Engaging Students as Co-Lecturers in Information Systems and Technology Courses

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Abstract

Engaging students in the learning process is critical to their learning experience. One common practice is to have student do the work and report it back in classroom as presentations. However, many of these presentations are solely presented by students and are crowded into specific presentation class sessions. This is suboptimal in achieving a teaching (learning) environment with balanced information exchange. This paper presents a collaborative lecturing methodology, which engages students in the complete process of learning design, topic research, and collaborative lecturing in classrooms. Key activities and features of the method are presented in a four-stage life cycle. The method has been employed by the author in multiple IT and IS courses of different subjects and levels. Past experiences and lessons learned will be discussed.

Keywords: information technology education, collaborative lecture, active learning, instructional design, student presentation

1. INTRODUCTION

Engaging students actively in the teaching and learning process has been proved to be an effective method in classroom (Prince, 2004; Michael, 2006). Of many current practices, student presentations are widely used as part of the classroom activities. For example, presentations are commonly planned as a concluding part of a topic research type assignment or project. Driven by the final oral presentation, students are required to do the work themselves in the preparation process and therefore learn in an active way.

Student presentations are organized in various formats. Some common practices and features of traditional student presentations are:

- Dedicated presentation sessions: they are usually held at the end of the semester or in a dedicated presentation period.
- Student led: these presentations are prepared and delivered by students solely. The instructor has little involvement and control of the presentation content during the presentation time.
- Limited and short time period: presentations are limited to a certain time period, which may be actively enforced.
- Performance focused evaluation: presentations are evaluated with a focus on in-classroom presentation performance.

The traditional study-and-present approach has varied learning effectiveness, much dependent on student capabilities. It is a good way to evaluate student learning results and presentation skills, but it is rather weak in terms of building classroom learning environments and contributing to the overall learning experience. A number of limitations are:

- Instructors generally do not know the presentation content until the actual presentation. Instructor-student interaction is poor in the process.
- Traditional report style presentations are difficult to foster a teaching (learning) environment with balanced information exchange. Presentations are often presenter-centered and lack of interaction. Other students are not sufficiently engaged in learning from their peers during presentations. "Too quiet" is often the issue in classroom.
- Students have various presentation skills, and the quality of presentation content also varies. Common pitfalls in presentation include reading slides, lack of interaction, or talking irrelevancy. All these factors create problems to student engagement and classroom learning.

Clearly the traditional presentation is more of an assessment tool rather than a facilitating tool that contributes to the classroom learning environment. To address this problem, a unique collaborative lecturing (co-lecturing) approach was introduced to utilize student presentations more effectively as an integral part of classroom learning. In the following sections, we will first briefly survey the theoretical background for the proposed pedagogical method, and then specify the methodology with details, followed by some initial student feedback. Last, we will conclude the paper with some discussions of key practices and lessons learned.

2. THEORECTICAL BACKGROUND

The co-lecturing approach lies on the theoretical basis of active learning, and is built on related practices of collaborative learning, peer learning, learning by teaching, and collaborative teaching. Although the definition of these concepts are very similar and are closely related, there are some subtle differences and variations. The following sections briefly introduce and discuss these concepts and related practices.

2.1. Active Learning

Active learning refers to a general type of learning methods that focus on active participation of learners. One of the commonly accepted definitions come from Bonwell and Eison (1991) who suggested that students must engage in higher-order thinking tasks such as analysis, synthesis, and evaluation in order to be actively involved. More specifically, Bonwell and Eison (1991, p19) defined active learning as "anything that involves students in doing things and thinking about the things they are doing." Active learning practices favor student participation and engagement in the learning process and encourage learning from students' own efforts. Common practices include active writing, classroom discussion, problem solving, case study, students teaching, etc. (Halley, Heiserman, Felix, & Eshleman, 2013). Over the past two decades or so, active learning has grown increasingly popular and has drawn considerable amount of interest among educators (Faust & Paulson, 1998; Prince, 2004). It has been widely accepted in higher education as one of the effective instructional methods. Numerous research studies have supported the benefits of active learning for adult learners (Bonwell & Eison, 1991; Prince, 2004; Michael, 2006).

