The Role of Writing Clusters in Minority Students' Beliefs about Writing

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ABSTRACT: Reduced motivation and low self-success beliefs caused by social factors, cultural factors, and the perception of the dissertation writing process attribute to the attrition of underrepresented students from doctoral engineering programs. Minority doctoral attrition in engineering undermines the aim to diversify the engineering field in industry and academia. The Dissertation Institute (DI) is a one-week writing intervention designed to combat minority doctoral attrition. A key component of this intervention is the daily facilitated writing groups called "Writing Clusters." The writing group sessions were recorded, transcribed, and analyzed using subjective value tasks from Eccles' Expectancy Value Theory to determine how the writing group environment with peers from an underrepresented group affected each student's motivation, success beliefs, and individual perception of the dissertation writing process. It was found that once the participants dismantled the cost and understood the utility and interest of the tasks required to complete their dissertation, they were able to build their success beliefs in their writing and increase their motivation to progress in their dissertation process.

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Between 2010-2012, less than 7% of engineering doctoral degrees were granted to historically underrepresented minorities (National Science Foundation. National Center for Science and Engineering Statistics., 2015). Additional studies concluded underrepresented minorities are not completing doctoral degrees at the same rates as other racial groups. Hispanics and African Americans completed their engineering degrees at lesser rates than their Caucasian counterparts (Sowell, 2008). These studies suggest there are issues plaguing historically underrepresented minority (URM) groups pursuing doctoral engineering degrees. These issues can reduce motivation in URM groups consequently causing an increase in URM doctoral attrition. A URM group's success is often hindered by low individual success beliefs caused by imposter syndrome (Langford & Clance, 1993), and social isolation (Carter-veale, Tull, Rutledge, & Joseph 2016) among other factors. The dissertation process as scholarly writing is often portrayed as a difficult and complicated process that can place pressure on students (Aitchison & Guerin, 2014; Paré, 2011) which can deter the pursuit and completion of a PhD. Previous research suggests students who goal set and receive periodic feedback tend to have an increase in confidence and motivation to achieve their tasks (Schunk, 1981, 1983). Additionally, students who make short-term rather than long-term goals have stronger confidence and success beliefs (Bandura & Schunk, 1981). Higher expectancies for success also tends to lead to better task performance (Bong, 2001; Eccles, 1983).

The Dissertation Institute (DI) was created to increase motivation for doctoral degree completion and reduce counterproductive factors

that impede the diversification of engineers in industry and academia. The DI, funded by the National Science Foundation (NSF), teaches strategies to help students overcome writing hurdles, and helps develop practical goals that lead towards degree completion. The DI is a yearly week long intensive intervention that introduces strategies for PhD students through various sessions and presentations. The DI also helps students reassess their expectations, offers feedback on their progression, helps them goal set to make the dissertation writing process less overwhelming, improve their motivation, and boost success beliefs as they continue their doctoral programs. The main goal of the DI is to improve doctoral degree completion of historically URM engineering students.

A key distinction of the DI compared to other dissertation boot camps is its daily, facilitated discussion sessions called "Writing Clusters." Writing Clusters are a pivotal part of the DI's mission to combat URM doctoral attrition. They allow groups of individuals hindered by low success beliefs a space to recreate and build self-success belief, empower themselves to overcome obstacles, and motivate themselves to complete their doctoral programs. Consequently, Writing Clusters can help reduce URM doctoral attrition from engineering programs. The Writing Clusters consist of seven to eight students in similar stages of their doctoral programs (i.e. proposal writing stage or dissertation writing stage). The Writing Clusters give students an environment to reflect on writing strategy effectiveness, assess their overall progress, and challenge practices of graduate school and academia.

Purpose

The purpose of this longitudinal, qualitative inquiry is to understand the process through which URM students adjust their success beliefs towards completing the dissertation while participating in Writing Clusters at the DI. This analysis will address the following research question:

> *RQ: How do Dissertation Institute participants adjust their beliefs about the dissertation writing process through the duration of the workshop?*

The results of this study will offer insight into students' thought processes, progressions, and other experiences during writing interventions. These results can be used to improve future writing intervention workshops and activities. This study's conclusions can be used to suggest strategies that URM doctoral students and advisors can implement to increase students' self-success beliefs and motivation to complete the doctoral program.

What Is the Dissertation Institute?

