

EMPIRICAL RESEARCH

Early Career Faculty Transitions: Negotiating Legitimacy and Seeking Support in Engineering Education

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Background: There is limited research exploring the experiences of engineering education scholars transitioning into faculty positions. It is an opportune time to explore these transitions because there is a growing number of scholars identifying with the community, a growing number of doctoral programs being developed, and growing interest in hiring people with engineering education expertise.

Purpose/Hypothesis: The purpose of this study is to examine the transitions experienced by our research team of early career engineering education faculty. We describe and systematically analyze our personal experiences to capture the significant events and isolating factors that impacted our transitions.

Design/Method: We engaged in a multiphase, multi-method, longitudinal research design grounded in collaborative autoethnography and collaborative inquiry. We leveraged Transition Theory and a multiple case study approach to examine written reflections recorded monthly for two years and ultimately identify the incidents that were critical to defining our experiences within our new roles.

Results: While we each held positions in different institutional contexts, we found ourselves negotiating our legitimacy as faculty members, researchers, educators, and administrators. Three themes emerged: 1) understanding the expectations of our roles, 2) establishing our visibility, and 3) fulfilling our own purpose within our institutions. In response to these experiences, we sought support from others within our institutional context and among the engineering education community. Yet, the success of this support-seeking strategy varied across our group.

Conclusions: The results of this work signify a need to support early career engineering education scholars in the development of local support networks as well as in their attempts to negotiate their legitimacy in faculty positions. Continued education of administrators and faculty members on the differences between engineering education research and scholarship will be helpful in ensuring that early career engineering education faculty have the support and resources necessary to succeed as researchers and educational change agents.

Keywords: transition theory; collaborative autoethnography; collaborative inquiry; early career faculty; longitudinal analysis

I am struggling as to whether being a faculty member is what I should be doing right now... I don't feel like I can (or know how to) have a powerful impact on engineering education within this role. So am I just not understanding the role correctly? Am I in the wrong place? Are there things I could be doing that I don't realize? – Dr. Jordan

I don't feel like I fit into the department culture yet. I am not sure that I will ever fit into the department culture, as it currently is, because I am more interested in pursuing big research projects than my colleagues. It has been a bit of a struggle because there are not people on campus that I can talk to about managing the balance that I want. – Dr. Eleanor

Like many other engineering education doctoral graduates and early career scholars, we sought to orient our careers towards realizing impact in engineering education. We are six engineering education scholars who hold faculty positions within diverse institutional and programmatic contexts. As we experienced our transitions into these roles, we found ourselves negotiating our legitimacy as faculty members, researchers, educators, and administrators. In response to these experiences, we sought support, with varying success, from others within our institutional context and within the field of engineering education. For two years, we recorded our internal and collective reflections about our own experiences to identify critical areas where we as a community could further support one another and especially, further support early career engineering education scholars attempting to establish their careers in faculty roles.

Throughout the development of engineering education as a field, the community's actions have sought both to support the efforts of its members to positively impact engineering education and to facilitate the individual success of new and more experienced members. These actions have included (1) developing national funding opportunities for engineering education research (Allendoerfer et al., 2016; Borrego & Bernhard, 2011; Daniels et al., 2011), (2) creating publication venues and opportunities to share engineering education research and innovations (Froyd & Lohmann, 2014), and (3) creating professional development opportunities to support entry into the field (e.g., Adams et al., 2014; Faber et al., 2018; Faber et al., 2017; Hixson et al., 2015; Huband et al., 2004; Mirabelli et al., 2020; Pawley et al., 2014; Sattler et al., 2012). In addition, over the last 15 years, members of the community have established engineering education doctoral programs with goals that include the development of future faculty who can serve as change agents within engineering education (e.g., Aning et al., 2005; Benson et al., 2010; Borrego & Bernhard, 2011; Christy et al., 2019; Diefes-Dux et al., 2006; Katehi et al., 2004). Even with these efforts to support both educational change broadly and the development of individual community members, the engineering education community still faces challenges both at the institutional level and within the broader field of engineering that require us to negotiate our legitimacy and seek support outside of our community.

In the summer of 2015, four of the authors reflected on their upcoming transition into new faculty roles at the annual PEER Collaborative National Network Unconference following the American Society for Engineering Education (ASEE) conference (Pawley et al., 2014). The PEER Collaborative National Network is one example of the type of professional development opportunities our community has created for each other. Started in 2009 by a group of twelve engineering education scholars seeking peer mentorship, the network has evolved to include more early and some mid-career engineering education scholars each year (Pawley et al., 2014). At the annual unconference, the facilitators provide opportunities for participants to (1) reflect on their experiences individually and collaboratively, (2) network with the engineering education community in the form of extended conference hallway conversations, and (3) give and receive advice on participant-generated topics. During a collaborative Rich Pictures activity (Checkland, 2000; Vanasupaa et al., 2008), one of the unconference activities in 2015, we were asked to individually reflect on the perceptions we, and others, have about our roles, our goals for the future, and our career pathways pending achieving or not achieving those goals.

Our resulting collective reflection was filled with images of uncertainty about the road ahead, excitement about beginning new chapters, and hopes about the outcomes of our work. For others further along in their careers, the imagery was not always as hopeful, prompting additional discussion over the course of the day. Through these and other conversations with more advanced scholars, we each recognized a need for weekly peer support and the ability to interrogate our experiences as engineering education scholars transitioning into varied faculty roles. To that end, shortly after the conference we connected with two other colleagues also transitioning into faculty roles and the six of us created STEER (Supporting Transitioning Engineering Education Researchers), anchoring its development on two core purposes.

The first core purpose of our group was to create a sense of community and a reserved safe space to overcome challenges that we would experience. Each of us were starting positions characterized by various models of responsibilities and localization (e.g., embedded in an engineering department, tenure-track in a disciplinary-education department, part of a first-year engineering program, etc.), similar to many others in our field (Borrego, 2006; McCave et al., 2020). Likewise, four of us began positions as Lone Wolves (Riley et al., 2017), without other engineering education community members at our institutions. With these considerations in mind, we designed STEER to include weekly meetings to discuss our day-to-day experiences and provide peer mentoring (Faber et al., 2016; Faber et al., 2017).

The second core purpose was to better understand our positions as faculty members attempting to impact change within engineering education in the context of our institutional culture and the engineering field more broadly. Unlike our traditional engineering disciplinary counterparts, members of our community seldom move along linear academic pathways (Atman et al., 2017; McCave et al., 2020); nor do we use methods, language, or theories from a single discipline (Allendoerfer et al., 2007). While there are similarities to other interdisciplinary scholars (Gonzales & Rincones, 2012), we view the experiences of engineering education scholars as unique in that we are often embedded within the system (i.e., engineering education) that we are trying to change. These differences can be observed not only in our day-to-day experiences, but also the development of community-specific professional development resources and support for early career scholars (Pawley et al., 2014; Sattler et al., 2012). With this in mind, we designed a multiphase, multi-method, longitudinal research study to collectively make sense of our own transitions as early career faculty in engineering education.

In light of our dual purpose, we recognized that we needed a methodological approach to support us during our transition as well as allow us to interrogate our experience, the culture of our field, and engineering education more broadly. As a result, we chose to ground the work in collaborative inquiry, with its cycles of reflection and action, and collaborative autoethnography, with its focus on collectively examining cultural phenomenon especially in the case of under-researched or sensitive topics. Each method enabled both individual reflection and collective sensemaking about our experiences. To conduct a more focused investigation of our transitions, however, we needed to make particular theoretical and analytical research design decisions to explore the transition data using a different lens. As a result, we leveraged Schlossberg's Transition Theory (Schlossberg, 1981; Schlossberg et al., 1995) and traditions of a multiple case study methodology (Merriam, 1998; Stake, 1995; Yin, 2009) to explore how we understood our transition and adapted based on our experiences moving into a faculty position. Lastly, a critical requirement for our approach was to mitigate the possible implications of power differences due to our status as early career scholars. We recognized quickly in our research process that in our positions as early career scholars, there was a risk in publishing in-depth accounts of our challenges and experiences in our department, institution, and field. Therefore, we incorporated measures to balance the presentation of stories with the protection of our individual identities. Overall, our methodological decision – making was greatly influenced by the desire to (1) collectively make sense of our experiences and contexts, (2) conduct the analysis and present the results in a way that protects and respects the identities of ourselves and our colleagues, and (3) share results that can support future and current early engineering education scholars.

Purpose Statement

The purpose of this study is to examine our transitions as a group of early career engineering education scholars entering varied faculty roles. Our inquiry was guided by the following question: How do early-career engineering education scholars experience transitions into faculty roles at varied institutions? In this paper, we define engineering education scholars (EESs) as change agents who identify themselves as having expertise in both engineering education research and practice, often developed through formal training such as PhD programs and/or postdoctoral fellowships. We self-identify as individuals who rely on engineering education research as part of our work to impact change in engineering education. Through this study, we argue that understanding our experiences as early career engineering education faculty seeking to enact change within engineering education is important and will enable our community to develop mechanisms to (1) better prepare current and aspiring scholars to occupy various faculty roles, (2) better prepare departments to support engineering education scholars, and (3) further encourage innovation and sustained success in engineering education. The results of our work will specifically contribute to the design and development of doctoral programs in engineering education by supporting the preparation of EESs for transitions into faculty roles. Also, by making the transitions of EESs into a variety of institutional contexts visible, our findings can enable better alignment between the professional goals of early career EESs and departmental resources and programming.

