

Fostering a Supportive Mentoring Space During a Global Pandemic

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Eliza is an Assistant Professor of Engineering and Science Education at Clemson University, with joint appointments to Mathematical Sciences and Education and Human Development. Her research centers issues of equity, diversity, and inclusion in STEM through the lens of identity development with a particular focus on graduate students.

Mrs. Rachel Lanning, Clemson University

Rachel Lanning is a Ph.D. student in the Department of Engineering and Science Education at Clemson University. Her disciplinary background is in mathematics with a mathematics Master's degree from Georgia Southern University. Her research interests include well-being and departmental culture as it pertains to graduate students.

Tony Nguyen, Clemson University

Tony Nguyen is a part-time doctoral student in the Engineering and Science Education Department and full-time lecturer in the School of Mathematical and Statistical Sciences at Clemson University. His research interests include mathematical symbol sense-making and symbol load.

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Sharetta (she, her, hers) is a PhD candidate in the Learning Sciences program, which is housed in the College of Education, and serves as the Assistant Director of Recruitment and Inclusive Excellence in the College of Science at Clemson University. Her research interests focus on justice, equity, diversity, and inclusion in mathematics education.

Tyler James Sullivan, Clemson University

I am a PhD student in the Engineering and Science Education Department at Clemson University with a background in Mathematical Sciences.

Tim Ransom, Clemson University

Tim Ransom (he, him, his) is a Ph.D. student in the Clemson Engineering and Science Engineering department, and has a disciplinary background in Computer Science. His research interests include STEM identity and computing education.

Mrs. Wysheka Austin, Clemson University

Wysheka Austin is a Ph.D. student in the Engineering and Science Education Department at Clemson University. She earned her B.S. in Electrical Engineering at Clemson University and M.S. in Supply Chain Management at Penn State Online World Campus. In addition to her Ph.D. studies, she also is a senior manufacturing leader at General Electric, where she is a 9+ year veteran. Her personal passion for creating a pipeline for young, African American women and minoritized people in STEM in the industry and in her community helps to shape Wysheka's drive for her research. Wysheka's research interest focuses on activation strategies to increase the interest of African Americans in STEM degrees starting with the middle school to high school transition.

FOSTERING A SUPPORTIVE MENTORING SPACE DURING A GLOBAL PANDEMIC

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OUTLINE

- ❑ Context - Who we are and the space we occupy
- ❑ Motivation - COVID-19 and graduate education
- ❑ Methods – Autoethnography
- ❑ Results - Structures to foster a supportive mentoring space
- ❑ Results - Practices to foster a supportive mentoring space
- ❑ Discussion and implications



In this talk we will provide context to situate where this work is occurring and with whom, motivation for what prompted our efforts, the methods used to examine the data, and our results grouped into two categories. Our first result category identifies the structures that supported our mentoring space. Our second result category showcases the practices within those structures that fostered a supportive mentoring space. We conclude with a discussion of the limitations and potential implications of this work.

CONTEXT - WHO WE ARE



Eliza

4th year Faculty



Tony

3+ year grad student



Wysheka

2nd year grad student



Tim

1st year grad student



Matt

1st year Faculty



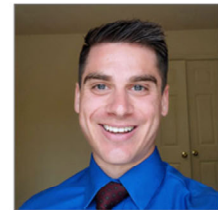
Rachel

3+ year grad student



Sharetta

2nd year grad student



Tyler

1st year grad student

Understanding who we are is key to understanding the supportive mentoring space we fostered during the pandemic.

Co-leading the space are two faculty members:

- Eliza had an established research group at Clemson University. Eliza has 23 years experience providing professional development activities and conducts research in graduate student identity and well-being.
- Matt was entering his first year as a faculty member at Clemson University. Matt had a background in corporate training and is an equity scholar with a focus on supporting inclusive environments.

Graduate students in the space included:

- Tony, 3+ year graduate student
- Rachel, 3+ year graduate student
- Wysheka, 2nd year graduate student
- Sharetta, 2nd year graduate student
- Tim, 1st year graduate student
- Tyler, 1st year graduate student

This was a **closed space** meaning any potential visitors were discussed ahead of time and would only be invited if the whole group agreed. Through the year this included a visit by two prospective graduate students, one alumni from the program, and a STEM education researcher. Throughout the year all potential visitors were invited into the space. In general, most of the members were very open and willing to have guest attend the space, but we wanted to make sure that all the members had a voice in this decision.

CONTEXT - SPACE WE OCCUPY

Large research-intensive university in South Carolina, US.