The DI is a one-week, writing-focused intervention offered annually and designed to combat reduced motivation, increase self-efficacy, and ultimately contribute to reducing the attrition of URM doctoral engineering candidates. The DI teaches students how to set attainable writing goals, and allows them to practice and implement new writing strategies through various workshops, group discussions, and individual discussions with facilitators. The DI additionally offers opportunities to focus on writing and support throughout the dissertation or dissertation proposal process.

DI topics include goal-setting, time management, stress reduction and other issues that inhibit progression to complete a proposal or dissertation. Students also have the opportunity to create a network of fellow doctoral students for motivation and accountability purposes. This initiative is like the interdisciplinary Graduate Writing Institute (Thomas, Williams, & Case, 2014); however, the DI has a specific focus on URM groups pursuing an engineering doctoral degree.

In addition to workshops, students participated in a daily hour-long focus group called Writing Clusters that consisted of a group of approximately eight students with a facilitator. The discussion topics included reflections of personal progression, DI workshops and activities, and graduate school politics/challenges.

Literature Review

There are numerous studies about research writing groups for doctoral students. Findings can be summarized into three main themes: doctoral writing group benefits, successful

writing group characteristics, and disciplinary understanding.

Common Benefits of Doctoral Writing Groups

Wilmot & McKenna (2018) aimed to characterize how writing groups in graduate education can be utilized as a transformative space both academically and personally. Through anonymous questionnaires, surveys, and interviews given to writing group participants, the authors claim a writing group serves as a "space for students to grow and develop as scholars in an environment in which they get constant feedback and encouragement from peers." (p.11). Other benefits include a safe environment that lead to professional/academic identity development and encourages challenges to disciplinary norms.

Aitchison & Guerin (2014) investigated how writing groups aid doctoral students in scholarly writing, which includes dissertations and journal articles. They collected a series of multi-method studies from a multitude of authors. These groups were found to "improve writing, reviewing, critiquing, and feedback skills" (p. 28). Writing groups were most appropriate to help doctoral students with their research writing as it offers a place for interaction in situated learning. The groups tend to "counter feelings of isolation" (p. 28) and are socially desirable to the students.

D. Maher et al. (2008) determined benefits of a doctoral writing group. Participants from two doctoral writing groups at the Australian University reflected on their experiences after a year and a half of participation. These revelations were documented and analyzed. Results suggested benefits of participating in a writing group included a change in perspective about the writing process, knowledge gained through shared learning and peer review, sense of community, social support, and academic identity development.

Writing groups facilitate a supportive inclusive environment that allow doctoral students to develop as writers and academics. The sense of community writing groups provide allows each student to feel comfortable enough to offer and receive feedback and share knowledge

to propel the success and development of themselves and their peers.

Characteristics of a Successful Writing Group

Boud & Lee (2009) explored the effect of writing groups on academic and research potential development and guiding principles that create effective groups. Numerous social science doctoral writing group participants and facilitators completed surveys and recorded activities over three years. The study determined reciprocity, transparency, and open dialogue amongst facilitators and students were important characteristics of a successful, sustainable writing group. The study also found members in an effective writing group share strategies, offer constructive critique to each other, and have a clear understanding of group dynamics.

M. Maher, Fallucca, & Mulhern Halasz (2013) strove to understand the motivation to join a voluntary writing group and participants' perceptions of their personal gains from the group. Reflective interviews from a writing group with voluntary participants were taken and analyzed. Participants noted that flexibility, consistency, structure, participants at different stages in their program, facilitator involvement and transparency made the writing group successful and sustainable.

Honesty and openness amongst all doctoral students and facilitators proved to be one of the most important aspects of a successful writing group. Transparency, full group participation, and participants at different stages are required to create an environment that facilitates effective knowledge sharing and critique, which are some of the main benefits of a writing group. Additionally, the structure and consistency a group session offers aids in group sustainability.

Disciplinary Understanding

Previous studies argued writing groups are most successful when all participants share a disciplinary understanding. Berdanier (2016) studied 50 National Science Foundation (NSF) Graduate Research Fellowship Program winners and their argumentation strategies in their research proposals, the writer's perception, and writing influence using a mixed methods

approach. The findings suggest engineers have a significant difference in their approach to writing than social science students. The author claims there is "a great need to develop specific courses to teach engineering writers within the disciplinary community, especially at the graduate level." The author suggests writing intervention development to help students address "debilitating tendencies" by introducing strategies to help reduce these tendencies (pp. 154-155). The author further emphasizes the importance of teaching engineering writing to "encourage sociocognitive enculturation of graduate students into the engineering discourse community," (p. xiii) in effort to increase "confidence in academic writing" and "lower attrition rates for doctoral students as a result of stronger disciplinary identity" (p. 157).