2.2. Collaborative Learning

Collaborative or cooperative learning involves students working in groups, or a joint effort of students and teachers (Smith & MacGregor, 1992). It is considered as one of the effective strategies in promoting active learning (Bonwell & Eison, 1991). Collaborative learning is centered on students' exploration or application of knowledge, and, in addition, emphasizes interaction with others and knowledge sharing (Du & Wagner, 2005). A broad range of research studies have shown that collaborative or cooperative learning enhances student achievement, attitude, retention, and inter-personal skills (Johnson, Johnson, & Smith, 1998; Springer, Stanne, & Donovan, 1999; Prince, 2004). Common practices include student teamwork in paper writing, presentation, and solution development projects.

2.3. Peer Learning/Learning by Teaching

Peer learning refers to the acquisition of knowledge and skill through active helping and supporting among peers (Topping, 2005). Students learn with and from each other without any implied authority (Boud, 2001). Particularly for adult students, learning from peers can best capitalize their experiences and knowledge.

Adult students can serve as resources to the instructor and fellow learners. Instructors may use open-ended discussions to draw out students' knowledge and experiences (Boud & Middleton, 2003).

Learning by teaching or peer tutoring is often characterized as one sub-type of peer learning. Despite its many similarities with the general concept of peer learning, peer tutoring is more specifically focused on curriculum content and the role taking as tutor or tutee (Topping, 2005). Educators have noticed the positive effect of learning by teaching early on with research evidence showing high morale, good attendance, and general satisfactory to the school environment among kindergarten children (Frager & Stern, 1970). Other researchers also noticed that peer tutoring not only has effective benefits in terms of academic achievement, but also has affective benefits such as enhanced self-esteem (Cohen, Kulik, & Kulik, 1982; Lublin, 1990; Podl & Metzger, 1994; Tsui, 2010). Learning by teaching or peer tutoring can occur either in informal settings such as one-on-one discussion or in formal settings such as group projects that are explicitly scheduled into classes (Keppell, Au, Ma, & Chan, 2006).

2.4. Collaborative Teaching

Collaborative teaching or co-teaching is the practice to have more than one person acting in instructor's role. It has been reported by many instructors and researchers as an effective lecturing method (Dugan & Letterman, 2008; Robinson & Schaible, 1995; Zhou, Kim, & Kerekes, 2011). Co-teaching has various formats of how the teaching team is formed, including a team of faculty members, faculty and industry guest speakers, and faculty and students. The literature shows an emphasis on co-lecturing with multiple faculty members, and other formats are less reported. Dugan and Letterman (2008) compared three styles of collaborative faculty teaching and reported a preference for two faculty member teaching together. Tenenberg (2010) described an Industry Fellows model in which an industry professional joins the classroom on a regular basis as a co-lecturer. Sikosek (2009) reported student self-evaluation of their co-lecture activities in chemistry classes, and students praised their co-lecturer role as having an opportunity for guided and active study of course topics. The study, however, did not reveal the details of how these co-lectures are designed and conducted in the classroom.

3. THE INSTRUCTOR/STUDENT CO-LECTURING APPROACH

The proposed co-lecturing method emphasizes a learning-by-teaching approach but with close collaboration between instructors and students throughout the whole process, including the in-classroom lecture session. The core practice of this co-lecturing method is defined in four stages in about four to five weeks from topic selection, research and preparation, in classroom co-lecturing, to final report (see Table 1 in the Appendix). The most distinctive feature is at the third stage when instructor-planned classroom activities are seamlessly integrated with student presentations, and student presentations become an integral part of the lecture. The method can engage students better both before the class and during the class time. Students participate actively in the lecture design and presentation preparation, including writing study guides, compiling reading list, preparing short lecturing presentations, and setting up discussion plans. Because of the involvement of the instructor, this leads to improved preparation before presentation, improved presentation quality and effectiveness, and improved student attention and interactions during the class.

The following subsections describe the four stages of this collaborative process in detail: initiation, development, co-lecturing, and final report. Table 1 (in the Appendix) provides a summary of the stages.

