

Graduate Students' Development of Teaching Skills and Identity

Nishchal Thapa Magar, George Mason University

Dr. Jill K Nelson, George Mason University

Jill Nelson is the Associate Dean for Undergraduate Programs in the College of Engineering and Computing at George Mason University and an associate professor in the Department of Electrical and Computer Engineering. Prior to taking the role of associate dean, she spent three years as a Program Director in the Division of Undergraduate Education at NSF where she managed programs that support innovation in STEM education, STEM education research, and education research infrastructure. Dr. Nelson's research and leadership efforts focus on improving STEM education with particular emphasis on faculty development. She is a recipient of the NSF CAREER Award (2010) and the inaugural (2017) recipient of the George Mason University John Toups Medal for Excellence in Teaching.

Jessica Rosenberg

Jessica Rosenberg is an Associate Professor of Physics and Astronomy and the Director of Education for the Quantum Science and Engineering Center at George Mason University. She is an astrophysicist focusing on what we can learn about galaxy evolution from the gas and star formation properties of galaxies. She is also working to improve STEM education with a focus on the education and retention of a diverse group of students in the STEM disciplines. She has developed and implemented education programs that span K-20, researched improvements to STEM classroom education, and is working to develop a career-ready quantum workforce.

Marco Brizzolara, George Mason University

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Abstract: This Work in Progress paper focuses on exploring how graduate teaching assistants' (GTAs') identity around teaching evolves during their time as a GTA. Studies have shown that there is a need to prepare graduate students for their responsibilities as a GTA and, in many cases, for future faculty roles. In this paper, we explore if and how GTA teaching identity changes over time with a focus on the impact of pre-semester and academic-year teaching professional development. Specifically, we aim to examine how professional development in combination with teaching experience contributes to GTAs' understanding of their role and agency in classroom instruction and student learning. While this study considers GTAs rather than faculty, it focuses specifically on GTAs' roles as instructors and as facilitators of student learning, and it examines how GTAs view their role and develop their identity as teachers. For this reason, it aligns well with topics of interest to faculty developers and those studying faculty teaching professional development.

This paper is part of a larger project that aims to transform the culture in STEM departments at a large, regional, R1 institution to one that values and prioritizes active and inquiry-based learning. The project leverages course-based communities of transformation (CCTs) which include instructors, GTAs, and undergraduate learning assistants. The CCTs aim to make active learning the default method of instruction in highly enrolled gateway courses in the participating departments (physics, math, and computer science). Early in the project it became clear that GTAs play a significant role in introductory courses, largely because of their responsibilities as instructors in recitations and labs. To prepare and support GTAs in their role, the project has developed pre-semester and academic-year professional development. The pre-semester workshop takes place over two days and is designed to prepare new GTAs as they enter the classroom. Content includes practical teaching skills with an emphasis on active learning, first day impressions, available resources, and how to create a welcoming classroom environment. Professional development during the academic year is different in each of the departments, but typically revolves around weekly meetings of GTAs and provides a forum for discussion of teaching pedagogy. These academic-year sessions include a course-like seminar (physics), a meeting of the GTAs for a particular course (math), and less formal gatherings for sharing and reflection (computer science).

After the two-day workshop in August 2023, seven focus groups were conducted with 3-4 GTAs in each group. We are now conducting additional one-on-one interviews to gain a deeper understanding of how GTA teaching identities evolve over time and explore whether there are differences in these experiences for international GTAs. The data from these focus groups and from the first five interviews provide initial findings for understanding new GTAs' teaching identity before they start their graduate teaching.

Introduction and Research Questions

The Gateway2STEM project aims to foster a culture of active and inquiry-based learning in introductory courses at a large regional public university. The project leverages course-based communities of transformation (CCTs), which include instructors, graduate teaching assistants (GTAs), and undergraduate learning assistants, to make active learning the default method of instruction in highly enrolled gateway courses in the participating departments. The project has

focused on gateway courses in math, physics, and computer science (CS). GTAs play a significant role in instructing undergraduate labs and recitations in introductory courses, often serving as the instructor of record. The Gateway2STEM project has established pre-semester and academic-year professional development (PD) to help GTAs prepare for these roles.

The pre-semester workshop takes place over two days and covers practical teaching skills with a focus on active learning (AL). Some of the topics addressed include creating positive first-day impressions, using university-wide student resources, and fostering a welcoming classroom environment. The follow-on professional development throughout the academic year varies by department, but typically revolves around weekly meetings of GTAs and offers a platform for discussing teaching pedagogy. The formats of the academic-year PD include a course-like seminar and more casual GTA-led gatherings focused on sharing and reflection.