Approaching Transitions

At the time of our transitions, we, the authors and research participants, were at six different institutions and occupying six different roles. Though we were experiencing a similar transition, the degree to which the transition changed our previous roles, relationships, routines and assumptions varied (Anderson et al., 2012). Schlossberg and colleagues highlight the importance of taking stock of the type of transition, the contextual factors influencing the transition, the individual's perspective on the transition, and the degree to which the transition impacts one's daily life (Anderson et al., 2012; Schlossberg, 2011). In our case, this taking stock includes from where we were transitioning, our faculty roles and institutional contexts, our identities and backgrounds, and the extent of our transition both personally and professionally.

First, it is important to take into account from where we were transitioning. Our entry into faculty roles was representative of other engineering education scholars, including those with engineering education degrees and those who had different graduate and professional experiences (Siddiqui et al., 2016). One of us, for instance, transitioned from a non-tenure track position. Two of us transitioned from postdoctoral fellowships in education research. The remaining three of us transitioned from engineering education doctoral programs.

Second, it is important to understand our faculty roles and institutional contexts. Overall, our diversity of roles is consistent with the variety of positions held by other engineering education scholars (McCave et al., 2020). One member of our group began a faculty role at a small, private, highly selective, residential engineering college. Two of us started at very high research activity institutions, one minority-serving and the other a primarily white institution. These positions, however, were distinctly different, with one of us in a teaching-focused role and the other in a tenure-track research role. Three of us started faculty positions at high research activity institutions, each within a college of engineering. These institutions were diverse in terms of size, geographic location, selectivity, and percentage of transfer students.

Third, we recognize the significance of our identities and backgrounds. Schlossberg and colleagues note the influence of factors such as an individual's gender, socioeconomic status, race, ethnicity, and resource availability (Anderson et al., 2012).

In the context of this study, we focus on gender, race/ethnicity, and social capital. One member of the group identifies as a Black man. Five of us identify as women scholars, with one Black woman, one Cuban American woman, and three White women in the group. As women working within engineering disciplines, we often experience differences in how we are perceived by our students and our colleagues (National Research Council (U.S.) et al., 2010; O'Meara et al., 2017; Stefl, 2020). Regarding social capital, some members of our group became ASEE members as graduate students, building a network of both peer and faculty mentors. Others had strong networks with the engineering education programs we were part of as graduate students or post-doctoral fellows. All of us also developed our social capital through our interactions within STEER. Our relationships with one another played an important support role that we have explored in previous research (Faber et al., 2016). Within this study, we identified how our relationships to others, which are impacted by our identities, backgrounds, and resources such as social capital, played a critical role in our experiences.

Lastly, it is important to note the impact these transitions had on both the personal and professional components of our lives. As noted by Anderson and colleagues (2012), taking stock in a transition requires a consideration of the degree to which the transition alters one's daily life. Two members of our group, for instance, relocated to cities in which they previously lived, and one of us started a position at an institution they previously attended. In addition, four of us relocated our immediate families. In our professional roles, our transitions were impacted by the extent to which we were prepared or had previous experience in the critical responsibilities that comprise a faculty role. For instance, two of us had already successfully received large research grants and many of us had previous journal publication experience. Within the classroom, three of us had experience as instructors of record. Others of us had teaching experience through running small seminars series, leading sections of first-year courses, and/or co-teaching. Even with these previous experiences, we recognized there were areas in which we would need to develop our skills over time (e.g., starting and sustaining a research group, teaching large courses, designing brand new courses, serving in administrative roles).

In alignment with Anderson and colleagues' descriptions of approaching a transition, we each approached our new faculty roles from different places. The overall impact on our lives, professional and personal, was different, and our pre-existing resources and support networks, as described in the results of this study, did influence our first two years in our new faculty roles. On the other hand, our diverse starting points portray a description of the engineering education community that is consistent with previous explorations of EESs. We found our way to engineering education along different pathways, bringing together different past experiences, and assuming different roles in our journey to positively impact engineering education.

Background

As a field, engineering education is still negotiating its validity and value within the broader engineering context (Beddoes, 2014; Gardner & Willey, 2016; Klassen & Case, 2019). Engineering education is interdisciplinary by nature, making its boundaries blurry and difficult to fully define (Baillie et al., 2011; Jesiek et al., 2009; Siddiqui et al., 2016). Siddiqui and colleagues (2016) describe how EESs draw from multiple disciplines and perspectives to address complex problems that cannot be addressed within a single paradigm. Engineering education faculty, as a result, work across disciplines, much like other interdisciplinary scholars (Gonzales & Rincones, 2012) and grapple with challenges of building cross-disciplinary collaborations (Borrego & Newswander, 2008) and developing an identity at the intersection of multiple disciplines (Borrego, 2007; Gardner & Willey, 2016, 2019; Siddiqui et al., 2016). Yet, EESs also have their own unique challenges; in particular, EESs are embedded within the system (i.e., the engineering education system) that they are trying to change. This tension impacts the resources available and experiences of faculty within the field. Examinations of faculty development and engineering education literature reveal three main areas where the uniqueness of engineering education may impact the experiences of early career faculty: (1) the history of pathways into engineering education, (2) the potential for professional isolation, and (3) the need to advocate for one's work as an interdisciplinary scholar.

History of Pathways into Engineering Education

Engineering education researchers have argued that, for those entering the field, there is a need to support an individual's transition in ways that may not be necessary for those entering academic positions in traditional disciplines. Borrego (2007) and later Streveler and colleagues (2015) have described the conceptual difficulties individual scholars face as they shift from engineering or other Science, Technology, Engineering, and Mathematics (STEM) disciplines into engineering education. Scholars in Australia have also explored the identity trajectories of discipline-based engineering researchers to discipline-based education researchers (Gardner & Willey, 2016, 2019). Their findings suggest that the pathway into engineering education can be impacted by not only individual development (as described by Borrego (2007) and Streveler and colleagues (2015)), but also social capital, institutional support, and field level support. In response to these needs, the field developed and continues to develop professional development opportunities for people interested in engineering education (e.g., Benson et al., 2010; Faber et al., 2017; Faber et al., 2018; Mirabelli et al., 2020; Pawley et al., 2014). In the United States, there has also been a rise in the development of doctoral programs in engineering education with over 20 institu-

tions granting degrees or developing degree programs (Yasuhara & Carberry, 2020). Yet, from a research perspective, studies have been limited to individuals making mid-career switches into engineering education (Siddiqui et al., 2016). In addition, the “pioneers” of engineering education often arrived at the field mid-career through diverse and sometimes “serendipitous” entry points (Allendoerfer et al., 2007, p. 14). Given these changes in how scholars have entered into the field, the realities associated with starting a career within engineering education are not well represented in current literature (Adams et al., 2007; Atman et al., 2017).

Potential for Professional Isolation

Examinations of discipline-based education researchers in science, another group of interdisciplinary scholars, identified that almost 40% of these faculty “seriously considered leaving” their positions and/or institutions due to feelings of professional isolation or burn out (Bush et al., 2008, p. 1796). While the pathways into engineering education have evolved since the development of engineering education doctoral programs and departments, many early career faculty still enter positions without more senior engineering education faculty to serve as mentors and supports. As such, professional isolation can be a concern for early career engineering education faculty (Riley et al., 2017).

Overall, as experienced across disciplines, the initial years in a faculty position require early career faculty to navigate the multiple identities of a faculty role (e.g., instructor, research advisor, project manager) (Archer, 2008; Austin et al., 2007; Boice, 1991; Campbell & O'Meara, 2014) and to make sense of cultural norms, expectations, and practices (Reynolds, 1992), all while completing the tasks necessary to achieve promotion. While there are extensive evidence-based resources and professional development for faculty (e.g., Boice, 2000; *Faculty Diversity*, n.d.; Higgs et al., 2006), these resources and the research on early-career faculty are generally limited to those who work at research-extensive universities and/or are pursuing research-centered, tenure-track positions (Buswell, 2017; Campbell & O'Meara, 2014; Coso Strong et al., 2019). In addition, these faculty are likely within the department that aligns with the discipline pursued in their doctoral program; this is not often the case for engineering education scholars. Thus, it is necessary to closely examine the experiences of early career EESs entering into faculty positions to understand the impact of their positions, especially those outside of an engineering education department, on their transitions.

Advocating for Work as an Interdisciplinary Scholar

Beyond feelings of isolation, engineering education scholars, similar to other interdisciplinary scholars, need to define and advocate for their value and the value of their research (Gonzales & Rincones, 2012; Siddiqui et al., 2016). In a 2016 exploration of the pathways of an international group of EESs, researchers highlighted challenges of legitimacy as they entered into engineering education research. As one participant described it, “engineering education is not counted as real research... there is really no incentive within the department to push forward engineering education but quite the opposite, I was being quite criticized for lack of performance in my [disciplinary research]” (Siddiqui et al., 2016, p. 2336). This experience is consistent with other engineering education research that emphasizes the need to defend one's work can be a result of individuals being unable to distinguish engineering education research from scholarly teaching (Beddoes, 2014; Borrego & Bernhard, 2011; Borrego & Streveler, 2014; Felder & Hadgraft, 2013). For example, EESs who hold faculty positions in traditional disciplinary departments have to validate their positions and the value that their expertise brings to the department, the engineering college, and the field more broadly. This work, on top of their other responsibilities, can negatively impact their experience. Consequently, it becomes critical that early-career EESs “advocate the importance of their work and defend it” (Gonzales & Rincones, 2012, p. 21), demonstrate how their work relates to how they are evaluated (Allendoerfer et al., 2007), and cautiously balance their responsibilities (Adams et al., 2007; Allendoerfer et al., 2007).

