In-Classroom Dynamics and Pacing Strategies to Improve Student Learning: Lesson Learned from a 100-Level Course

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Abstract

The paper presents in-classroom teaching strategies to immediately adjust lecture delivery method and instructional pathing to reflect student learning feedback and progress. A mid-term student survey was conducted to collect student comments and gain their learning experience. We made a series of improvements to the structure of lecture delivery and instructional pathing in the classroom to reduce lecture presentations and increase Q&A sessions. A follow up student survey was done three weeks after the lecture adjustment was made. The student survey data shows that after the adjustment of lecturing and pathing, the lecture delivery method was improved to 92% from 56% while the student's understanding of the materials was increased to 98% from 71%. The teaching strategies to improve the student's learning experience were considered effective. The adjusted lecture materials and instructional pathing have been documented and will be used for the next semester.

Keywords

Student survey, Classroom Dynamics, Instructional Pacing, Student Learning

Introduction

Background of course

This paper is to present teaching strategies used to adjust course delivery method and instructional pathing in order to immediately reflect student learning progress and address feedback from student surveys. CNST 112 is the Construction Communications class at the University of Nebraska-Lincoln. It is the second major specific class that students in the Architectural Engineering (AE) and Construction Management (CM) majors take when they enter the College during their freshman year. It serves as a fundamental course that teaches entry students in the AE/CM majors all required skills that they will utilize in their college career. This includes communication skills to help with understanding contract documents and drawings, along with technical terminology, symbols, and abbreviations. Their learning, as it focused on the basics, additionally introduced them to the most common materials used in Construction in the United States along with the codes that determined the local building practices. Overall, the goal of CNST 112 is to ensure that the students come out of the class equipped to read plans, do quantity takeoffs, and understand construction materials and methods.

Challenges

Challenges faced by the instructor were the classroom setting and the huge amount of lecture materials that were given by the previous instructor only a week prior to the beginning of the semester. Due to overwhelmed enrollments, the lecture room had to be assigned to a larger space

to accommodate the enrollment demands. However, the lecture hall where the class met was designed for large-scale courses and auditorium presentation purposes. After a few lectures, we realized the classroom was not an ideal place for "print reading" lectures and student practice as the students needed a space to open printed drawings on a large table so that they could follow the instruction. After a few weeks of lecturing in the Lecture Hall, the instructor and teaching assistant (TA) both observed that many students were getting less interested in lecture presentations and became redundant in participating in class activities. We immediately took action to address the obstacle and bring students back on track.

Methods

With the support of the School's Director, we made the following adjustments.

1. Rearrange lecture room: we worked with the staff to reserve two classrooms for laboratory practice. The lecture delivery method was rearranged with 30-50% lecture presentations and 50-70% laboratory practices depending on the student's learning progress

2. Readjust lecture pathing: we reallocated the percentage of lecture presentations and lab practice by reducing course presentations and increasing the Q&A sessions. The direction of lecture delivery was switched right away to mainly focus on lab practice which allowed us to walk the students through lab questions. The students were given more time in the laboratory hours to engage with other classmates and get their questions answered by the instructor and the TA. We observed the Q&A sessions were able to engage students together in a dynamic class environment and make sure students' questions can be solved before they left the classroom.

3. Student surveys: We conducted a student survey before the spring break to gain student feedback on the lecture materials and instructional pathing. Subsequently, we changed the delivery method and pathing based on their feedback. Three weeks after the completion of the first student survey, we did a follow up student survey asking the students to answer the same questions based on their experience in the lecture rearrangement. The purpose of the follow-up student survey was to allow us to evaluate if the student's learning experience has been improved.

