Virtual Design Studio Revisited

A blended approach for the digital natives

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Abstract. *This paper presents a distributed and blended model for a virtual design studio and demonstrates the application of the model in a real-life case study. An empirical survey revealed that the proposed model was well-accepted by the current generation of architectural students. The complementary use of the tools with different representational capabilities and synchronization modes enabled effective learning processes. The study also suggested that characteristics of architectural education might entail customization in online and blended learning in several ways.*
Keywords. *Blended learning; social networking media; project cloud; learning management system; collaborative design.*

INTRODUCTION

Virtual design studios emerged in early 1990s either as alternatives for or complementary to traditional design studios. A computer supported collaborative work discourse was built gradually, and such studios have long been discussed as a way of teaching collaborative design, of removing the barriers of time and geographical location and of promoting global teams. A virtual design studio can be defined generally as a type of design studio which investigates possibilities offered by the Internet technology and virtual environments. They have been mostly designed to enable collaboration between geographically distant parties in design education. The developments in technology have often motivated new experiments in virtual design studios. More than two decades of its first introduction, this paper revisits the concept of a virtual design studio and explores how it can evolve as a response to technological developments and changing generations of learners. A blended approach is presented as a solution and the outcomes of the proposed approach are discussed within the framework of a real life experiment.

Many things have changed since the introduction of early online design studios. Firstly, the Internet has now evolved to a social and distributed environment which is often acknowledged as Web 2.0. The term Web 2.0 refers to web applications that enable participatory information sharing, user-centered design, and collaboration. Typically, a Web 2.0 site facilitates for interaction and creating content rather than merely viewing pre-published content. Social networking platforms attracted particular interest among many Web 2.0 applications. A social networking site deals with building and maintaining social networks or relations among people. A social network platform includes a representation of each user (a profile), his/her links, and several other services such as e-mail, instant-messaging, tagging, etc. Social networking sites like Facebook, Google+, and Twitter have increasingly been popular in the

last decade. However, the use of social networking services in education have remained rather limited. On the other hand, the use of learning management systems in education has proliferated at the same time. A learning management system (LMS) is a software application for the administration, documentation, and tracking of online courses. A LMS allows students to communicate with instructors and team members, give and take online critiques, download course materials, design briefs, submit design sketches and design projects. Despite its advantages, LMS use in design studios has been rare, yet (Pektas and Demirkan, 2011). Another parallel development in Web 2.0 era is cloud computing. Cloud computing can be defined as the delivery of computing as a service whereby shared resources and information are provided over the Internet. Wang et al. (2010) defined three operational mechanisms for cloud computing: hardware as a service, software as a service, data as a service. A cloud computing platform can offer any of these or a combination. The use of cloud computing in architectural education has also not been explored and exploited.

Besides the Internet itself, its users have also changed in a great extent since the first introduction of virtual design studios. Now, a new generation of students which are referred as "digital natives" are in architectural studios. The term "digital natives" first coined by Prensky (2001) to define the differences between generations in terms of their attitudes toward digital tools. According to Prensky, a "digital native" is a person who "borns into the digital world" unlike a "digital immigrant" who "learns to adapt to the environment...(but) always retain to some degree their digital immigrant accent." Prensky's definition of "digital natives" has similarities with definitions of Generation Z, or Generation M (for multitasking), or the Internet Generation which refer to people born from the early to mid 1990s to the present. Digital natives or Generation Z has grown up with the Internet, which became increasingly available after early 1990s. They are highly connected, as many of this generation have had lifelong use of communications and media technologies such as the World Wide Web, instant messaging, text messaging, MP3 players, smart phones, touch screens, tablet computer technologies, etc. They are no longer limited to the home computer, but they carry it in their pockets on mobile Internet devices such as mobile phones. They have also a tendency for seeking multitasking and stimulation in their activities, since they have been exposed to many types of media continuously and simultaneously. Digital natives are also active users of Web 2.0 devices; they curate online at a rapid pace: sharing thoughts and observations on a variety of media, topics and products.

