I graduated, now what?: An overview of the academic Engineering Education Research job field and search process.

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I'm graduating, now what?: An overview of the Academic Engineering Education Research job field and search process.

Abstract

As the field continues to grow, more and more people are challenged with finding academic engineering education research (EER) positions that align with their broad abilities and interests. In the context of academia, EER positions most commonly exist in engineering education departments, traditional engineering departments (e.g., mechanical, civil), and non-degree granting programs (e.g., centers for teaching and learning, first-year engineering programs). These positions vary with regard to their emphasis on engineering education research, and provide access to different resources and mechanisms to impact engineering education. The purpose of this research was to better understand the academic EER job market as it relates to what applicants (i.e., graduates and post-docs) experience as they navigate the job-search and decision-making process. We reviewed the ASEE Educational and Research Methods (ERM) listserv for academic job postings over the past two and a half job search cycles (August 2017 to December 2019) to determine what academic job opportunities existed for early-career engineering education researchers. Concurrently, interviews were conducted with seven early-career EER faculty members to get a more detailed understanding of their academic job search and decision-making process. This paper captures the diversity of academic positions along with the types of institutions to provide a starting point for individuals on their job search process. It also provides an overview of the academic job search process timeline and professional and personal elements that can impact the decision-making process when selecting an academic job.

Introduction

To understand the academic job market that exists for engineering education researchers, it is necessary to first have an appreciation of the state of the engineering education research field. Engineering education research (EER) was first established as a field in the 1990s based on a desire to improve the state of engineering education [1]. According to Fensham's definition of the field of science education [2], as outlined in the work done by Froyd and Lohmann [1], EER needed the following criteria, among others, to be considered a field: (1) academic recognition; (2) research journals, conferences, and professional associations; (3) scientific knowledge and research methodologies; (4) model and seminal publications; and (5) implications for practice. In an EER development timeline created by Froyd and Lohmann [1], it was observed that the initial creation of engineering education coalitions later led to the development of venues for publication and presentation related to engineering education. Engineering education coalitions were program groups that were developed by the National Science Foundation to lead systemic change in undergraduate engineering education [3]. For example, the Frontiers in Education (FIE) conference was first held in 1995. As time progressed, more investments were made in the field of EER with the development of centers that focused on engineering education and the creation of the first departments of engineering education at Purdue and Virginia Tech in 2004 [1]. The field of EER was advanced further in 2006 when two events happened: the Journal of Engineering Education (JEE) moved to a research focused journal and Purdue University granted its first doctoral degree [4]. Yet, despite the general consensus on the initiation of EER, members of the EER community still debated the identity of EER and its status as a discipline, community, or field as late as 2009 [5].

The creation of the initial departments of engineering education enabled the development of individuals with expertise in engineering education research and the interest to prepare these researchers has grown. As of 2015, there were only four programs identified that had a PhD or Doctorate degree in Engineering Education based on the following departmental/program qualifications: (1) a degree offered by an engineering school or college, (2) had alumni, and (3) had been operating for at least five years [6]. Yet, over the past five years, there are many more up and coming doctoral-based programs that are currently in operation or under development [7]. It is also important to acknowledge that there are other pathways for individuals to enter into the academic engineering education field outside of earning a PhD in engineering education, as a recent survey of early-career engineering education researchers conducted by the research team found that 35.5% of respondents did not obtain a graduate degree within engineering education. Their pathways included postgraduate training within EER or transitioning to EER after receiving EER training and mentorship while in a disciplinary based faculty position.