Hixon et al (2016) explored an Engineering Education Writing Group to determine characteristics and practices of the doctoral engineering writing group that promoted sustainability and productivity to improve the institution's Communication Center. Interviews from eight participants and four non-participants were summarized and qualitatively analyzed. Results found a pre-determined structure, trust, honesty, accountability, feedback, and peer support were crucial for writing group success. It also found scheduling and a student's current status in their doctoral program determined whether a participant would voluntarily join the writing group. Most importantly, this study determined graduate students in engineering need more time to write scholarly articles needed for degree completion.

The studies presented above emphasize the importance and benefits of writing groups and the necessary practices and principles needed for successful groups. Writing groups appear to aid in mitigating some of the main issues previous research determined prevalent in the URM student doctoral experience such as social isolation and low success beliefs. Our study aims to further investigate the effect of an interdisciplinary engineering doctoral writing group in a writing intervention context not addressed by existing literature. Our study also aims to focus on the effect of writing groups on engineering doctoral students that are a part of URMs, which is also not directly addressed by existing literature.

Theoretical Lens

The expectancy-value theory (EVT) of achievement motivation developed by Eccles (1983) is the theoretical lens used for this study. Expectancy of success, or success beliefs, is defined as one's belief about how they will perform on a task (Eccles et al., 1983). EVT states that an "individuals' choice, persistence, and performance can be explained by their beliefs about how well they will do on the activity" (Eccles, 1983).

Overall, EVT claims people involve themselves in tasks and activities they believe they have a high likelihood of success in. This theory indicates one's expectancy of success as well as how much one values the task, hence task values. The task values of EVT and their definitions are as follows:

- **Interest:** The individual's personal enjoyment of the task
- **Attainment:** The importance the individual gives to the task and how their performance will reflect on them personally
- **Cost:** The probability of success or failure given what the individual must sacrifice
- **Utility:** How useful the task at hand is or will be to the individual

This framework fits our study as it allows us to understand how and why success beliefs are formed, and it allows us to organize a plethora of themes we gathered from our data into four subcategories, which will be discussed in a later section. In addition, we can observe where subcategories appear and their progression during the duration of the DI. The subcategories will allow us to observe a progression of belief values and show which pillars most heavily contribute to student success beliefs.

Methods

This qualitative study used a case study approach as our study met the criteria defined by Yin (2003): (1) the nature of the research question is descriptive, (2) the investigator lacks methods to control the site and participants, and (3) the

Figure 1: Writing Cluster Prompts

Day One
• What did you learn that you put into practice? How did it go when you tried it out? • What successes have you had? What challenges do you think you will need to overcome for the balance of the week?
Day Two
• Did you try something different this morning? How did it go? • What are you learning about your strengths and weaknesses as a writer?
Day Three
• How are your views about your writing ability changing? • Are your views about the importance of writing changing? Is your motivation to complete your degree changing in any way?
Day Four
• How will you sustain healthy writing habits when you return to your university? • What have been your biggest successes here and how will you sustain them? • What will be your biggest challenges in writing when you get back to your campus? How will you overcome them?
Day Five
• What is your biggest takeaway from this week so far? • What are your future plans?

phenomenon being studied is contemporary and the context is real life. In addition to meeting the previously described criteria our study was constrained in time and space (Stake, 1994) by focusing only on participants statements during the DI.

The primary form of data collection used was a focus group. One of the Writing Clusters consented to being examined as a focus group. Since EVT (Eccles, 2011; Eccles et al., 1983) can manifest differently in each person, the Writing Cluster as a focus group allowed participants to provide their individual points of view, narratives, and comparisons with other participants in the group. Additionally, focus groups are a good way to collect information from URM groups as this mechanism provides comfort among participants to know that their circumstance is not unique (Hesse-Biber and Leavy, 2011).

After candidates participated in scheduled workshops and individual writing time, they reported to their Writing Cluster. The schedule is included in Appendix A. Each cluster discussion had preassigned prompts for students to discuss (sample prompts are listed in Figure 1). The prompts aimed to understand students' expectancy of success as it changed throughout the institute and verify for changes in their goal-directed behavior; however, prompts also illuminated their experience with the DI itself.