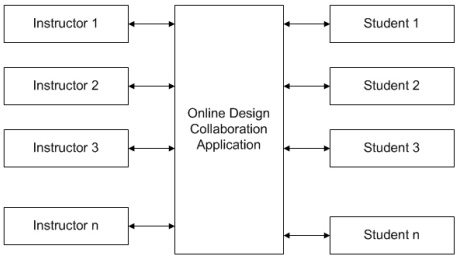
THE BLENDED VIRTUAL DESIGN STUDIO

This paper discusses that traditional delivery modes are no longer enough for the new generation of architectural students. Pektas and Ozguc (2011) proposed that design media should evolve as a response to dynamic design contexts. They suggested that the proper media for design should be interactive rather than one-way. The use of new participatory tools (such as learning management systems, social networking media and other Web 2.0 tools) may transform the merely one-to-one interaction style of the traditional studio into a many-to-many style which corresponds better to the characteristics of new generation of design students (Fig. 1). In this "networked" studio, the students can efficiently construct design knowledge through continuous interaction with their peers and instructors. A variety of tools can be "blended" with the traditional design studio to enhance learning processes.

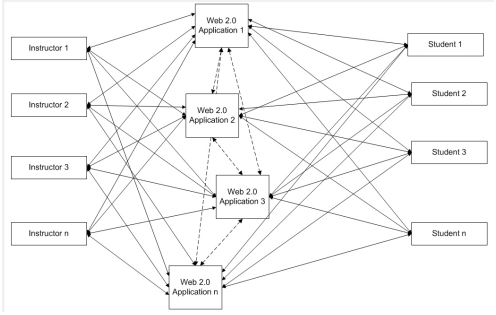
"Blended learning" is a popular topic in educational fields and generally defined as the integration of traditional face-to-face learning with online learning, which makes it possible to benefit from the advantages of both teaching methods (Garrison & Vaughan, 2008). Blended learning courses are gaining much interest, with new technology being developed to complement, not replace, traditional forms of learning. Despite its many benefits, blended learning has not been explored and exploited in architectural education, yet. This paper hypothesizes that the blended learning approach can be success-

Figure 1
Interactions styles in a conventional virtual design studio (a) versus the blended virtual design studio (b).

a



b



fully integrated with the traditional studio education. The proposed model of the design studio coincides with social constructivist learning theories. Social constructivist learning refers to an educational process which enables groups to create knowledge and meaning through co-creation. Palincsar (1998) presented a review of the theoretical underpinnings of social constructivism which was developed in the intersections of psychology, sociology, and education. Social constructivism has been the theoretical basis for many studies in online learning and computer-supported collaborative work. With the advent of social networking media, social constructivism gained popularity in educational fields; however, its applications in design education have been rare. In fact, psychological and socio-cultural issues in design education were often ignored (Pektas, 2010), though they offer valuable opportunities for improvement. Therefore, the blended design studio presented in the next section was designed and implemented within the theoretical framework of social constructivist learning and by the help of educational technology.

THE CASE STUDY

Within this framework, a virtual design studio was designed and implemented which enabled collaboration between interior architecture students of Bilkent University, Turkey and East Carolina University, USA. The aim of the project was to introduce students to green and sustainable building design principles through real-life problem solving as teamwork. The project spanned five weeks in a semester. The first module utilized only traditional face-to-face teaching and the second module comprised a blended approach in which traditional and online distance education techniques are combined. The students formed groups of five students and each group was assigned to design a partially self-sufficient unit in a specific climatic zone. The students did research related to the project, presented them to the class, produced initial design ideas and discussed their projects with the instructors. In the second module, each team was paired with two students from the other university who worked as consultant for their group for the rest of the project. Collaborative work across the groups took place in the LMS discussion forums and in Facebook in the form of asynchronous online text communication and through sharing images and drawings related to the projects. Besides discussion forums, news and announcements were also shared through Moodle. Four room-type videoconference sessions were organized. A half of them were interactive lecture sessions and the other half were interactive discussions on design projects.

DATA COLLECTION AND ANALYSIS

Students' perceptions of the methods and tools used in the study were elicited through structured and open-ended questionnaires. Qualitative variations in students' perceptions and approaches were categorized. The results of the analysis are presented below.

