A study of traditional discussion boards and social media within an online landscape architecture course

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Abstract. *Distributed design education is increasingly important in the education of designers. However, there is persistent concern about the ability of distributed design education to facilitate the rich communication necessary for the critiquing and collaboration that normally occurs within a design studio. This paper compares the use of a social networking site to a traditional discussion board in facilitating communication within an introduction to landscape architecture course. The study found that students engaged in more meaningful discussion when using the social networking site, but that the social networking site did not produce any measurable improvement in the quantity or depth of interactions between students. The results suggest that social networking sites alter the type of communication students engage in, but should utilize students' existing social networks to be most effective as there is insufficient time within an individual course for students to build a new social network around their course peers. The study concludes that emphasis should be placed on how pedagogical decisions might foster improved communication between students, and suggests that pairing social networking sites with additional pedagogical requirements could produce substantial gains.*

Keywords: online design education, social media, communication technology

JEL Codes: Y80, Y90

1. Introduction

Distance education has steadily grown in popularity and importance across higher education. However, despite rapid advances in the pedagogy, technology, innovation, and demonstrated efficacy of online education, the design field of landscape architecture has been slow to broadly adopt online education (Artunç, 2016; Author, 2014a; Li, 2007). At the same time, there is an increased demand for landscape architects in the global market, but recent assessments note that the traditional face-to-face educational system in landscape architecture is unable to meet these demands (Landscape Architecture CEO Roundtable, 2007).

While online design education, hereafter referred to as distributed design education (DDE), can play a critical role in addressing this educational capacity shortage, DDE researchers have been persistently critical of the ability of DDE to foster meaningful social interaction between participants and develop a learning community that supports the critical discussion that contributes to successful learning within the traditional design studio. Kvan (2001) noted that students collaborating at a distance had difficulty developing trust while working on a design, and problems with communication and building social trust between users in

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digital environments has been noted by other researches (Kahai, Carroll, & Jestice, 2007; Saghafi, Franz, & Crowther, 2012). This lack of trust makes it difficult for students to form a community of learning of the same quality that occurs within a traditional face-to-face design studio. This highlights why design instructors consider face-to-face interaction to be critical in design education; to facilitate communication, rapport, and trust building through the immediacy of feedback that provides the efficient social negotiation. DDE researchers have speculated that new technologies and platforms, such as social networking sites (SNS), could facilitate similar types of social interactions to that which occurs in the traditional studio (Ham & Schnable, 2011; Wang, 2011). SNS grew out of the advent of Web 2.0 technologies and are built around social connections that enable fluid interaction and collaboration between users (boyd & Ellison, 2007; Greenhow, Robelia, & Hughes, 2009). Examples of SNS include the well-known social media sites Facebook, Twitter, and LinkedIn, as well as broader categories of media such as blogs, wiki platforms, and virtual worlds (Manca & Ranieri, 2016). SNSs have dramatically grown in popularity in the last decade and have begun to make steady inroads into the academic world, with over 40% of educators reporting that they use social media in the classroom (Barczyk & Duncan, 2013; boyd & Ellison, 2007; Manca & Ranieri, 2016).

Junco, Heiberger, and Loken (2011) found that faculty often adopted SNS in their classrooms as a way to motivate students to engage in the learning process. Furthermore, the social character of SNS appears to be ideally situated for use in education because effective learning communities are based around social relationships (Lave & Wenger, 1991). As a result, researchers have hypothesized that SNS can be used as an effective community building tool to mimic the social interactions that occur within a traditional classroom (boyd & Ellison, 2007; Grimes & Fields, 2012; Hew & Cheung, 2013).

Much research has focused on measuring attitudes of the use of SNS and the novel application of SNS (Barczyk & Duncan, 2013; Cooke, 2015; Karvounidis, Chimos, Bersimis, & Douligeris, 2014). Ractham, Kaewkitipong, and Firpo (2012) found that 55% of students believed Facebook assisted in their learning process. Ham and Schnable (2011) reported an even higher level of enthusiasm from students, as 80% of students had a positive opinion of the use of social media in their course. Ellison, Steinfield, and Lampe (2007) found a correlation between some types of SNS use by students and a feeling of social belonging within the university community, and the ability of SNS to assist in community building was confirmed by Barczyk and Duncan (2013). However, few of these studies clearly demonstrate substantial measurable learning impacts from the use of SNS.

