



## Graduate Student Identity: A Balancing Act between Roles

### Dr. Rachel Louis Kajfez, Ohio State University

Dr. Rachel Louis Kajfez is an Assistant Professor of Practice in the Engineering Education Innovation Center and the Department of Civil, Environmental, and Geodetic Engineering at The Ohio State University. She earned her B.S. and M.S. degrees in Civil Engineering from Ohio State and earned her Ph.D. in Engineering Education from Virginia Tech. Her research interests focus on the intersection between motivation and identity of undergraduate and graduate students, first-year engineering programs, mixed methods research, and innovative approaches to teaching. Currently, she teaches within the first-year engineering program at Ohio State while maintaining an active engineering education research program.

### Dr. Lisa D. McNair, Virginia Tech

Lisa D. McNair is an Associate Professor of Engineering Education at Virginia Tech, where she also serves as Assistant Department Head of Graduate Programs and co-Director of the VT Engineering Communication Center (VTECC). She received her PhD in Linguistics from the University of Chicago and a B.A. in English from the University of Georgia. Her research interests include interdisciplinary collaboration, design education, communication studies, identity theory and reflective practice. Projects supported by the National Science Foundation include interdisciplinary pedagogy for pervasive computing design; writing across the curriculum in Statics courses; as well as a CAREER award to explore the use of e-portfolios to promote professional identity and reflective practice. Her teaching emphasizes the roles of engineers as communicators and educators, the foundations and evolution of the engineering education discipline, assessment methods, and evaluating communication in engineering.

# Graduate Student Identity: A Balancing Act between Roles

## Abstract

Graduate students balance the roles of teacher, researcher, and lifelong learner at a point in their careers when they are transitioning into professional identities. We examine the roles of students in engineering, education, and engineering education through a quantitative survey to better understand their unique experiences.

## Introduction

Graduate students are often required to balance a variety of roles while completing their education and preparing for their careers. This transitional process is a critical part of constructing their professional identities. However, it is not clear how well students are able to balance multiple roles or how well graduate programs support multiple role development. Through this study, we hope to better understand graduate student role identity by examining student perceptions in three fields—education which is typically teacher focused, engineering which is typically research focused, and engineering education which is a hybrid between the two roles—and to contribute to research focused on improving efforts in preparing the future professoriate.<sup>1</sup> Our goal is to answer the following research question:

*How do graduate students conceive of and rank professional role identities, including those of researcher, teacher, and lifelong learner, in terms of their current and future actual roles, expected roles, and desired roles?*

In order to address this question, a survey was developed, distributed, and analyzed to determine the differences in teacher, researcher, and lifelong learner roles for each field. Grounded in role identity theory, the survey elicits students' perceptions of their current roles in academia and the future roles they believe they will have after graduation.

## Literature Review

The concept of role identities is based on a combination of social identity theory and identity theory, in which “who you are is derived from social memberships [roles].”<sup>(2, p. 26)</sup> Formed through a reciprocal complex of an individual's personal and social selves, “role identities are role-based personas complete with goals, values, beliefs, norms, interaction styles, and time horizons.”<sup>(2, p. 51)</sup> Specifically, when individuals adopt roles, they also adopt the salient characteristics of that role, and those characteristics can inform the sense of self. Although enacting a role identity does not necessarily entail accepting that identity as self-defining, the navigation and transition between role identities does involve a shift of personas and sometimes leads to internalizing an altered conception of self.

Academia as a professional organization both provides a hierarchical structure of roles and requires individuals (especially faculty members) to construct their profession from a number of roles, e.g., researcher, teacher, advisor, administrator, etc. During graduate school, students are in a state of transition that could be described as experimenting with a variety of identities or roles including behaviors.<sup>3</sup> As students navigate possible role identities, they begin to “articulate a narrative thread that connects possibly disparate experiences into a coherent story about

themselves.”<sup>(2, p. 8)</sup> This preparation for an academic career that can require role identity transitions on a daily basis is critical but poorly understood.<sup>1</sup>

### ***Research Focused on Identity of Graduate Students***

Student identity has been explored in a plethora of ways. Specifically for graduate students, identity has been examined in terms of students becoming researchers<sup>(e.g., 4)</sup>, professionals<sup>(e.g., 5)</sup> and educators<sup>(e.g., 6, 7)</sup>. While identity has been studied focusing on other items and constructs, for the purposes on this work, we have chosen to focus on the three roles above.

In terms of being a researcher and professional, past work has been minimal but informative. Harrison<sup>4</sup> explored graduate students’ identity development as researchers in the field of counseling, specifically looking at his own personal development from student to researcher and found that the relationship between a research supervisor and student can greatly impact identity and professional development. Through cases studies with students creating ePortfolios as they balance their roles as students, researchers, and teaching assistants in an English department, Blair and Monske<sup>5</sup> found that ePortfolios can help graduate students develop a reflective view of themselves as professionals.