Regardless of the pathway selected for obtaining expertise in EER, early-career engineering education researchers can benefit from a better understanding of the types of academic jobs that are available within the field and the typical job search process. Previous investigations of the EER job field were conducted when there was only a limited number of engineering education programs and types of positions available to engineering education researchers [4]. Since this time, the EER field has seen enormous growth with the development of more EER departments, programs, and certificates, expanded awareness of the job prospects, and capabilities of EER trained faculty. This work provides an updated snapshot of the academic job opportunities available to early-career engineering education researchers through the ASEE ERM division and then provides interviews with a subset of early-career engineering education researchers that recently successfully completed their academic job search process. Our purpose was to learn more about how people experience the EER academic job search process and identify techniques or resources that could benefit the community in light of the developments in the EER field over the past 5 years.

Methods

In an effort to gain a better understanding of the job opportunities that are available to individuals with an Engineering Education Research (EER) background, seven recently hired engineering education researchers were interviewed about their job search process. Through analysis it was determined that a critical piece was missing by not understanding the types of jobs available in the EER field. This led to review of the job announcements that were shared to the EER community through the ASEE Educational and Research Methods (ERM) listserv. This particular ASEE division was selected as many individuals that are trained in EER are members of the division and as such academic job opportunities for this community tend to get posted and distributed through the ERM division. With information about the types of positions that were available over the past two and a half faculty job market cycles, the research team could have a more in-depth understanding of the job search process and decision-making that went into the final job selection from the seven engineering education researchers interviewed. The entire research team was involved in making all methodological decisions. Proper human subjects' approval was obtained before conducting the study.

Job Opportunity Postings

The data collected from the ERM listserv covered a two and a half year period from July 1st, 2017 to December 31st, 2019. All job postings deemed to be targeted towards early-career engineering education researchers were copied into a spreadsheet for analysis. Positions at the rank of Assistant Professor (or similar titles), or staff positions requiring less than 5 years of experience were representative of the job postings targeted towards early-career engineering education researchers. Data was then grouped to represent a standard academic year cycle with postings between July 1st and June 30th of the subsequent year grouped together. This provided us with two complete academic years worth of data and then half the academic year data for the 2019/20 cycle.

Job Posting Analysis

Each job posting was reviewed individually to evaluate the primary focus of the position (i.e., teaching, research, or staff) and the classification of the institution based on the Carnegie rankings. Positions were considered to be teaching focused if the primary responsibility of the position was classroom-based teaching whereas research based faculty positions had equal emphasis on teaching and research based responsibilities. From this analysis, a categorization system for the overall positions was developed as shown in Table 1.

Table 1. Overview of Job Posting Classification Criteria

Title	Acronym	Definition	Carnegie Classification
Teaching Faculty at Teaching Institution	TFTI	Primary job responsibilities and evaluation in classroom teaching; minimal resources for research support	Primarily Undergrad or M1
Teaching Faculty at Research Institutions	TFRI	Primary job responsibilities and evaluation in classroom teaching; broad or extensive resources available for research support if interests exist	D/PU, R2, or R1
Research Faculty at Teaching Institutions	RFTI	Primary job responsibilities and evaluation in conducting research although they may also have higher teaching and service based commitments; minimal resources for research support	Primarily Undergrad or M1
Research Faculty at Medium Research Institutions	RFMRI	Primary job responsibilities and evaluation in conducting research although they also have teaching and service based commitments; broad resources for research support	D/PU and R2
Research Faculty at High Research Institutions	RFRHI	Primary job responsibilities and evaluation in conducting research although they also have teaching and service based commitments; extensive resources available for research support	R1
Staff at Teaching Institutions	STI	Primary responsibilities in administration with potential for teaching and research and no faculty designation; minimal resources for research support	Primarily Undergrad or M1
Staff at Research Institutions	SRI	Primary responsibilities in administration with potential for teaching and research and no faculty designation; broad or extensive resources available for research support if interests exist	D/PU, R2 or R1

D/PU = Doctoral/Professional Universities
R1 = Doctoral Universities, Very High Research Activity
R2 = Doctoral Universities, High Research Activity
M1 = Master's Colleges and Universities-Larger Programs

The results from the categorization allowed for the research team to track the number of opportunities that were available to engineering education researchers in each of the job categories over the past two and a half faculty job market cycles.