When combined, these realities result in engineering education faculty roles having a unique set of challenges, distinguishing them from disciplinary engineering faculty. While research has focused on the development of engineering education (Beddoes, 2014; Borrego & Bernhard, 2011; Froyd & Lohmann, 2014; Klassen & Case, 2019), there is a gap in the literature as it relates to understanding what happens when people who are trained in engineering education research transition into academic positions. It is an opportune time to explore these transitions because there is a growing number of scholars identifying with the community, a growing number of doctoral programs being developed, and a growing interest in hiring people with engineering education expertise (McCave et al., 2020).

Theoretical Framework

As faculty members navigate the start of their academic careers, they have both anticipated and unanticipated experiences that impact their relationships, routines, assumptions, and/or roles as scholars, educators, and professionals. By critically examining these experiences, or transitions, we can characterize how we coped with and adapted to our first two years in a faculty role. Developed originally in the adult education and counseling context, Schlossberg's Transition Theory provides a lens through which to explore how individuals identify and adapt to self-identified transitions (Anderson et al., 2012; Schlossberg, 1981). The foundation of the framework in self-identified transitions is based on its use in counseling to

support individuals as they approach the transition, take stock of their resources, and then take charge of, and ultimately move out of, the transition. In the context of our exploration, we each identified the move into faculty roles as a transition we wanted support through and wanted to better understand.

Transition Theory has been used in many contexts—for example, to explore doctoral students' pathways through extra-curricular programming (Coso Strong & Sekayi, 2015) and to study transitions and pathways of underrepresented, or understudied, students, such as student athletes (Flowers et al., 2013), marginalized groups (Boyd-Sinkler et al., 2019), and veterans (Griffin & Gilbert, 2015; Main et al., 2016). Given our focus on early career EESs, we chose Transition Theory to examine our own experiences as we have changed our roles, routines, and professional relationships in the first years of our new faculty positions.

We consider that an individual faculty member's experiences are influenced by the context of the transition, the characteristics of the faculty member, the extent to which they have support, and the strategies they utilize. These factors, known as the 4S System (Anderson et al., 2012; Schlossberg et al., 1995), are defined as follows:

- *situation* – the faculty member's situation at the time of transition, answering questions such as what aspects are under the control of the incoming faculty member and what other stresses are they managing at the same time (e.g., moving to a new city, starting kids at a new school, leaving trusted colleagues),
- *self* – the faculty member's personal characteristics that could impact how they perceive the transition, including psychological resources (Anderson et al., 2012) (e.g., ego development, outlook, self-efficacy, values, etc.),
- *support* – the social supports that the faculty member engages with during the transition (e.g., family, friends, mentors, engineering education community of scholars), and
- *strategies* – the ways in which the faculty member interacts with the transition, including whether and how they aim to modify, reframe, or reduce stress caused by the situation (e.g., seek support, request information, develop a plan).

Within our transition into a faculty position, we recognized that we may experience and describe other transitions (e.g., becoming an instructor-of-record for the first time). Given the focus of the study on the transition into faculty roles, we chose to consider these smaller transitions as part of the larger overall transition. As such, the methodology for the study seeks to capture information about the 4Ss at critical points during the transition with the intent of isolating factors affecting and affected by the transition itself.

Methodology

Research Design

The study described in this paper aims to explore the following research question: How do early career engineering education scholars experience transitions into faculty roles at varied institutions? To capture the significant events of our transitions and to isolate specific factors that impacted our experience, we needed a methodology that enabled a focused investigation of our experiences entering a diverse set of faculty roles and institutional contexts. Accordingly, we adopted a multiphase, multi-method, longitudinal research approach grounded in collaborative autoethnography and collaborative inquiry.

Autoethnography is a research approach that uses personal experience to explore a cultural phenomenon. In the case of collaborative autoethnography, the voice of individuals are valued alongside a process of collective meaning making. This approach for collaboratively exploring cultural phenomena can be viewed as promoting community building and thus could be employed in instances of under-researched or sensitive topics (Archer, 2008; Geist-Martin et al., 2010). It enabled us to address topics we could not discuss with on-campus colleagues, but needed to discuss given their impact on our career trajectory, such as navigating challenges around professional isolation or making sense of interactions with colleagues and administration. In this methodology, we played a dual role as researcher and research participant, providing us a space in which we interrogated our own experiences and the experiences of other members of our group.

Collaborative inquiry provided a framework for us to learn from our experiences and improve our practices through the community we created. It informed our data collection as well as how we approached challenges and other aspects of our positions. While collaborative inquiry also seeks to leverage collective meaning making, unlike collaborative autoethnography, researchers pair reflection on practice with action (Heron & Reason, 2006; Kasl & Yorks, 2002). Knowledge development within a collaborative inquiry study is grounded in individual lived experiences that are expressed through narratives and images (Heron & Reason, 2006).

Combined, these methods allowed us to deeply and systematically explore our experiences as six EESs who recently began new faculty positions. To frame our data analysis, we leveraged traditions of a multiple case study (Merriam, 1998; Stake, 1995; Yin, 2009) perspective, where each faculty member represented a case. The subsequent sections provide an overview

of the study design and our efforts to maintain research quality throughout the process. The overall study protocol was approved as part of a larger project by the Institutional Review Board (#17-037). For further detail about the development of this methodology, please refer to Coso Strong, et al. (2018).

Data Sources

Each member of our group completed weekly, monthly, pre-semester, and post-semester reflections to capture our lived experiences within our new faculty positions. We collaboratively crafted prompts to invoke different types of reflection based on how far back we were reflecting. For instance, in the weekly reflections, we responded to questions such as “what did you find challenging about this week?” and “what, if any, accomplishments from this week are you proud of?”. In the post-semester reflection, on the other hand, we looked back at the entire semester (e.g., What did you accomplish this semester? What accomplishments are you most proud of this semester?). Through our main data sources, written reflections, and weekly online meetings, we made visible our personal thoughts and actions (Geist-Martin et al., 2010; Sochacka et al., 2016).

When reviewing the series of prompts that were developed as part of our reflection process, we found that our responses to one question from our monthly reflections, “In what ways do you feel like a faculty member? In what ways do you not feel like a faculty member?”, provided the necessary level of detail and context to allow for identification of key events within the transition. The data were collected during the first two years of our new role at our respective institutions. By using a multiple case study approach on the data collected through the collaborative autoethnography and collaborative inquiry, we were able to capture the nuances of our experiences and identify the incidents that were critical to defining our experiences within our new roles.

Data Analysis

Schlossberg's Transition Theory was used to guide an iterative data analysis process. Due in part to the complexity of an individual's transition into a faculty position, we integrated critical incident technique (Flanagan, 1954) with Transition Theory to determine the extent to which particular events, and the relationship between events, impacted our transition experience. According to Flanagan (1954), critical incident technique is a method that focuses on the observation of human behavior with a lens of identifying situations that have distinct significance and meet specified criteria: what transpired needs to be clear to the individual in the situation, and the consequences or results from its occurrence should be evident (Flanagan, 1954). Critical incident technique has been applied in a variety of fields including business, communication, education, and psychology (Butterfield et al., 2005; Grant & Trenor, 2010).

We approached our analysis using a five-phase iterative approach, as outlined in Coso Strong and colleagues (2018) (see **Figure 1**). The goal of this process was to support an in-depth, retrospective review of our in-the-moment reflections and maintain the authenticity of our experiences as we reflected back on them. We, thus, grounded our approach in a collaborative effort to make sense of our experiences, along with opportunities for individual reflection. In brief, a subset of our group reviewed each member's reflections and identified incidents that appeared to be *critical* on the basis of information that was conveyed in the reflection (Phase I). As part of this analysis, we took notes on elements that pertained to the 4S's associated with Transition Theory and on any further clarification needed surrounding the incident. Once we each completed our review of the assigned reflections, we met in pairs to discuss our observations and come to agreement on the critical incidents and the situation, self, support, and strategies observed. This approach allowed us to take an “outsider” or etic view of a group member's experience.

In Phase II, the particular group member being examined became involved in the research process as they were asked to complete their own timeline based on their personal recollection of events and review of their reflections. This portion of the data analysis allowed for an “insider” or emic view of each of our particular experiences. In the subsequent phase, Phase III, this individual then met with those of us serving as researcher pairings to discuss the critical incidents identified. These discussions led to the development of a finalized timeline that captured all the meaningful transition events that were deemed critical from the perspective of the individual under study, while providing those of us serving as researcher pairings with the additional detail necessary to fully comprehend the context of the situation and the 4S's associated with the incident. Phase III was critical in that each of us could articulate from our own perspective the impact of each incident and whether it was truly “critical.” These discussions also enabled collaborative and in-depth sense-making of each of our experiences as the “outsiders” posed questions to the “insider” about various aspects of each incident. Through follow-up questions and live discussion, we were able to deepen the timelines being developed beyond what would have been found only in the written reflections or from a first-person, retrospective account of the transition experience.