Background of the participants

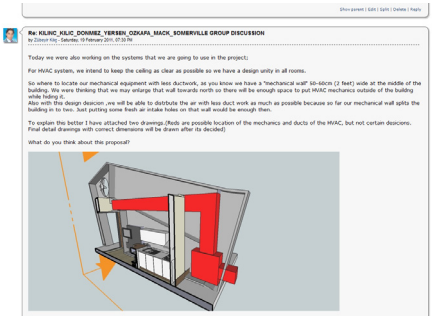
The participants were asked to indicate their level of computer experience on a five-point Likert scale in which higher values denoted more computer experience. The results showed that the students rated themselves as experienced computer users (X = 4.44, SD = 0.59). The students were familiar with the Moodle LMS, all of them reported that they had used Moodle at least in one other course before. All of the students had a Facebook account before the study and they were regular users. The percentage distribution of the participants' daily Facebook use were as follows: 33% of the participants: less than 1 hour, 57% of the participants: 1 – 1.5 hour, and 10% of the participants: more than 2 hours. Among the several tools utilized in the study, the room type videoconferencing was the only one, which was new to the participants, none of the participants indicated that he/she has used it before.

Comparison of blended, online and traditional face-to-face learning

The participants were asked to rank purely online, purely traditional and blended learning environments in terms of their appropriateness in design education. Sixty-one percent of the responses indicated that blended learning environments are the most appropriate for design education. Purely traditional learning environments was the second choice of 49% of the participants and 54% of the respondents reported that purely online learning environments are the least appropriate in design education (Table 1).

Students' views on the blended learning approach utilized in the study

Students' views on blended learning indicated that the benefits of this approach were highly acknowledged by them. Several students reported that the blended learning approach utilized in the study provided opportunities for interaction of cultures / exchange of ideas at an international level on the subject and combined the strengths of both online and traditional techniques: *"In my opinion this method was beneficial for the students because there were not just only lessons but also there was an interaction between the cultures. ... I think the blended approach is the best way of learning. Traditional techniques are quite beneficial and improving students' skill and visions. Besides, online techniques are quite helpful too. We combined them luckily."*



a

b

Figure 2
A snapshot from online discussions (a) and a perspective view of a design proposal (b).

Some of the students mentioned the difficulties of the blended approach such as time difference between the two countries, tight schedule of the workshop, and communication and coordination problems in teamwork: "*It is good to share opinions with the other students, but, we sometimes had communication problems so we couldn't change the project according to their comments.*"

Although most of the students appreciated the value of "blendedness" in the study, some of them noted that traditional (design studio) method should never be abandoned: *"Studying and working online is a requirement today and for the future. But of*

Table 1
Comparison of blended, online and traditional face-to-face learning in architectural education.

	1: Most appropriate		2: In-between	
	n	% of responses	n	% of responses
Purely online	9	22	10	24
Purely traditional	7	17	20	49
Blended	25	61	11	27

course classical methods of teaching in design education should not be forgotten."

Students' views on their use of the LMS as an interaction platform

The LMS as the interaction platform was found to be useful and easy to use. Several students indicated that the LMS enabled them monitoring other groups' process/files: *"The LMS was a good tool in order to follow others' projects and files. ... The discussion forums were the most efficient in terms of witnessing the other groups and their developments."*

There were also some suggestions for improvement in the LMS discussion forums such as more visual/intuitive interface, more synchronous communication, and instant messaging capability. The participants addressed that such changes in the LMS discussion forums would facilitate for better exchange of design information: *"I couldn't easily understand others' design ideas with that technology. May be something more visual would work better. ... The LMS is designed for all students in the school, but a design student may require more. The LMS sometimes was not enough to communicate. A system that enables us to work simultaneously could be better."*

Students' views on their use of the LMS as the project cloud

The use of the LMS as the project cloud was the best liked tool in the study, the majority of the participants indicated that accessing project resources on-demand was very useful: "*This was definitely useful because we always used to find some important knowledge and sometimes we benefited from some videos and presentation files which were uploaded by our instructors*." "*All the information that we found in the LMS was very good. Accessing the information on demand is crucial while conducting a project*."

Even a few students mentioned that the use of the LMS as the project cloud was its best functionality: "*The best aspect of the LMS was storing resources. We easily reach what we want to learn and any time and we had a chance to refresh them*."

There were some comments addressing the technical problems in the use of the LMS as the project cloud. Most of these problems were related to downloading/uploading performance of the LMS: "*It is useful; however, uploading performance of the LMS should be improved. Because, users usually have problems when uploading a file*."

