

# Lecture Reflections: Teaching Practicum

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## 1 Andragogical Approach

### 1.1 Student Level

When teaching in the classroom for students of different levels, I need to address their needs at various levels. Commonly, in the classroom, I see students at mainly three levels. The first are those who don't understand the material and need a more elaborate explanation or for the material presented differently. I attempt to listen to these needs with periodic inquiries into the class and provide the needs as they are required. Next, some students get most of the material but need some technical or mathematical properties to be refined or further explained. These students' needs are addressed more readily, as they are formulaic. Finally, some students get the material and technical details and begin to be creative with the concepts. For these students, entertaining real-world applications or optimizing seen structures satisfies their needs.

### 1.2 Size of Class

The students will need more group work built in when the class is larger. The group work allows the feeling of conceitedness with those around them, which is easier in smaller classes. The group work creates more of a personal connection to the lecture material than just a large abstract lecture. Similarly, with a large class, I need to move throughout the classroom so the students will not feel too distant from me as I present the material. A clicker or mouse would be effective for keeping the lecture on track with the lesson plan as I move. Smaller classes make asking individual students about their thoughts on the material and assessments easier.

### 1.3 Teaching Venue

When the modality changes to online, I need to provide more examples and materials so the students can examine themselves and assign more tasks they can accomplish with those materials. The increase in hands-on material work allows the attention of the students who would otherwise be captivated by the movement and fellow student presence to be diverted into the materials they would be able to use. In face-to-face classes, the students will put more energy into listening to my lecture, so I will need to capture their attention similarly. Slides are an effective method for allowing the student's attention to follow the material, fluency in the lecture, and diversity in my tone of voice.

### 1.4 Next Iteration

After reflecting on my pedagogical approach, I would change a few of my patterns in the class. When I present the material, I would like to see how effective building the three most common levels into each slide view is rather than addressing them according to the student's reactions. While addressing the student's reactions will still be critical, preemptively presenting the levels may aid some students in their learning. In the next iteration of the class, I would give more attention and focus to the course-level Andragogical Approach.

## 2 Content

### 2.1 Best Practices in Design, Planning, Delivery and Approach

In planning the lecture, I made sure to include a connection to the previous class concepts, the topics for the current class, the explanations for the major ideas, a summary of the major ideas, and the upcoming topics. This approach allows the students to remember where they are coming from in the material, what is about to come in the current lecture, and where the current material will lead them. This structure allows the students to live in a sense of a map for the material, as if it were a journey through the knowledge in an orderly way, rather than just endless amounts of ideas and data. In the lecture material, there was a plan for an in-class activity.

### 2.2 Lesson Plan Success & Modification

The lesson plan was successful in terms of the amount of lecture that could be fulfilled for the given lecture time of 75 minutes. However, modifications were required given the number of questions and student interest in the lecture material. The questions pushed back subsections of the lecture material enough that the summarization and future class topics could not be covered vocally. Even though the summarization and connecting topics were not covered in class, they were present in the slides for the students to examine and review during their own time.

### 2.3 Next Iteration

In the next iteration of the class, I would shrink the amount of time dedicated to the in-class activity so I could spend some time summarizing the new material that was covered while also presenting some of the ideas that will be covered in the next class. The in-class activity was based on a tree data structure, so the students could be started higher in the tree to reach the root sooner, which is to say, the students could be started in one of the larger-sized groups instead of pairing up. Similarly, I could give less time for each tree level to develop.

## 3 Student Engagement

### 3.1 Student Input Into Knowledge

Throughout the semester, I regularly asked my students, either at the beginning of the class about the previous lectures or at the end of the presented lecture, how the presentation of the material was going and, more generally, how the class was going. The general class questions were directed at the parts of the class that were parallel to the lectures, such as the projects, homework, quizzes, and technological communication structure and its flow with the TAs. Given these inquiries into the students' thoughts and minds, I take in the students' thoughts on the learning activities and can adjust them based on this input. This is similar to the design of the assessments. From the beginning of the class, the format of the quizzes changed based on this input, so the wording in the quizzes became less ambiguous and more free-response.

### 3.2 Next Iteration

While the polling of the students' thoughts allowed me great insight in how to direct future assignments and activities, there were some aspects that I could use some work on. In future classes, I will need to focus more on how to get student input regarding research work, as well as input into the future design of the course. As the questioning and redirection will nevertheless guide future courses, the students may not realize they are aiding future students, and so the focus going forward will be direct input for future course design— this question can be brought to a single question for each of the lectures: how could this material have been presented to you better when you didn't understand, knowing what you know now after learning.

