Social Learning in Engineering Education

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Abstract

Today, many engineering educators are concerned that their students do not receive enough practical knowledge of engineering and its context. Many engineering faculty members believe the educational solution lies in taking a more constructive approach, where students construct knowledge and connections between nodes of knowledge as opposed to passively absorbing knowledge. In this paper we are focusing on 1). Observational learning and 2). Identifying strategies for promoting social learning. Social learning has grown rapidly in the past few years in colleges requiring instructors to learn effective ways to build communities of learners. There are barriers to avoid, as well as key components to include, when creating social learning environments. Educators see social-learning as a way to both implement a constructivism in engineering education as well as match the teaching styles to the learning styles of typical engineering students.

Keywords- social learning, observational learning, constructivism, online education.

I. INTRODUCTION

The social learning theory of Bandura focuses on the learning that occurs within a social context. It considers that students learn from one another, including such concepts as observational learning, imitation, and modeling. Students can learn by observing the behavior of others and the outcomes of those behaviors. "Social learning is participating with others to make sense of new things," which cuts to the chase and helps us think about how the concept might be put into practice in both education and training contexts. Moving learning activities into their real-world context, and out of the typical classroom, allows students to become members of "communities of practice." These communities involve social interactions in which new learners can learn from more experienced learners, or experts, and eventually move into this more advanced role themselves. Students working together learn from each other and from their more experienced instructors and other expert mentors. Individual programs, courses, and student groups can encourage interaction of their members as communities of practice in their field of study. This is especially important in online education, where students and instructors are not in the same location.

II. WHAT IS SOCIAL LEARNING THEORY

The word social is everywhere right now in articles and publications related to education and training. What is *social* learning? And how does it relate to all of the other uses of social that is social media and social networking .we are reading about it these days. With this post my goal is to provide an introduction to social learning theory, examples of social learning in online higher education, and resources for further exploration. Psychologist Albert Bandura is the father of social learning theory. Social learning theory has become most influential theory of learning and development. Although rooted in the basic concepts of traditional learning theory, but he believed that direct reinforcement could not account for all types of learning So he added a social element, arguing that students can learn new information and behaviors by watching others. This is known as observational learning . His theory addresses that students learn from one another via observation, imitation and modeling.

III. BASIC SOCIAL LEARNING CONCEPTS

There are three basic concepts of social learning theory. First one is that students can learn through observation. Second one is based on the internal mental states of the person. Finally, this states that just because something has been learned, it does not mean that it will result in a change in behavior.

A. People can learn through observation

- *Observation learning*

Observation can be a very efficient learning process and skills are developed right from the birth time , this can be explained from the behavior of children the way they imitate and learn the things by observing people around them .This skill can be reflected on educational part as students will learn the things by observing their classmates.

B. Mental states are important to learning

The external, environmental observations are not only the factors to influence learning and behavior, but also it includes internal reward, such as pride, satisfaction, and a sense of accomplishment. This emphasis on internal thoughts and cognitions helps connect learning theories to cognitive developmental theories.

C. Learning does not necessarily lead to a change in behavior.

While behaviorists believed that learning lead to a permanent change in behavior, observational learning demonstrates that students can learn new information without demonstrating new behaviors.

- *The Modeling Process*

  Modeling can be applied deliberately in the classroom to teach mental skills and to broaden horizons to teach new ways of thinking and can be effective and efficient means of teaching new behaviour.Use all elements of observation learning, especially reinforcement and practice. Not all observed behaviors are effectively learned. Factors involving both the model and the learner can play a role in whether social learning is successful.

The following steps are involved in the observational learning and modeling process:

- *Attention*

  In order to learn, we need to be paying attention. Anything that detracts our attention is going to have a negative effect on observational learning. If the novel interesting and it is aspect to the situation, we are far more likely to dedicate our full attention to learning.

- *Retention*

  The ability to store information is also an important part of the learning process. Retention can be affected by a number of factors, but the ability to pull up information later and act on it is vital to observational learning.

- *Reproduction*

  Once we have paid attention to the model and retained the information, it is time to actually perform the behavior we observed. Further practice of the learned behavior leads to improvement and skill advancement.

- *Motivation*

  Finally, in order for observational learning to be successful, we have to be motivated to imitate the behavior that has been modeled. Reinforcement and punishment play an important role in motivation.

- *Self-regulation and Cognitive behavior modification*

Behavioral views on learning emphasize self-management helping students gain control of their own learning. Students taught with classic behavioral methods seldom generalized their learning to new situations. Generalization would be encouraged if students became partners in the behavior change procedures.

