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The Effect of Soft Classroom: A New Learning Environment Integrating MOOCs into Conventional Classrooms for College Students

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Abstract
In the last two decades, new insights into the nature of teaching and learning have driven the development of a variety of constructivist approaches for providing flexible and powerful student-centered learning environments. Also, recent advances in technology and in ideology have unlocked entirely new directions for education research. At the center of this discussion is the flipped classroom. This paper presents an ongoing study on how to integrate MOOC courses with an on campus course, adopting both the flipped classroom and self-directed learning paradigms. The authors created and recorded four courses, 2D CAD, 2D CAD project, 3D CAD and 3D CAD project, on Coursera, a popular MOOC platform. The instructor proposed three learning environments, the "hard classroom", "hybrid classroom", and "soft classroom". The students rated the environments for favorability in the beginning of the semester and decided whether or not they would go to the classroom during the course hours listed on the syllabus and how their learning would be facilitated. The "soft classroom" was the students' first choice, over the "hybrid classroom" and "hard classroom." Therefore, they were not required to attend the classroom physically. In addition, the students were responsible for their own pace of learning, without their learning progress being regularly checked. The instructor and teaching assistants were still available in the classroom during the course hours to interact with students. To understand how the "soft classroom" worked and helped students to learn, the authors distributed a self-developed survey, followed by focus group interviews of the students to reflect students' attitudes toward classroom attendance and their learning efficacy under this innovative self-regulated learning. Three rounds of surveys were conducted to examine students' changes in attitude and preferences as well as their perceptions of their learning efficiency. Based on students' self-reports, the average rate of physical classroom attendance was 26%. More than 60% of the students preferred this "soft classroom" learning. In addition, they reported on how efficient this course was in response to this new learning environment. The results from the three rounds of surveys and focus group interview provided evidence of the success of the current case. Students exhibited positive attitudes toward the soft classroom and achieved better learning outcomes. Besides expressing a preference for this learning paradigm, students also benefitted from its effectiveness. The soft classroom is an innovative model of teaching that utilizes educational technology and active learning to positively influence the learning environment by providing students opportunities to decide on the ways they are learning.

Introduction

Advances in technology provide students with plenty of opportunities to access materials online to support their learning processes. Learning from massive open online courses (MOOCs) is one of the new learning paradigms evolving in this trend. Although teacher-centered learning has some advantages, it may not provide students with sufficient flexibility or even the necessary skills to tackle real-world tasks. The modern challenge and trend is that students should become more responsible for their own learning and demonstrate higher readiness for self directed learning (SDL).

In the current case study, flipped classroom instruction was adopted in a course by

integrating MOOC online learning and weekly physical classes on campus. Students were required to watch the lecture videos pre-uploaded on Coursera every week and complete the online homework in four courses. Since the lectures were pre-uploaded and could be viewed anywhere and anytime, the emphasis on attendance in the physical classroom was decreased. Therefore, the authors propose a new paradigm, the soft classroom, which integrates both the MOOC and conventional learning, and advocate for it as one self-directed learning ideation that is particularly suitable in the flipped classroom context. This integrated classroom involves students viewing video lectures outside of class and then participating in learning activities during synchronous class time. Instruction occurs outside of the classroom, as opposed to traditional models of the lecture classroom and the independent creation of work. This self-directed learning environment stresses the circumstances that are of importance for successful learning to happen at all. Learning builds on the assumption that it is an individual process that develops in the cognitive conflicts that individuals experience when they expose their ideas in "exploratory talk" (Knight, 2007) with other peers. This means that learning takes place also among peers and is not only dependent on the influence of authoritarian experts. Students should be provided with opportunities to decide and manage the pace and ways of their learning. One way to search for an optimal situation is to combine traditional teaching and cooperative learning groups.

The purposes of the current case study were to examine if and how the soft classroom works, and to understand student favorability and the efficiency of learning. Three rounds of surveys and a focus group student interview were conducted to examine changes in students' ratings of the favorability of the soft classroom and their perceptions of their learning efficiency.

