Hashimshony & Haina, 2006; Schon, 1987). A review
of literature has shown that the design studio faces similar challenges to higher education. Therefore, if a model is able to respond to the problems in design education, it will be applicable in many other fields of higher education.

Design education needs f2f activities such as peer-learning and cannot be successful in a full online mode (Silva & Lima, 2008). It is believed that VDS will not replace the f2f studio setting in the future (Salama & Wilkinson, 2007). Although blended courses have been employed in other fields, their application to design education is new (Senyapili & Karokaya, 2009). As such, new flexible models for design studio are necessary to respond to changes and unpredictable conditions.

Blended learning models have been recently discussed in the literature in response to the weaknesses of fully online modes of learning with ‘not belonging to campus life’ as one of the main concerns (Rose & Ray, 2011). Many believe that in the future universities will continue to contain buildings and people but they will be increasingly enriched by a virtual counterpoint (Elger & Russell, 2003). Blended learning tends to be informal, experience focused, and based on knowledge sharing instead of formal, content focus, and training in traditional education (Cross, 2006, pp. xx-xxi). Blended learning reflects the blended nature of the world and the natural process of how learners really learn. Learning can be considered as both individual and social processes which complement each other in the blended approach (Jochems, van Merriënboer, & Koper, 2004). In all, blended learning models recognize the interplay of time and place, and how media can accommodate communication across the time/place dimension. One example is the CSCW (Computer-Supported Cooperative Learning) matrix first introduced in 1988 by Johansen (1988); it also appears in Baecker (1995).

Despite this early work, blended learning is still considered a new topic of practice and research (Dennis et al., 2006), with various disciplines such as architecture inviting further exploration of its potential for design education. The research described in the paper is one attempt to respond to this invitation.

Research Design

This paper reports on a comparative case study situated within the context of design studio education. Specifically, the study seeks to explore, describe, and understand the experiences of participants in the f2f and virtual design studio. Using experiential data it identifies indicators of behavior
that provide a foundation for the generation of a holistic model for blended learning. Research on learning environments should employ comprehensive qualitative studies that explore the perceptions of both educators and students (Saghafi, Franz, & Crowther, 2010). Qualitative research to do with the blended design studio is limited with the virtual design studio emerging as recently as 1993. Qualitative research in the area of blended learning can be very productive due to its interpretive and descriptive ability (Gerbic & Stacey, 2009). Moreover, the case study method can support the complexities of hybrid learning (Gerbic & Stacey, 2009). This comparative case study is also experimental in that it involved the construction of two learning environments specifically for the study: a f2f studio environment and a virtual design environment in order to compare the experiences of students and tutors and identify benefits and limitations as a basis to developing a blended learning model for design studio learning and teaching.

In the regular curriculum of this case study environment, each design unit has a coordinator who is an academic member of the school and several tutors who usually come from industry. Each unit is run once a week for four hours. The first hour is a lecture by the co-coordinator who presents the theoretical content for the unit. The next three hours are undertaken as a tutorial managed by a tutor responsible for a specific group of students. The tutorial groups provide the context for working on a specific design project. Tutoring as well as lecturing is delivered in f2f mode. At the beginning of the semester, all nine groups participated in a common two-week program followed by a VDS technology one-week workshop presented by the author and the Blackboard (online course management system) support team to those students and tutors volunteering for the study. 24 students of 165 students enrolled in the third year architecture course design unit participated in the study. These students were then divided into two groups to alternatively experience both the f2f and the virtual design studios during the remaining ten weeks of the semester. The virtual design studio was run in the first semester of 2010. It was the first time such a studio had been implemented. The author’s role in the study was to construct and test ICT for the virtual design studio, work as a facilitator, and attend all the sessions as a researcher observer.

In the VDS, the synchronous mode was implemented for lecturing and tutoring through ‘Elluminate Live’ (a real-time web conferencing tool which supports live online learning, teaching, and collaborating). The asynchronous mode in VDS was used for providing resources in Blackboard, reviewing design progress in wiki, and sharing ideas through students’ work in facebook. The tutor of the f2f group usually used a data projector, white-
board and markers for presenting ideas while the VDS group was dependent on online tools for presentation. In designing both survey and interview questions a concerted attempt was made to cover a wide range of issues involving design studio in order to identify and distinguish as many benefits and limitations as possible. In general, the interview structure was open-ended to allow ideas to emerge during the interviews. Overall in the main study, there were five interviews with educators and seventeen interviews with students at the middle and end of semester.