The larger body of research on SNS has been more descriptive in nature, relating the novel application of SNS to various eduational settings or subjects. Caswell, Jensen, Lee, and Shelton (2010) described of the use of Twitter to recreate historical events. The Author (2014b) used Pinterest to help students organize and analyze design material. Jalali, Sherbino, Frank, and Sutherland (2015) examined the use of Twitter in supporting learning amongst participants at academic conferences. Benetoli, Chen, and Aslani (2014) examined several uses of SNS within pharmacy education which were descriptive in nature. These studies represent just a handful of the diverse applications of social media across many fields.

Despite the research on, and experimentation with, social media within the classroom, researchers believe that additional research is sorely needed, especially to measure the direct impacts of social media on the learning process and learning outcomes (Crook, 2012; Manca & Ranieri, 2016). Barczyk and Duncan (2013) have stated that more research needs to be conducted on the how effective SNS are at building a learning community within the classroom environment. Cooke (2015) similarly echoes the need to study the impact of SNS on specific aspects of education, in order to understand the impact that SNS has across the pedagogy.

2. The Scope of this research

This research evaluates the effectiveness of SNS to facilitate discussion between students in comparison to traditional discussion boards used in a learning management system. Discussion boards are a ubiquitous element of online education as the primary mechanism through which students can engage in dialogue with their peers and instructors (Palmer, Holt, & Bray, 2008). Discussion boards have been found to be an effective way to decrease feelings of isolation amongst online students (Kirkwood & Price, 2005) and contribute to a sense of community building (Davies & Graff, 2005). However, the effectiveness of discussion boards is limited by the degree to which students actively participate with each other in discussing and negotiating a shared understanding. Wise, Hausknecth, and Zhao (2014) found there has been insufficient research on how students interact on discussion boards, but that there is a general assumption amongst educators that students conscientiously read and respond to their peer's posts. What research has been done has shown a generally low pattern of engagement by students (Brooks, Greer, & Gutwin, 2014; Palmer et al., 2008; Peters & Hewitt, 2010; Wise et al., 2014). Because building a successful learning community is contingent upon students engaging in legitimate social interactions with their peers and mentors, these findings raise serious concerns about the effectiveness of current online discussion boards in fostering community-building within an online course (Lave & Wenger, 1991).

The leading theories of design pedagogy are heavily reliant upon the physical setting of the design studio to facilitate social interaction in order to give impetus and drive to creative ideas (Schön, 1985; Fischer, 2004). Design educators believe discussion boards are insufficient to create the type of social interactions essential to design learning (Author, 2014a). However, the social aspect of a SNS has the potential to facilitate the rigorous social interactions that have been found lacking in DDE (Ham & Schnable, 2011; Wang, 2011). The collaboration of the design studio may be replicated through a SNS, which enables individuals to meet, interact, and develop a relationship, and then "create, consume, and share" material developed through a collaborative process (Greenhow et al., 2009). These features of a SNS support the belief that the medium may be an effective means of facilitating the rich social interactions that have been lacking in previous instances of DDE, specifically the creative and collaborative process, which is reliant upon interaction within a socio-cultural context (Fischer, 2004).

This research compares the communication that occurs on discussion boards and SNS during a design project to analyze how students interact by examining the frequency of posts, number of interactions, and the subject matter of the posts. The objective of this research is two-fold. First, it will help provide educators with a better insight into the effectiveness of SNS as an educational tool for fostering community-building through attentive communication on the part of students and, secondly, it will evaluate the effectiveness of SNS as a tool for promoting improved engagement in design-centric conversation between DDE students.

3. Context

The course used in this research is an introductory landscape architecture course at a university in the United States. The course has a diverse range of students enrolled in terms of year-level and declared major. In general, very few of the students are landscape architecture majors, or majoring in a related design field, but are taking the course to satisfy university general educational requirements. This course was first offered online beginning in 2004. Beginning in 2009, the course began to incorporate a series of design exercises, and the design component of the course has become both increasingly important to the curriculum and highly popular with the students. However, course evaluations have consistently shown that students are unhappy with the course discussion board and the feedback they receive on their designs via the discussion board.