Literature review

Innovative learning in civil engineering education

The changing nature of the engineering industry also requires constant changes to the educational process, and our reliance upon technology should not be the only driving mechanism for educational advancement (Caffarella, 2013; Coates 2000; Toft 2003). Modern engineering education programs should prepare students to become engineering practitioners. Hands-on projects and experience-based learning have, to some extent, helped students to cohesively conceptualize engineering fundamentals to develop holistically acceptable solutions for engineering problems. Many innovative learning paradigms have been advocated for civil engineering education. The dominant approaches are student-centered, self-directed learning, the flipped classroom, and experienced-based learning. These approaches share something in common. Callan (2000) asserted that these proactive approaches to learning will become a necessary survival skill and are associated with critical thinking as well as improved understanding and decision making (Candy, 2004). Self-directed learning (SDL) has often been regarded as a critical part of individualizing learning experiences (Caffarella, 2013).

The connected era creates a new need for learners to be knowledgeable about resource selection and to develop the ability to manage the collection, management, and use of relevant information (Brookfield, 2005; Knight, 2007). Current digital technologies also allow for newer ways of configuring classrooms, allowing for greater flexibility to students in the selection of topics to study as well as approaches to studying them (individually, collaboratively, and so on). Along with pedagogy and research frameworks, concepts related to self-directed learning (SDL) are prevalent as a way to differentiate

learning, change the roles of the learner and teacher in the classroom, alter the time/place of learning, and potentially alter the structure and practices of traditional schooling. There is increasing evidence in the literature promoting the advantages of both face-to-face and online learning, such as personal interaction with the teacher and other students and the flexibility and variety of online content (Wanner & Palmer, 2015). New developments in the educational landscape, such as online learning opportunities, shifts in pedagogy, and Internet-connected mobile devices, place additional expectations on all learners to take more initiative in their own learning (Chan, 2009; Knight, 2007). Similarly, innovations such as Khan Academy (www.khanacademy.com) or Coursera (Coursera.com) have sparked interest in the value of self-directed learning in elementary schools and consequent changes in the role of the traditional classroom teacher. In these models, additional class time is not needed for direct instructional purposes, freeing the teacher to address questions and individualize instruction. In such flipped classrooms, students must be able to manage resources, demonstrate independence, and be capable of self-discipline in order to be successful.

Self-Directed Learning and Effective Learning

Current research on the development of SDL has focused on both the internal characteristics of the learners and the broader context within which the learners are situated. For instance, Guglielmino (2007) commented that certain learning contexts are more effective at promoting self-directed learning. Confessore (2008) concluded from existing research that there is "evidence that the characteristics used to describe the learning organization are necessary ingredients for SDL to flourish." The emerging learning environments of the 21st century combine different pedagogies and technologies and provide ample reason to reexamine the opportunities for self-directed learning.

Candy (2004) suggested that self-directed learning "provides a more direct route into understanding the actual dynamics of and relationship(s) between learning and technologies." Technology can constrain the direction and focus, allowing for a user to quickly find and record relevant information, yet it also can be a distracting environment that leads to inefficiency or reduces motivation. Technology affords incredible access for learners to connect with others, explore topics of interest, and participate in opportunities otherwise unavailable to them. In addition, technology provides vast amounts of resources, both information and people, to serve as materials for further inquiry. These affordances can also be detrimental, for the vastness of resources can reduce the learner's ability to select relevant materials or stay on target for the learning activity. Focusing, in particular, on intentionally designed environments that broadly support SDL principles (such as a modified schedule to allow more time for projects and collaboration, pervasive access to technology, problem-solving content design, and intensive professional development for the teachers) could be informative to both theory and practice.

Theory and research further suggest that academic motivation is the product of an interaction between the structure of the learning environment and learner characteristics. The characteristics of the setting, including the level of instructor control, will influence the learner's perceptions of the learning endeavor and engagement with that endeavor (Candy, 2004; Kember, Gall & Gall, 2012). Research suggests that variations in teaching techniques are associated with variations in academic motivation (Fisher & Tague, 2011). Other positive effects of students' affective responses associated with self-regulated learning and academic goal orientation (Fisher & Tague, 2011) highlight one potential mediating variable: academic motivation. The potential mediating effect is also consistent

with the reported relationship between motivation and engagement (Gibbon, 2012). Interactions between academic motivation, learner characteristics, and instructional setting highlight one mechanism by which a mismatch between instructional setting and learner characteristics may affect performance (Chou & Chen, 2008). However, the effects among these variables still require further exploration.

The next section focuses on the design of the study, describing both the methods and instruments used and the three learning environments we proposed. Subsequent sections describe the data collection and analysis of both the quantitative and qualitative data and the findings of the analysis.