Data collected were analyzed using an iterative process of coding informed by Grounded Theory methodology and supported in part by the software program MAXQDA. Essentially, the software was used to organise and manage documents, codes, and memos. In turn, Grounded Theory was used for the following reasons as derived from Groat and Wang (2002, pp. 180-182), Charmaz (2006), and Gray (2009):

In GT, the author attempts to determine data based on setting, and is not influenced by pre-set opinions or notions. So, the theory develops based on data.

The process of data collection, data analysis and building theory is iterative, open ended and intensive because the objects of the study cannot be explained in the first stage.

GT method provides flexible and systematic guidelines for collecting and analysing qualitative data to build theory grounded in the data itself through generating concepts.

This approach brings a different perspective to the phenomenon being studied and allows more innovation and originality for the researcher.

Overall, the methodology adopts a progressive direction, rather than being pre-determined. It requires both flexibility and rigor (Strauss & Corbin, 1998). The research approach needed to respond to the complexity and context of design education; therefore, a systematic, holistic, and flexible approach was necessary. The Grounded Theory methodology underpinning the qualitative approach provided flexible, inductive, and in-depth outcomes.
Findings

Participants in the case study indicated that the f2f design studio has some significant advantages. For several students, human interaction is the most important benefit of the f2f learning environment. One student describes how she likes “being able to be around people and work of each other”. She continues: “I think it is nice being able to sort of walk around the room and look at people’s drawings […]. I prefer like having a tutor as they can directly point out things on my drawings, um I guess just the interaction side of it is really good.” From the tutor’s perspective, the f2f studio provides a more holistic relationship with students and greater engagement and response from the students. When students attend physically, the tutor can ask them to: “Sit at the desk now, do some work, and then show me before the end of the class. Being virtually, I can’t tell them; okay, do some stuff now and show me at the end of the class. In VDS, it does not work like that.”

Another student draws attention to collaboration with other classmates and while VDS places more emphasis on the individual and independence which she appreciates is good and healthy, it is not conducive to collaboration. Presentation and sharing knowledge also become different experiences when switching from the physical to the virtual design studio. For one of the students: “The ability to use projections, create physical models you can play with, and presentation panels you can spread out and view with ease is something much more human engaging than relying on a computer interface.”

In contrast, VDS and the provision of accessing digital copies of work in progress by each student increased motivation and positive competition. As one of the students comments: “Normally I would only have access to my own process but it was valuable to see other people’s process and gain ideas or direction from it. I feel this may have helped ‘push’ each other to do more work as well.” With respect to VDS (especially in real time), several educators and students highlighted technological proficiency as an issue. As described by one student: “The main disadvantage is perhaps some of the technical glitches, although most of the time this wasn’t a problem. The more that students use tools like this, the fewer problems there would be as they get used to managing digital files and live multimedia.” Several of the participants suggested changes to VDS to accommodate groups as well as one-to-one interaction: “I think it would be beneficial to have a virtual design studio where the group can talk to the tutor and group to group more than one to one. One-to-one has its place but I think it's not being a
team effort, effectively that would make it easier to run a virtual studio with groups than one-to-one.”

Participants also revealed how specific environments may work together in a complementary way. For example, a student prefers real time communication for answering questions and feedback, but a delay for reviewing others’ works. For another synchronous is fine for delivering ideas while asynchronous for ‘designing on your own’. The f2f as the synchronous environment seems to be more appropriate for spontaneous practice and improving skills (because of hands-on and peer-learning) while VdS in asynchronous mode is more appropriate for activities that take time such as research and reflection.

Permanent access to studio spaces is recognized as one of the critical issues contributing to planning difficulties. Ideally it would seem beneficial to create a studio space that has 24/7 hours access for the students and to encourage them to work there whenever they wanted to, thus extending their opportunity to work together and learn from each other. While web-based learning can provide this opportunity through platforms like facebook, some students were keen to learn in a student-centred setting offering them permanent and personal physical space for their studio activities. They prefer a flexible environment with a range of options responding to their different style of learning and personalities.

In fact, there were many responses to the surveys that revealed a range of various learning styles and preferences by students regarding on/off-campus participation (Saghafi et al., 2012). Based on participants’ opinions, neither f2f nor VDS on its own can respond to all the preferences and needs of students and tutors. Participants’ experiences in the case studies suggest that the f2f design studio has some significant advantages which cannot be ignored. In-person interaction and being together in the f2f design studio facilitates the formation of a learning community, encourages and supports peer learning as well as facilitates ‘learning by doing’. Live online studio (like web-based learning) adds flexibility regarding place and wider collaborative potential but reduces a 3D environment to a 2D environment or whatever appears on the monitor. While a web-based design studio supports constructive discussion and archival of design development in the process emphasizing process and review of progress, it can isolate some students detrimentally affecting their motivation and enjoyment.