3.1. Initiation

In the initiation stage, students will determine a topic area for further research. This phase is usually completed within the first 3 weeks of the semester. The instructor should prepare weekly schedule and topics for the whole semester, and also prepare a list of possible research topics that are aligned with the weekly schedule. The selection of the topic is not a simple assignment or a blind selection. First, the topics are carefully selected that are highly relevant to the class plan. The instructor has to provide guidance to students in selecting a topic that they will be interested in. Second, students will also conduct some initial survey of topics so they can have some ideas of what they are going to study. Students can propose their own topics but should consult with the instructor. Major activities in this stage are summarized in Table 2.

It is important for the instructor to explain the whole process and the collaboration requirement to students. Students are better to form teams based on their interests in the topic along with other factors such as schedule preference, teammate preference, etc.

Instructor	Students
• Preparing weekly schedule and topic areas • Introducing topic areas • Determining teams, topic area assignment, and schedule • Advising students on topic selection	• Forming teams based on interests, schedule, or personal connection. • Brief surveying of the topic areas • Selecting presentation date and topic area • Narrowing down to a specific topic

Table 2. Activities in the Initiation Stage

3.2. Development

The development stage lasts about three to four weeks on the topic research work and development of presentations. Unlike traditional student research and presentation preparation, the instructor is constantly involved in the preparation. On one hand, students study the selected topic and prepare presentations under the guidance of the instructor; at the same time, the instructor also plans and prepares the lecture that will incorporate student work. Instructor's plan may be adjusted based on student work. The preparation process may be unique for each team and their presentation.

The stage usually starts at least three weeks before the presentation date to ensure adequate research and preparation. Weekly meetings or updates are scheduled to facilitate the study and preparation process. Depending on how self-directed and organized students are, the instructor may take the project leader role to plan and monitor the progress. Major activities in this stage are summarized in Table 3.

Instructor	Students
• Providing guidance and resources if necessary • Preparing and adjusting lectures and activities based on students' plan • Regularly checking in with students to keep them on track	• Studying the topic • Preparing presentation materials • Creating a website to cover the topic and provide resources • Interacting with the instructor to get feedback

Table 3. Activities in the Development Stage

At the end of this stage, the team will produce presentation slides with detailed content. The slides are not just for the purpose of presentation, but also can be used as lecture notes or study notes, with reasonable details and learning resources. Depending on the level and type of the course, students may also prepare a mini-study guide with overview, reading list, and discussion questions. The mini study guide will be distributed to the class with instructor's material before the assigned class date. The instructor may include an online component to the project in which students will create a public website to present their research and learning.

3.3. Co-Lecturing

On the presentation day, typically, the instructor should start the lecture by introducing the topic with an overview. Depending on the topic, the student presentation may start at the very beginning, in the middle, or toward the end of the session. The schedule should be planned ahead by the instructor and shared with student presenters.

Normally, students will take control of the presentation. They will present, demonstrate, poll, or lead a discussion. The instructor will interact with the student teams and other students in various ways, depending on students' presentation and discussion leading skills and performance. The instructor will provide additional information and explanations at various times during the presentation, depending on classroom situations. The instructor can also ask planned questions or carry out planned activities at certain times to fulfill the course plan and enhance student interactions. The instructor may also have improvised actions based on audience responses, such as additional discussion on certain topics, more comments and feedback on particular concepts, or demonstration of additional resources.

The key practice is to gauge the level of student presentation performance and students' engagement, and act accordingly. If the student team does a good job at presenting and leading discussions, then the instructor can let students take more control and be more like a moderator or even an audience. If the student team does not perform well or is a bit off the track, then the instructor should be able to step in and take a co-presenter role. At these times, presenters

will be in instructor-planned activities just like other students.

Although generally there is no time limit on the presentation as it is part of the lecture, it is still the responsibility of the instructor to control the pace and time so that it fits to the general class plan. The instructor will also provide feedback on the slides and suggest improvements for the final submission. Major activities in this stage are summarized in Table 4.