Methodology

Participants

The participants in this study were students from one required course in the Department of Civil Engineering, Engineering Graphics, at National Taiwan University during the fall semester of 2015. A total of 36 students were enrolled in this course. Most (about 87%) were majoring in civil engineering, and the rest were majoring in bioenvironmental systems engineering or electrical engineering. In terms of other characteristics, 87% were freshman, 10% were seniors, and 3% were juniors; 81% were male and 19% were female.

Site and Course Content

The engineering graphic course was an 18-week, three-credit freshman-level required course for civil engineering students at National Taiwan University. This course covers four engineering graphic subjects, 2D CAD, 2D CAD project, 3D CAD, and 3D CAD project. All of the learning materials, such as lectures and reading supplements, were pre-recorded and uploaded on Coursera (Coursera.com), a popular MOOC platform. Since the expected workloads differed between MOOC learners and campus students, the instructor arranged a learning schedule for the campus students that was approximately twice as fast as the MOOC schedule.

The course adopted flipped classroom instruction by integrating online learning and a weekly on-campus course. The MOOC course included lectures, quizzes, assignments, and discussion forums, so physical face-to-face meetings on campus seemed not to be absolutely necessary. Students were required to watch the lecture videos every week and complete the online homework, in addition to taking three examinations on modeling in a physical computer classroom. Students who were enrolled in the Engineering Graphics course watched videos on Coursera and reserved weekly course hours for questions and discussion. During the three exams, students were allowed to review the video lectures on Coursera to complete the tasks.

Since the lectures were pre-uploaded and the students could view the course content anywhere and anytime, attendance in the physical class was not entirely necessary. Therefore, the authors proposed a new instructing/learning paradigm They had the students rate the favorability of the “learning environments” and decide whether they would go to the classroom or not during the weekly course hours listed on the syllabus and how their learning would be facilitated in the beginning of the semester.

The students were asked to rate the favorability of three options: “soft classroom”, “hybrid classroom”, and “hard classroom”. The main difference in the three options was the degree of monitoring by the instructor and teaching staff. In the **“soft classroom”** option, the

students were not required to go to the classroom weekly, and they were responsible for pacing their own learning without being regularly checked. However, the instructor and teaching assistant were still available in the classroom during the course hours to interact with students. The **"hybrid classroom"** employed the same rule on physical classroom attendance, but the instructor would check students' learning progress on a weekly basis. The **"hard classroom**" was mostly a traditional learning environment. Students were required to attend the course and the instructor would check learning progress every week. Students were asked to rate the three environments and decided to adopt the "soft classroom" for the fall semester of 2015.

Procedure

The questionnaire surveys and the focus group interview were conducted to comprehensively document students' performance, favorability ratings of the environments, and reflections. During the fall semester of 2015, a survey was distributed three times: immediately after two midterm exams and one final exam. The questionnaires aimed to determine students' ratings of the favorability of the soft classroom and the effects of learning in this innovative instructional environment. In addition to the standard question items, the questionnaire included several open-ended questions. Nine students were recruited for the focus group interview upon the recommendation of the instructor and teaching staff, with three students from each group (hard, hybrid, and soft, accordingly). In the end, seven individual interviewees completed the interview process. The interview collected details of their learning experiences and reflections on the course. The purpose was to further understand students' perceptions of the "soft classroom" learning environment and its effectiveness.

Data Collection and Analysis

The data collected for this research comprised 36 student questionnaires and interviews of seven students from the focus group.

The dataset for analysis included the data from three questionnaire surveys conducted after examinations in 6^{th}, 10^{th}, and 18^{th} weeks. The questionnaires were completed in the classroom. The focus group interview was conducted toward the end of the semester. We conducted the survey three times for two main reasons: first, to improve the development and validation of one self-developed survey; second, to correspond to and reflect on three votes on attitude transition and midterms to further depict students' performance. In addition, to examine the effect of the soft classroom, students' grades from the fall semester of 2014 were compared with those from the fall semester of 2015.

To understand the students' experiences of and reflections on this learning environment in detail, the authors selected nine students for focus group interviews. The interviewees were selected based on their shifts in favorability scores of the environments, such as changes in their ratings from the soft classroom to the hybrid or hard classroom in the first, second, or third round of the survey. Seven students were interviewed. As shown in Table 1, this group was composed of the following: 86% were freshmen from civil engineering, and 14% were seniors from bioenvironmental systems engineering; 57% were male and 43% were female; 71% changed the ratings and 29% did not. Questions focused on changes in students' preferences and reflections on the learning environment, as well as any effective learning strategies they developed in response to this innovative environment.