Though they may be supervised by lab coordinators and recitation supervisors, GTAs are often responsible for conducting lab or recitation sessions largely independently and for assigning grades at the end of the semester. The GTAs in this study are mostly in the first year of graduate study and many have not had formal teaching experience before beginning their GTA position. Studies have shown that there is a need to provide PD for GTAs to prepare them for their responsibilities and, in many cases, for future faculty roles [1,2]. In addition to being new to the institution and to teaching, many of the GTAs are international students from countries where the teaching culture may differ significantly from that in the U.S., which adds another element to their adaptation and learning as they enter the classroom.

GTA preparation can involve workshops and seminars as well as apprenticeship models designed to promote the use of effective instructional strategies [3,4,5,6,7,8]. Although previous studies have identified various PD approaches for new GTAs, there remains a gap in the literature with respect to GTAs' understanding of their role and agency in executing what they consider to be effective strategies for teaching and learning. Kajfez and Matusovich [9] conducted a study on GTAs in large first-year engineering programs and identified three teaching identity profiles: strong, transitional, and weak. These profiles are linked to their self-assessment of identity as a teacher (measured on a likert scale) and are correlated with their future career goals. While we have not asked the GTAs to explicitly rate their identity as teachers, many of them aspire to become professors and future faculty members, likely indicating a strong or transitional teaching identity. Building on the efforts of this study, we will look at how the GTAs discuss their views of themselves as teachers (i.e., which aspects of teaching they do and do not relate to and feel confident with) adding some nuance to these categories. It is this understanding of their role and their agency (which combines the Kajfez and Matusovich [9] constructs of identity and autonomy) that we refer to as their teaching identity. We will also interview the GTAs multiple times to understand the dynamic nature of their views which, in turn, will help us deepen our understanding of GTA development and instructional effectiveness in higher education settings.

Personal background and previous experiences are other dimensions that all GTAs bring to their teaching experiences. For international students these include a move to a different country, often teaching in something other than their native language, and sometimes encountering classroom structures and teacher-student interactions that are different from the environment in which they were taught.

To understand GTA identity and its evolution, we consider PD, GTA experience, and previous educational background. Our research questions are: 1) How does GTA identity change with experience and PD? and 2) How do the structure and environment of previous classroom experiences impact GTA identity, particularly for international students?

Data Sources and Analysis Methods

Three departments, Physics, Math, and Computer Science (CS) are involved in the Gateway2STEM project, which takes place at a major R1 public university situated in the mid-Atlantic region of the United States. Graduate students serving as GTAs for the first time participated in a two-day workshop before the start of the fall semester in 2023. The workshop included 6 GTAs from Physics, 10 from Math, and 44 from CS. Most of the participants were first-year graduate students at the institution. Immediately following the workshop, we conducted seven focus groups with 4 - 5 GTAs in each group (33 GTAs in total). Additionally, we have conducted hour-long follow-up interviews with 10 GTAs. Participants selected for follow-up interviews are GTAs who are teaching recitations. We did not include GTAs whose primary duties were grading and holding office hours but who were not in the classroom with students. These one-on-one semi-structured interviews were conducted roughly one semester into participants' GTA experience. These interviews explore the techniques GTA's use in the classroom, their view of their role in the classroom and how it reflects their thinking about teaching, their own experiences as a student, and their experience participating in teaching related PD. We plan to interview the GTAs again after the completion of their first year to study how their teaching identity continues to evolve.

In this paper, we report on the focus groups and on five of the follow-up interviews for which we have completed data analysis. Analysis is ongoing for the remaining interviews. All five of the interviews discussed here were with international graduate students from various parts of Asia (pseudonyms Sourav, Yan, Liwei, Caiyu, and Umid). We focus on GTAs' self-reflections with respect to their role in the classroom and their ability to implement the educational practices that they consider to be effective.

We used systematic coding of transcripts through open and axial coding, as suggested by Saldana [10] for qualitative inquiry. We developed codes from both the literature and the transcripts. Codes related to the broader structure of the project like GTA instructor identity, application of AL, university support, and professional development were drawn from existing literature. Codes related to emerging but often unanticipated themes like barriers to dissemination and implementation of AL, COVID, online instruction, and levels of student engagement were derived from open coding. The coding was performed using Dedoose software. From the codes, we derived preliminary themes, as described in the findings. We intend to revisit this data with additional coders looking at each of the transcripts and a more thorough analysis of the themes once we have a more complete data set.

Findings

Our preliminary analysis of the focus group and interview data examined how GTAs have been using AL in the classroom, their perception of their role, the external factors that have influenced their teaching, and differences in experiences for international GTAs. We begin with a short introduction to each of the GTAs with whom we conducted extended interviews.