In terms of teaching identities, Olsen<sup>8</sup> examined the transition to becoming a teacher with students who recently graduated from an English department. His work focused on exploring teacher identity to help novice teachers reach back to past experiences to help them better identify with their new role in the classroom. Jarvis-Selinger, Pratt, and Collins<sup>6</sup> also examined the transition from student to teacher but focused on participants’ commitment level to teaching through perceptions and expectations. They found that discussions of the transition can greatly assist teachers in developing and recognizing their new identities. Finally, Hamman, Gosselin, Romano, and Bunuan<sup>9</sup> researched the identity of new and emerging teachers, framing their analysis in terms of possible selves. Their work demonstrated that the theory of possible selves may be an important link between identity development and other areas of teacher development, a thread that also appears in Turns’ work on electronic portfolios.<sup>10</sup>

These articles show components of how people transition from student to teacher, but there is still a lack of information on how graduate students balance multiple roles. Graduate students’ roles as researchers, students, and teachers are of particular interest because they are navigating current and possible selves while completing their graduate degree<sup>(e.g., 11)</sup>. The other difference between past research and the current study is that we examine graduate students in technical fields, where teaching is often perceived to be secondary to working on research. In contrast, the participants described in much of the identity literature related to educator development come from fields where teaching is the main focus of preparation for future careers<sup>(e.g., 6, 9)</sup>. A few studies have been done in engineering on teaching<sup>(e.g., 11)</sup>, but the research is very limited.

### ***Summary***

Educational researchers have taken multiple approaches to exploring student identity development. While most of the research methods have been qualitative in nature, few studies have adopted quantitative approaches. The survey research discussed in this article addresses a

gap in the literature by developing a quantitative approach to graduate student identity development in engineering, education, and engineering education. We explore graduate students' perceptions of their multiple roles today and in the future, focusing on a) the *actual* roles they currently hold, b) the roles they *desire* to hold now and in the future, and c) the roles they believe they are *expected* to hold now and in the future.

### ***Terminology***

Throughout this research key terms were used with distinct definitions in mind. First, the term *identity* is used in terms of who a person is in the professional sense. For example, for graduate students and professoriate, identity often includes the roles of teacher, researcher, and lifelong learner, and individuals vary in how these roles are valued and integrated. We also use the terms *current* and *future* throughout our study. Current refers to the roles of the individual at the given time in graduate school when participants take the survey. Future refers to their role as a professional once they graduate. When referring to a future role, any career choice could be possible, but based on the results of our survey, this professional future role for both Master's and PhD students will be in academia (approximately 40%) or industry (approximately 40%) with the remaining choosing a variety of paths. The term *actual* refers to the facts as the student sees them—what the person is really doing today; *desired* relates to what the person wants to be doing; and *expected* relates to what the participant thinks others will want them to do or require them to do. Importantly, the data is gathered through the participants' perceptions of these items.

### **Methods**

A survey informed by role identity theory was developed for and distributed to a population of engineering, education, and engineering education students to better understand their views on being teachers, researchers, and lifelong learners. The survey was developed through an iterative refinement process that employed multiple experts and a pilot study with individuals outside of the population. Once the data was collected, it was analyzed using statistical techniques to compare the groups' professional identities today and in the future.

### ***Instrument Development***

The first step involved determining the roles that would be studied. We chose to gather information on students' roles as researchers, teachers, and lifelong learners, the latter of which we paralleled with their current role as students. Researchers and teachers were chosen because many graduate students are employed through research or teaching positions. Also in academia, the roles of teacher and research are important elements of the promotion and tenure process. We chose to not focus on the service component of being a faculty member because no specific role could be attached to that criterion and because limiting our study to the examination of three roles was important to focus the scope of our work and balance our survey. We wanted to keep extra-curricular activities out of our analysis since so many students are involved in a large variety of activities, and this complexity would make analysis challenging. We did include an open-ended question that asked participants to discuss other roles that we have overlooked to help with future revisions of the survey.

Once the roles were determined, we examined the roles through a current and future perspective taking into account what students actually do, what students want to do now and in their careers, and what students think is expected of them now and in their careers. Table 1 depicts the 15 dimensions of a graduate students' professional identity that were explored.

Table 1: Dimensions of Identity

Current			Future	
Actual Role	Desired Role	Expected Role	Desired Role	Expected Role
Teacher	Teacher	Teacher	Teacher	Teacher
Researcher	Researcher	Researcher	Researcher	Researcher
Lifelong Learner				

The ultimate goal was to compare differences and similarities between items to uncover disparities between graduate students' perceptions of what they are currently doing and what they will expect to be doing in their future professions.