Early Career EER Interviews

Participants for the interviews were selected from a pool of fifteen known recent hires in EER positions. The pool included seven participants with a variety of types of new positions as outlined in Table 2, however, they still only represent three types of positions out of all the possibilities that were described in Table 1. Participants were selected to ensure a variety of types of positions were represented and that only a single participant was selected from each of the institutions that were hiring as there were multiple hires made by some of the institutions during this academic search process. Aiming to get as diverse a sample as possible, the pool was composed of two women and five men, with four having a doctoral degree from an engineering education program. Of the selected participants, five were recently graduated from a PhD program while two were coming out of post-graduate positions.

Table 2. Early Career Engineering Education Researchers Accepted Job Position Descriptions

Participant	Position Title	Department	Classification
Dr. Monday	Lecturer & Research Assistant Professor	First Year Program	TFRI
Dr. Tuesday	Assistant Professor	General Engineering	TFTI
Dr. Wednesday	Assistant Professor	Technical Department	TFRI
Dr. Thursday	Assistant Professor	Engineering Education	RFHRI
Dr. Friday	Teaching Fellow (International Position)	Technical Department	TFTI
Dr. Saturday	Assistant Professor	Engineering Education	RFHRI
Dr. Sunday	Assistant Professor	Engineering Education	RFHRI

An interview protocol (see Appendix A) was created to investigate the experiences of graduate and post-graduate students in seeking EER positions. We developed interview questions on the basis of prior data that was collected from our larger research study on faculty agency for early career engineering education faculty. Table 3 provides a sample of the questions that were asked during the interview. The focus areas identified were used to provide guidance to the graduate students conducting the interviews. This information allowed the graduate students to probe deeper into participant responses if initial responses were not related to the desired focus area.

Table 3. Primary interview questions for Early Career Engineering Education Researchers

Question Number	Question Prompt	Focus Area
1	Could you describe your pathway into the Engineering Education Research community?	Pathway into Engineering Education and Career Plans
2	What position will you be starting in the fall? Describe your expected roles and responsibilities.	
3	Could you describe your experience on the job market?	Job Search Process
4	What resources did you use? Why?	
5	What do you wish you would have known going into the process?	
6	In what ways do you feel prepared to be a faculty member?	Expectations and Preparation
7	What do you expect from a typical work week/day?	
8	What are you most excited about regarding starting your position?	

Interviews were scheduled for a 90-minute period using video conferencing software. Graduate students on the project conducted interviews in pairs with a lead interviewer and a co-interviewer. Interviews were both video and audio recorded. Audio files were transcribed for data analysis using Rev.com. Once transcribed all interview transcripts were sent back to the interview pairs for review and correction to verify accuracy.

Interview Analysis

Interview transcripts were analyzed by the three faculty researchers to understand: (1) the types of roles accepted, (2) the perceptions of these early education researchers about their future position, (3) the overall timeline of the job search experience, (4) the resources used throughout the process, and (5) the decision-making process for selecting their final position. Each analysis was completed using an emergent analysis approach [10], where each researcher read through the transcripts identifying themes relevant to the focus areas identified in Table 3. The subsequent paragraphs describe the specific analysis used to understand each area of interest.

The analysis process started with categorizing the types of positions that each participant recently accepted into the aforementioned categories provided in Table 1 in order to better identify similarities and differences in roles accepted by early-career EER faculty. The researchers reviewed each transcript focusing primarily on the responses to questions two and seven (Table 3) to provide an initial insight into the positions each participant had accepted for the Fall of 2019. In reviewing the interview questions eight additional details emerged about what these early-career engineering education researchers (participants) were most excited about going into their new positions. Themes emerged around the areas of excitement and anticipated challenges facing them in these positions.

