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# Narrating the Experiences of First-year Faculty in the Engineering Education Research Community: Developing a Qualitative, Collaborative Research Methodology

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## **Narrating the Experiences of First-year Faculty in the Engineering Education Research Community: Developing a Qualitative, Collaborative Research Methodology**

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Courtney is an Assistant Professor in the Technological Studies Department at The College of New Jersey. She joined The College of New Jersey after completing a Ph.D. in Engineering & Science Education at Clemson University. Prior to her Ph.D. work, she received her B.S. in Bioengineering at Clemson University and her M.S. in Biomedical Engineering at Cornell University. Courtney's research interests include epistemic cognition in the context of problem solving, researcher identity, and pre-service K-12 teacher preparation.

### **Dr. Cheryl A. Bodnar, Rowan University**

Cheryl A. Bodnar, Ph.D., CTDP is an Assistant Professor in the Department of Chemical Engineering at Rowan University. Dr. Bodnar's research interests relate to the incorporation of active learning techniques in undergraduate classes as well as integration of innovation and entrepreneurship into the engineering curriculum. In particular, she is interested in the impact that these tools can have on student perception of the classroom environment, motivation and learning outcomes. She obtained her certification as a Training and Development Professional (CTDP) from the Canadian Society for Training and Development (CSTD) in 2010, providing her with a solid background in instructional design, facilitation and evaluation. She was selected to participate in the National Academy of Engineering (NAE) Frontiers of Engineering Education Symposium in 2013 and awarded the American Society for Engineering Education Educational Research Methods Faculty Apprentice Award in 2014.

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Dr. Walter Lee is an Assistant Professor in the Department of Engineering Education and the Assistant Director for Research in the Center for the Enhancement of Engineering Diversity (CEED), both at Virginia Tech. Lee's research interests include co-curricular support, student success and retention, and diversity in STEM. He received his Ph.D in Engineering Education from Virginia Tech, his M.S. in Industrial & Systems Engineering from Virginia Tech, and his B.S. in Industrial Engineering from Clemson University.

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### **Dr. Courtney S. Smith, Virginia Tech**



Courtney S. Smith is a Teaching Assistant Professor at UNC Charlotte. Her research interests span the mentoring experiences of African American women in engineering, minority recruitment and retention, and best practices for culturally inclusive pedagogy in the engineering classroom.

# **Narrating the experiences of first-year faculty in the Engineering Education Research community: Developing a qualitative, collaborative research methodology**

## **Abstract**

In this work-in-progress, we will illustrate how we used two collaborative, qualitative research methods to narrate the experiences of six engineering education researchers (EERs) as we transition into new faculty roles within the EER community. To explore this phenomenon, we developed a community of practice where we shared our experiences and informed our practice through written reflections and weekly meetings. Using the Q3 qualitative research framework as a guide for establishing procedures, we combined elements from collaborative autoethnography and collaborative inquiry to narrate our experiences. We analyzed a subset of our first semester reflections to understand the challenges we faced in our new positions and support we received from our weekly meetings. We found the time management of teaching, research, and service to be overarching challenges. Additionally, the support from our weekly meetings provided a sense of community and place to receive advice to address these and other challenges. We found that the proposed collaborative qualitative research methodology was useful for not only exploring the experiences of new faculty, but also supporting the development of EERs.

## **Introduction**

As the demands and expectations for faculty increase, many institutional leaders and future faculty question whether the typical graduate school model provides the necessary training for an academic career [1]–[4]. Prior studies suggest that graduate education provides students with anticipatory socialization of the role of a faculty member, such as: what is involved in a faculty position, what products are valued, and what expectations may be imposed upon faculty members. However, graduate education does not prepare students for the organizational socialization role, where they are no longer observers but the individuals responsible for attaining these elements [5]. The transition from graduate student to faculty member will vary widely depending on the experience of the student. For certain individuals, this transition will be a painless next step in their academic journey; while for others, it can be quite traumatizing, with a lack of understanding of the requirements and obligations associated with new faculty positions [6], [7].

Specific challenges are often cited with the transition into an early career faculty position, such as time management, adjusting to a new environment, and integrating within the context of the department and institution [8]. These challenges arise as faculty members determine the appropriate distribution of time between their teaching, research, and service responsibilities within their department, college, and greater research community and between their work and familial responsibilities. Additional challenges occur because of the complexities associated with learning new practices and determining the best resources for responding to issues.