Once the five perspectives (current actual role, current desired role, current expected role, future desired role, and future expected role) and three roles were determined, questions were created for each of the 15 dimensions. Five questions were developed for each dimension so that a reliability analysis could be performed. Following the creation of the 75 items, demographic questions were generated, along with a set of questions that made comparison between the various dimensions of current and future identity. All of the 75 items were Likert-type scale response with seven choices (1-Strongly Disagree, 2-Disagree, 3-Somewhat Disagree, 4-Neutral, 5-Somewhat Agree, 6-Agree, 7-Strongly Agree). A seven-point scale was chosen so that higher reliability could be obtained while allowing for more variability in individual responses.<sup>12</sup>

Once all of the questions were written, they were reviewed by three experts to ensure validity. One of the experts specialized in identity related content, another specialized in survey design, and the third specialized in general research evaluations. After the experts reviewed the questions, revisions were made to language and format. Next, the survey was entered into the online survey tool so it could be piloted for additional question revisions and timing evaluation. The survey was distributed to five individuals outside of the specific population and who were unfamiliar with the study. These individuals were chosen because they understood the roles of being a graduate student and because their disciplines closely aligned with those in the population. The pilot revealed small changes that needed to be made to improve flow and readability in the survey. Based on the pilot, the survey in its current form was going to take no more than 20 minutes to complete; however, many questions were deemed to be obviously redundant. After the pilot, the survey was once again examined by the identity and evaluation experts, and the 75 items related to the various dimensions of a graduate students' identity were decreased to 60 items where four items mapped to one of the 15 dimensions outlined in Table 1. This decrease in the number of items still allowed for reliability testing but made taking the survey more manageable. The entire survey design process helped to ensure future reliability testing could be done and helped guarantee content validity. Once the survey was revised, it was distributed to the identified populations via email (for a copy of the survey questions, please contact the authors). The data collection period lasted approximately four weeks. After the four-

week period, the survey was closed to future access so that the results could be analyzed. A copy of sample survey questions can be found in Appendix A.

### ***Participants***

The population of interest in this study was engineering, education, and engineering education graduate students at a large public research-focused university located in the southeastern United States. Although each population of students engages in research, we were interested in exploring the differences in how students in the different disciplines self-assess the balance of their roles as researchers, teachers, and lifelong learners, taking into account that most graduate students go through a process of “trying on” different roles during this transitional phase.<sup>3</sup> We chose engineering students because we thought they would more typically represent the researcher role, and we chose education students because we thought they would more typically represent the teacher role. Engineering education students were chosen as a hybrid between the two fields. By having each of these present, we could gather information about various roles from a multiple perspectives.

The students in this population were initially all graduate students working on their Master’s degrees or PhDs from a variety of engineering disciplines and education departments. Approximately 1750 students were in engineering (79% of the total population), approximately 450 students were in education (20% of the total population), and approximately 25 students were in engineering education (1% of the total population). It should be noted that the engineering education department is housed within the College of Engineering, but the students take a variety of courses in engineering, education, and engineering education that differentiates them from typical engineering majors. Based on these subpopulation numbers, the entire population of this research was initially approximately 2225 students.

Sampling was not needed for this study because all members of the population were given the opportunity to participate through the use of college listservs. Two listservs were used to disseminate the survey (one through the College of Engineering and one through the School of Education). Both listservs included all part-time and full-time students, students currently enrolled in the programs, and students at distance campuses whose program was part of a specific department physically located at the main campus. The goal at the start of the survey distribution was to achieve responses that were proportional to the population.

### ***Data Collection***

The survey developed was distributed to students through an email with a link to an online survey. The survey tool Qualtrics was used to create the survey and to collect the data. Both groups received the same email which briefly explained the study, provided a link to the survey, and explained an incentive that would be available to survey participants. Students who completed the survey would have the option to be entered into a drawing for one of ten \$20 gift cards. This incentive was included to try to increase the response rate.<sup>13</sup> Approximately a week after the recruitment email was distributed, a reminder email was sent and about a week later, a final reminder was distributed. In total, the population was contacted three times to participate in the study, and 424 responses were received. Given the population of 2225 students, the

responses received indicated an overall response rate of 19% before data cleaning or manipulation took place. After the initial data cleaning, 345 responses remained from both Master's and PhD level students for a response rate of 16%.

### ***Data Analysis***

The data analysis consisted of four main components conducted using SPSS. First, the data was cleaned to remove incomplete surveys and adjust data based on free responses. After removing the Master's students, 189 responses remained (31 (~16%) were from education, 145 (~77%) were from engineering, and 13 (~7%) were from engineering education (the engineering education program is only offered as a PhD)). The Master's students were removed to focus the sample on those more interested in future careers in academia that involve research, teaching, and lifelong learning. Second, reliability analyses were performed and items were combined and averaged to develop the 15 identity dimensions. Third, a series of ANOVAs were conducted to determine the differences between the three groups in the population in terms of each dimension. Fourth, the comparison questions in the final section of the survey were analyzed with an ANOVA to determine the differences between current and future roles between the groups as viewed by the participants. Finally, a set of pie charts were created to visually examine how engineering, education, and engineering education graduate students view their current and future roles (refer to Appendix B).

### **Results**

After data cleaning, reliability analyses were performed in SPSS on the four questions related to each of the 15 dimensions (see Table 2 for Cronbach's Alphas for each dimension).