As analysis progressed, review of responses to interview questions three and four (see Table 3) were used to construct an overall timeline associated with EER positions which includes document preparation and expected interview and offer timing. In analysis of questions three, four, and five, the research team identified a number of resources that seemed to play a vital role in the job search and decision-making process across the participants. While initially analysis was framed around just the three specified questions, many of the participants discussed the types of resources they used throughout the interview.

Lastly, analysis was used to determine how the interviewed early-career engineering education researchers approached the decision-making process. The research team holistically reviewed all of the interview data collected and made notes of any elements that pertained to decision-making. The decision-making elements emerged as either professional requirements (e.g., access to resources, culture, and ability to collaborate), or personal requirements (e.g., location, family needs, desired lifestyle). Notes were used to form an aggregated list of professional and personal elements that influenced the decision-making process of early-career engineering education researchers.

The final results obtained from the analysis performed allowed for the creation of an infographic that could assist graduate students and post-docs with their academic job search process. The infographic provides a snapshot of the distribution of academic jobs available to EER early career faculty, a timeline of the academic search process, and a visual graphic of factors that influence decision making when selecting an EER academic position.

Results

The completed analysis provides a snapshot of the job opportunities available to early-career engineering education researchers and a more nuanced view of how early-career engineering education researchers go through the job application and selection process. Particular elements captured include: the breadth of types of job opportunities; how job opportunities are distributed between types of institutions (teaching or research focused); and the types of primary responsibilities (teaching or research focused) associated with these job opportunities. We also examined how the distribution of job opportunities varies during academic years, which is an important factor to take into consideration as an early-career engineering education researcher prepares to begin the job search process. Lastly, our results also provide a detailed overview of the job search timeline, resources that can be of benefit when going through a job search, and professional and personal factors that may be influential in the decision-making process for final job selection. The results that follow pull from the analysis performed on both job postings and participant interview responses.

Job Opportunities

The first key observation is the proportion of jobs that are available to early-career engineering education researchers at different institution types. Figure 1 shows the count of job opportunities under each of the classifications previously described in Table 1.

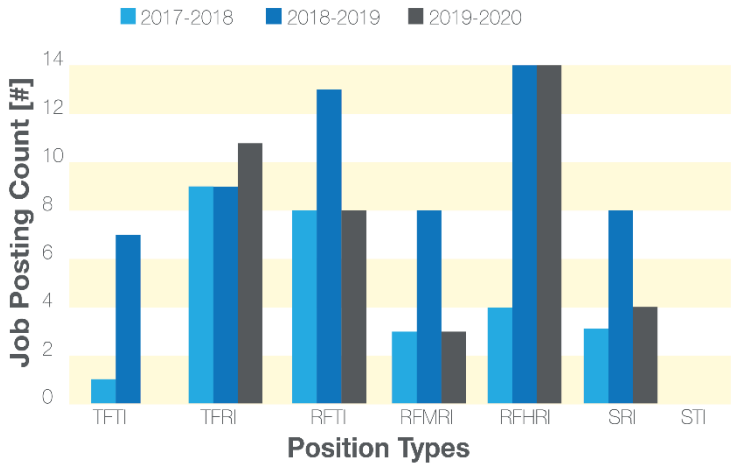

Figure 1. Early Career Engineering Education Researchers Job Posting Count during the past 2.5 faculty job search cycles

From Figure 1, we were able to capture a count of the total quantity of teaching, research, and staff focused positions that were promoted through the ERM listserv over the last two and a half job cycles (July 2017 through December 2019). Table 4 shows a summary of the job opportunities based on teaching, research, and staff positions as defined in Table 1. Overall, there were more research focused positions available to engineering education researchers in each of the faculty job search cycles than there were teaching and staff focused positions.