Studies in the field of education have characterized the transition into early career faculty positions as a period of confusion and anxiety, in which the necessary training and support are not always provided. However, there are few studies that specifically investigate the experiences of engineering education researchers—who face a unique set of challenges due in part to the cross-disciplinary nature of their positions [9]. Additionally, EERs often transition into a variety of faculty roles and learning environments, ranging from non-tenure track teaching focused positions to tenure track research-intensive positions across various departments. Depending on the environment that a new EER finds him or herself in, other challenges may arise, such as how their colleagues, department, and institution define their specific faculty role. Through this work, we sought to investigate this transition period by applying a collaborative qualitative research methodology to a group of early career EERs as we transition into new roles.

### **Developing an Understanding**

When we began our faculty positions last summer, we viewed ourselves as EERs seeking to answer the question “how can we achieve success in our new roles?” We also sought to unpack the overall landscape (or culture of faculty life) in regard to how our research discipline could be incorporated into the cultures at our new institutions. Informal conversations about these topics quickly evolved into discussions of how to systematically and collaboratively respond to these matters. The result was a collaborative research exploration of our experiences. We aimed to select a methodology that would allow us to engage in meaning making about the cultures, and provide a cycle of reflection and action that would help us improve our practices as faculty members. Using the Q3 qualitative research framework [10] as a guide for establishing procedures, we extracted elements from two qualitative methodologies, collaborative inquiry and collaborative autoethnography, to narrate our experiences as we transitioned into new roles.

We piloted this methodology by forming a community of practice [11] and collecting data about our experiences through weekly individual reflections. In this paper, we will 1) describe how we integrated the two methodologies, 2) present our data sources and analysis methods, 3) present preliminary results, and 4) briefly describe how these results can help future EERs transition into new faculty roles. We will also discuss potential limitations of our methodology and how these limitations may have impacted our analysis.

### **Method Development**

For research and development purposes, we aimed to generate knowledge about how to achieve success as an EER. This broad question was able to capture the diversity of our current positions and our personal research interests. However, our differences created a challenge in developing a definition of what “success” meant across each of our roles. As a result, we chose to leverage our diversity as a way to explore the academic cultures in which we were entering and to consider how our differences could support the development of the group as a whole.

We selected elements from both collaborative autoethnography and collaborative inquiry methods because neither method alone could capture the breadth of our experiences integrating

into our new faculty roles. Collaborative autoethnography informed our data collection and analysis, allowing us to begin to understand, based on shared sensemaking, how academic culture impacts EERs' transition into new faculty roles. Collaborative inquiry provided a framework for us to learn from our experiences and improve our practices by being involved in the community of practice we created; this method informed the conversations within our weekly meetings and how we approached challenges and other aspects of our positions.

### *Collaborative autoethnography*

Autoethnography is a research approach that uses personal experience to explore a cultural phenomenon. In the case of collaborative autoethnography, the voice of the individual is valued alongside a process of collective meaning making. Collaborative autoethnography includes four key dimensions: *self-focused*, *researcher-visible*, *context-conscious*, and *critically dialogic* [12].

Collaborative autoethnography places the researchers in a dual role, as researcher and research participant, providing us “a scholarly space to hold up mirrors to each other in communal self-interrogation and to explore our subjectivity in the company of one another,” (*self-focused, researcher visible*) [12]. We used written reflections and online meetings to document our experiences, challenges, and journeys each week; this supported the development of visible personal thoughts and actions [13], [14]. To help remain analytical within collaborative autoethnography, researchers must remain aware of the context of their experiences and make the familiar anthropologically strange (*context-conscious*) [13]. All of the researchers in this study were starting new positions and most of us were new to our institutions, which has facilitated our process of “making the familiar strange.” Additionally, in collaborative autoethnography, the researcher is viewed as a data source and a central part of the analysis process (*critically dialogic*) [12]. The presence of multiple researchers in the dual-role of researcher and participant and the dialogue among these researchers enhances the overall co-construction of meaning within collaborative autoethnography [12]. Reflection and meaning making can occur in both the group setting and through individual reflection [12], which influenced the structure of our data analysis process. The nature of collaborative autoethnography supports our intent to work together to systematically understand the cultures of the academic environment we have entered and how our role as engineering education researchers can exist within that environment.