Table 2: Cronbach's Alpha's for Identity Dimensions

	Current			Future	
	Actual Role	Desired Role	Expected Role	Desired Role	Expected Role
<b>Teacher</b>	0.936	0.705	0.885	0.945	0.836
<b>Researcher</b>	0.902	0.747	0.748	0.944	0.824
<b>Lifelong Learner</b>	0.827	0.570	0.676	0.802	0.846

As shown above, the alpha's ranged from 0.579 to 0.945. Ideally, each case should have been over the standard 0.8 criteria to achieve internal consistency or at least be above 0.65 to be acceptable.<sup>14</sup> Except for the dimensions of the current expected lifelong learner and current desired lifelong learner, all of the constructs had Cronbach's Alphas over 0.7. The questions pertaining to each dimension were averaged for a total of 15 items to be used during analysis. The last step of the initial data analysis consisted of organizing responses by departments creating three disciplinary groups.

### ***Construct and Role Analysis***

A series of ANOVAs were conducted for each discipline (engineering, education, and engineering education) in order to compare responses to: a) questions about individual roles in terms of current and future dimensions, b) questions about alignment between current and future

roles, and c) point distribution questions about role activity. In addition, responses to an open-ended question about other roles were examined through open-coding.

### *Comparing Individual Roles in Current and Future Dimensions*

First, analysis of current role dimensions revealed that there are several instances of statistical difference between the nine current role dimensions using a criterion of  $p < 0.05$  (see Table 3).

Table 3: Summary of Differences in Current Role Dimensions

<b>Dimension</b>	<b>Comparison</b>	<b>Mean Difference</b>	<b>Std. Error</b>	<b>Sig.</b>
Current_Teacher_Actual	ED and ENG	1.040	0.363	0.013
	ED and ENGE	-0.211	0.613	0.937
	ENG and ENGE	-1.251	0.541	0.057
Current_Researcher_Actual	ED and ENG	-0.996	0.239	0.000
	ED and ENGE	-0.550	0.392	0.341
	ENG and ENGE	0.446	0.340	0.391
Current_Teacher_Desired	ED and ENG	0.819	0.261	0.006
	ED and ENGE	-0.182	0.444	0.912
	ENG and ENGE	-1.001	0.391	0.030
Current_Researcher_Desired	ED and ENG	-0.901	0.186	0.000
	ED and ENGE	-0.893	0.311	0.013
	ENG and ENGE	0.008	0.273	1.000
Current_Teacher_Expected	ED and ENG	0.615	0.355	0.197
	ED and ENGE	-0.616	0.591	0.551
	ENG and ENGE	-1.231	0.516	0.047
Current_Researcher_Expected	ED and ENG	-1.482	0.202	0.000
	ED and ENGE	-1.102	0.332	0.003
	ENG and ENGE	0.379	0.288	0.388

However, no statistical differences exist between engineering students and engineering education students in terms of the researcher dimensions, where they both reported around six or “agree” for all cases. Also, no statistical differences exist between education students and engineering education students in terms of the teacher dimensions, where they both reported between 4 and 5 or “neutral and somewhat agree.” There are statistical differences between engineering and education students for five of the researcher and teacher dimensions ( $p < 0.001$  for 3 cases – dark grey;  $p < 0.05$  for 2 cases – light grey). Between engineering and education students, education students reported a score approximately 0.5 to 1 point higher for each teacher item while engineering students reported a score approximately 0.5 to 1.5 points higher for each researcher item. The current lifelong learner items showed inconsistent results and therefore were not included in the table above.

The second ANOVA revealed instances of statistical difference in each of the future role dimensions using a criterion of  $p < 0.05$ , except for that of the future expected lifelong learner ( $p = 0.071$ ) (see Table 4).

Table 4: Summary of Differences in Future Role Dimensions

<b>Dimension</b>	<b>Comparison</b>	<b>Mean Difference</b>	<b>Std. Error</b>	<b>Sig.</b>
Future_Teacher_Desired	ED and ENG	1.375	0.313	0.000
	ED and ENGE	0.258	0.533	0.879
	ENG and ENGE	-1.116	0.469	0.048
Future_Researcher_Desired	ED and ENG	-0.848	0.235	0.001
	ED and ENGE	-0.492	0.392	0.422
	ENG and ENGE	0.356	0.343	0.554
Future_Teacher_Expected	ED and ENG	0.728	0.274	0.023
	ED and ENGE	-0.029	0.466	0.998
	ENG and ENGE	-0.757	0.410	0.158
Future_Researcher_Expected	ED and ENG	-0.555	0.184	0.008
	ED and ENGE	-0.422	0.304	0.350
	ENG and ENGE	0.133	0.265	0.870

As in the results from the current dimension items, no statistical differences were found between engineering students and engineering education students in terms of the researcher dimensions, where they both reported approximately 6 or “agree.” Also, no statistical differences exist between education students and engineering education students in terms of the teacher dimensions, where they both reported between 5.5 and 6 or “agree” for all cases. Again, there are statistical differences between engineering and education students for both the researcher and teacher components ( $p < 0.001$  for 2 cases – dark grey;  $p < 0.05$  for 2 cases – light grey). Between engineering and education students, education students reported a score approximately 0.5 to 1.5 points higher for each teacher item while engineering students reported a score approximately 0.5 to 1 point higher for each researcher item. The future lifelong learner items again showed inconsistent results and had not been included in the table.