4. Methodology

For this study, a SNS was created using the Ning platform, which enables individuals to create a SNS that is customizable to their particular needs. Ning was selected over an established SNS, such as Facebook, because of the ability to customize the available features and create a closed network available only to the students enrolled in the course. Students in the course (n=30) utilized the SNS from the first week of class and, at the beginning of the course, were given an assignment to familiarize themselves with the functions and use of the site. During the final three weeks of class, students were required to post their design exercises on the SNS and post a critique of no fewer than two of their peer's projects. This requirement was intended to instigate communication between students and provide a starting point from which social interactions would organically progress. Further interaction was not required, primarily because the purpose of the study was to determine if the nature of an SNS would encourage students to interact in a meaningful way, and it was felt that introducing pedagogical scaffolding requiring a high-level of interaction would complicate determining the impact of the SNS.

Following the completion of the course, the social interactions between students were analyzed to determine if students were engaging in significantly more social interactions on the SNS, which is specifically designed to facilitate social interactions, in comparison to the LMS, which is primarily meant to facilitate learning through curriculum management. Specifically, there was an analysis of the number of interactions that occurred on each post, the levels of interactions (level one being an initial response, level two being a reply to that response, etc.), and the content of the posts. Additionally, a word count was conducted to uncover any difference in the length of posts on either the LMS or SNS. These findings were then compared to the same data from student posts on the Canvas LMS from the previous semester (n=24) to determine if there was any substantial difference in the social interaction between the SNS and the LMS. Other than the student cohort, the same learning material and assignments were used in both semesters.

A content analysis of student's comments was conducted to determine if either platform encouraged deeper commentary and participation by students, or in some way altered the type of communication that took place. Content analysis has been used to analyze discussion board posts and proven to be an effective method for evaluating student interactions (De Wever, Schellens, Valcke, & Van Keer, 2006). Paired with the analysis of the depth of conversation that occurred, it is possible to make an assessment on whether the SNS facilitates changes in the type and/or quality of discussion that occurs amongst the students. To conduct the content analysis, comments from students were open-coded line-by-line. After completing the initial coding round, a synthesis round was conducted in which the initial list of codes was analysed and similar codes were grouped together.

5. Results

The results found that the number of interactions, level of interactions, and post word counts on the SNS and LMS were comparable. There was a modest increase in the average number of student responses per post on the SNS, with 2.59 responses compared to 2.4 on the LMS. Very few of the conversations advanced into multiple levels of interaction on either system. Only two social interactions (of 188 possible interactions) advanced beyond the first level on the SNS. Likewise, only two social interactions (of 160 possible interactions) advanced beyond the first level on the LMS. In all four of these instances the original post had garnered a high number of total responses from peers, and all were in the upper quartile of responses per post. The word counts for initial posts on the SNS and LMS were 121 and 135, respectively, and 63 and 77 for responses (see Table 1). None of these results were statistically significant and suggest

that there is little difference in the inherent ability of the SNS to encourage social interactions between students at a rate higher than a traditional discussion board.

Method	Total posts	Average # of responses	Second-level interactions	Avg. initial post word count	Avg. response word count
LMS	160	2.40	2	135	63
SNS	188	2.59	2	121	77

Table 1: Response rates, depth of interaction, and word counts for the LMS and SNS.

The coding process resulted in the identification of 30 initial codes. After reviewing all of the coded comments, these were consolidated into 15 codes, which were subsequently grouped into the four thematic categories of design, pedagogy, self-reflection, and social. The design category included the codes of critique, design description, design context, and process; the pedagogy category included the codes of assignment difficulties and pedagogy; the self-reflection category included the codes of comment on personal ability and experience; the social category included the codes of agreement, direct response, idle discussion, personal insight, personal preference, positive reinforcement, and rapport building. The complete coded responses for the LMS and SNS are shown in Table 2.

6. Discussion

The results of the study were somewhat surprising. First, it was hoped that the use of the SNS would improve student collaboration by increasing both the number of social interactions and the depth of interactions that occurred between students. In examining the number of interactions and the depth of the interactions, the SNS provided no significant improvement over what occurred in the LMS discussion board. The results of the study found a modest increase in the number of interactions and, comparable to the LMS, very few conversations on the SNS moved beyond the first level of interaction. This result was disappointing in light of research suggesting the social framework created by an SNS would encourage students to interact and collaborate with each other at an elevated level. Additionally, this finding is contrary to the expectations of DDE researchers who were optimistic that an SNS could act as a model, or method, to improve collaboration in DDE (Ham & Schnable, 2011; Wang, 2011).

