Creating a Diverse and Inclusive STEM-eLearning Environment through an Online Graduate Teaching Assistant Training Module

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Abstract

This work demonstrates an online graduate teaching assistant training module that aims to embrace diversity and promote inclusion in the online programs offered by an engineering school. Located at the heart of a metropolitan area, our institution is diverse in our student body as well as in faculty and teaching assistant composition. When we expanded our programs into online learning environments, we realize that the importance of promoting inclusion becomes even greater. One of our online programs is a bridge program that encourages people with non-STEM majors to step into the STEM fields. The transition to a different discipline adds a layer of complexity for students and amplifies a need for us to recognize their different academic and cultural backgrounds. Graduate teaching assistants (GTAs) have a substantial opportunity to impact student perceptions of disciplinary knowledge due to their higher level of interaction with students. Compared to a face-to-face classroom, there are more barriers when forming an online learning community that promotes an inclusive learning experience. This paper highlights different elements of our GTA training module, Gateway to Online Teaching, with a focus on one of the main topics, Cultural Awareness for an Inclusive Classroom.

1. Introduction

Located at the heart of a metropolitan area, our institution is diverse in its student body as well as in faculty and teaching assistant’s demographic composition. When we expanded our engineering programs into online learning environments, we realize the importance of promoting inclusion becomes even greater. One of our online offerings is a bridge program that encourages people with non-STEM majors to step into the STEM fields. The transition to a different discipline adds a layer of complexity for students and amplifies a need for us to recognize their different academic and cultural backgrounds.

Graduate teaching assistants (GTAs) have a substantial opportunity to impact student perceptions of disciplinary knowledge due to their higher level of interaction with students [1]. In some research-oriented universities, GTAs cover more than 90% of laboratory sections [2]. Therefore, enhancing their teaching practice will directly influence students’ learning experience. In an online learning environment, some students perceive a lower degree of social presence of others in the course [3], which might result in a feeling of isolation. Compared to a face-to-face classroom, there are more barriers when forming an online learning community that promotes an inclusive learning experience. These findings from previous studies prompt us to create a training module for our GTAs to recognize student backgrounds in their online classrooms.

This paper presents the process of developing an online GTA training module: Gateway to Online Teaching. Different elements of the module are highlighted, with a focus on one of the
main topics, Cultural Awareness for an Inclusive Classroom. This online GTA training module was launched in Fall 2018 and a potential evaluation plan is also discussed.

2. Elements of the module

A need assessment was conducted at the beginning of the development process. Based on the conversations with various stakeholders and the data from course evaluation, the learning outcomes of the GTA training module are identified as follows:

(1) Identify and follow a protocol to handle students’ inquiries.
(2) Use the basic functions in the learning management system (LMS) to carry out course-related tasks.
(3) Communicate with students and faculty in a professional way.
(4) State strategies for creating an inclusive online learning environment.
(5) Describe characteristics of students at risk and take proper measures to help students at risk.

With these learning outcomes in mind, the topics are broken down into the following:

(1) Part I: The Essentials
   Foundation of Online Teaching
   Cultural Awareness for an Inclusive Classroom
(2) Part II: For Teaching Assistants
   Responsibility and Expectations
   LMS Basics

The entire module is designed based on active learning principle: Opportunities for learners to reflect upon their own experience to enhance learning are embedded throughout the module. In the following section, components in the cultural awareness for inclusive classroom section are highlighted in greater detail because of its immediate relevance to this year’s conference theme.

2.1 Scenario

This section starts with a scenario in which a female student is having issues with her online statistics instructor (See Figure 1).

Figure 1: A screenshot taken from the scenario portion of the module
The GTAs are asked to jot down their thoughts on what they think the cause of the problems might be after reading this student’s experience.

2.2 Activity: Reflection

In the follow-up activity, several statements are presented to GTAs with which they can compare their answers. These statements are carefully crafted as they reflect different assumptions. GTAs can tick off the statements that are similar to their thoughts.

![Figure 2: A screenshot taken from the activity portion of the module](image)

2.3 Common assumptions

When encountering a different culture group (e.g., gender, socioeconomic status, occupation, and so on), people tend to form assumptions based on their limited, existing knowledge about that group. The activity described above is designed to help students discover these underlying assumptions. In educational contexts, these assumptions can potentially lead to responses/actions that prevent one from embracing the value of diversity.

