CAN WE MAKE STUDENTS LIFELONG LEARNERS THROUGH SOCIAL NETWORKS?

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Abstract

The Accreditation Board for Engineering Education and Technology (ABET) criteria require engineering programs to demonstrate that their students attain "*a recognition of the need for, and an ability to engage in lifelong learning*". Online environments provide a great deal of access to self-learning resources but such access is typically limited to the period of formal education. Extending availability of such resources beyond the formal education period is neither feasible nor ideal as they are mostly strictly configured to support many other aspects of education that go beyond self-learning.

We believe more generic solutions that are available during and after the formal education periods should be *sought to engage students in lifelong learning*. This paper focuses on use of social networking tools (SNTs) as the medium for collaboration in education. The advantages of SNTs to lifelong learning are twofold. First they provide easy and fast access to relevant information even after formal education. Second they allow keeping social ties with people having similar professional interest and possibly access to their extended network. This paper will focus on a senior year Plastics Engineering course students' utilization process of discussion boards in dedicated and generic technological platforms, alongside their challenges, response and overall reaction to social network based learning platforms.

Introduction

Technology and Life-long Learning

Throughout the last decade many higher education institutions implemented self-directed lifelong learning into their course curriculum. Some of the implemented modules, links, and assignments carried internet-based components. The self-directed learning modules implemented in the capstone senior design course required students to reach the ASME's website to read online material.[4,5] Some universities and programs developed virtual learning environments to deliver the online resources to their students, which will in the long run help the students to develop self learning skills.[6] The components of information technology have been widely used in engineering education.[7] As the technological advancements are used as an active component of lifelong learning, the concept of lifelong learning transformed from being taking some courses after graduation to a learning concept that encompasses the entire career.[8]

The technological advances that cultivate curriculum-based learning can be divided into two groups: the first group includes advances in technologies that are dedicated to education. To name a few, moving from over-head projectors to smart boards, initiation of distant learning by online campuses, moving from on site collaboration to on line collaboration via blackboards. The second group involves technological improvements that are external but applicable to education, such as using e-readers and softcopies instead of hard copies of books, use of emails for asynchronous communication instead of waiting for office hours. Educators from different backgrounds adopted both external and dedicated technologies but probably with different motivations and decision-making process.

Decisions regarding use of dedicated technologies are likely to be at the organizational level. Faculty is required to use them because of the policies set forth or because there aren't any other alternatives. Adoption of such technology can be considered as authority based. As an example, use of blackboard platforms, widely accepted technology for peer-to-peer connection and information sharing among class members[1], is decided and implemented at the university level.

The students are required to use their blackboard accounts for submitting their assignments and for other communication purposes as defined in the syllabus. The advantage of targeted technologies is that they have a higher level of observability, defined as "*the ease with which the technology can be seen, imagined, or described to the potential adopter*"[17]. However, these technologies are likely to have a steeper learning curve and limited in their lifetime to the period of formal education. Once the semester is over, students lose their access to course's page.

Schools do not necessarily mandate use of external technologies at least in the early stages of the technology's lifespan. Therefore use of this technology with the educational purposes follow a bottom-up adoption style among the educators and students. Especially technologies regarding collaboration require critical masses to adopt it for it to become part of the process. Although they have a lower level of observability, generic technologies tend to be adopted more naturally as they are applicable and available for a wider spectrum and a longer time frame. To give an example, students are likely to have used emailing for more than educational communication; also it is natural for them to communicate via email for educational purposes as well.

Considering the longer term of availability of the more generic technologies, we believe that for life long learning, generic technologies should replace the targeted technologies when its effectiveness meets the ones of targeted technologies. With this in mind, we think SNTs are good candidates for replacing education specific collaboration tools as blackboard message boards; generic platforms can remain as tools for self directed learning even after the completion of the formal education. Although the roles of social networks in online environments along with the impact of individual differences on student performance have been investigated to understand students' learning styles[3], we haven't come across any study that aims using SNTs to cultivate lifelong learning.