In Phase IV of the analysis, we developed a coding scheme based on the 4S factors. Two members of our group developed the codebook by reading and re-reading a subset of the timelines. In particular, the two of us implemented open-coding methods to independently develop initial categorizations for each of the 4S's within the timelines and an overall codebook

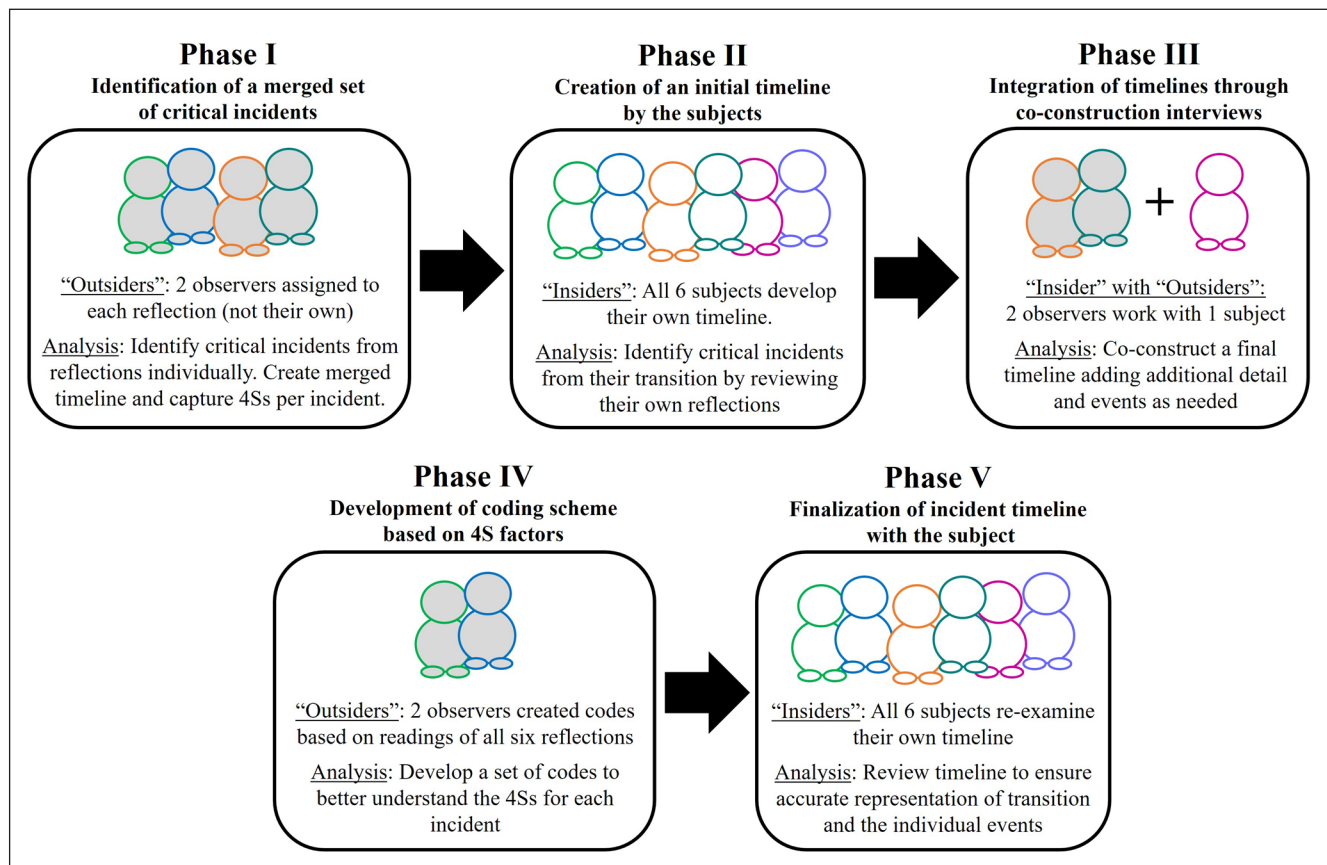


Figure 1: Iterative analysis process engaging the subjects in the analysis (Coso Strong et al., 2018).

(Charmaz, 2014). The sets of codes were implemented through a qualitative data software, Dedoose. While there were instances where it was difficult to determine if a strategy, support, or self existed, every incident was identified using a descriptive situation code.

To establish interrater reliability in code development, one timeline was coded by the two group members responsible for leading Phase IV. Those group members met to discuss their developed codes and negotiate any redundancies in codes and necessary clarifications to code definitions. Through this process, we explored existing frameworks to enable a closer and more theoretically consistent approach for defining the different strategies that each of us employed during our transition. Ultimately, we selected Skinner and colleague's (2003) Structure of Coping Mechanisms for its alignment with the descriptions of approaches taken in the participant timelines. Once the codebook was condensed, it was reviewed collaboratively by the two of us and applied to the remaining timelines.

A final visual and coded timeline was developed in Phase V for each of us using the resulting codes (see **Figure 2**). Each incident was represented with a quote describing the situation, along with codes for each of Schlossberg's 4S's. For example, in Semester 3, Dr. Sara (pseudonym) explained, “throughout this month, I have been struggling with what I want my faculty career to look like and how it is different than what is expected of me.” While she considered what she wanted her faculty career to look like, she sought support from existing relationships, including within-institution mentors, institutional faculty, and colleagues from her previous institution. The other strategy she employed was advocating for herself. Once each of the timelines was complete, we each conducted a member-checking exercise to ensure an authentic and thorough representation of the events and the corresponding components associated with them.

Overall, our methodological decisions across the data sources selected and the design of the data analysis enabled us to deeply explore sensitive topics within the first two years of our transition (Archer, 2008; Bourdieu, 2001). Once we completed the development of the visual and coded timelines, we explored the timelines and further examined emerging themes. To present the final results included in this paper, we recognized a need to balance the sensitivity of the incidents shared with their significance to our community. As such, the results are presented to protect our identities. In particular, we use new pseudonyms for each story, all female/feminine gender pronouns (she/her/hers), and descriptions of our positions describe us all as part of departments (rather than colleges or schools). Lastly, some additional details have been

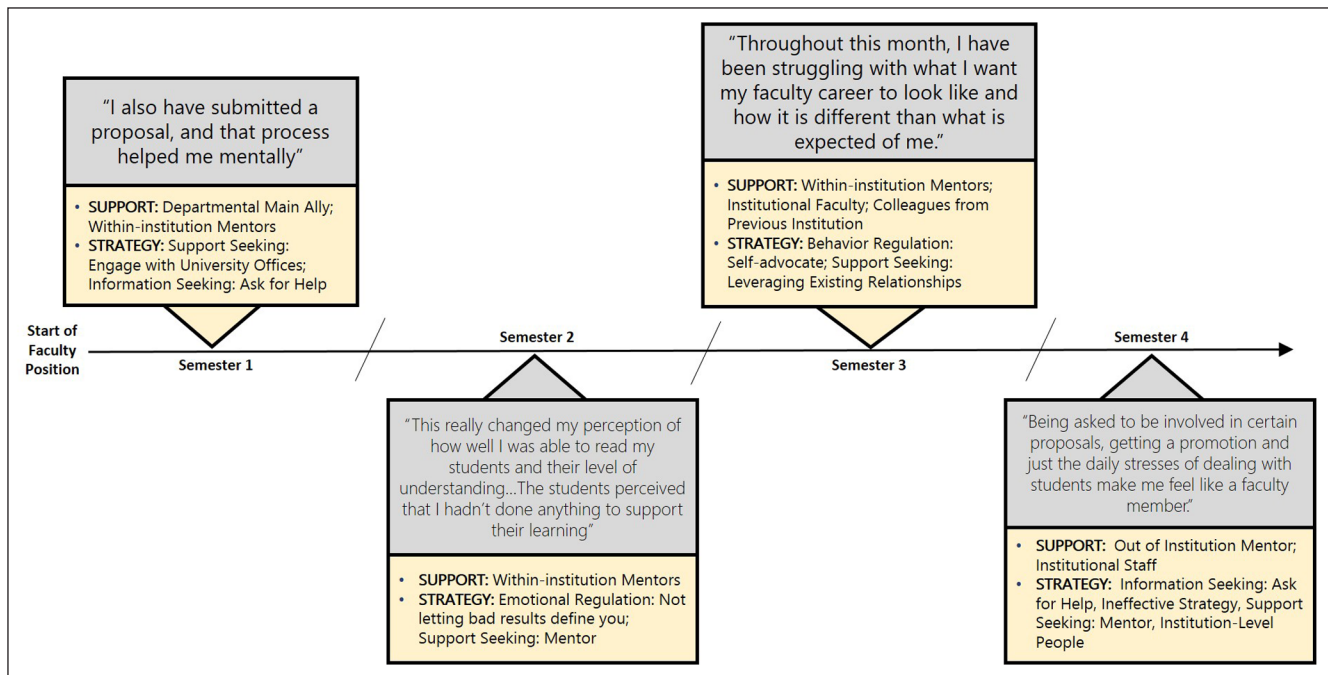


Figure 2: An abbreviated timeline with four critical incidents that represent codes for support and strategy. The full timelines contained an average of 29 incidents and each included codes for situation, support, strategy, and self.

added to the stories to further protect individual identities. These details do not impact the themes discussed or the critical evidence in the story.