At a fundamental level, SNS work through leveraging the existing social network of an individual, and without these pre-existing social networks individuals do not engage in a high level of interaction (boyd & Ellison, 2007). The organic growth of a personal social network is necessary for the SNS to retain much of its effectiveness in fostering social interaction. By artificially creating a new social network tied solely to a course, and asking students to interact within that network, educators appear to be undercutting the authentic social character of an SNS. This confirms the conclusion of Khoo and Cowie (2011) that online communities can not be forced into creation. Therefore, it is unlikely that an SNS will work effectively as a social solution within DDE unless students are able to build rapport with each other prior to interacting on the network. This suggests future experiments with SNS would be better done with advanced students who have had time to create a social network with each other in previous face-to-face courses. However, this does not provide a solution for how DDE might be utilized earlier in a design curriculum, or in cases where students are geographically distributed and unable to build rapport prior to enrolling in a course.

As a motivational tool, it would appear that SNS does not extrinsically motivate students to participate at a higher rate, suggesting that instructors are not gaining the motivational benefits in the classroom that they are trying to achieve through the implementation of SNS (Junco, Heiberger, & Loken, 2011). This finding supports the conclusion of Barczyk and Duncan (2013), who found that while students had a favorable opinion of SNS, they did not find it any more useful or preferable than the LMS. This has significant implications for educators and administrators who view SNS as a potential method for improving learning and connectivity amongst modern students.

Code	LMS Initial post	SNS Initial post	LMS Replies	SNS Replies	LMS All posts	SNS All posts
Agreement	0 (0%)	0 (0%)	19 (16.81%)	5 (3.91%)	19 (9.18%)	5 (2.92%)
Comment on Personal ability	1 (1.06%)	2 (4.65%)	2 (1.77%)	0 (0%)	3 (1.45%)	2 (1.17%)
Critique	0 (0%)	0 (0%)	1 (0.89%)	28 (21.88%)	1 (0.48%)	28 (16.37%)
Design description	3 (3.19%)	8 (18.61%)	12 (10.62%)	7 (5.47%)	15 (7.25%)	15 (8.77%)
Design Context	17 (18.09%)	7 (16.28%)	5 (4.43%)	2 (1.56%)	22 (10.63%)	9 (5.26%)
Assignment Difficulties	3 (3.19%)	6 (13.95%)	2 (1.77%)	6 (4.69%)	5 (2.42%)	12 (7.02%)
Direct response	0 (0%)	2 (4.65%)	5 (4.43%)	8 (6.25%)	5 (2.42%)	10 (5.85%)
Experience	6 (6.38%)	2 (4.65%)	3 (2.66%)	2 (1.56%)	9 (4.35%)	4 (2.34%)
Idle discussion	0 (0%)	0 (0%)	1 (0.89%)	2 (1.56%)	1 (0.48%)	2 (1.17%)
Pedagogy	21 (22.34%)	4 (9.30%)	12 (10.62%)	5 (3.91%)	33 (15.94%)	9 (5.26%)
Personal insight	9 (9.57%)	1 (2.33%)	9 (7.97%)	3 (2.34%)	18 (8.70%)	4 (2.34%)
Personal preference	9 (9.57%)	4 (9.30%)	4 (3.54%)	8 (6.25%)	13 (6.28%)	12 (7.02%)
Positive reinforcement	0 (0%)	0 (0%)	9 (7.97%)	43 (33.59%)	9 (4.35%)	43 (25.15%)
Process	25 (25.6%)	7 (16.28%)	11 (9.74%)	4 (3.13%0)	36 (17.39%)	11 (6.43%)
Rapport building	0 (0%)	0 (0%)	18 (15.93%)	5 (3.91%)	18 (8.70%)	5 (2.92%)

Table 2: Coded responses

Clearly, SNS can only go so far in impacting student behavior. It is apparent that most students using the SNS completed only the minimum amount of interaction required by the assignment, behaving in a similar manner to students on discussion boards (Palmer et al., 2008). This reinforces the suggestion above that pedagogical scaffolding solutions are potentially a more potent force in encouraging students to interact, and that requiring higher levels of interaction between students as part of a graded assignment could be more

effective than relying solely on the social merits of an SNS. It is recommend that researchers continue to experiment with SNS within distributed design education, but pedagogical incentives need to be integrated for success.