Instructor	Students
• Introducing the presentation at certain time point • Providing additional information and explanation at various times during the presentation • Inserting planned or improvised activities • Taking control if necessary • Controlling pace and time	• Presenting materials according to the plan • Responding to questions from the instructor and the audience • Leading discussions • Participating in instructor planned activities like other students

Table 4. Activities in the Co-Lecturing Stage

3.4. Report

In the final phase, students are usually given one week to complete the final report. The report package usually includes the finalized presentation slides, other learning materials (such as mini study guide), demonstration or prototypes development, and any supporting materials collected (such as documents, papers, web resources, images, video clips, etc.). Students need to further complete and compile the materials and report based on instructor feedback in the class. This may include adding additional materials, updating slides, correcting mistakes, adding references, etc. Students may also be asked to write a project summary and complete peer evaluations if applicable. All materials and resources can also be posted and updated on the website, and the class can continue the discussion online if the class would like to.

4. STUDENT FEEDBACK AND COMMENTS

The authors had practiced the Co-Lecturing method in a variety of information systems and technology courses in the past, each with some variations of the method (Table 5).

This method was implemented for the first time in an undergraduate level introduction to information systems course, which was offered as a night class in summer. Students welcomed the practice as they found the method interesting and they were engaged. The final student evaluation of the course is 4.8 out of 5.0. The following selected student feedback from the formal student evaluations represent some early success of the method.

> *"Fun class. The group presentation/ discussion format was very enjoyable and a great way to learn the info."*
>
> *"There was never a dull moment. The late night class was a joy after work hard all day at work -- you kept it interesting and exciting."*

IT/IS Course	Description
Introduction to Computer Information Systems	Undergraduate entry level, required for all business major students
Database Management Systems	Undergraduate level, required major course for the information systems degree
System Integration	Graduate level, required fundamental course for all IS students
Managing Data and Databases	Graduate level, required fundamental course for all IS students
Introduction to Information Security	Graduate foundation course for all MSIT students
Advanced Web Concepts and Applications	Graduate level, elective course for MSIT students

Table 5. Co-Lecturing Method Implementations in Past Courses

The most recent course in which this method was implemented is an advanced web concepts and applications course at the graduate level. At the end of the semester, as part of the continuing instructional improvement practice, a survey was distributed to the students asking for feedback. The survey includes a section with the following questions related to the Co-Lecturing method asking for qualitative feedback:

1. How did the co-lecture project impact the way you prepare for class and the learning

process? Did you spend more time and do more readings? Were you more engaged?
2. Do you think you learn more from co-lecture (as a presenter) compared to other regular lecture sessions (where you are not a presenter)? In what ways?
3. How would you describe the instructor's role in the preparation process and presentation? Is instructor's involvement helpful?
4. Would you like to take more co-lecture or more regular lecture sessions (as a presenter) if time is not a constraint? Why and why not?

Selected student responses are organized in Table 6 (see Appendix) as either positive, neutral, or negative. The positive comments reflected expected outcomes; the neutral ones reflected some different student needs; the negative ones revealed the problems which we can address in the future. From the responses, students generally thought this method had let them think more from a teacher's perspective and forced them to organize their thoughts. There were two major problems reflected from student responses. The first one was related to the amount of work. The method does take a lot of time both from the instructor and the students. The second one was more specific about the lack of responses from an in-presentation survey, and the instructor should have provided more support.

5. DISCUSSION

As noted by other researchers in a similar study, there are several key factors that can affect the effectiveness of the co-lecturing approach. First of all, students have to take initiative to assume the responsibility for their own learning. Secondly, the instructor has to prepare the students adequately and maintain the role of coach throughout the process (Podl & Metzger, 1994). The key practice of the co-lecturing method is a good level of cooperation and collaboration between the instructor and the students. This collaboration is throughout the entire process to help motivate the students and provide clear guidance to ensure the success of projects.

During the development stage, it is important for students to complete their own study on time, and communicate with the instructor about the study progress. Having a good understanding of what students are doing can help instructor better plan the class session. A plan and regular meetings can help the project progress well. However, in real life situations, if it becomes a challenge for these regular meetings to happen, then it is important to establish a team leadership or correspondence of the team to ensure effective communication. As one student noted, "Most grads who also work are not going to be able to make meetings between the hours of 8am & 6pm. At times I felt the assigned person to go to the meetings was not giving updates in a timely fashion and having later meeting options would have made it easier for me to attend a meeting with the course instructor."