Table 1 The backgrounds of students in the focus group interview

Gender	Dept./Grade	1st Rating (1st week)	Second Rating (6th week)	Third Rating (10th week)
M	Bioenvironmental System Engineering/Senior	Hybrid	Soft	Soft
F	Civil Engineering/Freshman	Soft	Soft	Hybrid
F	Civil Engineering/Freshman	Soft	Soft	Soft
F	Civil Engineering/Freshman	Soft	Hard	Hard
M	Civil Engineering/Freshman	Hybrid	Hard	Hard
M	Civil Engineering/Freshman	Soft	Soft	Soft
M	Civil Engineering/Freshman	Hard	Soft	Soft
M	Civil Engineering/Freshman	Soft	Soft	Soft
M	Civil Engineering/Freshman	Hybrid	Soft	Soft

Instruments

The questionnaires aimed to examine how this new learning paradigm worked by targeting two main questions to determine the favorability and effectiveness of the soft classroom. In order to answer these questions, the surveys were developed based on related learning theories, such as self-directed, self-regulated, and autonomous learning theories. The questionnaire items were outlined and written by a focus group including the instructor, experts, and students. A pilot study was conducted to verify its reliability and validity. The first, second, and third versions of the questionnaire were designed with 47, 57, and 53 items, respectively. The items were divided into five parts: (i) how much effort students put into this course, such as the question "On average, how many hours do you spend on this course, including watching videos and doing homework?"; (ii) students' feelings regarding the favorability of the soft classroom, such as the question "Do you like this way of learning?"; (iii) the effectiveness of the soft classroom, such as the question "What do you feel about your learning outcomes?"; (iv) learning strategies developed corresponding to this course, such as the question "Did you develop any strategies for this course in response to the soft classroom?"; and (v) self-reflections on this course, such as the question "What is the ideal way to learn in university?". Parts (ii) and (iii) were mainly composed of Likert-type items scored on a ten-point scale wherein higher ratings represented stronger agreement. Because not all students consented to complete the questionnaire every time, the three rounds of the survey respectively collected 36, 35, and 35 copies of questionnaire feedback.

Results

Data analysis revealed the following two main findings: First, students' attitudes toward the learning environment seemed to change throughout the course of this class. However, in general, students had a variety of reasons for adopting the soft classroom, since it was the learning environment that they preferred. Second, several lines of evidence show the effectiveness of this new learning environment.

Favorability of the Soft Classroom

Students' attitudes toward the learning environments seemed to change throughout the course of this class. From the beginning to the end of the semester, the number of students preferring the soft classroom learning environment increased from 15 to 23 students.

The questionnaire surveys and focus group interview showed positive results for both the favorability and the effectiveness of the soft classroom learning environment. A detailed explanation is provided in two parts in the following paragraphs.

The favorability of the hybrid classroom was higher than that of the soft classroom at the first rating (week 1). However, two students, both of whom were considered opinion leaders, gave good reasons for choosing the soft classroom and persuaded their peers to rate the environments again. Based on that decision, the instructor adopted the soft classroom, which would allow students to decide if they would come to the classroom during the class hours and manage the pace of their learning without being regularly checked.

The rating results are shown in Table 2. As can be seen in that table, the students' favorability ratings shifted at the four time points (the first week, 6th week, 10th week, and 18th week). The favorability of the soft classroom increased from 15 to 23 students, while that of the hybrid classroom decreased from 18 to 9. The rating of the hard classroom remained relatively unchanged.

Table 2 Ratings of Engineering Graphic Course learning environment at four time points

Voting	1st week	6th week	10th week	18th week
Soft Classroom	15	21	22	23
Hybrid Classroom	18	12	7	9
Hard Classroom	2	2	2	3
No vote	1	1	5	1

The results of the questionnaire surveys and group interviews were consistent. Students preferred the soft classroom for specific reasons that are illustrated in the following sections, based on the research questions.

(i) Question 1: Which does your ideal university learning environment look like? Why did you choose soft, hybrid, or hard?