In this section, several common assumptions about certain student groups are presented using flashcards and students can flip the cards to discover the proper solution associated with the assumptions (Figure 3). For example, one might think “All students from a particular group share the same view on an issue, and their perspective will necessarily be different.” The best practice
to mitigate the impact of this assumption on the back of the card is to “regularly encourage all students to express different perspectives on issues, and not to express surprise when people from the same group share opposing views or have a view consistent with the majority of the class.” The materials in this section are adapted from the Center for Research on Learning and Teaching at the University of Michigan [4].

Figure 3: A screenshot taken from the flashcard portion of the module

2.4 Strategies to promote an inclusive online learning environment

In the final section of the module, several strategies that are suggested by literature to promote an inclusive online learning environment are provided, which includes the following categories:

1. Know your student audience
2. Tap into your students’ backgrounds, cultures, and experiences
3. Strive to create a safe, trustworthy, and positive rapport

For example, an ice breaker that asked the story about students’ names can be employed at the beginning of the semester to know students. Also, online instructors are also encouraged to tap into students’ backgrounds, cultures, and experiences when teaching, as opposed to the story presented at the beginning of the module in which the instructor only gives examples related to baseball.

References are provided for the GTAs to engage in further readings. To enhance GTA’s learning experience with this online module, we also designed a game for them to play as well as to reinforce the concepts they gain from the training module.

2.5 Branching Scenario Game

The branching scenario game is titled “The Super TA Challenge” in which GTAs will have to navigate through situations that a TA might encounter on a daily basis. After reading the scenario, they will select the option that they think is the best. They will receive different points based on the choice they make. One of the scenarios that is related to diversity and inclusion is presented in Figure 4, in which a group of students ask the TA if they can use a different delivery method to participate in the discussion forum.
After the first student posts start to go up, you get an email from a group of students asking if they can post a video response to the prompt, involving interpretive dance and puppetry. How do you want to respond?

Yes?
As long as it remains on topic, that should not be that big of an issue, right? Email the professor to ask.

Nope!
The professor did not request anything other than text. Try not to deviate from that.

Hey! Listen!
Let everyone know what the group is doing, just so they are aware of what is happening.

Figure 4: A screenshot taken from the branching scenario game

After they tally all the points, they can refer to the result chart to see how well they do in this game (Figure 5).

You got through the story, but how did you do? Based on your score, click on the feedback tab and find out what happened based on your choices.

6 - 8
Select this option if your score is 5 - 6

3 - 5
Select this option if your score is 3 - 4

0 - 2
Select this option if your score is 0 - 2

Figure 5: A screenshot taken from the result chart of the game
3. Evaluation plans to be discussed

Although formative assessment (e.g., knowledge check) is employed in different sections throughout the GTA training module, a summative assessment is still yet to be developed to evaluate the overall effectiveness of the training program. In instructional design fields, the domains of learning are categorized as cognitive domain (knowledge), affective domain (attitudes), and psychomotor domain (skill). Each of these domains have their associated taxonomy [5, 6, 7] to measure the learning outcomes. The challenge of creating a summative assessment plan is resulted from the fact that this GTAs training module contains all three learning domains: Obtaining knowledge of online teaching (cognitive), cultivating awareness and embracing diversity (affective), and performing task using LMS functions (skill). The learning outcomes in the affective domain, in particular, is known to be difficult to measure. We would like to invite feedback during the presentation at the conference to create a more comprehensive evaluation plan.

4. Conclusions

Problem solving is the core of engineering, and diversity of thoughts and perspectives can form a solid foundation for a fruitful brainstorming. A talent shortage in the STEM fields has been projected for decades, which indicates that individuals from different backgrounds are encouraged to step into these fields, especially the under-represented groups [8]. To help students of different backgrounds to succeed in pursuing an online STEM degree, our institution aims to level the playing field for all groups by providing an inclusive online learning environment, and the first step is to train our teaching force to embrace the diversity in online classrooms. “It is not our differences that divide us. It is our inability to recognize, accept, and celebrate those differences.” As stated by Audre Lorde, the renowned civil rights activist, we should come up with strategies to reap the benefits of the diversity in the STEM fields. Overall, it’s the collective effort of human beings that makes this global society move forward.

References