### *Collaborative inquiry*

Collaborative inquiry provides a lens similar to collaborative autoethnography in that it aims to collectively “understand your world, make sense of your life, and develop new and creative ways of looking at things” [15]. However, in contrast to collaborative autoethnography, researchers pair reflection on practice with action [15], [16]. Knowledge development within a collaborative inquiry study is grounded in individual lived experiences that are expressed through narratives and images [15]. Participants explore these lived experiences to co-construct theories or propositions with the intent of “testing” the knowledge derived from this form of inquiry through actions of the individual participants [15], [17]. Thus, implementations of collaborative inquiry

are comprised of inquiry cycles of reflection and action that result in co-constructed understandings of lived experiences that can influence the practices of the participants. These cycles typically occur within the context of four phases: forming the group, creating conditions for reflection and action, acting on the inquiry question, and co-constructing meaning from the experiences [15], [17].

### *Research Sample*

We represent six engineering education researchers who are transitioning into new faculty positions, each at a different institution. The positions we are transitioning into are each unique, and we all bring different backgrounds with us. Three of us started faculty positions immediately after completing a Ph.D. in Engineering Education; two of us are transitioning from a post-doc position; and one of us is transitioning from a non-tenure track to a tenure track position. The diversity of our positions represents the breadth of positions available for engineering education researchers. Two of us are transitioning into assistant professor positions within an Engineering Education Department; however, these positions are very different from one another, as one focuses on undergraduate education and the other focuses on K-12 education. The other four are situated within more “traditional” engineering programs, such as first-year engineering, chemical engineering, or electrical engineering. Of these four, two are transitioning into a position with more emphasis on teaching and curriculum development, while the other two are transitioning into positions that have specific research requirements. Our backgrounds and current positions are summarized in our biographies at the beginning of the paper.

### *Data Collection and Analysis Cycles*

We completed weekly, monthly, pre-semester, and post-semester reflection questions during the fall semester of our first year in our new faculty roles. These reflections were uploaded to Dropbox prior to our weekly Google Hangout meetings. During these meetings, we often referenced our individual reflections when sharing our personal experiences from the previous week. The purpose of these meetings was to discuss our experiences and to seek advice about current challenges we were facing. These weekly meetings provided a space for us to interact with and learn from the other members of our community of practice (a component of collaborative inquiry). This reflection and action cycle continued each week, as we continued to engage in and improve our practices. In particular, we reflected weekly about the extent to which our participation in these meetings impacted and changed our practices through a reflection question that was built into our weekly written reflection document, providing a method to track the impact of our collaborative discussions on our practice.

Our data analysis method consisted of concurrent analyses (which occurred each week as we reflected on our discussions and made alterations to our practices) and formal “summative” analysis sessions, the first of which was held in January. To prepare for the “summative” analysis session, we each created a single document that captured all of our relevant responses to the weekly, pre- and post-semester questions related to challenges faced in the course of the semester and how the community was helpful in providing strategies to address these challenges.



We then read through all of our entries for the semester as well as those of another community member that had been assigned. The goal of this analysis was to identify themes that arose for the group discussion. We used the analysis discussion as a basis for vetting and defining the key challenges that were faced by our EER community during our first semester. During this discussion, we identified individuals that dealt with similar challenges and formed two groups of three for the collaborative autoethnographic analysis of the themes. Each group of three designated a time to discuss the personal and cultural experiences related to the themes. Both meetings were audio recorded and lasted approximately 45 minutes. The audio recordings were professionally transcribed and formed the basis for the narrative of the results and discussion section of this manuscript. The narrative was revised using an iterative process in which all of us reviewed the complete narrative.

### *Research Quality Considerations*

To ensure the validity and generalizability of the data collection (making the data) and analysis (handling the data) performed as part of this study, we referenced the Quality in Qualitative Research (Q3) Framework developed by Walther, Sochacka, and Kellam [10]. Application of the Q3 framework allowed us to mitigate many of the challenges associated with collaborative inquiry and autoethnography. Table 1 highlights how we applied this framework to our particular study. The definitions within the table are those of Walther, Sochacka, and Kellam whereas the bulleted items represent our efforts to mitigate any issues that may be associated with the use of qualitative methodologies for our data collection and analyses.