Students' views on their use of videoconference

Videoconference sessions were found to be useful both for exchanging design ideas and interacting with another culture: *"Video conferencing sessions were an easier way of group discussions. ... We could have been able to see another culture and we learned a lot of things from them."* Several students indicated that videoconference sessions were enjoyable and useful: *"Video conference sessions were fun. ... They were really joyful and enjoyable."*

Freely interacting and being able to see each other during communication were discussed as important advantages of the videoconference tool: *"They allowed us not only to see the presentations but to see how they are commented in spoken language; which is really important."*

A few students mentioned that oral communication in a foreign language was difficult for them: *"Understanding the foreign language was hard."*

Students' views on traditional studio (face-to-face) teaching

The majority of the students mentioned that studio discussions were very useful. Some of them even discussed that traditional face-to-face teaching is an indispensable part of design education: *"Offline studio discussions are a must for an interior design student, because they improve our design skills."*

Several students suggested that traditional studio is more effective for developing a project, because they can work on a variety of media and communicate with instructors more easily: *"Offline studio is much more effective, we can discuss more details about our projects. ... Classroom discussions are the best method for understanding and analyzing projects, because you can draw, write anything on the papers and you can communicate with instructors efficiently."*

There were also some comments indicating that traditional face-to-face teaching is a more familiar method: *"The traditional technique is the most common so we are all used to it. It is beneficial, as we know."*

Students' use of the social networking media (Facebook) in the study

Seven groups out of nine groups (78%) reported that they used Facebook for the project work in the study. The reasons for using Facebook in the workshop included socializing with group members, discussing management of the project, sharing project files, and discussing design content (Table 2).

Students' views on the comparison between Facebook and the LMS

Students' comparisons between Facebook and the LMS highlighted several advantages and disadvantages of each. The primary reason for using Facebook was closely related with its widespread use among the students: "*We used Facebook in this study because it has already been used by everyone in our group*."

Comparisons between the LMS and Facebook by the students revealed interesting findings. Some claimed that the LMS provided a more structured and formal medium, thus they preferred it in the study: "*The LMS is an academic platform, so I think it is more appropriate for this project*." "*Discussing our projects with our group in a formal environment like the LMS is better, but if we'd like to socialize with some of our group members, Facebook could be a better choice*."

Others preferred Facebook because they think that it is easier to use, more enjoyable, and intimate: *"When I compare the LMS with Facebook as a whole, I can say that Facebook is easier to use. ... The LMS seems more boring compared to Facebook. Facebook is fun. ... All of the students in the class can see my messages in the LMS. I used Facebook, because it is more private."*

Finally there were a group of students who perceived no difference between Facebook and the LMS in terms of communication and file sharing: *"You can share files with the LMS as easily as you can do with Facebook. ... We can discuss projects through the LMS or Facebook, they are just the same."*

	n	% of responses
Socializing with group members	12	75
Discussing management of the project	11	69
Sharing project files	10	63
Discussing design content	9	56
Total number of responses	16	100

Table 2
Reasons for using Facebook for project work.

DISCUSSION AND CONCLUSIONS

The results of this study suggested that the proposed blended and distributed model for a virtual design studio was well-accepted by the current generation of design students. Several students reported that the blended approach was well-suited to their needs and preferences. The complementary use of the tools with different representational capabilities and synchronization modes enabled effective learning processses. The use of the LMS as the project cloud was the best liked tool in the study. Since design teamwork is a knowledge-intensive activity, many participants appreciated the usefulness of the project cloud in this respect. Videoconference tool was found to be valuable both for exchanging design ideas and interacting with another culture. The LMS discussion forums were perceived as useful especially for monitoring other groups' process/files. This indicates another advantage of online tools in architectural education: they render the design process explicit. Some shortcomings of the LMS discussion forums were also disclosed. For example, several students addressed that the forums were not visual/intuitive enough. These findings suggest that online tools which can represent a variety of information and enable learners to record, manage, and share their processes effectively may be more appropriate for architectural education rather than conventional LMSs. Generic LMSs can be customized with these purposes or multiple tools can be used together.

Although blended learning was the first choice of many students, students' views on the traditional studio teaching were also highly positive in this study. Therefore, further research is needed to highlight what aspects of the traditional studio are valued by the students and how these can be integrated with online learning components. The use of Facebook for project work was also noteworthy. A review of academic studies on Facebook use revealed that only very little amount of existing Facebook content was educational (Hew, 2011). In our study, the participants used Facebook in various ways including discussing design content, managing the project, and sharing project files. However, comparisons between the LMS and Facebook by the students presented conflicting views. Thus, this study suggests that the potential educational uses of Facebook need to be explored.

This study presented a distributed and blended model for a virtual design studio and demonstrated the application of the model in a real-life case study. The results indicated that the proposed model can be used in further studies in this track.

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