As indicated earlier, blended learning involves various time-place dimensions. In this study, the category of place-time learning environment has four dimensions:
1. SP ST: Same place and time; formal learning spaces such as a physical design studio as an f2f environment that is restricted by time and place
2. SP DT: Same place but different time; informal spaces such as an exhibition space for design projects, accommodating casual interaction between visitors
3. DP DT: Different time and place; asynchronous virtual learning environments such as web 2, facilitating flexible community-paced learning
4. DP ST: Different place but same time; live online environments, such as Elluminate Live, which are accessible from anywhere

The main aspects of the four different environments based on time and place are summarized in Table 1.

Table 1
The main characteristics of the category of Place-Time modes

<table>
<thead>
<tr>
<th>Environment Aspects</th>
<th>SP ST: Same place and time</th>
<th>DP ST: Different place, same time</th>
<th>DP DT: Different place and time</th>
<th>SP DT: Same place, different time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>f2f: Physical design studio</td>
<td>‘Elluminate Live’ as a live online environment</td>
<td>Web-based learning environment</td>
<td>Informal on-campus spaces such as exhibitions</td>
</tr>
<tr>
<td>Flexibility</td>
<td>None</td>
<td>Anywhere</td>
<td>Anytime and anywhere</td>
<td>Anytime</td>
</tr>
<tr>
<td>Type of pace</td>
<td>Scheduled</td>
<td>Scheduled</td>
<td>Community-paced</td>
<td>Community-paced</td>
</tr>
<tr>
<td>Type of feedback</td>
<td>Instant feedback</td>
<td>Instant feedback</td>
<td>Progressive feedback</td>
<td>Comparative feedback</td>
</tr>
<tr>
<td>Type of interaction</td>
<td>In person</td>
<td>Computer-mediated</td>
<td>Computer-mediated</td>
<td>In person</td>
</tr>
<tr>
<td>Level of formality</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>
The headings show four types of place-time learning environments. The first row provides an example of each environment in design studio education; the second gives an assessment of each in terms of flexibility of time and place, ranging from very limited to very flexible for both place and time to limited to time but flexible for place, and limited to place but flexible for time. The following four rows relate to specific activities such as learning pace, type of feedback, type of interaction, and level of formality associated with activities accommodated in the various environments. In terms of learning pace, having a designated space that is subject to university timetabling requires a scheduled program managed by the tutor. This is also generally the case in a live virtual tutorial environment. Without these restrictions, as in DT DP and SP DT environments, the learning pace can be self or community-managed. These types of environments could be used between weekly scheduled classes.

With respect to feedback, this is labelled as ‘instant’, ‘progressive’ or ‘comparative’. The ST mode provides for more immediate feedback and the DT mode in a web 2 environment – with its storage, discussion and recording facilities – for more progressive or summative feedback. In informal places, such as exhibition spaces, in person comparative feedback is provided through comparing students’ pin up works and 3D physical models. The fifth row characterises different types of interaction. Whereas the SP mode facilitates interaction in person, the DP mode is mediated through the internet. As the sixth row conveys, having more flexibility regarding time provides for more informality. Informal learning mainly refers to providing learning opportunity through environments which are out of scheduled time (either on-campus or online) or out of teacher-directed. Informal learning is understood to occur through platforms like facebook which provide informal interaction.

In all, participants indicated that the virtual unit on its own did not respond to all their needs. This suggests that an appropriate approach is a blended one optimizing the benefits of both f2f and on-line environments. Figure 1 presents an outcome of interpreting the findings focusing on the qualities of the place-time learning environments. In this Figure various qualities are located along a horizontal on-campus/off-campus axis and a vertical synchronous/asynchronous axis. This diagram is particularly useful in conveying shared qualities or attributes. For instance, both environments of the asynchronous mode can support comparative feedback on student work.
Since the limitations of one environment are counteracted to varying degrees by the positive attributes of other environments, the focus can be on designing learning experiences that are blended to have more benefits than limitations. For instance, SP ST as a f2f environment is restricted to a specific place and time, but DP DT as a web-based environment provides access from anywhere at any time. Therefore, if a blended model combines on campus synchronous and asynchronous online environments, it will optimize the benefits. For example, in-person interaction and being together in the f2f design studio facilitates experiential learning and the formation of a learning community. It has associated with it a sense of the whole and can be equipped and conceptualized to provide access to a range of facilities. Connecting the physical studio space with other on-campus informal learning environments facilitates other forms of interaction such as exhibitions enabling engagement with the broader community.