Social Networks and Lifelong Learning

Educational institutions, like many other entities, adopt social networks at an increasing rate; nowadays almost all higher educational institutions have Facebook[9] pages, LinkedIn[10] alumni and student groups and even active Twitter[11] accounts to notify students and faculty about emergencies. The idea behind this initiative is to mainly create a network where all students, staff, faculty and alumni are connected and are informed about school's news. Higher number of participants on university and college social environments proves that, these environments can successfully reach to masses. Even though the use of social networking platforms among the higher education institutions increased, the social network platforms are more targeted platforms towards directed searches. Their main area is not education; therefore actively using them for educational purposes is not a common approach. In this research, we aim to leverage social networks for the collaboration needs of formal education to set the grounds for lifelong learning. Social networking platforms will be available after the course is over or after students have graduated; making them great candidates for lifelong education. This paper looks into the implementation of social networks in engineering education while comparing how dedicated and generic platforms handle lifelong learning. The initial implementation and outcomes assessment is provided to analyze the students' comfort level with the applications.

Overview of Implementation Process

Course Description

In order to understand students' behavior towards learning via dedicated network versus learning via generic network is compared in a senior level engineering course. The examined course is a mandatory senior level Process Control course in Plastics Engineering Department at University of Massachusetts Lowell. In the Fall 2011 semester 33 undergraduate students were enrolled, 31 of them choose to participate in the self-directed lifelong learning experience. The course teaches principles of control systems, process block diagrams, feedback control, process monitoring, DOE, SPC/SQC, and Taguchi methods. The class meets on Tuesdays and Thursdays for 1 hour 15 minute long sessions. Following each class meeting, students were

assigned homework. During Fall 2011 semester a total of 22 homework assignments were given. The total weight of the homework assignments was 25% of the course grade. The course also included two separate projects, both of which required students to work in teams and submit a written report along with an in-class presentation. The projects total made up 25% of the course grade. The remainder 50% of the course grade is divided equally between the mid-term exam and the final-exam. Throughout the Fall 2011 semester course syllabus, all lecture presentations, supporting materials, and lecture related links along with homework and project assignments are shared over course's Blackboard page. For two of the homework assignments, students used the homework feature in Blackboard to submit their homework. In Fall 2011 semester a new component, self-directed learning modules, is added to the course. In order to make self-directed learning voluntary, just as it would be in life after graduation, the students who completed all self-directed learning modules receive 10% extra credit. Students who wish to not to participate did not receive any penalty. And students who submitted some of the self-directed learning modules received partial extra credit.

Methodology

In the Fall 2011 semester students in the senior level engineering course were presented with the concept of self-directed lifelong learning. They were provided with an initial in-class presentation of what self-directed learning is and how it can be helpful in transforming traditional in-class learners to self-directed learners. The material was aimed to improve students' technical knowledge where as the method of implementation was selected to improve students' soft skills. The methodology consisted of 5 major steps:

Step 1: In – class presentation on lifelong learning and self-directed learning
Step 2: Survey (Pre-implementation survey) to measure students' comfort level and overall understanding of the concept of lifelong learning
Step 3: Selection of the implementation platform
Step 4: Implementation of the self-directed learning modules
Step 5: Survey (Post-implementation survey) to measure students' responses to the experience, and also to collect feedback

Step 1: In-class presentation on lifelong learning and self-directed learning

In the beginning of the semester students were provided with an in-class presentation on what lifelong learning is and why it is important to become a lifelong learner. The motivators for lifelong learning for academia and career are explained. Given the economical climate and tough job market it was highlighted that having the skill of self-regulated, self-directed learning is very valuable. The course instructor also highlighted that through their careers there is a chance that they will be required to do research, and learn a subject related to their job on their own. Learning a subject when one does not have any prior knowledge is hard; however doing it by one's self could be harder. Having the skill or previous experience of self-directed learning will last students through their lifetimes. It was understood by the instructor that, exposing students to self-directed learning will not make them experts at it, though it will provide them the initial exposure where they will overcome the initial struggles and hardships.

Step 2: Pre-implementation Survey

Prior to implementing the self-directed learning components into the course, an initial survey is conducted by the course instructor. The survey was intended to measure students' understanding and initial reaction to self-directed learning along with to understand what kind of platforms and social networks they are most comfortable with.