Research Quality and Limitations

The use of the previously described data collection and analysis methodologies impacted our own experiences as we were intentionally trying to make sense of them. Yet, similar to other early career faculty development opportunities (e.g., *Faculty Diversity*, n.d.), these methods served as a mechanism for reflection, community building, and learning from experience. Therefore, while they played a role in our experiences, we argue that they made visible incidents that otherwise may have remained unexplored.

As a means to ensure research quality, we referenced the qualitative research quality framework (Sochacka et al., 2018; Walther et al., 2013). As described in more detail in Coso Strong and colleagues (2018), we developed and implemented different mechanisms to promote theoretical, procedural, communicative, pragmatic, and ethical validation alongside process reliability in both the data collection and analysis phases of this study.

During the data collection phase, we ensured theoretical validation by having those involved in reviewing reflection responses examine relevant Transition Theory literature. We also isolated the relevant questions for this study, "How do you feel like a faculty member", from the rest of the data set to ensure the analysis was focused on the area of interest. Our procedural validation approach included the reflection questions of interest within the larger data collection initiative. We then leveraged these initial reflections along with the follow-up interviews in Phase III to ensure we were obtaining an authentic view of our experiences. When in the role of an individual under study, we served an active role in the co-construction of our own critical incident timeline to address communicative validation with detailed notes being taken at each meeting to ensure all details were captured. The data collection was focused upon the first two years of our faculty positions and brought together data from us, as individuals, in diverse institutions and positions providing pragmatic validation for the work. Ethical validation was approached by allowing all of us to have the opportunity to decide how to be engaged with this research effort and as a result, the creation of research pairings reflected the specified interest levels. In addition, we each acknowledged that we would need to discuss at each stage of the research design how much and what information we would be willing to disclose in publications of this work. Process reliability was ensured throughout by accurate tracking of all plans associated with data collection and analysis. As mentioned under theoretical validation, the data of interest was separated from the larger data set to allow for focused analysis to be conducted.

Data analysis also encompassed each element of the research quality framework (Sochacka et al., 2018; Walther et al., 2013). The subset of us working on the data analysis once again reviewed the Transition Theory literature, this time focusing

on identifying gaps within the field where this analysis could provide new insight. We also reviewed critical incident technique literature to establish that the proposed research methods were a reflection of the targeted theories. An audit trail was created to capture the data analysis process. In addition, the individual under study remained involved throughout the timeline creation process to allow for procedural validation. One measure of communicative validation was member checks of the timelines after they were co-constructed, which supported the development of timelines that were authentic to each of our experiences. The other approaches used included referencing appropriate literature both within the engineering education research space as well as relevant Transition Theory literature to better support how our results are contributing to the broader field. Pragmatic validation was sought by keeping Transition Theory separate from the results until after we, as participants, had constructed our own individual timelines in Phase II. We also used our network contacts within the engineering education field as a means of reflection, to ensure that our results are meaningfully contributing to the social reality we are investigating. Process reliability was assured by keeping all documentation in separate records, which could be accessed if questions arose after the co-construction of the final critical incident timelines. All six of us in this project have been involved in the review of all associated research claims and have developed vulnerability statements that document what we are comfortable sharing with the broader community for ethical validation.

Results

The analysis of our six stories of transition presented in the timelines illustrates our experiences making sense of our new roles, solidifying our identities as faculty members, and engaging with our particular responsibilities. While we each held positions in different institutional contexts and with varied responsibilities, we found ourselves *negotiating our legitimacy* as faculty members, researchers, educators, and administrators. Several themes surfaced around the ways in which we felt the need to negotiate our legitimacy: 1) understanding the expectations of our roles, 2) establishing our visibility, and 3) fulfilling our own purpose within our institutions. The intersection of our successes or continued challenges in achieving legitimacy tended to be most frequently impacted by 1) the level of clarity of expectations in our roles, 2) an understanding of our work and expertise, and 3) the alignment of our personal goals with our institution's goals. Not all of our attempts for legitimacy were successful, but initial challenges did not dictate an inability to foster this legitimacy in the future. In response to these experiences, we sought support from others within our institutional context and within the field of engineering education. Yet, as our findings describe, the success of this *support-seeking strategy* varied across the group and for those of us who could not find support or felt unsupported by our local communities, the desire and ability to seek support locally faded by the end of our first two years.

Negotiating Legitimacy

Earning legitimacy in academia, most institutionalists would argue, is about fitting in, mimicking, and adopting the kinds of behaviors and forms that have already been deemed as expected and acceptable (see Berger and Luckman 1966; Goffman 1967; Meyer and Rowan 1977; Rusch and Wilson 2007). Bourdieu (1988) offers a sharper theory on legitimacy in academia. In short, Bourdieu conceptualises academia as a “field” where individuals battle for position...having position and symbolic power gives one the ability to be involved in defining what is or is not legitimate in terms of academic work. – Gonzales and Rincones (2012, pp. 11–12)

As EESs, although we all hold degrees in engineering, our work mainly lies outside of the traditional engineering disciplines. These differences in our expertise often placed us outside of common networks, in a new realm of language and perspective, as well as with different sources of funding and publication sites to those of our colleagues. As we navigated our new positions, we recognized that our background and expertise contrasted with what had already been deemed legitimate within most engineering institutions. Our analysis of the timeline data signaled that even while experiencing situations common to early career faculty broadly, the theme of negotiating legitimacy was at the root of many of our critical incidents. Our ability to feel like or fit in as faculty members was highlighted in situations where we (1) tried to define the expectations of our positions, (2) built relationships with students both in and out of the classroom, (3) interacted with upper administrators as researchers, and (4) served as administrators ourselves. In each of these situations, the responses we received from peers, administrators, and students impacted our perspectives on our own legitimacy as faculty as well as our subsequent actions.

The themes presented in the subsequent sections provide a glimpse into several critical incidents in which our sense of legitimacy was built or challenged. These results expose an interplay of several dynamics of the legitimacy that we sought as early career EESs. The dynamics of our negotiated legitimacy centered on our balance and success of (1) our personal and professional goals, (2) our teaching and mentoring of students, and (3) our research. While some aspects of this legitimacy were self-imposed, our realization of this legitimacy was often contingent upon our interactions with others within our institutions and our field, **Figure 3**.

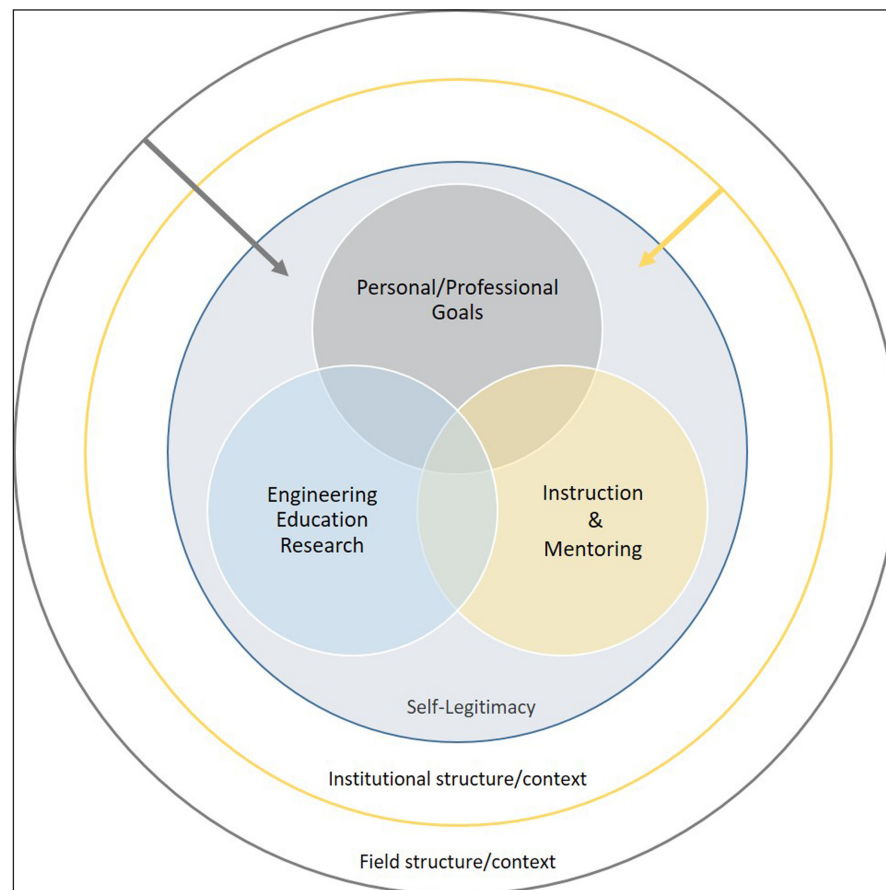


Figure 3: A visual representation of the dynamics and factors of negotiated legitimacy among early career engineering education scholars.