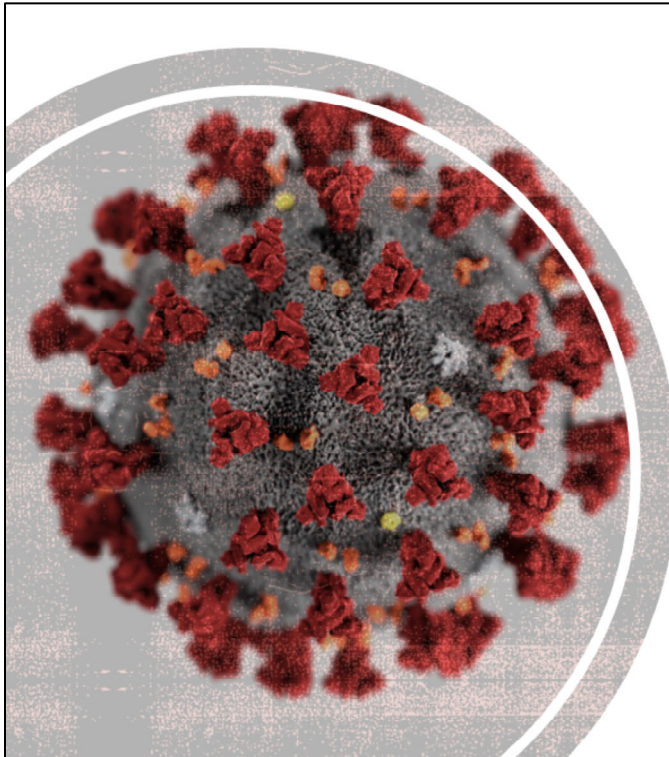
STEM education research space:

- Doctoral programs in STEM Education & Learning Sciences
- Largest research group within our department
- Focus on mathematics education
- Research interests in equity, identity, and diversity in STEM




The research group exists primarily within the Department of Engineering and Science Education at Clemson University. The department is housed in the College of Engineering, Computing, and Applied Sciences rather than the College of Education. All of the faculty members have at least a Master's in a STEM discipline; most have joint appointments to their disciplinary department. One member of the group is completing a PhD in Learning Sciences through the College of Education.

The disciplinary backgrounds of group members include mathematics, computer science, industrial engineering, and sociology. However, the group focuses largely on mathematics education and on issues of diversity, equity, and inclusion. Our research group is one of the largest within the department and the only one that is facilitated between two faculty members.



MOTIVATION

- ❑ COVID-19 was a disruptive force in our communities, families, and educational setting
- ❑ Massive shifts to online education
- ❑ COVID-19 has a greater effect on women (Cardel et al., 2020) and communities of color (Weissman, 2020) in STEM fields
- ❑ High levels of stress and mental health impacts for graduate students in STEM (Evans, et al., 2019; Hyun, et al., 2006)



The COVID-19 pandemic was a disruptive force that continues to impact the lives of our entire global society as we modify how we interact within our communities, families, and in educational settings. This once-in-a-generation phenomenon prompted a rapid shift to online learning which had the widespread effect of disrupting academic trajectories and contributing to feelings of isolation for many individuals. While it's too early to determine the impact COVID-19 has had on educational settings for underserved and marginalized communities in STEM, there is emerging evidence that the disruptive force of this global phenomenon has had a larger effect for women (Cardel et al., 2020) and communities of color (Weissman, 2020).

STEM education graduate students during this time reside within a complex system of tensions such as pursuing their doctoral research and collecting data impacted by COVID-19, completing course requirements for classes that have shifted in modality, and preparing for an uncertain job market with widespread hiring freezes. Overlay these tensions with existing research that has documented high levels of stress and mental health impacts for graduate students in STEM (Evans, et al., 2019; Hyun, et al., 2006), and the status quo is untenable and problematic. As such, as a field we face an immediate need to share and document ways to support and empower graduate students at this critical stage of their academic journey.

METHODS

- ❑ Leveraged practices from autoethnography to “use personal experiences to describe and interpret cultural texts, experiences, beliefs and practices” (Adams, et al., 2017 p.1)
- ❑ Examination of artifacts (e.g., agendas, notes, readings)
- ❑ Self-reflection using reflexivity to identify and interpret shared practices, norms, and beliefs among the members in the space
- ❑ Faculty mentors had extensive experience in qualitative methodologies and supported emerging scholars in the reflective methods

We drew on methods from autoethnography to “use personal experiences to describe and interpret cultural texts, experiences, beliefs and practices.” This included a review of all the digital artifacts that had been created over the last year. Digital artifacts included agendas, notes, assigned readings, Canvas page entries, holistic reviews, and announcements. Then we used critical reflexivity to examine and interrogate the shared practices, norms, and beliefs among the members in the group that contributed to the fostering of a supportive mentoring space. The faculty mentors had extensive experience in qualitative methodologies and supported emerging scholars in reflective methods.