Twenty-three (64%) of the students (Figure 1) chose the soft classroom for its flexibility, its efficiency, and their own sense of ownership of self-control. *"I think university learning activities are supposed to be mostly self-directed"* (Student No. 10). *"Self-directed or self-regulated learning is very efficient, especially in the online course. I could watch the video repeatedly and control the path by myself"* (Student No. 8). On the other hand, 11 (31%) students chose the hybrid classroom because it combined both elasticity of time and some level of pressure to ensure the learning progress or results. *"Some pressure could enhance my motivation to learn"* (Student No. 30). *"I like it that I could choose the way of learning that I like and not need to worry about the learning schedule at the same time"* (Student No. 35).

(2) Question 2: Please describe your ideal learning environment.

The students expressed that the ideal learning environment should provide knowledge, ownership, and opportunities for teamwork. First, regarding knowledge: *"Theory and practice are both important for this course. There should be sufficient discussion time for instructors and students to learn new things about engineering graphics"* (Student

No. 1). Second, regarding ownership: *"I like it that I can study the course at home by myself"* (Student No. 21). *"In this flexible learning environment, we could choose when and where we liked to learn. And we learned better!"* (Student No. 35). Third, regarding teamwork: *"More teamwork and discussion happened during the learning activities"* (Student No. 36).

(3) Question 3: Would you like to choose the soft classroom learning environment for your other courses in the future?

Twenty-two (61%) of the students (Figure 2) expressed a willingness to try it again. "*I am already adapted to this style through this course*" (Student No. 14). "*The learning time is very flexible*" (Student No. 1). "*Sure, since it is free and efficient*" (Student No. 25). Only 2 of the subjects refused to try again. "*Other courses were stressful. I don't think I could handle it myself*" (Student No. 10).

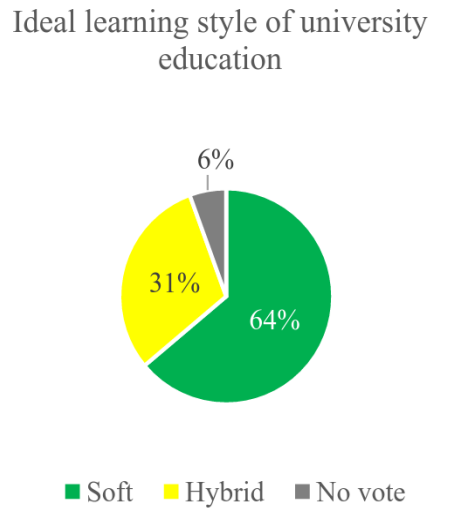

Figure 1 Ideal learning environment by votes

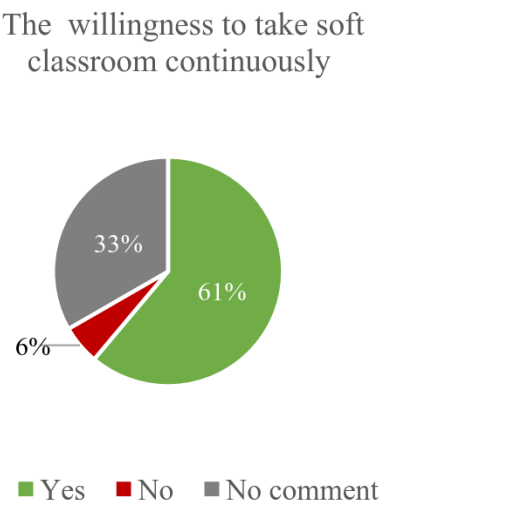

Figure 2 Willingness to try a soft classroom again

Effectiveness of the soft classroom

On the students' self-reported surveys, 22 students scored themselves higher than 70 points out of 100. Of these, seven students gave themselves scores of over 90; 8 students, scores of 80 to 89; and 7 students, scores of 70 to 79. Only 5 students scored themselves lower than 60. The effectiveness appears to have been dependent on three key factors. The first was procrastination: *"I didn't follow the learning schedule; I always completed the lecture video one week before the examination. I wish I could have done it better"* (Student No. 19). Second was a lack of practice: *"I was out of practice. Completing the lecture video and homework alone was not good enough for the course"* (Student No. 1). Third was the heavy course requirements: *"There are too many required courses for Civil Engineering freshmen"* (Student No. 10).

In general, student satisfaction tended to increase toward the end of the course. Most of them believed they should be responsible for their own learning. Furthermore, the students learned techniques for self-control, self-regulation, time management, and frustration management.

