Assessment of the Impact of Web-based Class Projects on Student Learning Experience

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Motivation

The purpose of this study is to assess whether exposing student course work to professionals outside the classroom, can motivate students to work harder and more enthusiastically and, as a consequence, improve their learning. Previous studies indicate that engineering students learn better when they perceive coursework as valuable to their future career, impactful on society, or relating closely to engineering practice[1,2,7]. Also, studies have shown that student learning improves when class projects are presented and reviewed by a much broader audience and that feedback from multiple sources improves overall academic performance[4,5]. In this study, these motivating factors are incorporated by augmenting "conventional" class projects into web-based projects using an online platform that makes them accessible to a wider technical audience.

Class Projects

• Web-based class projects have been implemented in two civil engineering graduate-level courses:

Course	Semester	Students	
		Undergraduate	Graduate
CEE 549 - Geoenvironmental Engineering	Winter 2013	6	13
CEE 542 - Soil and Site Improvement	Winter 2014	5	6

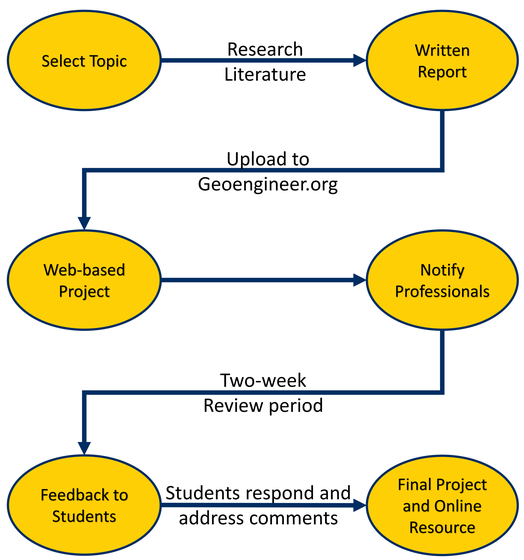
• Class projects have two primary components: a written report and an oral presentation.

• Course instructor notifies professionals via email announcements.

• "Draft" projects are posted online for a two-week review period during which professionals provide students with feedback.

• Final projects are uploaded and remain online as a technical resource at:
http://www.geoengineer.org/education/web-based-class-projects

General Project Procedure



Self-Assessment Survey

• Upon completing the course, students participated in an anonymous exit survey which aimed to assess the impact of web-based projects on individual student's learning experience.

• Survey questions targeted student self-reported learning, motivation, preferences, and overall experience.

• The survey also aimed to assess potential strategies for improvements to the course and projects and also solicited open-ended written feedback.

• Select questions asked students to rank various class components (lecture, online project, literature papers, problem sets, studying alone, studying with others, and the textbook) based on how they helped in better understanding the breadth of the course, better understanding a given topic in greater depth, and promoting collaborative work.