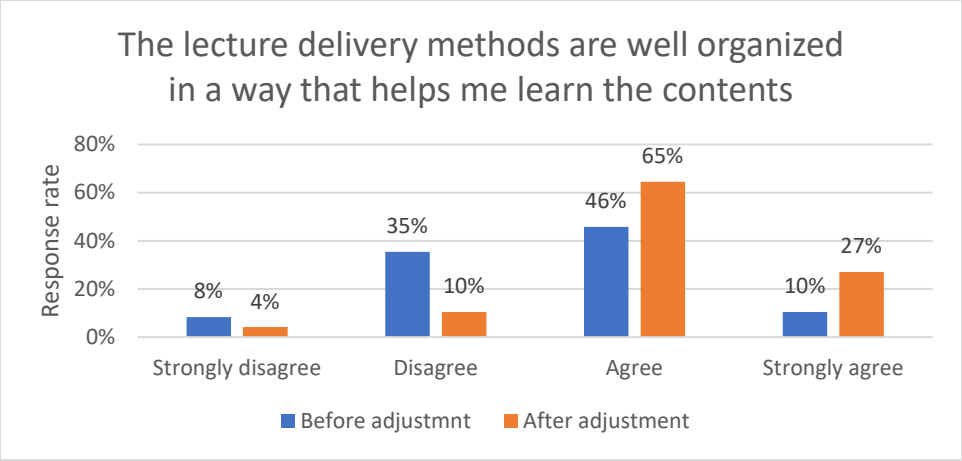
Results

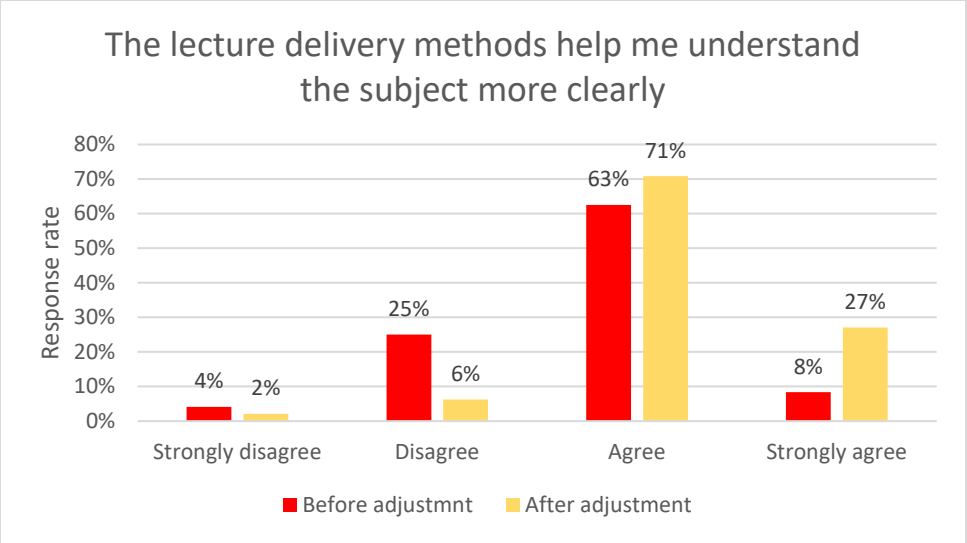
The response rates of both student surveys were 84% and 89% respectively. Three questions in the two student surveys remained the same including

- The course is well organized in a way that helps me learn the contents
- The assignments help me understand the subject more clearly
- The instructor/TA answer questions in a timely manner clearly

Students had four options to respond to each one of the three questions:
Strongly disagree; disagree; agree; strongly agree

The results of the first survey (before adjustment) and the second survey (after adjustment) are shown in Figure 1.