Step 3: Selection of the Implementation Platform

This step was one of the most challenging steps due to the fact that it required in-depth understanding of the amount of time students spent on course's Blackboard page and other social platforms they are member of. Since all the course material, including class notes, presentations, homework, project assignments and supporting course links and materials are provided via course's Blackboard page, students were

expected to spend a considerable amount of time on course's Blackboard page. Blackboard also provides a discussion platform for students to post questions for instructor or classmates to answer. Blackboard will be used as the dedicated learning platform for this course. The generic learning platform can be any social networking platform. Students are asked which social learning platforms they are actively member of amongst: Facebook, Twitter, and LinkedIn. Even though there are various other social networking platforms available, these are the most common and widely available ones. Despite the fact that LinkedIn started as a professional networking platform, with the status update feature it offers, it carries common characteristics of a social networking platforms. Among the 31 students that participated in the survey 87% of the students had active Facebook accounts, followed by 64% LinkedIn accounts, and 30% Twitter account and less than 1% with no social network accounts. Results also indicated that 75% of the students had one or more social network account ownerships. Even though Facebook had higher account ownership amongst the students in the class, it was a challenging decision to whether to select Facebook or LinkedIn as the generic account. LinkedIn had the advantage of being a professional networking platform that made it a good fit for the generic platform. In an effort to make an educated decision, the demographics and usage statistics for Facebook and LinkedIn were compared. When looked at the membership numbers and grow rates; there are over 800 million active users in Facebook[12] and 135 million users in LinkedIn[13]. When the average user demographics compared; Facebook users averaged around 28 years of age, whereas LinkedIn users averaged at 42 years.[14] Clearly number of users and age average are not themselves sole indicators of which platform should be selected over the other; however combined with the students' account ownership percentages, average time spent on Facebook[15] and the fact that the account ownership for Facebook is also highest among college students[16] made it a great candidate for the generic platform selection.

Once the implementation platform is selected, the course instructor developed a course page and shared the links with the students. In order to view and participate in the self-directed learning, students needed to "like" the page. Students who "liked" the page, considered as members of the page. As the instructor posted the self-directed learning materials on course's Facebook page, a notification appeared in students' Facebook News Feed. This way, students received instant alerts when a module or a question or an answer is posted on the course's Facebook page.

Step 4: Implementation of the Self-directed Learning Modules

Once the generic learning platform is selected, the links to the self-directed learning modules along with the assessment questions are posted on the course's Facebook page on a once-a-month basis. During the Fall 2011 semester 4 self-directed learning links are shared with students. These links contained reading and listening materials that are related to the materials covered in the course as well as the related to the students' major and future career paths. In order to receive the extra credit, students were instructed to learn the material shared in the link and answer the associated questions. Usually 2-4 questions per learning module are assigned. Students were also instructed to post their answers to the course's Facebook page. This way, not only they provide their answer to the questions; but also they create a more resourceful learning environment for everyone else in the class. One student's point of view can be beneficial to another student, as well as it can open a door for debates on different perspectives. Another reason students were instructed to post on course's page is because in generic networks if they find something worth sharing they will post it on their walls or on their friends' walls. This way, not only the use of social network is mimicked in an educational purpose, but also students are trained to the idea to share information that is related to their careers or background with classmates, colleagues and even coworkers.

Step 5: Post-Implementation Survey

Upon completion of the self-directed learning experience, students are provided with a second, a post-implementation, survey. This survey was

targeted to see what the students think about the whole experience as well as to give them an opportunity to express their challenges, feedback, likes and dislikes about the implementation process. The outcomes of the post-implementation survey along with the students' feedbacks are discussed in Results and Outcomes.

Outcomes and Results

The pre-implementation and the post-implementation surveys are aimed to gain knowledge and learn more about the students' experiences regarding the self-directed learning process. The initial survey mainly targeted to understand students' social network account ownership statistics as well as to learn why they have social network memberships and accounts. The question regarding the membership usage is provided as:

"*I am a part of a social network, because:*
a. Everybody else is
b. It is a way of representing myself
c. It is my online identity
d. To keep in touch with friends and family
e. To make new friends
f. *To share news, updates, thoughts, pictures with friends and family*"

The outcome of this question is provided in Figure 1. Students were encouraged to select all choices that apply to them. And keeping in touch, networking and sharing are the top three common reasons why students own social networking accounts. This outcome also serves as a support to the idea of using a social network platform for educational purposes. Especially for life-long learning, where they will continue to keep in touch with their college classmates, co-workers and colleagues and share resources and information.

The post-implementation questions and outcomes are more directed towards students' experience with the process and their feedback. One of the questions was intended to learn students' commitment to help other students after they graduate. They were presented with the question below; results are presented in Figure 2.