#### *Comparing Alignment between Current and Future Roles*

The next series of ANOVAs compared the three groups’ responses to four alignment questions. These questions directly asked graduate students if they thought there was an alignment between their current and future roles. While the first set of individual roles questions could be used to identify alignment indirectly, the direct alignment questions required participants to think about their roles in general terms to provide a different perspective. Only one question yielded significant results ( $p=0.33$ ,  $p < 0.05$ ) indicating discrepancies between the groups: for the current role and future desired role comparison, engineering education students agreed more than both education and engineering students with the statement, “My current role as a graduate student will prepare me for what I *want* to do when I graduate.” All students scored above 5 “agree”, indicating that students in each discipline believe there is alignment between the current roles they have, what they want to be doing, what they believe is expected of them today, what they want to do in their future careers and what they believe will be expected of them in the future.

### *Comparing Point Distributions of Role Activity*

The final part of the analysis examined the point distributions participants gave their future and current roles as a teacher, researcher, and lifelong learner. These questions were included to provide a third view on the alignment between current and future roles. The first point distribution questions asked students to assign weights to their roles as teachers, researchers, and lifelong learners to represent “who you are today,” and the second question asked students to assign these weights to represent “who you want to be in your profession.” The point distributions required participants to consider the roles of teacher, researcher, and lifelong learner in a general perspective. Asking the questions in these ways allowed for multiple views on the results to ensure validity in the responses. A set of pie charts was created to graphically depict the differences between the current and future roles by group for this item (see Appendix B).

### *Open-Ended Question Coding*

Following the series of standard quantitative survey questions, an open-ended question was asked to examine roles that participants felt were essential to their identities but were not discussed in the survey. The question was, “With regard to your roles as a graduate student, are there any other roles you have that we have not discussed that you feel are important to who you are as a graduate student?” The responses that were submitted for this question were open-coded for general themes and trends. The most common roles that the participants cited were mentor, spouse, service, and collaborator. Some also commented about their role in social groups such as the role of a friend and others talked about being an employee because they held jobs outside of those of a traditional graduate student. While some trends were observed in the answers to the open-ended question, there was little consistency in the responses.

## **Discussion**

The data gathered through this survey provided both anticipated and surprising results. In terms of the three fields, we see similarities between certain fields for certain roles, and we see consistent differences for others. The lifelong learner role provided an inconsistent picture of that role in the fields across the multiple dimensions.

### *The Dimensions of Identity*

In terms of the 15 dimensions of identity perception researched in this work, we were able to determine that students in the three fields do indeed view the roles differently. In terms of the current role identity dimensions, we see that there is statistical difference between the views of education and engineering students for every dimension relating to teacher and researcher except for that of the “current teacher expected.” For these dimensions and these groups, we would expect to see education students relating to teacher items more than engineering students, and engineering students relating to researcher items more than education students; and in terms of mean differences we do see that education students rate teacher items higher and engineering students rate researcher items higher. This discrepancy between the two groups reflects a difference in the social context and cultural values between disciplines and may point to the need for improving preparation for future professions in both fields. Context is critical to individuals’

selections of roles as they construct global identities. As Ashforth<sup>2</sup> notes, global identities are constructed from experiences and formed largely in terms of roles that are viewed as positive and valued by others. People tend to internalize roles that reinforce the self in positive ways, have salience in the relevant social context, are possible to enact, are integrated with other roles, and reflect positively on the self.<sup>2</sup>

When engineering education students were added into the analysis, we expected to see no statistically significant difference between engineering education students and education students in terms of being a teacher; and we expected no statistically significant difference between engineering education students and engineering students in terms of being a researcher. The data in Table 3 confirms this hypothesis. For the future roles, our expectation that the same phenomenon would occur was also confirmed (see Table 4). Examining the descriptive data, all of the dimensions have means between four and just over six indicating a positive agreement except for the dimensions of current actual teacher and current expected teacher which both are around three or “somewhat disagree.” This supports the hypothesis that these are indeed roles that graduate students balance, but that the role of a teacher is something that most graduate students are not doing. Again, in engineering, there exists a gap between research and practice<sup>15</sup>, but fields such as engineering education are helping to fill that void by educating students on the importance of both research and teaching. More generally, these results confirm that graduate programs should be working to improve approaches to preparing the future professoriate.<sup>1</sup> Institutionally, we should be investigating how programs are communicating professional expectations and supporting graduate student experiences in expected roles.

The interesting and surprising result relates to the role of a lifelong learner. For these dimensions, we expected to see no significant difference between any of the groups since lifelong learning is a concept that is not discipline specific. There was, however, a difference between education and engineering students for all of the items except for the future expected lifelong learner where there was no statistical difference with an overall mean of 5.2.