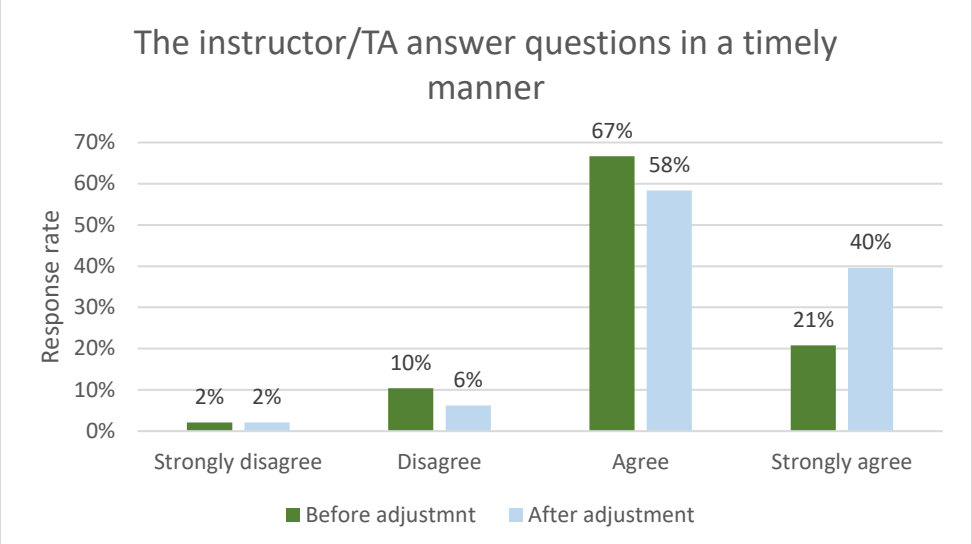


Figure 1: Results from the two student surveys

Before we made the adjustment to the lecture delivery method, 43% of students were not happy with the entire lecturing structure (as shown in Question 1, Figure 1) while 33% of them reported not to gain better understanding of the materials. After the lecture improvements, the rates of "strongly disagree" and "disagree" in the two questions dropped to % 14% (Question 1) and 8% (Question 2). In contrast, after the adjustment of the lecturing method, the rates of "agree" and "strongly agree" in Question 1 increased to 92% from 56% while the rates of "agree" and "strongly agree" in Question 2 increased to 98% from 71%; all indicated that the effort in rearrangement of lecturing and pathing was improved significantly. We were confident about the adjustment of lecture delivery and instructional pathing, therefore we kept the same lecturing method and pathing for the rest of the semester.

A copy of the final student evaluation administered by UNL was received three weeks after the end of the spring semester. The response rate was 75%. We received a few complaints about the inconsistent lecture style but most of the comments were very positive. Some of the student comments are quoted directly from the report:

- "At the beginning of the course I think there was too much to be expected from the students. I remember multiple times when questions from the assignments we had not covered and did not know how to do, and I talked about it with other students and they said the same thing. The professor later on did a course survey/evaluation at half of the semester, and after the course survey/evaluation was done, I saw improvements that helped my learning."

- "The instructor cares and wants to have a connection with the students. After he pursued the lab room full time instead of the lecture hall, I was able to remain more focused and felt like I could ask questions!!"
- "At the beginning the communication was a little rough, but the professor and TA made changes along the way that definitely improved this class"
- These comments reflect the fact that our effort in the improvement of the lecture method and instructional pathing in the classroom is satisfactory.

Summary

Based on the Spring Semester, there were multiple observations made as to what worked well in the course and what did not. Most importantly, the course required more time allocated to it for students to properly learn everything they were required to learn, and to fully grasp the content that was being taught to them. Since they were learning all the content for the first time and many of them did not have prior knowledge, it is important that the course focused more on introductory concepts and basics, before moving into fundamentals. Based on student feedback, we learned that students needed more time to complete Lab assignments in the Q&A sessions. In addition, in the Q&A sessions, we noticed students were able to actively communicate with the instructor, the TA and their classmates which positively led to better grades in their assignments and exam scores.

Bibliography

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Dr. Chun-Hsing (Jun) Ho received his Ph.D. degree in civil engineering from the University of Utah in 2010 with an emphasis on construction materials and pavement systems. He is an Associate Professor in the Durham School of Architectural Engineering and Construction at the University of Nebraska-Lincoln. His research brings together emerging technologies using engineering principles, innovative construction materials, Internet of Things (IoT), data analytics, computing algorithms, sensing, and GIS mapping to provide a variety of analysis methods that allow his research team to better assess the performance of civil infrastructure systems and built environment under the effect of extreme events. Dr. Ho has 20 years of work experience from industry and academia in the areas of building construction, railroad engineering, airport engineering, and pavement engineering. Dr. Ho is a licensed professional engineer in the state of Washington.

Nyawa Allieu

Nyawa Allieu is a Construction Management Senior at the University of Nebraska-Lincoln who is pursuing a double minor in Architectural Studies and Business. She is a founder of the National Society of Black Engineers at UNL and serves on the executive board. She has also served as an executive member of the Associated General Contractors Student Chapter at UNL the last 2 years. In addition, she is a member of the Engineering Student Advisory Board. She is a graduate of the International Baccalaureate Program and holds a Maryland Seal of Biliteracy for English and Spanish. She has been a Teaching Assistant at UNL since Fall 2022. Her achievements have been highlighted by multiple University publications.