Of particular note is that research focused positions do not exclusively apply to EER focused research but rather encompass both EER focused research and disciplinary research. As we were including all job postings that were provided to the ERM listserv, it is possible that the high

count of research focused positions may have been due to the inclusion of disciplinary research positions. Although not often an occurrence, there is the possibility of doing both EER focused research or scholarship and disciplinary research although this is very dependent on the description of the position and requirements for recontracting. There were also notably higher numbers of positions that were available at research based institutions (RI, MRI, HRI) than at teaching based institutions. This information can be helpful to prospective engineering education researchers on the job market as it will allow them to focus their job application efforts based on the types of positions that are of greatest interest to them. A particularly interesting trend is the increase in the number of positions available to early career EER faculty. As shown in Table 4, this academic year search process seems particularly promising for EER graduate students and post-docs particularly since teaching based positions typically end up being posted towards the start of the new calendar year, which is not captured in the data provided for the 2019-20 academic year.

Table 4. Yearly Job Postings for Early Career Engineering Education Researchers during the past two and a half faculty job search cycles

Yearly Job Posting Count Totals	**2017-2018**	**2018-2019**	**2019-2020**
Teaching focused	10	16	11
Research focused	15	35	25
Staff focused	3	8	4
Total	*28*	*59*	*40*

EER Detailed Job Search Process

Five of the seven jobs accepted by our participants were posted in the ERM listserv. Overall, five of our participants applied to multiple jobs that ranged from teaching-focused to research-focused positions. The majority of participants used a strategy of honing in on specific positions (particularly tenure -track) based on their career goals, while the others had a more general approach to applying. For those with a general approach, the goal was to get as many offers as possible then make the best decision possible.

Job Search Timeline

Based on participant interview responses, the research team constructed a job search process timeline representative of what a potential applicant might experience during an EER job search cycle (see Figure 2). In their interviews, many of the participants noted that they were encouraged by their advisor/mentors to begin applying to jobs a year out from graduation or prior to the end date of their current contract. For post-graduate participants, this job application timeline meant that they were immediately going back on the market when starting their current position. These results align with work conducted by Kajfez et. al. [4] where it was found that 92% of individuals started their job search process before they completed their degree.