Engineering education students fell in the middle of education and engineering students in all of the lifelong learner comparisons. Low reliability of the lifelong learner items (see Table 2) mitigates the impact of these findings, and further analysis is needed. Also, as a role “lifelong learner” may be complicated in that it is an integrated role in professional careers while more explicit and separable as “student” in graduate school.

### ***Current and Future Role Alignment***

The analysis of the alignment questions also produced interesting results. First, we see that there is no statistical difference between any of the groups in terms of (a) what they want to do and what they are actually doing now ( $p = 0.260$ ) with an overall mean of 5.220, (b) what they believe is expected of them and what they are doing now ( $p = 0.874$ ) with an overall mean of 5.490, and (c) what they believe will be expected of them in the future and what they are doing now ( $p = 0.202$ ) with an overall mean of 5.410. All of these items had means above five, indicating that the participants “somewhat agree” that there is alignment. However, the alignment between what they are doing now and what they want to do in the future showed that engineering and engineering education students answered this question differently ( $p = 0.033$ ), where engineering education students saw more alignment than engineering students.

Engineering education students had a mean of 6.23; engineering students had a mean of 5.20. This result raises questions about what kind of work is needed in engineering better align current and future roles. For example, these results may support past research showing that students lack a clear definition or understanding of what they will be doing in the future as professionals<sup>(e.g., 16)</sup>. Or, education and engineering education students may have internalized the role of teacher more than engineering students simply because of the inherent valuation of education in the field. Even though engineering students may desire to teach in the future, it may not be supported and valued in their programs. Better alignment between current roles and future work is needed, which could perhaps be achieved through certificate programs or other nontraditional methods of teaching in graduate school.

### ***The Points Distribution***

Analysis of the point distribution data showed that each group rated the roles differently except for the future lifelong learner role ( $p = 0.069$ ). These differences could be due to the funding system of the various disciplines where 77% of engineering students selected GRA as one of the primary funding sources and 26% selected GTA while only 26% of education students selected GRA and 42% selected GTA. Perhaps education students identify more with being students or lifelong learners because they are not being paid for research roles as frequently as engineering students. Since engineering education students are part of the College of Engineering, their pay structure parallels that of engineering students.

Upon visual examination of the pie charts shown in Appendix B, it should be noted that in all three fields teaching was given less points for the current role than the future role. This leads us to conclude that, while the participants indicated overall alignment between current work and future work, when they were asked to assess the roles holistically we see a misalignment. These results suggest that future work is needed to enhance students' identification with being a lifelong learner and with being a teacher since in all disciplines the students expect to be doing more teaching than they are currently doing. Furthermore, this finding supports past work that detailed reflection can reveal gaps in professional development and even help support clearer understanding of identity roles<sup>(e.g., 9, 10)</sup>. In the next phase of this research project, we will begin to uncover more of the details of why and how students perceive certain roles in specific ways through an in depth qualitative analysis of e-portfolios. This work will help us understand the transitions that students go through from graduate school into their profession, and it will also provide insight into their perceptions of that transition.

### ***Open-Ended Responses***

The results of the open-ended question varied greatly by participant. There were observable trends in that many cited the roles of mentor, spouse, server, collaborator, friend, and employee as significant to their identities. These identities are ones that will be examined in future studies as they are essential to who graduate students are. At this point in this study, examining all of these roles using quantitative measures would be challenging so future work will examine these roles using qualitative techniques to truly understand their impact and interaction between the roles of teacher, researcher, and lifelong learner.

## ***Limitations***

In terms of this research, there are two main limitations. First, the sample population of engineering education students was only 13 participants. Due to the small size of the program, this was anticipated, but all of the results should be interpreted with the size as a major consideration. The other limitation is generalizability. This study was only conducted at one (R1) university with only three fields studied, so the results cannot be generalized beyond the population.

## ***Future Work***

We plan to evaluate and analyze the lifelong learner results carefully so that reliable lifelong learner items can be created, either as new questions or as questions that relate orthogonally to lifelong learning in teacher and researcher roles. We also plan to revise and distribute the survey nationally to all graduate fields of study to see how the additional fields view these roles. Also, we plan to follow up with the same population to discern any changes that may have occurred throughout graduate school. Finally, we will combine this study with a qualitative research project where more details on the various roles could be obtained.

In terms of role identity, this research has provided a snapshot of students' perceptions of their roles as researchers, teachers, and lifelong learners. In the future, more extensive research will aim to provide a better understanding of the transition between these roles, how the balance changes between the roles as a student progresses, and how roles are perceived and instantiated within academic institutions. Results of such research could address the question of how students are prepared for what is expected of them in their future careers and which experiences as a graduate student prepare them for their various roles. For example, do graduate teaching assistant appointments prepare students to teach more than structured programs designed for preparing the future professoriate? Also, are there other ways besides traditional appointments to give students experiences that prepare them for the future?