Negotiating Legitimacy: Setting the expectation

Embarking on our new roles, we came to realize that some of us were experiencing a lack of alignment between our understanding of our expectations and the expectations of our colleagues and upper administration for our role. An array of cultural and structural norms often served as barriers as we attempted to make sense of our role expectations, acclimate to our new position and context, establish ourselves as credible within our department and field, build community locally and nationally, and ultimately achieve success in our teaching, research, and service.

The dissonance around expectations was often emphasized by conversations with upper administration and senior faculty. Dr. Bailey, a faculty member with prior professional experience, quickly realized that there was some misalignment in what she expected and what was expected of her. To some extent this misalignment was due to the administration's (mis)understanding of the resources needed to support Dr. Bailey's research area, and that impacted her belief that she fit into the culture of the institution: "I don't feel like a faculty member sometimes based on not entirely feeling like I fit in with the culture yet...I still feel like I am on the outside looking in."

In Dr. Bailey's first year, the dynamics of legitimacy emerged as her department made sense of her abilities as an engineering education researcher and what resources and time she needed to conduct that research. In a position that was presented as expecting significant time towards research, it was the expectation of this tenure-track faculty member that time would be allotted for research projects and that her teaching load would be adjusted based on her research obligations.

Dr. Bailey soon recognized that there was a level of miscommunication regarding what her role was and how she fit into the culture of the department. Dr. Bailey reflected on how she felt her department enacted its doubts of her legitimacy: "I didn't need resources or release time because I was doing Engineering Education research. Feeling that my research wasn't valued the way other faculty research was valuable." This disconnect was perpetuated in recurring discussions with senior members in her department. Dr. Bailey first realized that there was a need to negotiate the legitimacy of her research efforts when she was given a higher teaching load than other new faculty members in the same role. It took an upper administrator

in the college stepping in and saying that Dr. Bailey was teaching too many courses and should be treated equitably as compared with other newly hired assistant professors for the situation to change.

Negotiating Legitimacy: Do they know I exist?

A few of us found ourselves in newly created roles with non-existent support structures or in situations where our institutions and other departments had limited knowledge of our existence and expertise. Unfortunately, this situation was the reality for Dr. Claire. Upon entering her position she quickly came to realize that she was not being included on institutional emails, did not exist on any web pages, and was not invited to important meetings. In those first several months, she could not get access to the resources she needed that other new faculty were afforded. The compounding effects of these actions often resulted in her expertise being ignored, her voice being silenced, and her presence being largely dismissed.

The dynamics of being respected as a faculty member and the intersectional dynamics of being a woman and junior faculty can be unique for a number of reasons. While there may be some preconceived visual expectations of a professor with respect to age, gender, and race in the largely White and male dominated field of engineering, there continues to be a low number of women and minorities at any level. Early career faculty are often perceived to look like students themselves. Dr. Ana recounted how she is “often mistaken for a student or am ignored by other faculty.” She recalled a series of situations where an administrative staff member, external to her own department, did not believe she was a faculty member and how that impacted her legitimacy in an important meeting.

When I went in there to meet with [this staff member], they first thought I was a student. During the meeting, I also felt like I was being talked down to and not listened to. Rather than having a conversation, the [office] lectured me about what should have been done. They were completely talking down to me, not respecting me as a faculty member.

Negotiating Legitimacy: Is fulfilling my purpose more important?

Each of us entered our roles with a set of goals and aspirations for our careers and how we might enact them. The reality of whether or not our new roles or institutions afforded us the ability to reach those goals was an unanticipated barrier. Dr. Jordan felt that she had found alignment between her personal career goals and her faculty position.

I may not be a “faculty member” as there are still tough moments, like the rough meeting with [a senior faculty member] last week that made me feel like a graduate student (as she told me she was worried I was doing too many things)...But at [university], I feel like I have found the central purpose of my work.

Unfortunately, in an interaction with a senior faculty member, Dr. Jordan had an experience reminiscent of being lectured by her doctoral advisor about how she should and should not spend her time, which made her question her legitimacy as a faculty member. Dr. Jordan’s experience demonstrates a unique dissonance of internal validation and external validation. Despite needing to negotiate her basic legitimacy as a faculty member and not a graduate student, she believed that she had found a place that allowed her to fulfill her purpose in research, at least at the moment. This contrast raises a question of greatest importance, which is more important: legitimacy or fulfilling one’s personal purpose?

I don’t feel like a faculty member only in the sense that I don’t want to conform to some of these things. I want to collaborate, to fight for/attempt to support something bigger than me. I don’t want to wait for change and I don’t think drama and politics need to dictate how I support my students.

Dr. Jordan struggled to reconcile her need for legitimacy as a faculty member with the ability to pursue her own goals; ultimately contributing to her decision to pursue a position elsewhere. This juxtaposition further highlights how critical legitimacy can be, and that it can be desired or withheld in a number of forms. For some, the effects of having to negotiate legitimacy pushed them to change positions, either internally or out of the institution all together. In each case the decisions are justified by a variety of rationale (1) fit or alignment of goals, (2) research and teaching balance, and (3) a general respect by the institution for their research.

Negotiating Legitimacy: Successes

While some of us struggled with convincing others of our legitimacy, for others, the challenge was not as great and success was more easily realized. Dr. Hannah found that her opinions and relationships with students were legitimized quite frequently early into her transition. Dr. Hannah noted how she was “in the room during important conversations.” “People value[d] my opinion.” and “the input I provide is valued from both students and faculty members.” One factor that contrasts the challenges faced by others and Dr. Hannah is the more established nature of her department and familiarity with engin-

engineering education research across its faculty and administrators. Dr. Hannah also had established relationships with many of her colleagues prior to starting the position, which may have contributed to the lack of need to negotiate her legitimacy. These two factors may have allowed her to avoid a number of the institutional and cultural barriers that were faced by others.

Dr. Sydney recognized that her legitimacy was hinged not only on her professional actions, but her age and status in relation to the other faculty in the department. Being given an opportunity to demonstrate her skillset and current endeavors helped Dr. Sydney open a door of understanding and communication between her and her colleagues. She noted the shift that occurred when her department chair gave her an opportunity to engage the department in what she was passionate about and trained to do:

As the youngest person in the department [by age and tenure] I was glad that I was not challenged by my colleagues, but I often felt they were a little unsure of what I was doing. This changed a bit when my chair allowed me to give a presentation on my [work] during a faculty meeting which I believe opened up a new realm of conversation between my colleagues and I as well as giving me a sense of validity.

Dr. Sydney’s experience, as shown in **Figure 4**, demonstrates that despite early failures or successes throughout her experience they did not necessarily define a path of continued struggle in gaining legitimacy within herself or within her professional context. While there were certainly challenges that came as new roles were taken on or as she navigated new contexts within her institution, she also found ways to weave her personal goals into the structure of the institution to strengthen her legitimacy.

Support Seeking

The situations presented in the previous section outline experiences where we were or were not considered legitimate. In response to these experiences and in some cases, to proactively bring legitimacy to our work and roles, we sought support locally, within our institutional context, and at the field-level, within the engineering education community. These strategic actions served as a constructive strategy for seeking comfort, finding someone who would listen to us or seeking aid (Skinner et al., 2003). Who we chose to seek support from was based on our personal and professional relationships, but also the type of support we were seeking (e.g., affect, affirmation, aid, honest feedback) (Anderson et al., 2012). In our attempts to secure funding, for example, we leaned on and benefited from our collaborators, mentors, and advisors. To conduct research and/or make modifications to course curricula, we recruited students.

At the same time, we viewed our legitimacy as faculty based on our ability to build these local networks and field-level networks of support. As Dr. Francis explained during her first semester,

I don’t feel like a faculty member because I don’t have any students. It’s strange seeing everyone else have a functioning research group, and I don’t have anyone identified who wants to work with me long term.

Overall, these support networks served as a critical foundation of our transition, impacting our perspective of our legitimacy in our roles as well as our actions towards our goals. Yet, the stability and effectiveness of these supports had a powerful impact on our decision whether or not to continue to seek out these avenues of support in the future. In this subsection, we explore how we sought out and attempted to construct a support network on campus during our first semester and year. This network construction process, for some of us, complemented our existing supports within the field. Still, the success

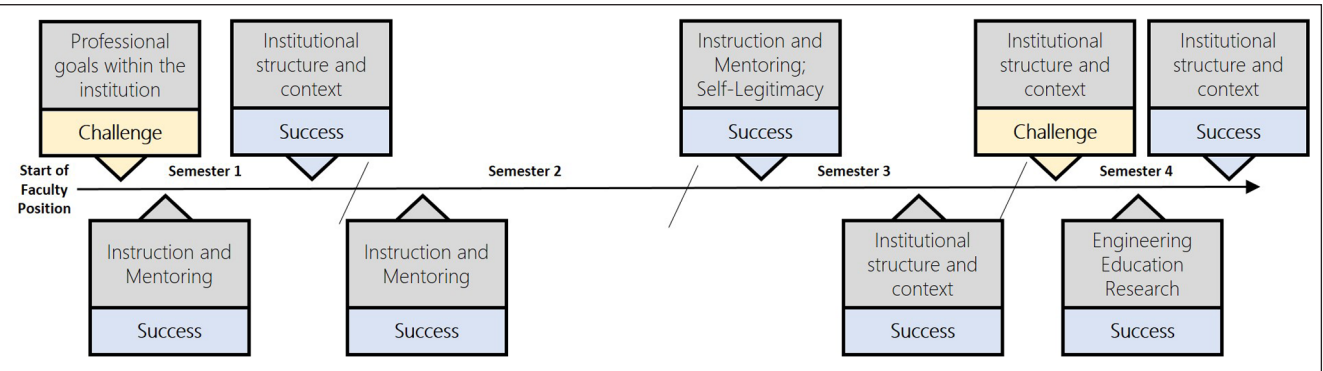


Figure 4: Timeline of varied success and challenges for Dr. Sydney.

of this process varied across our group and for those of us who couldn't find support or felt unsupported by our local communities, the desire to and ability to seek support locally faded by the end of our first two years.