We transcribed responses to sample questions after all data was collected from the Writing Clusters. The transcriptions were analyzed using pattern coding (Miles, Huberman, & Saldaña, 2014) which helped us find common themes amongst participants' responses. Most comments could be classified into two main categories relating to writing: mechanics and expectations. The expectations category refers to beliefs participants have about themselves and/or their writing. Participants discussed goal setting, goal adjusting, and reflections on progress within this category. The mechanics category refers to key themes where the participants began to understand the requirements of writing the proposal and dissertation and as techniques on how to

Figure 2: Demographics of the Subjects of the Study

SEX | ETHNICITY | RACE
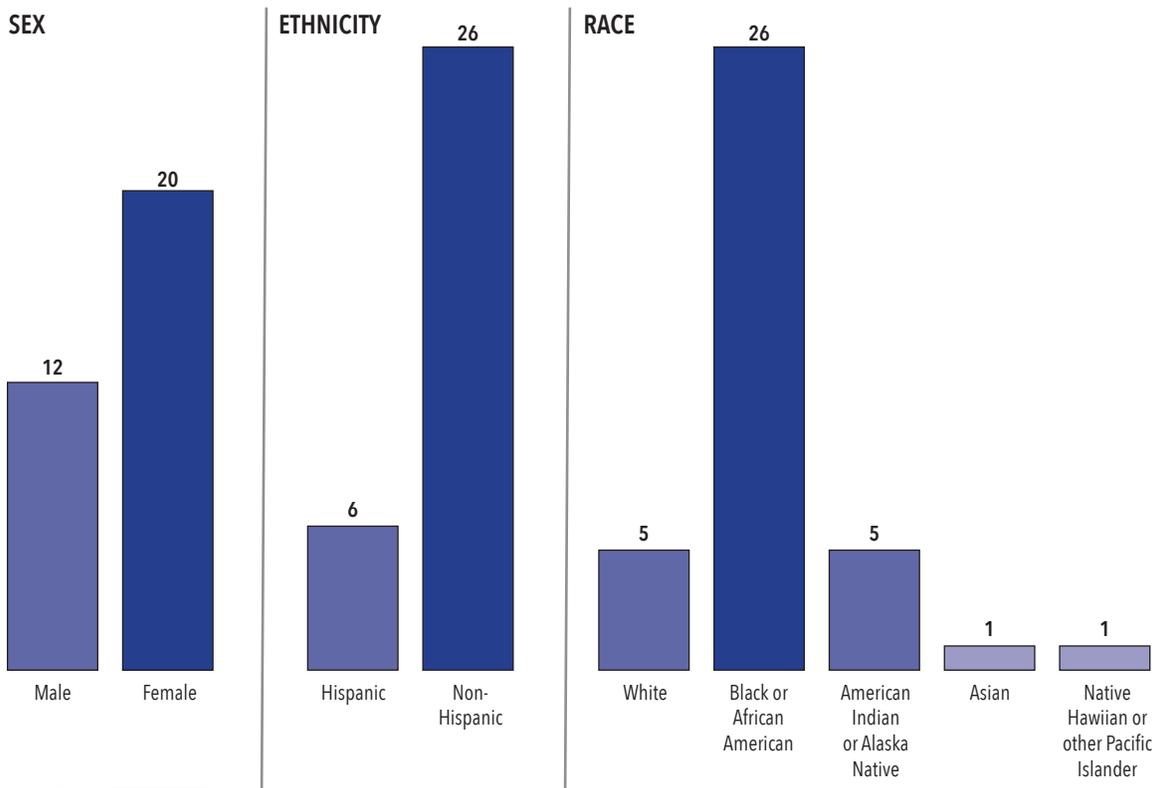
do so. Participants discussed time management, discipline, formatting, grammar, and writing organization in this category. We coded the data longitudinally (Miles et al., 2014) within their respective categories. The longitudinal coding allowed us to easily observe the overall progression of student's success beliefs and behavioral changes during the program as expressed during the Writing Cluster.

There were some student comments that did not fall into writing related themes (i.e. advisor issues, funding, work-life balance etc.) in our analysis. These quotes were excluded from this study since they were beyond our scope of analysis. Figure 2 describes the demographics of participants in the DI. The Writing Cluster analyzed in this study was a representation of the overall population of the DI.