The growth of students' performance

The effectiveness of the soft classroom was also examined by comparing student grades in the fall semester of 2014 to those in the fall semester of 2015. In 2014, the overall course

grades of 32 students were calculated based on projects (40%), Coursera quizzes (25%), homework assignments (25%), and one midterm exams (10%). The average grade was 78 points, and the standard deviation was 14.06. In 2015, however, the overall grades were composed of scores on Coursera (60%), quizzes (30%), and one construction visit (10%). The average was 85, and the standard deviation was 9.72. As shown in Figure 3, more students scored higher in 2015; in fact, 83% of the students scored over 80 (A-) in 2015, as compared to the 56% who scored over 80 (A-) in 2014.

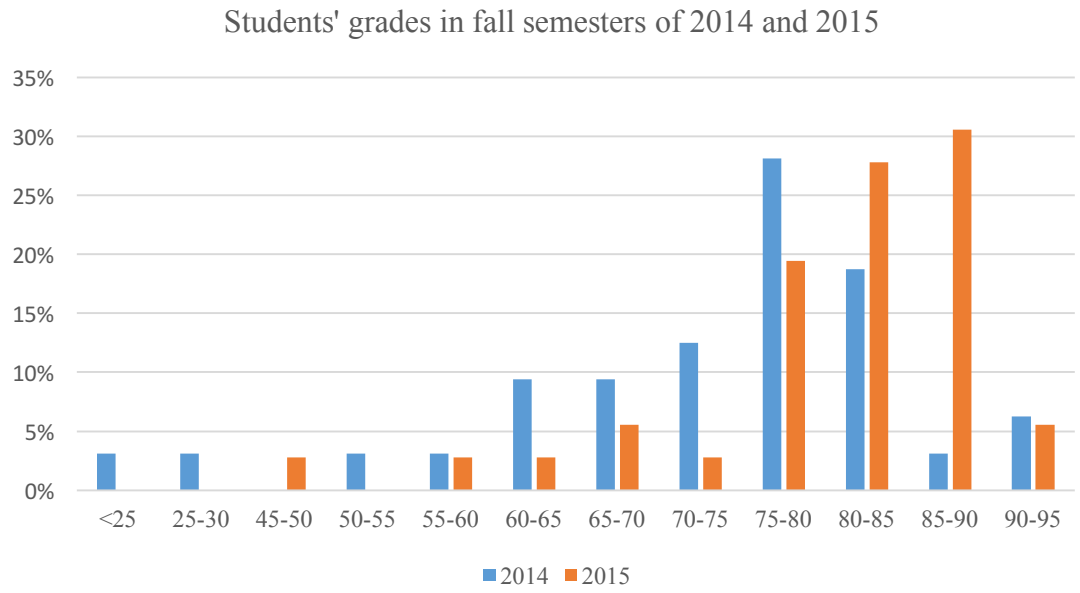

Figure 3 Students' final grades in the fall semesters of 2014 and 2015

Suggestions for improving the soft classroom in an engineering graphics course

Since the soft classroom was rated as favorable by the students and considered effective, they listed the following suggestions to improve the soft classroom.

(i) The students noted three main aspects that caused frustration or made experiences challenging. First, there was no immediately feedback: *"When we encountered questions while watching the videos, there was no one who could help right away. We had to figure it out by ourselves for the time being"* (Student No. 27). The second aspect was time management: *"I always pushed back th e priority of this course. It turned out that I didn't have enough time to complete it all"* (Student No. 36). Third was software problems: *"There were some differences between the lecture video and my software version of CAD"* (Student No. 8).

(ii) The students suggested that the learning effectiveness could be improved in two ways. First, students should develop personal learning habits: "*Due to frustrating experiences in this course, I would pay more attention to and tackle self management if there were a second chance*" (Student No. 22). Second, the teaching could be improved: *"Individual facilitation for peers who have not adapted to the learning environment could help a lot"* (Student No. 11). *"The instructor could provide more materials or relative cases for reference"* (Student No. 28). *"I would like to watch more lecture videos"* (Student No. 27).

Moreover, the authors further examined the reasons behind the change in the favorability ratings. In general, students who received above average grades preferred to choose an even freer learning environment, such as changing from a hard to a hybrid environment, or

from a hard to a soft or hybrid to soft environment. Students' favorability ratings of the learning environment seemed to be linked to their performance, to some extent. For example, 6 of the 8 (75%) students who voted for a freer learning environment on the first questionnaire received above average grades, and 2 of 2 (100%) who voted for a stricter learning environment on that questionnaire had below average grades on the first examination in the 6th week. This trend shows that the favorability of the soft classroom depended upon the students' mastery of and confidence in the learning environment.