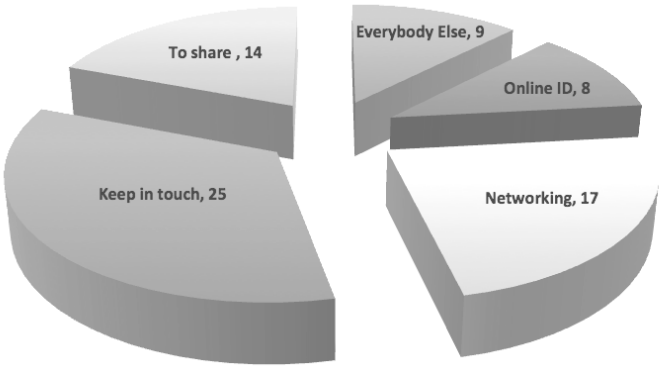

Figure 1. Students' Social Network Usage.

"*Once the semester is over, I will continue to "like" the page, so I can have access to more links in the upcoming years. This could be beneficial for my career.*"

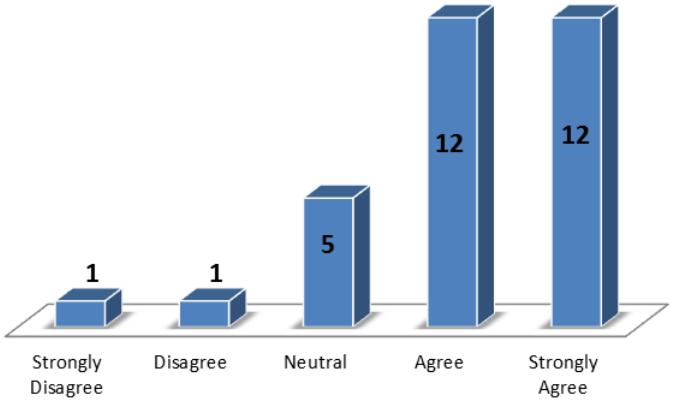

Figure 2. Students' Post-Graduation Use of the Course Facebook Page.

The implementation of computer-based technologies, simulations and systems are widely implemented into various courses. By the time students are in their senior year, they are introduced to virtual learning environments, simulation-based projects and online assignments. Self-directed learning via Facebook is a new computer-based, technology oriented component. Students' feedback to this new component is measured with the following post-implementation question; the results are shown in Figure 3. The majority of the students, over 87%, were happy with the new technology-forward implementation into their courses.

"I like the fact that something new and technology forward is implemented in one of my courses"

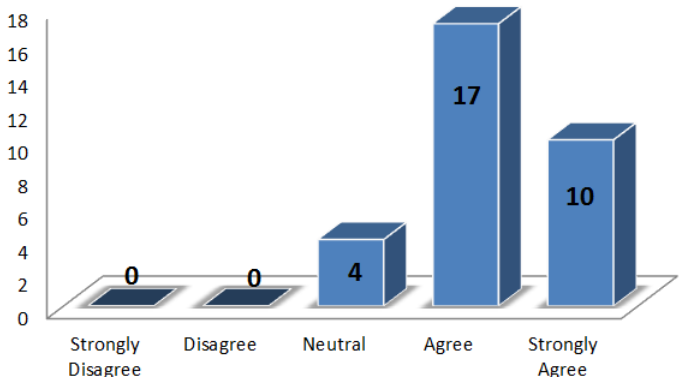

Figure 3. Students Reaction to Technology Forward-Implementation.

The technology-forwardness and the effectiveness of the self-directed learning process via Facebook are well recognized by the senior students. A similar learning Facebook-based learning component can be added to other levels into engineering education. When asked whether this can be an interesting and beneficial experience for freshman, sophomore or juniors, students' reaction was very positive. The outcomes of the below post-implementation question is shown in Figure 4. As it can be viewed, the majority of the students' think that this kind of an experience can be beneficial to the lower classes.

"Implementing self-directed learning via Facebook can be interesting and beneficial to freshman, sophomore, and junior engineering students"

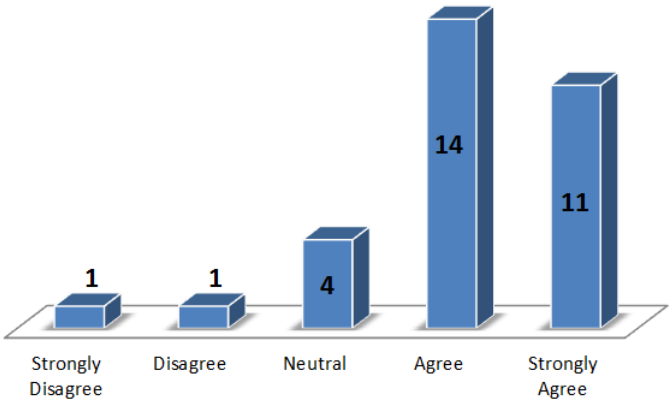

Figure 4. Students' Social Network Usage.