## 4 Inclusive teaching

### 4.1 Students Material Access

During the observation session, I pulled from two sources of slides. The first was from the course for the standard set of slides that must be presented to the student to complete the core material. The second set was to fulfill the best practices for teaching. The first set of slides included the lecture material for hash-maps, and the second included the connection to the previous class, the summarizing, the lecture plan, and the upcoming classes so the students had a sense of where they were in the lecture material. Both sets of slides were available to the students at the start of the lecture. The plan material first follows the core material.

### 4.2 Assessment Information

At the outset of the lecture, I informed the students how they had performed on the previous quiz, each included a question by question breakdown about how the class performed overall. The overview showed the average score of the class and the relative difficulty of each question as gauged by the class. The assessment information was a result of the blackboard analysis tools for Ultra. As a standard in the course, I informed the students if they felt they should have earned more points on questions, they should reach out to me with the details of the questions and their thought process as to why they earned more points, and subsequently award those points if the concerns raised were in alignment with the merits of the questions.

### 4.3 Assessment Authenticity and Legitimacy

As far as assessing authenticity, I generated the quizzes based on the lecture presented in class. The quizzes were based on what material would benefit the students to know going on to the computer science workforce. There were various questions, from multiple choice, with single or multiple answers depending on the question, true and false questions, free response questions, and matching questions. Some of the free response questions included coding and binary tree diagrams. These questions were based on the core lecture material aligned with the course objectives and were legitimate in their designs for the course.

### 4.4 Next Iteration

In the next iteration of the course, I will seek to include material on study skills better. In the lecture material, I will highlight points of study that I will request the students read up on to familiarize themselves. This will allow them some direction about the material at home and allow more time to be devoted to new material in class rather than covering the material they would otherwise learn on their own time. Similarly, if we cover the same or similar material to what is highlighted in the study material, they will know it in greater depth, having covered it on multiple occasions and formats. In addition to allowing the students to develop study skills, particularly after the era of online study in COVID-19, I will point them to a greater sense of their academic achievement, as they should seek to be lifelong learners. In pursuing lifelong learning, they will encounter material that does not have a proper lecturer. However, given the skills to study independently, they will develop into the knowledge that a lecturer may otherwise impart by properly applying their study techniques.

## 5 Assessment

### 5.1 Objective-Assessment Alignment

There are four objectives listed for the course in the syllabus, which are as follows :

- Implement common operations on a variety of data structures
- Use, modify and implement data structures in complex application
- Choose a data structure and implementation based on application requirements

- Analyze the efficiency of operations on a variety of data structures using asymptotic analysis

Two objectives were included in the exam for the quiz given. The first and last objectives were to implement common operations on various data structures and analyze the efficiency of operations on various data structures using asymptotic analysis. Several questions touched on the objectives, so the quiz aligned with the objectives. While the quiz contained these alignments, they were not called out in the quiz or the analysis, which could be improved upon in the next class iteration. This would allow the students to better connect with the overall goals of the class.

## 5.2 Student Feedback

At the beginning of the class, I presented the results of their most recent quizzes. Although they had received their scores on previous days of the week, they were seeing the scores and analyzing the class overall for the first time. I ran the analysis on Blackboard and then showed it to the students. These included the most challenging questions in the class as far as class performance and how well Blackboard was able to gauge the students' overall material understanding depending on how they answered other questions and the scores subsequently received.

## 5.3 Next Iteration

In teaching the class again, I would focus more energy and time on providing feedback to the students on the class assignments, quizzes, and exams. In the current iteration of the class, I provided feedback for the students in that the material was reviewed after exams so the students understood how to compare each of their answers to the correct answer. However, specific comments were given to each student on select assignments, such as homework and projects. This feedback could be extended into the classwork and quizzes to aid the students. study skills

# 6 Diversity, Inclusion, Equity and Belonging

In terms of diversity, equity, and inclusion, the in-class activity addressed some of the classroom's needs. The activity allowed the students to develop an idea individually, addressing the need for some individualistic learning to think through ideas in and for themselves. This went on to pairs, which addressed inclusive needs by allowing students to connect in a more personal setting. Then, the pairs joined with another pair, and so on, until the class was joined. This larger and larger pairing addressed a sense of growth into the material for them and the growth of the material itself. They got to see their ideas considered from a classmate's perspective. The groups were as diverse in as much as the class composition could allow. However, a lack of diversity in STEM fields and, subsequently, a lack of diversity in STEM classrooms is a known issue for the university and me. Work can be done in the future to increase diversity. The learners felt a sense of belonging from the activity as they owned the ideas generated, which allowed them to own the ideas presented in the lecture, as they had to use the lecture concept in their design.