## **Conclusions**

In this study, we focused on exploring the following research question to better understand the graduate student experience:

*How do graduate students conceive of and rank professional role identities, including those of researcher, teacher, and lifelong learner, in terms of their current and future actual roles, expected roles, and desired roles?*

In conclusion, the results of this study provide an initial sketch of graduate student identity as constructed of multiple roles and often conflicting perceptions of actual, expected and desired roles which can be used to supported curricular and program changes. Our work indicates that engineering education students parallel education students in terms of teaching and engineering students in terms of research, but that in both education and engineering a balance between teaching and research is needed. Although education students showed higher investment in the role of lifelong learner, the strength of these results is mitigated by low reliability and requires further investigation. Also, based on the point distributions given to the roles by students, we see that there is a unique balance to the roles depending on field and that the roles do not align as

well as one would anticipate when alignment questions are asked directly. Overall, these results support the further development of graduate programs to provide proper alignment between current and future roles in terms of students being teachers, researchers, and lifelong learners, specifically pointing to the need for improved efforts in preparing future faculty.

Additionally, this research is part of a larger study that explores professional identity construction facilitated through use of e-portfolios. The results of this pilot study will enable us to distribute the survey widely, identifying critical gaps in student's self-perceptions that e-portfolio work could help address.

## References

1. Denecke, D.D., Kent, J., and Wiener, W. (2011). *Preparing Future Faculty to Assess Student Learning*. Washington, DC: Council of Graduate Schools.
2. Ashforth, B. E. (2001). *Role transitions in organizational life: An identity-based perspective*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
3. Colbeck, C. S. (2008). Professional identity development theory and doctoral education. *New Directions for Teaching and Learning*, 2008(113), 9-16.
4. Harrison, R. L. (2008). Scaling the ivory tower: Engaging emergent identity as researcher. *Canadian Journal of Counselling*, 42(4), 237-248.
5. Blair, K. L., & Monske, E. A. (2009). Developing digital literacies and professional identities: The benefits of ePortfolios in graduate education. *Journal of Literacy & Technology*, 10(1), 40-68.
6. Jarvis-Selinger, S., Pratt, D. D., & Collins, J. B. (2010). Journeys toward becoming a teacher: Charting the course of professional development. *Teacher Education Quarterly*, 37(2), 69-95.
7. Park, C. (2004). The graduate teaching assistant (GTA): Lessons from North American experience. *Teaching in Higher Education* 9(3), 349-361.
8. Olsen, B. (2008). How "reasons for entry into the profession" illuminate teacher identity development. *Teacher Education Quarterly*, 35(3), 23-40.
9. Hamman, D., Gosselin, K., Romano, J., & Bunuan, R. (2010). Using possible-selves theory to understand the identity development of new teachers. *Teaching and Teacher Education: An International Journal of Research and Studies*, 26(7), 1349-1361.
10. Turns, J., Sattler, B., & Kilgore, D. (2010). *Disciplinary knowledge, identity, and navigation: The contributions of portfolio construction*. In Proceedings of International Conference of the Learning Sciences, 1, 818-825.
11. Winberg, C. (2008). Teaching engineering/engineering teaching: Interdisciplinary collaboration and the construction of academic identities. *Teaching in Higher Education* 13(3), 353-367.
12. Rhodes, R. E., Matheson, D., & Mark, R. (2010). Evaluation of social cognitive scaling response options in the physical activity domain. *Measurement in Physical Education & Exercise Science*, 14(3), 137-150.
13. Laguilles, J. S., Williams, E. A., & Saunders, D. B. (2010). Can lottery incentives boost web survey response rates? Findings from four experiments. *Research in Higher Education*, 52(5), 537-553.
14. DeVellis, R. F. (1991). *Scale development*. Newbury Park, NJ: Sage
15. Jamieson, L. H., & Lohmann, J. R. (2009). Creating a culture for scholarly and systematic innovation in engineering education: Ensuring U.S. engineering has the right people with the right talent for a global society. *American Society for Engineering Education*. Washington, D.C.: American Society for Engineering Education.
16. Matusovich, H. M., Streveler, R. A., & Miller, R. L. (2010). Why do students choose engineering? A qualitative, longitudinal investigation of students' motivational values. *Journal of Engineering Education*, 99(4), 289-303.

## Appendix A

Below is a sample set of questions for one of the three roles for the different dimensions included in the survey. For a full copy of the survey, please contact the authors.

To what extent do you agree or disagree with the following statements?

### Current Actual Role - Teacher

- I am currently a teacher
- My peers see me as a teacher
- My main responsibility this semester is to teach

### Current Desired Role - Researcher

- If possible, I would like to spend more of my academic time researching
- I am happy with the amount of responsibility I have researching
- If I were to describe myself with one of the following words, teacher, researcher or student, I would prefer researcher

### Current Expected Role - Lifelong Learner

- Part of my yearly evaluation includes reporting my academic activities such as grades, courses completed, etc.
- Others (faculty advisor, department, etc.) believe my current responsibility is to learn
- Currently, I am funded to be a student

### Future Desired Role - Teacher

- When looking for a job, I will seek a position that prioritizes teaching
- An important component of my future job will be teaching
- In the future, I want to be like faculty that spend a lot of time on teaching

### Future Expected Role - Researcher

- In my future field, most people will work as researchers
- Most of the positions that will be available to me are for researchers
- Criteria for promotion and tenure in my field will require research