Table 1. Description of how the Q3 Framework [10] was applied to our study.

Description	Making the Data	Handling the Data
<p><b><i>Theoretical Validation</i></b> Do the concepts and relationships of the theory appropriately correspond to their social reality under investigation?</p>	<p><i>The research process needs to be able to capture the full extent of the social reality studied.</i></p> <ul style="list-style-type: none"> <li>● We created pre-semester, weekly and post-semester reflection documents in a joint collaborative manner</li> </ul>	<p><i>Interpretations need to reflect the coherence and complexity of the social reality under investigation.</i></p> <ul style="list-style-type: none"> <li>● Each individual reviewed and identified themes observed in their reflections and those of another member of the community</li> </ul>
<p><b><i>Procedural Validation</i></b> Which features of the research design improve the fit between reality and the theory generated?</p>	<p><i>Strategies need to be implemented in the research design to mitigate threats to contextual validation.</i></p> <ul style="list-style-type: none"> <li>● Weekly reflection documents provided participants opportunity to reflect on elements of the past week that were of importance to them</li> <li>● Changes to weekly questions required approval by the majority of the group</li> </ul>	<p><i>Processes need to be implemented to mitigate risks of mis-constructing the participants' reality in the researcher's interpretations.</i></p> <ul style="list-style-type: none"> <li>● An audit trail was kept to track any changes that were made over the course of the study</li> <li>● We had two individuals review the reflections</li> </ul>
<p><b><i>Communicative Validation</i></b> Is the knowledge socially constructed within the relevant communication</p>	<p><i>The data gathering needs to capture the respondents' inter-subjective reality.</i></p> <ul style="list-style-type: none"> <li>● We were aware of the importance of the weekly reflections to capture personal experiences</li> </ul>	<p><i>Interpretations need to be grounded in the accounts of the participants. The knowledge produced needs to be represented in accordance with the meaning conventions of the research community.</i></p>

community?	<ul style="list-style-type: none"> <li>● We met weekly to share our experiences and discuss them within the context of the EER community</li> <li>● We were free to ask additional questions of any individual that was sharing their reflections</li> </ul>	<ul style="list-style-type: none"> <li>● We individually first analyzed our own and one other member's reflections to identify themes</li> <li>● As a group, we discussed the themes that emerged from this analysis</li> </ul>
<p><b>Pragmatic Validation</b> Do the concepts and knowledge claims withstand exposure to the reality investigated?</p>	<p><i>The concepts underlying the research design need to be compatible with reality in the field.</i></p> <ul style="list-style-type: none"> <li>● We are all trained to do EER through our graduate studies or skillsets gained after completing a graduate degree</li> <li>● We represent new tenure track and non-tenure faculty positions at diverse types of institutions</li> <li>● Weekly reflections were collected over the course of the fall semester</li> </ul>	<p><i>The knowledge produced needs to be meaningful in the social context under investigation.</i></p> <ul style="list-style-type: none"> <li>● We helped resolve our challenges in our weekly meetings</li> <li>● We reflected on how the weekly meeting was helpful to us</li> <li>● Our findings are relevant within the EER community as others transition to faculty positions</li> <li>● This method may be applicable beyond our study within EER</li> </ul>
<p><b>Process Reliability</b> How can the research process be made as independent as possible from random influences?</p>	<p><i>The data needs to be collected and recorded in a dependable way.</i></p> <ul style="list-style-type: none"> <li>● We created a document that outlined our process for collecting data</li> <li>● All individuals working on this study are EERs</li> <li>● Everyone contributed to the weekly meeting agendas allowing us to identify issues we wanted to discuss</li> </ul>	<p><i>Procedures for generating and representing knowledge need to be established and documented.</i></p> <ul style="list-style-type: none"> <li>● We used multiple community members when analyzing our reflections</li> <li>● We created an audit trail to track any changes in our methodology</li> </ul>

## Results and Discussion

Our analysis for this paper focused on two themes: *the challenge of time management* and *support we received from our weekly meetings*. Informed by collaborative autoethnography, our results are reported in narrative form.