Examining the second research objective of the impact of SNS on student engagement in design-centric conversation, it appears that the SNS positively altered student posting behaviour. Wise, et al. (2014) has found that learner's posts on discussion boards were often "shallow and disjointed." In the present study, this was especially true of the LMS discussion board, where the conversation often focused on technical aspects of the course pedagogy, instead of the learning material and each other's designs. More importantly, the student discussion was focused largely on their own designs. Agreement and rapport-building (defined during the coding process as finding common experience) are the two most prominent codes from student replies on the LMS, but neither leads to improvement in the design. Some examples of student replies that were coded like this include:

"I used the tree painting as well. And I put them in groves for most of the design of my landscape."

"I agree about some of them being distracting. I want to feel calm and relaxed in my yard, not distracted. "

"I liked the one with the trees as well. I thought of them as quaking aspens. It reminds me of home where I grew up."

From the perspective of a design conversation and the critiquing process, none of the above comments provide the original poster with valuable feedback on how to improve their design. These type of replies run counter to Fischer's (2004) description of the creative process in which students have their design ideas challenged and are encouraged to consider alternative solutions through the development of further design iterations. Rather, the interactions on the LMS discussion board resemble what Webb, Jones, and Barker (2004) and Thomas (2002) describe as "parallel monologues" in which students' posts have little discursive relationship to each other. In stark contrast, on the SNS, significantly more of the replies in the discussion were directed outwards, and concern the work of other students. The second-most common code in the replies on the SNS was "critique" with 28 coded instances (this compares to just a single coded instance of critique amongst replies on the LMS). Some examples of student-responses coded as critique include:

"The big flaw I see in this design is the use of space that has an ocean view. Use the ocean view as the main piece in the design and design around that. Make sure you have an idea of what that space would be used for and how it should be used to enjoy the ocean view."

"You could put the raised beds in a cool arc pattern from the entertaining area. Then with the leftover space you can extend the path/patio area and move the sun bathing section away from the entertaining area."

"In the upper left hand corner, maybe you could put some type of fountain or water feature. That seems to be the only element missing."

Compared to the comments from the discussion board, these comments demonstrate the value of directed responses that critically focus the discussion on a peer's design. Unlike the responses from the discussion board, which provided only cursory agreement and often amounted to a description of the design, the comments from the SNS provided their peers with actionable information that simultaneously challenged the concept of their design and provided them with alternatives to consider and evaluate. This is the most critical finding from the current research in relation to the delivery of DDE, and suggests that a SNS, while it might not improve the quantity of discussion between students, may encourage students to focus their comments outward, onto the work of their peers.

Why this is the case remains unclear. It is possible that the differences in responses may be the result of a conditioned response. Discussions on popular SNS services, such as Facebook or Twitter, are organic and unscripted, and replies focus on a post or topic – they are a direct response to the individual. On mainstream SNS an individual responds to a post, but has no requirement to create original content on that topic, and may thus feel more free on a SNS to respond about the topic in a very outward manner. However, on a discussion board, the conversation is typically scripted (intentionally or unintentionally by the instructor) with a discussion prompt and interaction expectation that students often encounter across multiple courses.

It is possible that the regular use of a similar discussion board interaction formula across multiple courses inadvertently conditions students to respond in a predictable way. This interpretation would support the findings of Thomas (2002) who suggested that the structure of online discussion forums, in which students are given assigned topics with required replies organized into threads, biases and limits the conversation that occurs amongst students. Regardless of the cause of the different discussion behavior exhibited on the SNS, the analysis of the conversations suggests that utilizing an SNS may indeed produce better results for DDE in regards to improving learning outcomes by improving the rigor of the discussion. Therefore, the conclusion of this research is that SNSs appears to provide an improved alternative to discussion boards for design educators based on their ability to encourage outward, design-focused discussion.

7. Future Work

More research is needed to understand the exact mechanism within the SNS that altered student's discursive behavior. Research also should focus on the application of scaffolding strategies to increase the level of interaction between design students, including if introducing additional scaffolding has any impact on the discussion that occurs between students. Finally, research should be conducted on incorporating a student's existing social network into the academic use of a SNS, even those who are not enrolled in the course.

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