In comparison, the web-based design studio using platforms like Facebook, wiki and Blackboard facilitates constructive discussion and archiving of students’ design process therein providing for a focus on the process and review of progress. Alone however, these platforms can isolate students failing to provide the same motivation and enjoyment as the f2f studio. While the live online studio adds flexibility regarding place and greater possibility for collaboration it relies on a 2D environment as opposed to a 3D envi-

**Figure 1.** The main attributes of the Place-Time environments.
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In the study, these attributes provided the foundation for developing a holistic blended design studio model (HBDS) (Figure 2).

**Figure 2.** The HBDS model and its attributes.

As highlighted, there are four dimensions: mode of learning; place-time environment; the characteristic components of the environment; and benefits and limitations in terms of teaching/learning activities and experience. With an emphasis on learning, the model highlights two fundamental, although when considered dynamically over time, not necessarily mutually exclusive modes: the synchronous mode and the asynchronous mode. In terms of synchronous learning, this is learning happening at the same time (ST) face-to-face (f2f) in the designated campus design studio or other campus space. Such real time learning can be enriched when the f2f studio is integrated with linked online platforms such as Elluminate Live that connect students/tutors at the same time in different places (DP). Asynchronous learning on the other hand is learning happening informally at different times in the one place (such as for student exhibitions that are not part of scheduled unit time) or in different places, the latter being facilitated through web-based platforms like wiki, facebook and Blackboard. As described, according to the participants, specific environments or modalities have specific benefits and limitations.
In the HBDS model as described f2f and live online communication deliver scheduled sessions anywhere in real time. When integrated with the asynchronous mode, web 2 and on-campus informal learning spaces support self-managed learning at different and same places. In this way various students’ learning styles can be accommodated. Theoretically, the model offers benefits from all four environments, but practically this may not be possible owing to different limitations such as available space and resources in some institutions.

According to the participants’ perception, integrating online and on-campus education in parallel is valued for providing flexibility in terms of place. So, in the HBDS model, live education is supported through both on-campus and off-campus design studios. More so, participants emphasized the need for implementing a web-based design studio. Therefore, web 2 as an asynchronous mode and f2f as a synchronous mode of education play the main role in different scenarios as conveyed in Table 1.

Table 2
Different scenarios of the HBDS model

<table>
<thead>
<tr>
<th>Scenario</th>
<th>SP</th>
<th>ST</th>
<th>DP ST</th>
<th>DP DT</th>
<th>SP DT</th>
<th>Multimodal</th>
<th>Parallel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Scenario 4</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 2 presents four possible scenarios: scenario 1 utilizing benefits from all four environments as identified in the HBDS model: scenario 2 is limited by the shortage of physical spaces offering on-campus informal learning opportunities; scenario 3 where the live online mode has been omitted due to possible limitations like technology and/or group size; and scenario 4 with f2f integrated with web-based facilities. The scenarios just described with the secondary components (DP ST and ST DT) option highlight the flexibility of the HBDS model. Increased flexibility can be achieved through multimodality (for example, f2f with web-based learning) and/or through offering f2f and live VDS. However, as conveyed in Figure 3.
Scenario 4 involving a blend of just the primary components of synchronous and asynchronous modes demonstrates the possibility for substantial benefit.

Figure 3 presents the main primary and secondary features of each f2f and web-2 education in the HBDS model. Although it provides a discussion about maximizing the benefits of the main environments, it can be considered as the fourth scenario of the HBDS model. The findings of this study highlight the complementary relationship between f2f DS and web-based DS as the main environments of the HBDS model. The diagram conveys how the benefits of each environment (F2F design studio and the Web 2 design studio) optimises the learning potential of each environment contributing to an outcome that is more than an aggregate of the parts.

Figure 3. Optimizing f2f and web-based education in the HBDS model.

For example, the f2f design studio provides benefits from learning by doing, being able to bodily (and sensorally) experience a ‘whole’ setting, and through being a physical space capable of accommodating a wide range of facilities and equipment. The f2f studio facilitates the formation of an on-campus learning community and potential enhancement of motivation and enjoyment, in-person interaction, and learning from peers. These advantages increase learning effectiveness. Lastly, f2f provides direct feedback, spontaneity, and for the development of implicit knowledge through bodily engagement. These factors contribute to more effective delivery.

On the other hand, web-based learning leads to savings in time and cost for transportation, decreased building cost, and greater flexibility for students in terms of where they learn. Web-based technology provides archives
of the design process facilitating knowledge sharing, focus on process, and comprehensive assessment. Web 2 supports asynchronous learning, providing progressive feedback, self-managed and flexible learning, and equal opportunity for all learners.