During the presentation, it is a higher requirement for the instructor to control the classroom performance. Let students know and feel comfortable about the presentation format ahead of time. Let student presenters lead as much as possible, but take control if necessary. The instructor has to prepare for less performed student groups. For example, sometimes students read slides too much, then the instructor may want to jump in from time to time to start some conversation with the class to take the attention from the slides a bit. At other times, some students tend to talk about something irrelevant for a long time and the class seem to get bored, then the instructor may want to remind students to move on.

Although the method is a good way to engage students, it is not for all course types and levels. From the author's personal experience, the method is less effective in lower level undergraduate classes. This may attribute to the experience level of undergraduate students. The more experience the students have, the better they can handle the research and the presentation.

6. CONCLUSION

The primary advantage of employing the co-lecturing approach as a classroom teaching technique is its capability of engaging students both inside and outside of classrooms. This method is found to be more effective in teaching higher-level undergraduate or graduate level IT and IS courses where students often have higher self-motivation and can bring their own life or work experience. The structured four-stage approach helps to mitigate some of the challenges in peer learning and ensure the success of the teaching. Further research is recommended to provide more empirical support for the co-lecturing approach.

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Appendices

Table 1. Four-Stage Co-Lecture Method Summary

Stage	Overview	Time	Milestone
Initiation	Students conduct initial survey of subject domains, and choose a topic based on team interest and course plan.	In the first a few weeks of the semester.	Teams and topics determined
Development	Students conduct in-depth study and investigation of the topic under the guidance of the instructor. Students prepare presentation and other materials such as study guides and website. The instructor regularly meets with students and advises students to stay on the right track. The instructor may adjust class plan based on student work. The preparation process is also a group learning process.	Two to four weeks	Presentation slides, mini study guide
Co-Lecturing	The presentation is delivered as part of the lecture, with other instructor-prepared classroom activities seamlessly integrated into student presentations. The student presentation becomes an integral part of the lecture. The instructor plays a dual role of co-lecturer and audience depending on student performance.	During the assigned class time	In-classroom delivery of presentation
Report	Feedback is provided to students after the presentation so they can finalize and submit a final report package, which includes all presentation and learning materials.	A week after the presentation	Final report package

Table 6. Student Feedback Summary

Question	Positive	Neutral	Negative
#1	I was definitely more engaged. I prepared a lot more. First of all the topic was interesting. And I was able to relate it to my career goals a lot more.	When preparing for the lecture portion of the class, on the days that the groups were presenting the method was the same. Making sure I had the assigned readings so that I could contribute to the discussion.	I don't feel I was more engaged. I have done this before. I think it worked well for the rest of the class.
#2	Learned a lot more as co-lecturer. I had a vested interest in everything that was going on because I could see it for my career. You definitely learn more from the co-lecture as a presenter since there is quite a bit of research and you have a lot of back and forth discussion with teammates as to what we will and will not include in the presentation and reading assignments.	I liked it but I don't feel I learned more.	
#3	The course instructor's involvement definitely helped to narrow down the topics discussed. If we didn't have enough material the instructor had plenty of suggestions for additional things we could include. He is very helpful and prepared. he gives you links to material to help you get started.	Instructor's role is to give us a variety of topics to choose from. He/She should show enthusiasm in the lectures they do so we feel enthused. Then the professor should give us achievable guidelines and keep us within those guidelines i.e. we as students sometimes want to do so much, we can't possibly achieve it all. Quality over quantity.	I was disappointed in the rest of the class's participation when it came it the survey we passed out. Maybe, that can be encouraged more from the professor's level so they would feel more inclined.
#4	Definitely. It forces me to think from the other direction and use a part of my brain I don't use when just sitting there listening.	Probably a little more co-lecture because you are forced to really know the material in order to effectively lecture or conduct a discussion on it.	I like to present but I felt overwhelmed from other classes this semester.