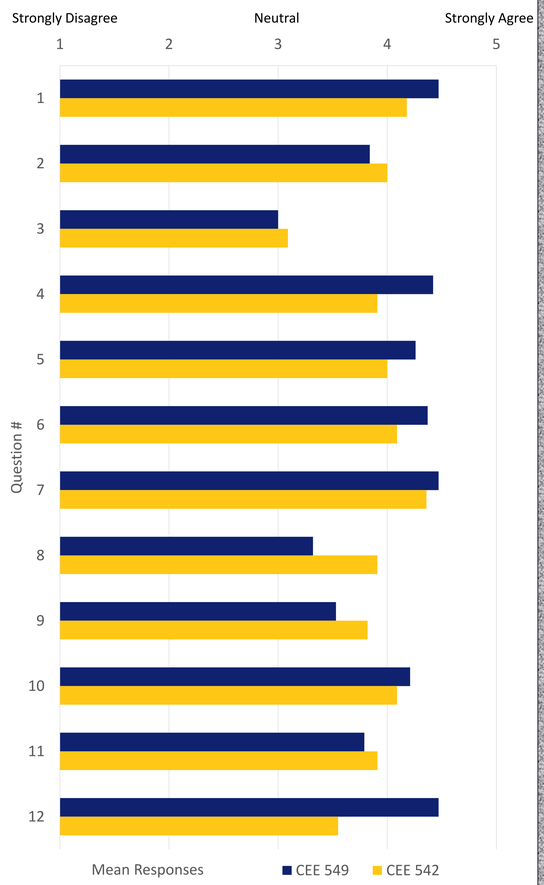
Student Responses

• Students in both classes indicated that online projects were the second most important component for understanding the breadth of the course subject, only surpassed by classroom lecture.

• Students considered the online projects to be the most important course component contributing to an in-depth understanding of the course material, which was an explicit objective of the online projects.

• Students also strongly indicated that the online project was the most important component promoting collaborative work.

Q#	Question Description
1	Having an online project instead of a final exam was overall an excellent decision
2	Having an online project instead of a final exam helped me learn more
3	Having an online project instead of a final exam forced me to study more
4	I overall prefer the experience of a web-based project compared to a conventional class project
5	The web-based project motivated me to do a better quality job overall than a conventional class project
6	The web-based project motivated me to work harder than a conventional class project
7	I like the idea of having professionals/online visitors reviewing my project, as opposed to just the instructor
8	Preparing the web-based project was more stressful than a conventional project
9	Working on a web-based project forced me to work more closely with my teammate(s) than I would have for a conventional project
10	Receiving feedback from the online visitors was professionally fulfilling
11	Responding to visitor's review comments was a valuable experience
12	I am excited about the fact that the web-based project will remain online and will be used as reference/resource by other professionals, students, or faculty



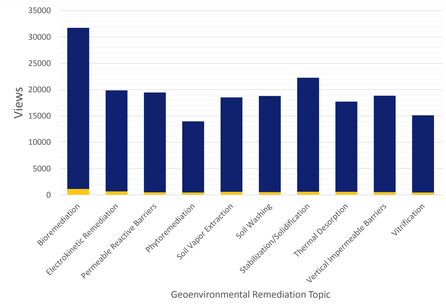
Professional Impact

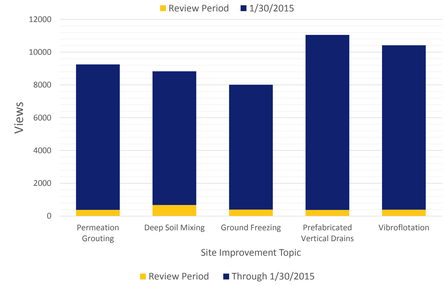
• During the two-week review period, while students received feedback from professionals, projects received 300 – 1,100 views.

• Through January 30, 2015, CEE 549 projects received a total of 14,000 – 31,000 views (roughly two years).

• Through January 30, 2015, CEE 542 projects received a total of 8,000 – 12,000 views (roughly one year).

• The high volume of traffic for projects posted for less than one or two years shows that professionals use these projects as online technical resources, and that they are extremely visible to the professional engineering community.





Conclusions

• "Conventional" class projects were replaced by web-based projects in two graduate-level engineering courses with the intention of improving student learning, motivation, and professional engagement.

• Survey results indicate that students' self-reported learning and motivation are enhanced when working on a web-based project compared to a conventional project. Specifically, students report that the online project was professionally fulfilling and motivated them to learn more, work harder and perform better quality work.

• Students drew satisfaction from creating a lasting resource for the profession.

• The large number of online visitors of student class projects is an indication of the value of these online resources for practitioners, researchers, and other students.

Future Work

• Additional student feedback is being planned through formal interviews of online project participants. Feedback received from students is used to devise improvements.

•Projects are planned to be expanded to additional courses and universities.

• The online platform through Geoengineer.org is freely available for use by educators.

Acknowledgements

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