### *Challenge of Time Management*

Courtney S.: From our investigation one of the major themes that came out was time management. It included aspects of task identification, and finding balance between teaching, research and service. Some of the more specific aspects of time management were how we spend our time without getting overwhelmed. Some of the task identification the participants talked about included compiling lists of lesser tasks and recognizing which tasks were important and when. Balancing their research, teaching, and service often was contingent upon travel to and from campus and finding a delicate balance between those. We're going to give a few examples to support each of these areas under this theme.

Cheryl: Alexandra said one of her critical issues about time management was how to navigate the balance between travel and teaching. Specifically, when she couldn't attend some of the classes she was teaching, she was concerned about how to spend her time between teaching and the conferences.

Courtney S.: Erin talked a little bit about needing to manage her time better and sticking to a more regimented schedule so that she knew how to spend her time, while trying to limit being pulled in different directions. She really talked about how she constantly was feeling behind and stressed. I think that was her way of navigating how to not get overwhelmed.

Walter: I think both of those concepts that you just mentioned also showed up in Courtney F.'s reflections, specifically at the beginning of the semester when she didn't have a routine, and she couldn't really get into the groove of things with regard to time. That showed up in the overwhelmed aspect, particularly with the task of having to observe students who were teaching creeping in more so once the semester got going full steam ahead. I think both of those were indications of not having a routine, so not knowing how to manage your time. It also happened when unexpected large tasks pop up and interrupt your routine once it's established and you have to figure out how to make it work.

Walter: Task identification was one of the challenges that I experienced personally. It was related to time management but it had a lot more to do with making sure that I was focused on the right task. I found that to be a challenge to really figure out. "Okay, what should I be doing?" Not necessarily how I should manage my time once I figured that out, but figuring it out since there was no one really saying, "This is what you should be doing today." Having that balancing act of, "Okay, if I have this much time and this is what I want to get accomplished, what should I be doing now? What should I be doing tomorrow? Are there things I'm not doing? Are there things other people are doing that I should be doing?"

Really going through that process of figuring out what to do with all this "free time", particularly since I was only teaching one course. Beyond the day that I was teaching there was so much open time that, in addition to figuring out how to manage my time, there was this additional layer of figuring out, "Okay what needs to be done and then what does it take to actually do this? Then how much time is this going to take?" Then combining that with the time management aspect.

Cheryl: I would echo on that, Walter, because I found something similar in my personal experience that the semester seems like such a long period of time to get a lot of tasks accomplished. Trying to identify exactly what order you should be tackling the different tasks you have ahead of you. For me it was really the papers that were a hard thing to try to keep on top of just because they have no firm deadline.

Courtney S.: I would say I had a similar reflection. Because my role was very undefined, I wasn't sure if I should be spending a lot of time on research versus teaching. I spent a lot of time navigating with my supervisor what I should be doing, and how much time I should be spending on each task. Going through that with my supervisor and internally was a bit of a struggle until I figured out that maybe I should be spending more time on teaching versus research.

Cheryl: I think Alexandra also went through something similar where she was talking a lot about how she really wanted to keep her schedule somewhat clear. At the same time, she was watching it slip away at an exponential rate just from meetings and other tasks that she had to accomplish.

Walter: Courtney F. talked about coming to a similar realization as Courtney S. She talked about struggling between her teaching load (it being so high) and her desire to do research, and figuring out which task she should be spending time on and how much time. Really trying to figure out what that balance was.

Cheryl: I think that was also echoed in Alexandra's reflections as well. She understood that she wanted to spend time on writing and research, but she was feeling that she tended to run into the situation where she wouldn't set it as time on her specific calendar. Then because of that, she said she was struggling trying to find time to get her own things done.

Courtney S.: Erin was very specific about not using lists enough to focus on herself and what she needed to accomplish each day.

### *Support from Weekly Meetings*

Alexandra: Moving away from the challenges question, one of the questions we asked ourselves throughout the semester was about the particular support we were receiving from our weekly STEER [Supporting Transitioning Engineering Education Researchers] meetings and the group as a whole.

In particular, each week we responded to the following question: "Do you want to note anything from the previous week's meeting that was particularly important or useful for you this week?". Through the analysis of our written responses, the ideas of 'knowing you aren't alone' and the solidarity of knowing others were going through similar things to you emerged. The group appeared to serve its members as moral support, a venue for reassurance, and a safe place where people could vent as needed.