RESULTS

Structures that emerged as key to foster a supportive mentoring space

- Weekly research group meetings
- Asynchronous reading group
- Paired progress meetings

Practices that emerged as key to foster a supportive mentoring space

- Norms for participation were generated, discussed, and named
- Attending to emotional and personal well-being
- Focus on holistic growth
- Naming our collective space

Based on our autoethnographic reflection we identified three structures and four practices that contributed to the developed of our supportive mentoring space.

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STRUCTURES - WEEKLY RESEARCH GROUP MEETINGS

2 hour synchronous meetings via zoom platform

Co-planned by the two faculty members

Ongoing, collaborative, searchable agenda with notes from each discussion

Agenda typically included:

- Emotional and personal check-ins
- Announcement of milestones
- Discussion of shared readings or professional development activities

"It's important to highlight the flexibility, understanding, and care that was available during the shift to move to 100% online in this space" -Wysheka



The research group meetings were co-planned by the two faculty members but allowed for real-time adaptive support during the synchronous meetings. The **coplanning was a critical feature** to the successful facilitating of the meetings since both faculty members went into the space with a shared understanding of the goals of the weekly meetings and any areas for concerns.

The meetings leveraged an ongoing, collaborative shared agenda in a Google document. Members in the group appreciated this ongoing agenda as it allowed for easy searches of past discussions, kept a log of our meetings in a central location, and featured documentation of key-takeaways from the meetings. The structure of the agenda typically included a series of emotional and personal check-ins to promote mental health and well-being, announcement of milestones, and synchronous discussion of shared readings or professional development activities.

EMOTIONAL AND PERSONAL CHECK-INS

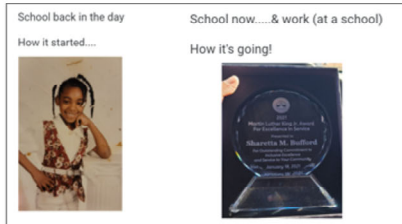
Draw your educational journey



Meme generation



How it started/How its going



Function of life



Games we play



The series of optional emotional and personal check-ins were especially impactful to start the meetings as they allowed space for individuals to have their personal identity affirmed and discuss challenges they faced and accomplishments they achieved. Example activities included: sharing a drawing of your academic journey, creating a meme that captured your emotions, creating a “how it started/how its going” reflection, graphing your time during an academic break, or choosing a board game that reflected your attitudes toward the week. These activities allowed for individuals to process where they were emotionally and were also professional development activities for us as STEM education researchers to be attuned to the emotional and personal health of research participants.

EMOTIONAL AND PERSONAL CHECK-INS (CONT.)

Resource page with each emotional check-in is available here for future use: <https://bit.ly/2YDdXMM>

Additional activities include:

- Writing a short poem
- Selecting a song that motivates you
- Generating a list of self-care activities
- Making a list of stressful items and tearing them up
- Creating a title for the dissertation of your life
- 2 truths and a lie

“Popcorn” or “tag” style sharing was identified as contributing to stress for some students in the group while sharing so this practice was removed

“Pursuing a PhD can have an emotional and physical toll on one’s body. However, our emotional and personal check-ins invited the vulnerabilities and meaningful conversations that made me feel human and helped me endure.” - Sharetta



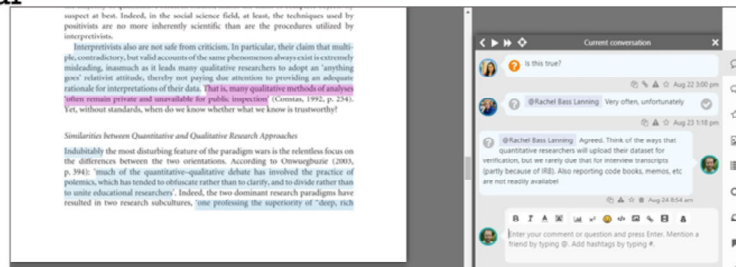
Some activities prompted creativity such as creating a poem to capture your emotional state with guidelines and support for creating the poem, another activity of selecting an inspirational song you enjoyed and playing a clip for the group, or even just sharing a small win for the week and accomplishment you were proud of since the last meeting. Each member of the research group rotated facilitating and designing one of these activities at the start of the meeting. They were originally slated to take 15 minutes but we found that flexibility in this time frame was important for allowing people to build community and feel treated as a whole person.