Conclusion

In an attempt to integrate a MOOC course with a conventional learning paradigm and to increase student motivation and skills, the authors proposed the adoption of a "Soft Classroom" learning environment in an engineering graphics course. The soft classroom was implemented to better utilize an existing digital enhanced learning environment, the Coursera MOOC in the current case, in combination with self-directed learning, and thereby to enhance the motivation of self-directed learners.

Combining the flipped classroom and the self-directed learning paradigms, the soft classroom is an innovative model of teaching. This model utilizes educational technology and active learning to positively influence the learning environment by providing students opportunities to make decisions on the ways they learn. In the soft classroom, the instructor serves as a facilitator, and the students are empowered to become active participants in their learning experience. Initially designed for use in traditional higher education settings, the flipped classroom involves students viewing a video lecture outside of class and then participating in a learning activity during synchronous class time. Instruction occurs outside of the classroom, as opposed to the traditional models of the lecture classroom and the independent creation of work (Knewton, 2012). Mastery of concepts, hands-on projects and homework assignments, and collaborative work are the key goals of class time. During classroom time in every modality, students create graphic works with the guidance and assistance of the instructor. Students come to class ready to apply knowledge with the help of the instructor. Furthermore, with the instructor and teaching staff available to answer questions in the classroom, students receive the assistance they need to succeed. Many students are then able to engage in active learning and engage with the material, rather than passively listening to a lecture.

The courses were developed by focusing on students' self-directed learning. The results from our three rounds of surveys and the focus group interview provided evidence of the success of the current case. Students held positive views of the soft classroom. In addition to expressing a preference for this learning paradigm, students benefitted from its effectiveness.

The soft classroom works for several reasons. One is that students in such a classroom also develop a wide variety of learning strategies and techniques. Their active participation creates a creative yet productive learning environment. For instance, students welcome the sense of ownership of their learning, and as a result, they develop learning strategies and become active learners. At the same time, the sources of learning materials are plentiful. Instructors are able to create their own videos and use pre-existing ones online. The lessons provide students with plenty of opportunities to complete the learning material or study questions to help focus their individual learning. Evidence points to this new model as a viable option to utilize with students in the civil engineering classroom.

Teaching engineering courses should be different from teaching other courses, for

engineering courses prepare students to face the highly demanding engineering market. This case study supports a view of students as self-directed learners. Self-directed learning proposes that the most common and most important reason for learning is the desire to use or apply the knowledge or skill. In the self-directed learning model, the learner is viewed as having an innate desire to learn. The environment and instructors in formal education settings must foster this need. The learner must guide the objectives and experience, with the instructor responding to the learner's needs as a guide (Ozuah, 2005). Instructors must also rethink their traditional beliefs regarding teaching and learning.

The media technology serves as a bridge to learning. Students become a more valuable asset, controlling the pace of their own learning, while instructors serve as facilitators. The need for instructor interaction, facilitation, and feedback also lies at the core of the success. The move from a traditional classroom to a soft classroom creates a number of challenges for faculty members to overcome. It is critical to the success of the course that the instructor act as a facilitator and that students take control of mastering the learning targets of the course. Faculty members must be deeply involved in the creation of the course and lessons. Additionally, outreach and individualized progress reports for students must be considered and developed. Instructors and teaching staff should provide instant feedback and suggestions on all aspects of the course.

Further research is necessary to understand the benefits of the soft classroom in civil engineering education. For example, it would be helpful to discuss students' self-reported learning progress at the time of survey. The reality of their learning progress could be a reason why students' preferences shift. A student changing from hard to soft might indicate that the student manages time well and could learn more flexibility by choosing the soft classroom. Alternatively, a change from soft to hard might indicate that a student has fallen behind and is looking for more "support" from the instructor and teaching staff. Nevertheless, our research to date on the "soft classroom" shows that it provides a flexible and self-controlled learning experience, and the data from this case study demonstrated the positive effects of the soft classroom as well. The authors aimed to determine the benefits and a method of integrating MOOCs courses with engineering graphics courses in a soft classroom learning environment, and to examine the changes in learning behaviors and results of this kind of learning environment. It is hoped that this research will lead to an innovative engineering course in college civil engineering education that optimizes its effectiveness by using technology facilitation in the future.

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