Four of the five GTAs we interviewed arrived at the institution just before the start of the fall semester. Sourav arrived having recently completed his undergraduate studies in his home country. He taught labs for CS 112, an introduction to Python programming, in the fall semester. Yan and Liwei came to the institution after completing their master's studies in the U.S. Prior to their master's studies, both had pursued their education in their home country. Liwei's undergraduate program was a dual program with a U.S. institution in which he was supposed to spend a year of his studies in the U.S. but because of COVID that didn't happen. Yan taught labs for CS 262, an introduction to low-level programming, while Liwei taught labs for CS 112. Caiyu pursued both his undergraduate and master's degree in the U.S. and taught labs for CS 211, a course in object-oriented programming. Caiyu attended a private high school in his home country where the language of instruction was English, and the structure more closely resembled that of U.S. schools than that of the traditional schools in his home country. Umid was in his second year in the Math department but was teaching for the first time. He taught recitations for Math 214, elementary differential equations. Umid pursued his undergraduate education in his home country before coming to the U.S. for graduate school.

Using active learning in the classroom:

Historically active learning has not been the default practice in the labs and recitations in which these GTAs were teaching. The Gateway2STEM project has worked to get more active practices embedded in these courses. Part of this effort has involved teaching the GTAs about active learning strategies as part of GTA PD. All interviewees described using some form of active learning in their classrooms. They mentioned having students practice problem solving and programming on their own or in groups rather than relying on lecturing and showing students how to solve problems. Most of the GTAs described dividing students into groups and encouraging them to work with their peers. Umid noted that active learning approaches allowed him to save time and to be more efficient as a GTA.

“I decided that a lot of hard work using the old-school method, checking 50-60 students at the top of the grading, is super hard. So, I implemented group work.”

While it is not yet clear how much active learning the GTAs are using in the classroom overall, these preliminary results indicate some success in motivating GTAs to experiment with active learning practices and to view them in a positive light.

Role of a GTA in the classroom:

GTAs reside in an interesting space in the classroom. They have significant autonomy in their classes, but they are responsible to an instructor or coordinator and are often given prescribed materials or approaches they are expected to use with their students. They also have a mix of responsibilities.

One of the roles that some of the GTAs highlighted is as a grader responsible for evaluating labs, homework, and projects. While grading, GTAs communicate with students and work to provide consistent grading rubrics. They emphasized the importance of good communication, consistency, and the idea that grading is not merely deducting points without any feedback. GTAs often struggle to find the balance between authority and connection with their students in the classroom. In the focus groups conducted before the semester began, several of the GTAs expressed concern about their relationships with students and their ability to establish their authority in the classroom given the similarity in their ages. In his interview, Caiyu described initially wanting to be friends with all the students, but within a few weeks, realizing that being too friendly could lead to unwanted questions and disruptions in the class. Finding a balance between approachability and authority emerged as a crucial aspect of their teaching roles, which aligns with the transitional teacher identity described by Kajfez and Matusovich [9], as it evolves towards an established identity as a teacher.

Differences in experiences for international GTAs:

International GTAs often come to their teaching experiences from cultures that have different educational structures and a different relationship between students and teacher than is typical in the U.S. The most common concerns that we heard from international GTAs in our focus groups were around adapting to the differences in language and culture. They were worried about how they would engage with students and their ability to understand and communicate with students. The five GTAs we interviewed are all international students. These GTAs pointed out that teaching in a second language poses a language barrier that may result in miscommunication. One of the students at the focus group described the challenge of becoming a teacher in a very different culture where the student-teacher norms are significantly different.

“From a cultural perspective this might be the most challenging aspect for me. In my home country, students are afraid of their teachers. So, I think it’s somewhat different here. They are not afraid and keep asking questions.”

It is clear from these first students that the international student experience is incredibly varied with some classroom experiences looking a lot like the ones in which they are teaching as GTAs while others are significantly different. The rest of our interviews will help us understand the breadth of experiences and how they influence GTAs’ engagement in the classroom.

Next steps

Our initial analysis indicates that GTAs learned new teaching strategies as part of the pre-semester GTA workshop and in their academic year PD and that they have, in general, worked to incorporate active learning techniques into their teaching practices. We are beginning to understand GTAs’ views of the different roles they play in the classroom. The experiences faced by international students are somewhat different and significant, encompassing disparities in language among other factors. With so many international GTAs, understanding what they need to bridge the gap between their culture and the culture of the U.S. classroom they are entering is critical to effective GTA PD. We plan to continue to interview GTAs about their experiences and to conduct regular follow-up interviews with GTAs so that we can understand how their GTA identity evolves over time.

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