Participation was optional (aligning with our norms/community guidelines) and members could pass. We originally leveraged a “popcorn” method for the order of responding to the activity where the person sharing would tag the next person to share out; however, half-way through the year as we reflected on our practices we decided that this created stress for some members of the group so we shifted our practices to allow voluntary order of response. We identified that the “popcorn” style was causing stress when we used an anonymous survey to gather feedback for changes to our weekly research group meetings, discussed those in the group, and also provided time where the faculty mentors were not present for the students to discuss issues for future revisions.

STRUCTURES - ASYNCHRONOUS READING GROUP

- ❑ Asynchronous STEM education weekly readings
- ❑ Facilitated through annotation software Perusall
- ❑ Provided safe space to ask questions, helping to reduce imposter syndrome
- ❑ Monitor what resonated and track growth over the course of the year

"The use of Perusall allowed me as a mentor to engage with others' ideas offline, see growth in understanding, and share my own areas of confusion" - Matt



The asynchronous collaborative reading annotations were facilitated through the online mark-up and reading technology, Perusall. The Perusall tagging system provides a collaborative note taking experience. The asynchronous and collaborative nature of this tool allowed the faculty planners to understand what resonated with students, promoted conversations between students online, and allowed for monitoring of professional growth and engagement. This was especially important as we view learning as a social endeavor and the impacts of COVID-19 necessitated finding various ways to promote interaction with scholarship, an activity that can often feel isolating and unstructured. Allowing for comments from both faculty and graduate students around the same article allowed individuals to explore their own interests, ask questions, and help reduce imposter syndrome to make visible concepts that many of us were working to understand. Furthermore, as faculty the written discussion allowed us to monitor what was resonating with members in the group and also used to track growth over the course of the year.

STRUCTURES - PAIRED PROGRESS MEETINGS

- ❑ Advisor and advisee progress meetings
- ❑ Co-Advisor peer mentoring
- ❑ Weekly or biweekly schedule
- ❑ Allowed for individualized support and engagement
- ❑ Included holistic feedback review at the start of each semester

"My weekly individual research meetings helped keep me on track and I knew that there was always time set aside to focus on my needs both academically and personally during a time of stress and uncertainty." -Rachel



The paired progress meetings provided a targeted space to support individual students' needs and discuss issues that arose during the pandemic. These helped foster more intimate spaces that could provide tailored feedback and support for the particular time on the academic journey of the student (e.g., pre-qualifying exam, proposal defense, data collection).

The two faculty members also met weekly both to plan the weekly group meetings and also to support and mentor each other in different aspects of professional growth.

These paired meetings with faculty and graduate students also featured the use of a holistic feedback process at the start of each semester.

HOLISTIC REVIEW PROCESS

Informed and developed based on research findings (Pfirman & Gallagher, 2017, 2018; Pfirman, 2018) and is a living document

Reflective process from both the student and mentor

Scales are based on assessment of **independence** in reaching a quality product, not on the quality of a particular finished product

- Response levels: no opportunity to observe, significant supervision, moderate supervision, approaching independence, independent
- Assessment categories: professional identity, research agenda, study design, data collection and analysis, written communication, oral communication



Holistic review form available here: <https://bit.ly/3C5F94c>

These meetings also featured a holistic development plan where at the start of each semester, both the student and faculty evaluate progress towards independence as a STEM education researcher and set goals for the upcoming semester. The holistic growth form aligns with larger department practices that begin with holistic admissions review and continue through evaluation of milestones that reflect progress. It was created based on research on the perceptions of underrepresented doctoral students in STEM of what would best support them in their journey. Each student self-evaluates and the faculty member also evaluates. Comparison of those ratings allows for calibration and helps uncover the general mental and emotional well-being of the student as they progress.

Scales are based on assessment of independence in reaching a quality product, not on the quality of a particular finished product

- Response levels: no opportunity to observe, significant supervision, moderate supervision, approaching independence, independent
- Assessment categories: professional identity, research agenda, study design, data collection and analysis, written communication, oral communication

The holistic review meeting concludes with mutually setting one to three developmental goals and one to three task goals for the semester. The developmental goals are intended to help guide decision-making when opportunities inevitably arise, so that opportunities can be evaluated against current goals and the student feels comfortable and justified in saying “no” when appropriate.