At the end of the implementation process, students were asked to review their overall experience with the self-directed learning modules. Even though it was the first time self-directed learning modules were introduced and even though the conveying was a little "out-of-the-box", a good portion of the students, approximately 78%, stated that they enjoyed the self-directed learning experience, as shown in Figure 5.

"Overall I enjoyed the self-directed learning modules"

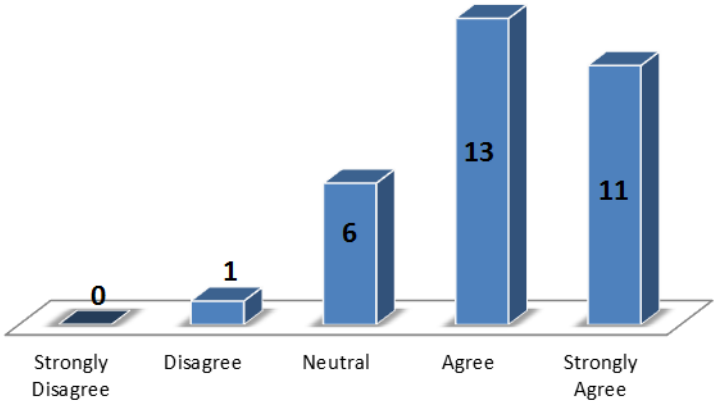

Figure 5. Students' Feedback on the Experience.

The overall implementation process was straight forward, though there were some expected difficulties and challenges throughout the process. The main challenge was students' discomfort in using Facebook as a part of their class assignment. Some students voiced their concerns and worries regarding their faculty having an access to their personal information they put on Facebook. This concern was addressed by reminding them that they need to protect their privacy, personal information at all times. Therefore making the information they wish not to share not visible to public is reminded. Few students also voiced their discomfort due to being "out-of their comfort zone"; where they had to learn something new. As there is resistance and discomfort against learning or doing something for the first time, there was a certain amount of discomfort especially during the first two assignments. Some students were unable to submit their answers on the course's Facebook page, since the post lengths were limited to 1000 words. This was a learning experience, where the course instructor informed

students to keep their answers 1000 words or shorter, or make multiple posts, or if they have already completed their assignment submit via email. All of the students who participated in the self-directed learning process choose to submit their first assignment either via email or hard copies. Even though it was concerning that submitting a hard copy was completely opposite of what the instructor had in mind, definitely provided a great understanding on students' resistance and discomfort. Another cause of resistance was due to some students' discomfort in sharing their answers on a public platform. They were hesitant that other people can see their answers. This was a valid concern; however since the Facebook page wall was available to members only, the only other people that can see their answers were their classmates and the course instructor. Aside from the privacy concerns, there were few hiccups due to the technicality of the process. Few students were not familiar with Facebook, when they created accounts to participate the self-directed learning process; they had difficulty learning how to "like" a page and how to post their answers. This definitely created frustration and confusion on students' side. In one instance one student posted his answers on his own Facebook page; which the course instructor did not have any access to therefore did not have any knowledge of student's response. Even though these were all addressed and resolved before the end of the semester, it did create difficulty for the student and the instructor. Aside from the challenges, students also voiced their enthusiasm and excitement given that a "non-educational" tool is used in their class as an educational tool. One student stated "*It was fairly easy for me, as I have Facebook application on my phone. I was able to complete one assignment on my phone when I was on the road for a job interview. Great addition to the course*", and participating students agreed that even though it was "a little hard at first" they can see this as a permanent component to the course.

Conclusions and Future Work

This study focused on the implementation of the educational materials over a social network. It was initially based on the idea that social networks are a part of everyday life, though they are not an active component of the learning process. As the demand to distance and virtual learning increases, the use of social networks can be a part of the learning process. In this research, a social network, Facebook, is used as a communication and sharing platform. The course instructor shared the material with the students and students shared their responses and discussions with the course instructor and their classmates.

The outcomes along with the students' feedback together provided a greater and better understanding for the course instructor and will be used as a road map for future applications. In future applications having students be more active can be added as a component to the self-directed learning modules. Also in an effort to reach maximum amount of students in a platform where they are all comfortable with can be achieved by developing an application that will send the learning modules to major social networks. This way, students won't feel the pressure to create a Facebook account or having to familiarize themselves with a social network they haven't used before.

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