## Appendix B

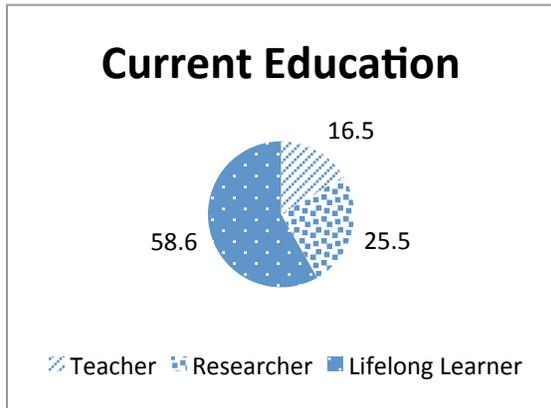


Figure B1. Education Current Role Distribution

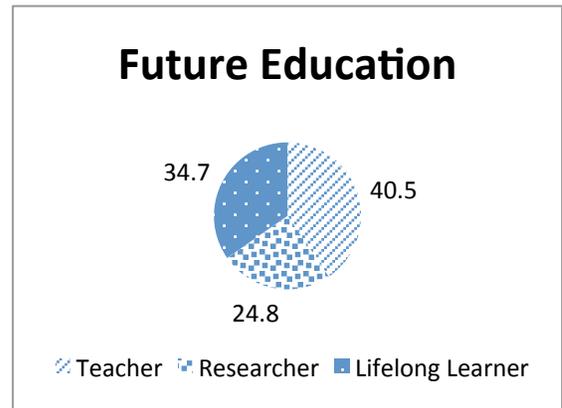


Figure B2. Education Future Role Distribution

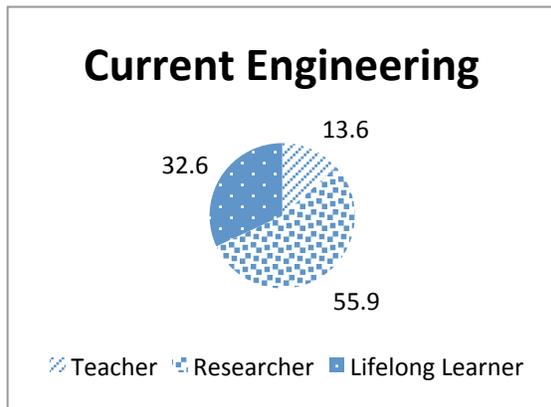


Figure B3. Engineering Current Role Distribution

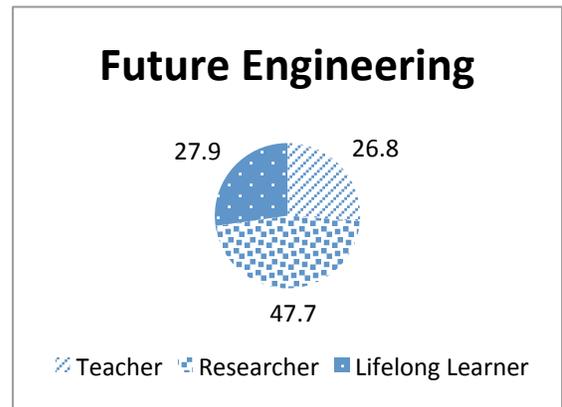


Figure B4. Engineering Future Role Distribution

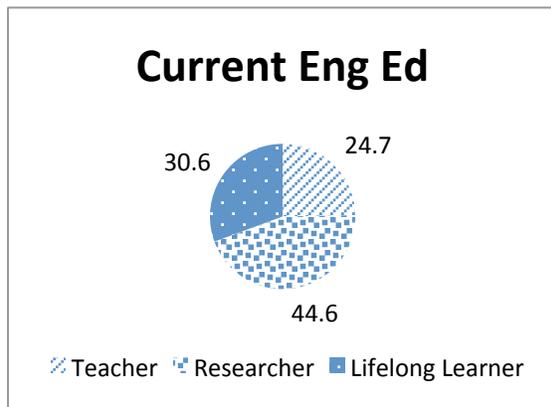


Figure B5. Eng Ed Current Role Distribution

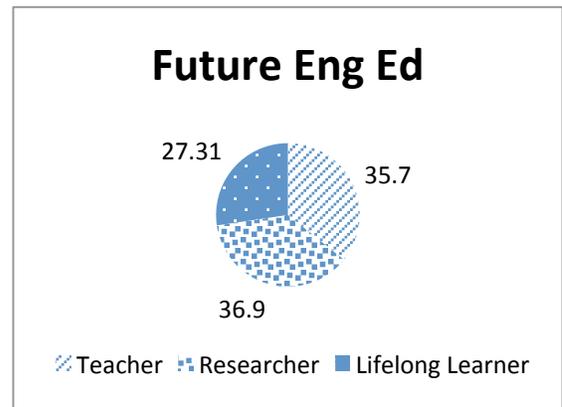


Figure B6. Eng Ed Future Role Distribution