Sample items included:

- Maintains a professional academic CV
- Situates research within extant literature and contextual data
- Relates research agenda to issues of diversity, equity, social justice
- Carries out research that adheres to ethical human subjects research
- Establishes a clear and appropriate theoretical framework
- Contextualizes results appropriately
- Ensures quality throughout the research cycle
- Organizes research papers clearly
- Communicates methods and results clearly in formal writing
- Contextualizes results clearly in formal writing
- Writing has coherent narrative and clear transitions
- Uses correct grammar and spelling
- Adjusts style and details appropriately for different settings
- Uses inclusive language and framing

HOLISTIC REVIEW PROCESS (CONT.)

Primary Bases for Evaluation: This is a holistic evaluation based on all of the activities, both formal and informal, that you have carried out during your time in the ESED program. However, the activities listed below were of particular relevance within each category.

Professional Identity: research meetings, lunch and learn, online search for website and CV (1/14/2021), self-reports from RUME conference attendance, TN STEM Ed

Research Agenda: qualifying exam, research meetings, proposal and proposal defense

Study Design: qualifying exam, research meetings, pilot studies, proposal and proposal defense

Data Collection and Analysis: qualifying exam, research meetings, pilot study, proposal and proposal defense

Written Communication: qualifying exam, successive drafts of proposal, RUME paper, TN STEM Ed poster

Oral Communication: qualifying exam, lunch and learn, research meetings, proposal defense, TN STEM Ed, seminar

Development Goals for upcoming semester:

Let's start thinking about a five-year research agenda coming out of your dissertation work
Work on improving professional online presence

Task Goals for upcoming semester:

Collect dissertation data!
Get JRME paper submitted

"As a growing researcher, this process has helped me acknowledge where I've been, identify areas to improve, and orient myself towards where I want to be." -Tony



Above are screenshots of examples to showcase the identified bases for evaluation, and the development goals.

PRACTICES - NAMING A COLLECTIVE SPACE

- ❑ Naming helps shape a collective identity (Fox, 2011; Moscovici & Duvonn, 2000)
- ❑ Communicating the values and beliefs of the named space (Gatson, 2011)
- ❑ Started with keywords, drafted ideas, and discussed symbolism
- ❑ Processes occurred after a year of regular meetings and occurred over several weeks of brainstorming, multiple name generation, and discussion
- ❑ Named our space the “Transforming Identity, Diversity, and Equity in STEM (**TIDES**) Research and Mentoring Collaborative”



One of the culminating activities of fostering this mentoring space was to collaboratively name the space. Naming holds significance in helping shape a collective identity (Fox, 2011; Moscovici & Duvonn, 2000) and communicating the values and beliefs of the named space (Gatson, 2011). One of the drivers for having a topical named space was to move away from standard practices of having STEM research groups named after the primary researcher which can convey ownership and hierarchy that we wanted to resist.

This process of naming occurred first by identifying keywords that we believed described the values and interests of the members of the space and then working to combine and brand these with imbued symbolism. The naming processes occurred after roughly a year of regular meetings and occurred over several weeks of brainstorming, generating multiple names, and discussing our views on the name, acronym, and logo. We view the group name as a landing place for our current space that captures our emphasis and aims. As our dynamics change, as our focus shifts, and new members enter the space we are open to revising our named space.

We named our space the “Transforming Identity, Diversity, and Equity in STEM (TIDES) Research and Mentoring Collaborative.” The symbolism of a tide was captivating as it communicated the need for a “tidal wave” to change the culture within STEM education. Furthermore, the idea of the ebb and flow of “tides” helped highlight that we are impacted by forces we cannot control, but together, we can weather the storm and support each other. In this presentation, we will discuss the broader context in which this community developed and provide design implications for building supportive mentoring spaces.

DISCUSSION AND IMPLICATIONS

- ❑ Holistic review needs to include values that are centered within our space, so we incorporated awareness and practice of diversity, equity, and inclusion, and general well-being
- ❑ Graduate student well-being is a current research topic of our group
- ❑ Current structure and practices are with 10 people, scaling to larger spaces would be limited
- ❑ What are the implications of moving to hybrid models, in the office, and other post-COVID implications?

“What really impressed me was how well the group was able to work in a virtual space.” -Tim



After a year of facilitating this mentoring spaces we have reflected on areas of change and also implications for extending these practices to other spaces.

We first realized that we wanted to make adjustment to our research-based holistic review process to include the focus of our practices that include emotional well-being and an explicit attention to issues of diversity equity and inclusion.

Second as we have occupied other spaces and classrooms we have witnessed how a careful attention to scaling this to larger settings is needed. For instance, doing emotional and personal check-ins requires trust, familiarity, and takes time. Scaling these to large classes is doable but requires different approaches.

Lastly, as we hopefully move beyond COVID-19, we need to pay special attention to how we transition these spaces from fully virtual to hybrid, in-person.

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