Impacts of repeated engagement with local support

As was described in the previous section, transitioning into any faculty career involves stressors, whether in the classroom, the lab, or internally. For Dr. Francis, some of those stressors were mitigated by her local support structure. Dr. Francis previously developed and continued to develop a strong, stable set of supports at a variety of levels within her institution. Whether her research group students, mentors, or departmental colleagues, Dr. Francis engaged in a consistent practice of seeking information or support from those around her: "I have mentors around me who already know what I want to accomplish and can point me in the right direction when they become aware of opportunities." At the same time, in situations where the next step was unclear or she wanted additional information, she sought it out. In her second year, she was beginning to build her research group and noted how she had "many more students looking to [her] for advice and feedback, which is different." She started working with a few students, but wanted to figure out how to approach setting up a research group and engaging with students before they selected advisors. As such, she approached a colleague who was outside of the department, but had knowledge of departmental processes and culture. In this example, Dr. Francis used a support-seeking strategy to engage with a colleague who had a good understanding of her department to help her make sense of her role as a mentor and research advisor.

Dr. Gail's support-seeking practice began in a similar manner to Dr. Francis, as she constructed her support network locally to complement her support externally. While she did not always identify support seeking as a strategy, for almost every incident in her first year, she leveraged her support system. In her first week, as an example, she noted constantly asking for help as she was "totally unsure if [she was] doing things correctly," and did not want to try and solve problems aimlessly. Yet, as her transition continued, the effectiveness of her support seeking efforts began to decrease and she began to shift her perspective of individuals within her institution who she thought were stable supporters. Twice, at the end of her second semester and again at the end of the third semester, Dr. Gail sought support from senior colleagues for situations related to her service assignments. In both instances, she received no support.

In the first instance, she attempted to follow the advice of many new faculty resources and references (e.g., Boice, 2000; Brent & Felder, 2000; Higgs et al., 2006) by saying "No" to additional service assignments. She had spoken with other faculty at her institution about possible solutions to remove herself from a service assignment that was not well-aligned with her goals and that she was initially told earlier in the year would go to someone else. At a meeting with upper administration, neither of the administrators present were supportive of her giving up that assignment without a plan for what would happen without her in that role. In the subsequent months, after continued discussion, she was again assigned that service role and another one on top of it. During her second year, she again asked for relief from some service responsibilities. In this instance, she asked to move or not attend a half-day meeting for one of her committees, immediately following a large event for her other service role. This incident is the only incident where Dr. Gail explicitly called out not receiving support she requested, because she tried speaking with her committee and explaining her case. They just were not supportive of her situation. The remainder of her second year illustrated a large decrease in critical incidents in her timeline, along with a notable decrease in her discussion of local supports or engagement with support seeking as a strategy.

Dr. Gail's experience contrasts that of Dr. Francis, as they both attempted to build stable supports and to seek support on campus, but their success with that strategy ultimately impacted whether they continued to seek local support over time. In this case, Dr. Francis continued to build and use her local support network, while Dr. Gail did not.

Results of exploring different avenues for support

Drs. Diane and Mallory each faced challenges seeking support at their institutions and each explored different avenues for support on their campuses. The results as illustrated in **Figure 5**, however, differed, and by the end of their second year, Dr. Diane relied on a single local ally while Dr. Mallory had a diverse local support network.

In the case of Dr. Diane, she found her initial attempts to engage with institutional faculty, staff, an on-campus mentor, and others ineffective. Dr. Diane held a role outside of a traditional department and promotion structures. Her experiences demonstrated a lack of clarity by the institution as to their expectations for the role and the related infrastructure necessary to support her work. Early on she notes a need to rely on her colleague's local network of staff and other faculty that could provide information on issues they were encountering. In an attempt to support her research work, she unsuccessfully sought support from an on-campus mentor. "The mentor they were supposed to have hasn't been helpful at all." As the semester went on, she realized that she would not be able to meet her research goals for the first semester. "I don't have the support system or encouragement to do anything other [than] focus on teaching" and curriculum development.

Even with her teaching, she experienced obstacles to engaging with and developing a support network. At the start of the second semester, she reached out to a former colleague from her previous institution, but never received a response. At the start of the second year, she tried to implement a new computer software for her course, but when an issue came up with

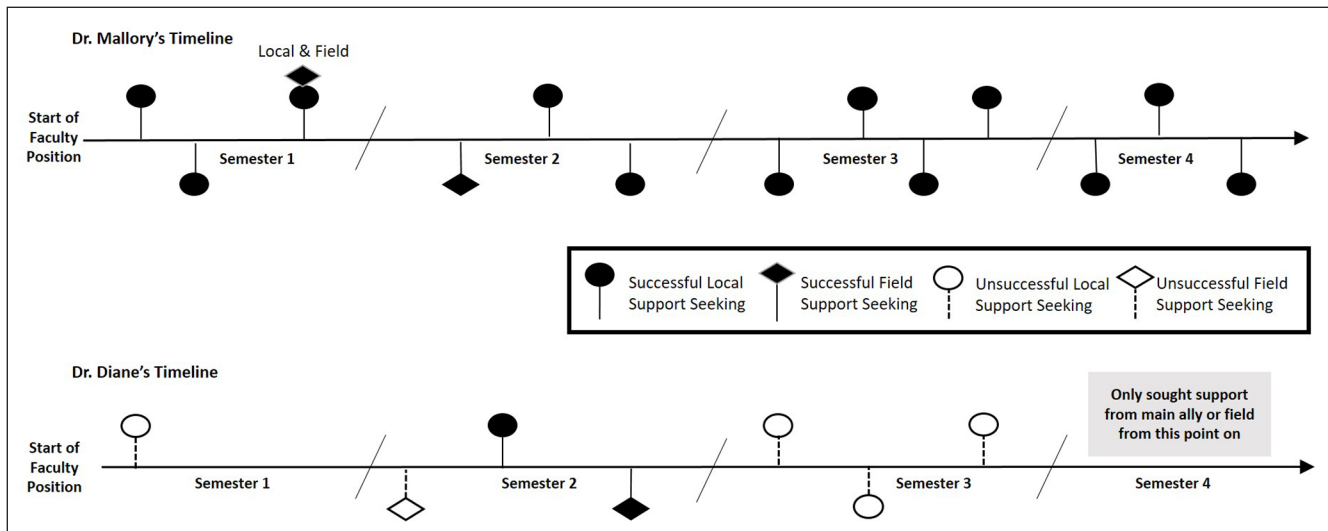


Figure 5: Drs. Mallory and Diane's timelines highlight contrasting experiences with local support. Dr. Mallory experienced consistent success from local support, while Dr. Diane's local support was limited to her main ally after repeated ineffective support seeking attempts.

the software it was “just another example of not knowing how to navigate the [institution] and [our department] not really know[ing] who to send us to.” Eventually, after calling individuals who were not responding or sending her to other people, Dr. Diane and her colleague found a work around on their own within the system that they have been using ever since. Over time, the frequency of her use of support seeking as a strategy decreased and she relied mostly on her main ally within the department, another early-career faculty member.

This contrasts the experiences of Dr. Mallory, “I am fortunate to have great support.” She began her position taking initiative and leveraging opportunities presented to her to develop a support network on campus. When she could not get the right support, she got creative about seeking support elsewhere. For instance, recruiting graduate students was a challenge, so she sought out undergraduate research assistants and worked with undergraduate students from her previous institution as well. In addition, Dr. Mallory's regular communication with her faculty mentor, an on-campus teaching mentor, and later colleagues within her department, not only impacted her approach to teaching, but it also gave her a greater appreciation for her efforts at work-life balance. “I know that I have yet to optimize many aspects of my position but from conversations with mentors in the field, I realize that this is true of many people despite having been faculty members for a long time.”

Extensive versus targeted support seeking

Drs. Lily and Eleanor implemented support seeking in different ways. Dr. Lily reserved support seeking as a strategy in critical moments, while Dr. Eleanor engaged in frequent support seeking:

Whenever I'm making a decision, I'll always talk to many people to get feedback. And I try to get a diverse range of people. So not just people I have a lot of conversation with, but also people who know other aspects of the field well and have different strengths.

For Dr. Eleanor, she noticed early on that her professional goals were different from her colleagues. As such, she explains, “it has been a bit of a struggle because there are not people on campus that I can talk to about managing the balance that I want.” She, instead, looked external to the institution and worked within the engineering education community to find the support she needed. Throughout her first year, Dr. Eleanor would start looking for support locally within her department and, as needed, she would move outward within the institution before looking outside of the university. In that year, she found a local network in other departments. The difference in support she received impacted her perspective of her overall legitimacy within her local spaces and influenced her decision to leave her position. At the end of her first year, she explained, “Within my department I feel very respected and I also feel respected within the [other departments], but [from engineering programs] I don't feel like faculty have any idea of what I do.” During her decision-making process about taking a position at another institution, Dr. Eleanor continued her successful practice of gathering significant information from both her local network and her EESs network to support her decision – making.