Results

The results are presented in chronological order alongside the events occurring in the Institute between each Writing Cluster meeting. We take this approach to understand the changes in student perceptions in the daily context of each session's conversation. Writing Clusters were held once a day every day for the duration of the Dissertation Institute.

Day One

The first Writing Cluster session took place on the second day of the Dissertation Institute. Students attended workshops on completing the dissertation, healthy writing habits, handling procrastination, and mechanics of writing before their first cluster meeting. One of the activities in these workshops tasked the students to plan backwards from their desired PhD graduation date to figure out when they would have to meet all of their university's required deadlines and milestones. This activity framed much of the conversation held on the first session of the writing cluster.

We found two main themes in participants' reaction to day one: recognition of unrealistic expectations on completing the dissertation and self-assessments on habits hindering their writing. For the first theme, students

commented how the timeline activity required them to assess and rearrange their expectations regarding their dissertation goals. Many participants mentioned how their original expectations were too ambitious and unrealistic, especially after calculating the time between the milestones and university graduation requirements and how these led to their desired graduation date. The following quote shows a student coming to terms with her overambitious goals:

> "Yeah, I had like super high expectations after being pumped up for a day and a half but I guess wasn't realistic about priming the pump."
> — African American Woman

While many participants began to reexamine their conceptions about dissertation writing, others began to resolve the anxiety they felt while working on the dissertation. Participants began to question the role of the dissertation in the broader picture of their PhD programs and future careers. A participant began to reassess the meaning she gave to the dissertation document stating:

> "We are so invested in the dissertation, but it is only a permission to do something greater. […] So it doesn't have to be perfect, and it just has to get done… Because it's not as big of a deal as we make it out to be in our heads."
> — Native American Woman

The second theme we observed was participants began to assess the weaknesses of their current work environments, identify their best work environments, and understand where they lack self-discipline. Participants also began to think about ways to prevent these distractions from affecting them during their writing time. One participant had an idea of environments that worked better or worse for her. She claimed:

> "I don't work well in environments where I know the people that are working around me, because I'll want to talk to them. But with strangers I can work really well."
> — African American Woman

Discussions on Day One revolved around the realization that their expectations about graduating may be too aggressive when considering what is required to graduate by the university. Students also began to understand the role of the dissertation both within their PhD process and in the larger view of their career post-PhD. Consequently, they started to assess the changes they needed to make to get their dissertation completed. These conclusions helped begin to adjust their success beliefs and shift the value they individually assigned to the dissertation.

Day Two

Between the first and second session of the Writing Cluster, participants were given a few hours to write. Themes of goal-setting, goal assessment, and self-discipline were further observed on Day Two.

After understanding the purpose of the dissertation and revising timeline expectations, participants began to center their focus on the writing process, specifically how to replace bad writing habits for sustainable ones in their daily routine. During writing time at the beginning of Day Two, participants tested writing strategies they learned in workshops during Day One and attempted to attain revised goals from the previous day.

> "Since yesterday, we talked about some of us and the experience was to do a lot more planning than words, so I decided my chapter was less planning and more words on paper… I had a goal of two paragraphs. So that worked because I did finish two paragraphs."
> — Latina Woman

In addition, they stated strategies encouraged by the facilitators such as experimenting with different writing places and writing times to determine what works best for them and becoming more disciplined about distractions.

> "I switched things up this morning and actually like wrote alone in my room this morning. There's very low accountability. Like it's more relaxed kind of thing. I'm not a morning writer is what I have found. I'm definitely more of

an afternoon, night person. I found that I was getting like, when I was by myself, I was getting distracted by my emails and phone"
— Native American Woman

Participants began to apply what they learned in Day One and further analyzed their habits. They set and attained smaller goals and worked on replacing any remaining expectations that were unrealistic. Participants began to understand how perfectionism and constant editing can hinder the writing process on this day. They began to seek balance between a perfect deliverable and one that is good enough.

By Day Two, participants began to adjust what they believed to be the cost of completing the dissertation. They were able to overcome some limiting beliefs about how much effort they can invest in the work because they adjusted the size of the overall task into smaller individual tasks. The completion of these smaller individual tasks helped adjust expectancy of success for the larger overarching dissertation.