- *Self-management*

The goal of education is to produce students who are capable of educating themselves, and then students must learn to manage their own lives, set their own goals, and to provide their own reinforcement. They may help set goals, observe their own work, keep records of it, and evaluate their own performance. Cognitive Behavior Modification and self-instruction Self-management generally means getting students involved in the basic steps of a behavior change program. Cognitive behavior modification adds an emphasis on thinking and self talk. Remember students guide themselves through a task by using private speech. In Cognitive behavior modification, students are taught directly how to use self-instruction and many components include dialogue and interaction between teacher and student, modeling, guided discovery, motivational strategies, feedback, careful matching of the task with the student's developmental level and other principles of good teaching.

IV. SOCIAL LEARNING IN CLASSROOM

There are two main types of groups that teachers can use when using social learning in their classroom. The first is heterogeneous grouping**.** This is when students of different ability levels are combined. The definition of heterogeneous grouping could also be expanded to include grouping together students of different grasping power levels. This approach can be especially useful at the beginning of their engineering so students get to know each other.
The second type of grouping is homogenous grouping. This means grouping together students that are similar. The similarities may refer to ability or thinking level. As a teacher, we may be able to identify students of similar ability levels by referring to our past assessment scores. The groups will likely change according to the lesson. This approach can be useful to group students together that may need extra help so the teacher can work more closely with them, while the students who need no extra help can be grouped together and work on something different.

- *Ways Interpersonal Social Learning can be addressed in the Classroom*

In the classroom as teachers; we will be faced with a great variety of students with a great variety of learning styles. Learning to balance the teaching styles we use will be crucial to the successes of our pupils. Social learning in particular has endless possibilities in the ways we can utilize group work within the classroom. Some concrete examples include

*1) Role playing**:***

Role-playing is a technique that works well with others, whether it's one on one or with a group of students. For example, have the students be assigned a SLO, and have them act it out for the classroom.

Another example might be to role-play with one person being the instructor and the other being the student.

2) Debating a topic:

Debates are conducted when one group of students are assigned one side of an issue while another group argues for the other side. We can then have the groups switch roles and argue the opposite side. Finally, we may have all the students drop their advocacy and come to a consensus about the topic, or develop a report that takes the best evidence and reasoning from both sides. Debates are a great way to teach about Social Studies events.

3) Create quizzes:

Get students into small groups and give each group a small segment of our lecture material. Ask each group to prepare a short quiz on their assigned segment. We can then have each team quiz the other groups, or collect the quizzes and give each student a package of all of the quizzes and allow the students to use them as study material. This method will only be truly useful for the students if we go over the questions and provide the proper answers.

4) Group test taking:

Create a test that can be in-class or take-home. The group is expected to collaborate on answers, and each student reviews the score of the group.

5) Mind maps:

Mind maps and systems diagrams are great to work on in class as a group. Have one student be the appointed drawer, while the rest of the class works through material and suggests ideas. The group may have varied views on how to represent some ideas; however this is a positive part of learning in groups.

V . SOCIAL LEARNING CASE STUDIES AT MY COLLEGE

As per the university norms to which my college belongs students have two mid exams each having both descriptive and objective (Quiz).In this semester, I handled signals and systems subject for II year E.C.E [40 students]. This subject requires strong mathematical background. As per my analysis, after few classes I understood all the students were not cope with subject because they are less mathematical knowledge. To increase the performance of my students, as a part of social learning I followed some of the methods of social learning.

Case Study 1: I divided the students into 5 heterogeneous groups. After the completion of each unit, I gave different assignments to all the groups. They worked in collaboration and came up with the solutions. I repeated this procedure for all the 5 units. Then all the groups interchange their solutions and used these as study material.

Case Study 2: In order to improve their performance in objective (quiz), I implemented quiz competition among the groups as a part of social learning. First, I had assigned a topic to each group. Secondly, I had asked each group to prepare a short quiz on their assigned topic. I collected the cumulative material and gave it to the remaining groups. Finally, I had conducted the quiz competition, in which, all the Students had participated actively and I could see the improvement in their performance. And, this reflected in their performance in midterm examination marks.

Case Study 3:

As a part of social learning, I divided the students into 2 homogenous groups. I focused more on the group who were very weak and took extra concentrate to them. By this, those students are also improved in their performance.

The results of this are among 40 students, 20 students improved 90%, 15 student's improved 80% and 5 students improved 75% of their performance when compared their initial level. This method is useful in their internal and external assessment. This is effectively useful and meaningful in evaluation of student. This will address the social aspects of learning in addition to technical assessments.

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