Dr. Lily sought support strategically throughout her initial transition. In one instance, for example, she wanted to bring a proposal before her Chair to convert a study room into an active learning classroom. The Chair had sent out an email about having extra funds and was open to ideas on how to spend down that money. As a result, Dr. Lily engaged with a colleague who was a lab manager and had done a lot with active learning to explore the idea of creating an active learning classroom within the department. Seeking support in this instance prepared her to present the best proposal possible to the Chair, and in the end, they provided funds to renovate the entire space. As part of her day-to-day activities, Dr. Lily harnessed other support strategies to effectively build legitimacy in her faculty role, including developing professional relationships with other faculty and her Chair so that they would see her as an asset within the department. In her administrative role, she took time to gather feedback and strengthen the relationships with her colleagues as she completed her major responsibilities. She noted the impact of this engagement and the challenges she faced at the start of this second transition, her transition into an administrative role. "Now that I have gone through a bit of the struggle, you could almost call it some hazing, I am being more accepted, utilized and respected as a faculty member."

Discussion and Implications

Engineering education is still a developing field with the first doctoral graduates receiving tenure in the last decade and a half. Studies of the academic job market have demonstrated a diversity of opportunities for members of our field (McCave et al., 2020). However, with this increase in the types of roles and institutions where EESs can work, there is an increased need to understand the realities of these positions, especially for early career faculty. The results of our examination of our experiences as early-career engineering education faculty illustrate how we engaged in negotiating our legitimacy within ourselves, our institutions, and our field. These results also emphasize the critical nature of local and field support throughout our transitions, and how not receiving support during our early experiences can negatively impact how we approached situations in the later parts of our transitions.

Legitimacy in Early Career Faculty Positions

For the six of us, the dynamics of legitimacy went beyond the bounds of research and teaching demands to include basic resource needs to accomplish daily tasks as a faculty member. For many engineering education faculty their positions exist in new or developing structures (i.e., new programs not yet placed in the institutional ecosystem, new positions within a department or college), often resulting in unestablished protocols or unclear chains of command. This lack of order can lead to new faculty believing they are an afterthought. A lack of basic support from administration may signal to those external to one's department that these new employees do not provide significant value or legitimacy in the eyes of the administration.

The perception by other faculty of EESs' limited value is compounded by a common conception that their work is mainly in the scholarship of teaching and learning and does not require the same amount of time and/or resources as traditional engineering research (Felder & Hadgraft, 2013; Klassen & Case, 2019). While there may not be a need for large scale equipment, EESs often require research space to conduct interviews and extensive hours to analyze qualitative or quantitative data as well as to develop adequate measures of data. As illustrated in our stories, the (mis)understanding of engineering education research has tangible consequences on course loads and how we attain necessary resources. Our experiences highlight how our field is still in its adolescence, leaving many administrators and department leaders still learning about the values, forms, and complexities of engineering education research. The reality of this deficit in legitimacy can result in negative experiences that cause some faculty to question their fit and long-term willingness to stay in a position. Unfortunately, these experiences align with those of others within the discipline-based education research community who have articulated not feeling valued or understood within their departments (Bush et al., 2008).

The Importance of Local and Field-Level Support

To develop credibility and succeed in our faculty positions, we leveraged support-seeking strategies to build, maintain, and utilize local and field-level supports. Overall, through this process and across our different positions, we valued the support of our engineering education community in-person at annual conferences (e.g., Pawley et al., 2014) and through the cross-institutional support we provided each other through STEER (Faber et al., 2016). Yet, these results also demonstrate the critical importance of our local communities as we transitioned into our positions. Success in already having and/or building a stable local community enabled some of us to seek local support no matter what situations we faced. Yet, for those of us who could not find support or felt unsupported by our local communities, the desire to and ability to seek local support faded by the end of our first two years. The overall importance of the local support network became even more pronounced in instances where we felt we did not have a broad field-level network or in instances where we were in new programs or positions.

The importance of support during the early career stage is well acknowledged in the literature, in the context of both supporting the transition (Fleming et al., 2016; A. L. Perry et al., 2019) as well as establishing legitimacy (Archer, 2008).

Yet, even for the most active networkers, support within one's department plays an important role in building one's local network (Fleming et al., 2016). Researchers have argued that expanding one's networks when moving into an interdisciplinary field like engineering education is critical, "where these connections may be the only support a scholar has in doing what may be seen as unconventional (and sometimes unrecognized) work by traditional disciplines" (Allendoerfer et al., 2007, p. 10; Gardner & Willey, 2016). Even though we have attempted to build community within engineering education graduate programs (Adams et al., 2014; Diefes-Dux et al., 2006) and across graduate programs (Sattler et al., 2012) as well as for early career faculty at the field level (Pawley et al., 2014), the pattern suggested in this study emphasizes a need to enable and equip early career faculty to develop stable and effective local support networks to complement their field-level network. In addition, these results highlight the need for building local support networks outside of the engineering education community, which could also translate to outside of an on campus engineering education department or program.

Implications

Moving forward, the engineering education community needs to examine its approach to supporting early career faculty as they negotiate their legitimacy and seek support in their positions. At the field level, we have developed ways to elevate new faculty voices through networks focused on new engineering education scholars (e.g., UK and Ireland Engineering Education Research Network's Newer Researcher Network, PEER Collaborative) as well as awards (e.g., Education Research & Methods Division's Apprentice Faculty Grant, Frontiers in Education's New Faculty Fellows, best paper awards). While these provide early career faculty with field-level support and mentorship, along with awards to put within one's annual evaluation and CV, given that these networks and awards are field specific they may not translate to non-engineering education departments.

As a community, we could work to amplify strategies used by EESs in a variety of faculty role types for building credibility locally (e.g., local teaching and learning awards or grants, in-field conferences and awards for those in an engineering disciplinary department). In addition, more established engineering education faculty could share resources and experiences advocating for their research and instructional practices as well as locating infrastructure and resources to support their work within their institution. Alternatively, department leaders with new engineering education faculty could work with them to provide opportunities for sharing their expertise locally through talks within and outside of the department. In engineering education and related graduate programs, these implications could translate to changes in academic career preparation courses to include explorations of different evaluation structures and how to navigate those, and/or a focus on multidisciplinary communication (i.e., how do you present to different disciplinary audiences).

The implications of this work become especially important as more of our community move into new roles such as teaching assistant professors or similar positions, hold positions with multiple titles, and/or take on administrative roles early in their career. Given the diversity of our field, regular reflection on the needs of our EESs and faculty will be necessary to understand both locally and at the field level what developmental opportunities and resources are needed.

Limitations and Future Work

This collection of our experiences as early career engineering education faculty provides a snapshot of key aspects from our groups' first two years as faculty. While each of us held a different position and came to our position from a unique academic background, our six experiences do not encompass all of the diverse experiences of EESs in the early transition of their careers from student to professional. From the timelines and quotes it can be seen that similar types of transitions were experienced across various roles and at varying points for each. It is possible that some of the transitions experienced by some of us early on will not be experienced by others until years three or four. While only a limited number of transitions were represented within this paper, we are aware that numerous other types of transitional experiences surely exist and should be explored (Anderson et al., 2012; Reybold, 2003). As seen by these documented transitions, our early transitions were early indicators of future outcomes and transitions such as in the case of Drs. Jordan and Eleanor.

Recognizing the bounds of our collective experiences, we have continued to examine the experiences of other early career EESs in faculty roles. Since completing this study, we have conducted interviews with other early career EESs. These interviews will expand the knowledge on the types of roles that EESs attain and what other types of varying and similar transitions they face within their roles. As was seen in this investigation each situation and strategy employed in these early transitions altered our perspectives and actions. Our work also is investigating how many of these transitional experiences play a role in the type of impact early career EESs aspire to and are able to have.

Conclusion

This work builds on previous explorations of engineering education pioneers and examinations of early career interdisciplinary scholars (e.g., Gonzales & Rincones, 2012; Siddiqui et al., 2016) by studying the transitions of early career EESs into new faculty positions. Our collaborative and individual reflections and examinations of our experiences illustrated how negotiating legitimacy at the individual, institutional, and field level was a critical component in our transitions. The

(mis)understanding about engineering education research and how it differs from scholarship of teaching and learning led to resource issues that impacted our ability to be effective. Although support from the field through mentors and research networks was beneficial for each of us, our analysis revealed that support received locally influenced our actions as well as impacted our perceptions of our own legitimacy and our feeling of “fit” within the culture at our institution. These results implicate the need for better understanding of engineering education research on the part of administrators and the provision of support locally through mentors and resources to enable the success of early career EESs starting faculty positions. The study is of particular importance due to the continued growth in the engineering education field and the need to support EESs in the myriad types of available positions within the field. As a field that values facilitating one another’s successes, we argue that this study provides a foundation for critically examining the experiences of EESs and existing resources within the community to better align our efforts with the realities of scholars seeking to impact change within engineering education.

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Competing Interests

ACS is a member of the editorial board for Studies in Engineering Education, which is on a voluntary basis. All other authors have no competing interests.

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