Figure 4 simply shows the most important aspects of the blended components in the HBDS model. In the f2f environment, physical space facilities, motivation, enjoyment and instant feedback have been considered as the most important benefits, while being restricted to time and place, and the focus on final product are the most important limitations. On the other hand, being flexible with regard to time and place, a focus on the process, and providing progressive feedback have been realized as the most important benefits of web 2. The lack of physical learning spaces and human interaction are the most important limitations of the web-based environments.

Figure 4. The summarized HBDS model complemented by f2f and web-based education.

Figure 4 represents how the limitations of the f2f learning environment are counteracted by the positive aspects of the web-based learning environment. For example, lack of human interaction in web-based learning can be counteracted by motivation and enjoyment resulting from f2f interaction. Therefore, physical and virtual design studio education models complement each other in the blended model. For instance, instant feedback in live communication and insightful feedback in lag time discussion act as complementary components.

Discussion and Implications

Learning activities in design education are not limited to lecturing. As a problem-based and project-based learning environment, design studio also
involves tutorials, presentations, and critiques. Design studio education can be considered as an incomplete inquiry without one-to-one as well as many-to-many interaction, visual presentation, and feedback through drawing. This highlights the need for pedagogical activities to be considered in relation to learning settings. Unlike other studies, all four place-time environments have been employed in this case study integrated by online platforms synchronously and asynchronously. In addition, the experimental nature of the study provided for a comparative analysis both of student as well as tutor experience across the f2f and VDS environments.

Other significant aspects of the designed study include:

- It was the first time that Facebook was used in design education as a component of VDS extending studio time, space and communication in an unlimited way.

- In live presentations, synchronous and asynchronous platforms were integrated. Web-based platforms were implemented in live mode (either online or f2f) for presentation and application sharing when students presented their works through Wiki or Facebook.

- Lectures were broadcast through Elluminate Live for remote participants presenting an integrated experience for on-campus and online participants.

In addition to the benefits of implementing each mode in the HBDS which have been explained, this model has attributes that have been derived from considering the model as a whole. The HBDS is a multidimensional multimodal model which works in different contexts and supports constructivist learning. These unique attributes include:

1. The development of a holistic model that is contextually responsive. Different scenarios of the HBDS model can be chosen based on context and goals.

2. Combining different spaces, times, and designed media, this model supports the following dimensions:

   2.1. Scheduled and self-managed learning for synchronous and asynchronous modes respectively.

   2.2. Informal and formal learning through different learning environments.

   2.3. Group and individual learning activities.
2.4. Different types of interaction such as human interaction and computer mediated interaction, or one-to-one, one-to-many and many-to-many.

2.5. The HBDS model seeks a balance between the process and the product in studio teaching by implementing both f2f and web-based environments.

The HBDS model then has been produced by balancing and blending complementary components of learning environments.

3. The HBDS model extends the boundaries of the blended theory by enabling self-determination, a self-management, and personalization of the learning environment:

3.1. Compared to regular blended models, in relation to the HBDS model students have choice to participate on/off-campus in most of the sessions constituting self-determination of the learning environment. It is possible to hypothesize that if a model can provide a wide range of arrangements and types of learning modes, students are the most appropriate group for determining their learning environments.

3.2. The HBDS model provides for self-managed learning activities due to flexibility in time and place through the asynchronous in-community mode. In other words students and tutors are able to choose when, where, and how to interact during each semester week.

3.3. The HBDS model provides the opportunity for personalization of content and activities through sharing knowledge, archiving the process of design, and reflective feedback. Using facebook as a learning platform allows students to personalize their learning environment.

4. The archival of design process enables both tutors and students to review each group and individual progress. Two kinds of archival modes were provided in the case study enabling tracking of the process of design and progressive feedback. While wiki provides formal and group learning communication, facebook works as informal and individual learning interaction with both the learning community and the wider virtual communities. The content provided by these
platforms presents a constructivist dynamic knowledge produced mostly by participants.

Conclusion

With a focus on tertiary design education and the design studio, the study described in this paper exploited the opportunity to explore the notion of flexibility and the capability and capacity for hybridized learning that also has value for learning environments in general. It would appear that an effective blended design studio should support constructivist learning and address current criticisms of design education. Both f2f and web-based learning settings should be considered as the main and mandatory components of a BDS model. The main outcome is a holistic multidimensional blended learning model that, through the various modalities, provides adaptive capacity in a range of settings. This model balances and blends the benefits and limitations of the two components in a complementary relationship. Finally, further study could test the HBDS model in different contexts, fields, and with different learning approaches.

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References