Courtney F.: Cheryl mentioned a number of times that it was reassuring to know that others were dealing with similar issues. A couple times she mentioned that she was struggling with a graduate student she was working with and how to create incentive to have that student contribute to her project. Walter was having a similar struggle in terms of assigning a graduate student tasks to complete. It was reassuring to her that she wasn't alone in this struggle. She also got ideas about how to fix it, which aligns with one of our other areas of support.

Cheryl talked about, nearly every week, how it was comforting to know that she wasn't the only one facing challenges and that others were in the same boat as her in terms of either teaching experiences or struggles with integrating within the institution and learning how things work.

Erin: For me in my post semester reflection, thinking back on all the discussions we had, I did note when things helped or anything that I had gained from some of the discussions that we had. I especially noted, "While I had previous experience being a teacher and being a leader, there are some things that happen that you can't prepare for. Being able to discuss those with a group of

like-minded colleagues was really nice and supportive. It helped me to approach situations differently, think of others perspectives, and find ways to tackle the hardships of the semester.”

Courtney F.: I don't think mine falls only in this category; I know I mentioned in my post reflection that I kind of came into my first semester of the first year thinking that it was going to be really horrible. That's what I heard from a lot of people. I didn't really know what horrible meant, but I just knew it was going to be difficult in whatever way. I did note in the post reflection that the first semester was challenging but it was not nearly as horrible as I pictured it was going to be. I don't know what aspect of the support contributed to that. Whether it was knowing I wasn't alone, or getting tips and tricks from others in the group and then comparing experiences and coming up with new ideas. I don't know exactly what about the support but definitely the support helped it not feel as horrible.

Alexandra: Courtney S. noted in her pre-semester reflection, that by having other minority researchers in this study, in our group, we would be able to share and discuss some of our own experiences, and hopefully she would be able to have a more positive experience and we could encourage one another.

Throughout the term, she noted that some of the meetings were very “impactful”: “I feel like a lot of us are really getting to the hard parts of our positions and are benefiting from being able to have people that are available that we can share our woes with, without fear of judgment or incompetence.”

In my post semester reflection, I talked about how I felt like I had a support network in STEER. “I was never truly alone during this trying first semester. People always had great suggestions/advice, and the fact that people were being highly productive in different ways helped motivate me to be productive.” Both Courtney S. and I used the terms, ‘reassurance’ and ‘moral support’ throughout the term when we wrote about the weekly meetings.

Courtney F.: Similar to Courtney S., Cheryl also said that in her post reflection, that it was nice to have the group on a weekly basis to talk about issues that she was facing without judgment.

## **Limitations**

It is important to note that our experiences are context specific and, thus, do not represent the full breadth of possible experiences for new faculty within the engineering education research community. Additionally, we selected a small subset of themes that arose during our group discussions to serve as the basis for the results presented in this study as the study is still underway and the aim of this paper was to highlight the methods we used to collect and analyze the data. We believe that the subset of themes selected is of particular relevance to our audience and will provide the starting point for future discussion on improvements that can be made to graduate student education and support systems for early career faculty. The connection between the researcher and participant may have influenced our interpretation of results as part of this study. We tried to mitigate this effect through the application of the Q3 framework to ensure the transferability of our results.

## Implications for Future Research

The work presented here lays the foundation for studies to investigate the experiences of EERs transitioning into new faculty positions. Through this initial study we identified time management as a key challenge EERs face in new positions. This can lead to studies that aim to understand what departments and institutions are doing to adequately prepare graduate students with the necessary time management skills to enable smooth transitions into early career faculty positions. We also identified the support received from an EER community of practice as being critical in helping us during our transitions. This knowledge may contribute to the formation of communities of practice for new faculty at their respective institutions or broader ones within a specific research field such as EER. We believe that this study may be a starting point for exploring how graduate student education and faculty mentoring programs can be adjusted to achieve more successful transitions for early career faculty.

The collaborative qualitative research methods presented here combine elements from collaborative autoethnography and inquiry to narrate the experiences of EER as they transition to new faculty positions. These methods may be valuable to study other transition periods within and outside of engineering education, such as early career engineers and K-12 engineering education teachers.

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