Day Three

Between sessions two and three of the Writing Cluster, participants had free time to write and workshops to prepare for the defense. Participants were given writing time and free time to use at their disposal afterwards. In this session, we see participants doing further revision to their previous goals and how this continuous adjustment changed their beliefs about completing their dissertation into something achievable. Some participants noted that after making their goals realistic, their beliefs about the dissertation and their personal writing process began to shift.

"I honestly came into this week not really sure what physically I could get done because I was buried very early in like the writing process. My goals at the beginning of the week, before we really got started were very abstract and not very like concrete. I felt like I've built my confidence a lot in writing. Just doing it."
— Native American Woman

Although students did not achieve some goals, participants used this failure to adjust

their perception of the task's difficulty and adjust future goals as they continue to write rather than becoming discouraged and intimidated by the process like before. We observe a participant's expectations for the week and writing ability change as a product of her new knowledge.

"At the beginning of the week I had a certain set of goals and then I 've been working I've noticed that my goals are changing. But they're also going towards finishing the dissertation. So I feel okay about that. It is the things that I've been working on this week that weren't the things I through I'd be working on this week."
— African American Woman

We found a notable change in the nature of participants' comments during this third session. These comments shifted from the larger discussion of setting goals and a productive environment to specific questions regarding the mechanics of drafting their proposals and dissertations. Participants also focused on what it will take to complete each section of the dissertation and which ones will require more work/planning. A participant acknowledges his writing strengths and uses them to plan for success stating:

"Some things are a lot harder to write than others. Part of the reason why I was so upset it well yesterday is because I was used to writing solely the experimental part […] Anything else especially introductions requires you helping yourself figure out what is it exactly that you're saying and how you're going to say it. So that's a lot harder and I'll take that into account to set more realistic goals."
— Latino Male

We see how participants use their successes from the previous day to commit to planning through the breakdown of tasks during Day Three. They also begin to understand not all tasks require equal effort and plan accordingly. This a priori assessment of effort increased their expectancy of success in completing tasks ranging in both size and effort.

Day Four

Between the third and fourth Writing Cluster sessions, participants had time to write and workshops on advisor communication, stress management, imposter syndrome. We continued to notice how participants comments were more focused on the mechanics of writing such as literature searches, literature reviews, building arguments, and other dissertation mechanical elements. We see a participant discusses the lack of literature in her field of study claiming:

> "I have the same issue with my literature review. There is generally a broad body of literature, but they still don't really have anything to do with my particular project. So, I feel like my literature review was really scarce. It's like not really that much of my dissertation, as much of it is methods, so I kind of saw it as a blessing."
> — African American Woman

Students no longer mentioned whether certain expectations were too high or low regarding their timeline on this day. They began to focus on how they would plan for success upon their return to their home institution. In the following quote we see one student negotiating with herself where she will work when she returns home to prevent falling into previous habits:

> "I had that same concern as well. It kind of goes to what you are saying about […] not returning to what was comfortable before coming here. […] So I'm making sure that when I first get home, I'm not going to work in my office right off the bat because my muscle memory will take over."
> — African American Woman

Participants actively engaged in the task of writing and began to discuss hurdles relating to the mechanics of writing rather than planning or belief of their ability to write by Day Four. This shift shows the students began to engage in the plans they set forth in the previous days.

Day Five

Participants attended their last Writing Cluster section on the last day of the Dissertation Institute. During the Writing Cluster, the group began to reflect on their time at the DI. Themes of handling setbacks and increased confidence were observed.

Participants acknowledged how they were often discouraged by setbacks and how that would cause anxiety and stress throughout the week. By the end of the DI, participants talked about learning effective strategies to overcome obstacles and how to continue to progress in their writing. In the following quote, we see how one student discusses one of the strategies they employed to overcome their writing anxiety:

> "I'm taking away from here […] that in order to avoid the anxiety of writing, I kind of told myself 'Well, I just need to do more work in this area then I'll go there'… I had count of 200 words after a time of writing where I felt the most productive and the most capable."
> — Latino Man

Many participants noted an increase in self-confidence and their writing abilities after the DI's conclusion. The quote below captures a summative statement from one of the students towards the end of this writing cluster session:

> "I think my biggest takeaway and it kind of goes off of what everybody else has said is that I can do this. […] I really built my confidence, 'I can actually put work on a page'. I've written several pages of stuff this week, and that is just mind-blowing"
> — Native American Woman

We observed students adjust goals and perspectives at the beginning of the week, testing strategies regarding their writing process and leaving with a sense of empowerment over their dissertation and productivity.

Discussion

Analyzing and changing expectations about the overall degree progress and writing goals were

commonly shared themes among the participants during the first two days of the DI.

Participants had to first determine how much work and time was required to meet their graduation milestones and adjust their goals accordingly. Initially, the time and effort to complete a dissertation intimidated participants and they viewed the cost of completing the dissertation as high. We were able to dismantle these beliefs about the strenuous effort that went into a dissertation and the need for a dissertation to be a perfect research deliverable during DI workshops. Consequently, participants understood the true utility of their dissertation for their career paths and adjusted their perceptions of the work needed to complete the dissertation. These adjusted perceptions about effort also lowered the cost factor for the students.

Once participants achieved a true understanding of the effort needed to complete the dissertation and the actual milestones needed to graduate, they were able to begin thinking of strategies to break down their writing goals. We were able to tangibly point to specific days pf the DI in which participants began asking questions that related less to the expectation of completing the dissertation and more about the mechanics of writing it. Students began to articulate their reflections on the progress they made that day and used this information to assess their planning. Each participant's beliefs about their own personal success improved due to informed planning and execution of their writing goals and positive reinforcement from cluster members and facilitators.

It is important to note that while not all participants in the Writing Cluster were working on the dissertation, they all planned in accordance with their desired doctorate degree graduation date. This planning led them to consider the process of writing the dissertation and account time to complete it. In conclusion, the DI writing clusters provided students a safe space for participants to encourage each other among like peers as they adjusted their task beliefs regarding the dissertation develop positive habits that could lead them to degree completion. Our findings are similar to those observed by (Wilmot & McKenna, 2018)

Conclusion

The overarching purpose of this study was to observe the progression of participants' success beliefs during a one-week intervention. The intervention's Writing Cluster structure allowed participants to openly understand the cost, utility, and interest in required tasks to complete their dissertation by helping participants reassess expectations, change perceptions, make short term goals, write in smaller portions, reflect in a group setting, and give themselves and others immediate feedback. Consequently, participants progressively built their confidence and self-success belief in their writing skills.

The results of this study can be applied directly to URM doctoral students in an engineering program, specifically in a group setting. A student must first address how their perception of tasks creates challenges, understand the utility of the task, and compare the utility of the task to their perceptions and potential challenges in effort to increase their own success beliefs. Afterwards, the student should begin to find tasks pertaining to the dissertation that interest them so they can stay persistent in the writing process. Students must also adopt writing strategies that allow them to break down tasks into smaller sections, encourage self-discipline, frequent self-reflection and feedback. These efforts will allow the student to create self-sustainable productivity and confidence in their writing ability.

Limitations of this work include disproportionate representation amongst URMs at the Institute. Future works can focus on one URM and the progression of their success beliefs about their writing abilities over a short period of time in a writing group setting.

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Contributor Bios

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Dr. Mayra S. Artiles is an assistant professor in the Engineering Education Department at Arizona State University. She has a B.S. in Mechanical Engineering from the University of Puerto Rico at Mayaguez and an M.S. in Mechanical Engineering from Purdue University with a focus on nanotechnology. Before completing her PhD. in Engineering Education, she worked at Ford Motor Company as an Electrified Vehicles Thermal Engineer for four years. Mayra has collaborated in research projects on diversity in engineering, institutional support for minority students, intercultural competency development in engineering students, and doctoral student motivation. Her current research focuses on understanding the role of institutional policies in doctoral student persistence.

Dr. Holly Matusovich is a Professor in the Department of Engineering Education. She has formerly served as Assistant Department Head for Undergraduate Programs and Assistant Department Head for Graduate Programs. Dr. Matusovich is recognized for her research and practice related to graduate student mentoring. She won the Hokie Supervisor Spotlight Award in 2014, was nominated for a Graduate Advising Award in 2015, and won the 2018 Graduate Student Mentor Award for the College of Engineering. Across all of her research avenues, Dr. Matusovich has been a PI/Co-PI on 12 funded research projects including the NSF CAREER Award, with her share of funding being nearly $2.3 million. She has co-authored 2 book chapters, 21 journal publications, and more than 70 conference papers. She has won several Virginia Tech awards, including a Dean's Award for Outstanding New Faculty, and Outstanding Teacher Award, and a Faculty Fellow Award.