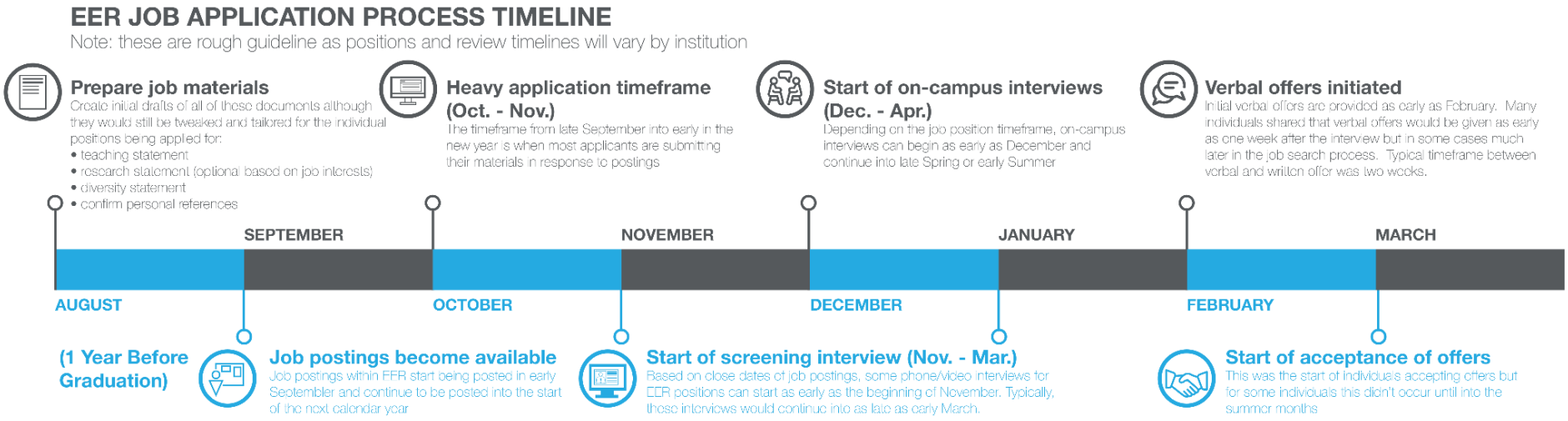

Figure 2. Job Search Timeline constructed from participant's job search

Many participants noted that they started seeing job postings for research-focused positions at the end of summer or early in the fall, while the postings for teaching-focused positions seemed to come out later in the fall or early spring, comparatively. This result indicates that job application and interview timeframes for research and teaching positions differ significantly and should be accounted for when planning the job application process. For job searches that were posted earlier in the fall, phone interviews took place during November and December, while those that posted later in the fall and early spring tended to occur in late January through early March. On-campus interviews started in January and continued through April, depending on the job posting timeline and job search timeline. Lastly, participants started to receive job offers in early March and continued until positions were filled.

Job Search Resources

The most commonly used resource across all of our participants was their advisor, which ranged from PhD advisors to faculty mentors and undergraduate advisors depending on the individual. Advisors often encouraged the participants to enter the job market, provided access to important networks, and reviewed documents. Other peers, currently on or just off the job market, were also a highly used resource for participants as they drafted documents, prepared for job talks, and negotiated their needs and wants. Two of the participants also participated in a faculty training program which gave them insight to the job search process, development of application documents, and expectations of faculty life. Resources provided by professional networks such as conferences and listservs provided many of the job postings and workshops for future faculty. Again, confirmed by Kajfez et.al. [4], all of their surveyed EER graduates relied on email listservs for job postings. A variety of other campus support resources were utilized, including career and writing centers, to support the participants in preparing their applications.

Job Decision Making

A variety of professional and personal elements influenced the decision-making process of early-career engineering education researchers as shown in Figure 3.

Figure 3. Professional and Personal Elements in Job Decision Making Process

As the participants within this study had unique experiences with their decision making process, we have selected example quotes that are both broad and more specific to best capture participants' experiences.

For most of our participants, one type of professional element that was relevant to the decision-making process was the ability to find a position that provided the correct balance between the required amount of teaching and research. One participant, Dr. Wednesday, for instance, described how they were going to try to structure their week to ensure that they met the goals associated with their position while still being able to complete the work that was most important to them based on their professional priorities. Specifically, they referenced that they would not want to work any more than 50 hours during a week due to their young family.

> Let me break down my priorities, which two of the biggest priorities are writing/doing research. And making sure that I prepare great material for teaching, and...meeting students' needs. So, majority of my time [is] going to those. And then, when I have leftover time from the 50 hours...I consider [spending] more time investing into mentoring students, serving the department, [and] just chatting with other faculty to get to know them.
> - *Dr. Wednesday*

Whereas, Dr. Saturday described the balance of teaching and research at their newly selected institution as a notable contrast to the balance of these responsibilities at other types of institutions where some other recently hired peers were hired. It was emphasized that the type of institution had a significant role in dictating the amount of time that would be available to perform research. For instance, research based positions will typically expect greater than 50% of a faculty member's time dedicated to performing research, while a primarily teaching position typically expects greater than 50% of a faculty member's time dedicated to teaching.

> I have a lot of friends who are going into teaching positions...they have to teach like so many percentage...and they have 20% research where mine is like a normal faculty position where I teach three total classes a year. - *Dr. Saturday*

The organizational culture associated with a prospective department and institution were also seen as key considerations for many of our participants. Organizational culture can vary in definition from person to person but broadly includes the observed behaviors, shared perspectives, values, and beliefs that are held by individuals within the organization [11]. In the case of our interview participants, they spoke of culture in reference to behaviors and values held by both the faculty members present as well as the leadership within the department in terms of their support for EER. For instance, Dr. Monday mentioned that they felt they had professional alignment with individuals that had already been successful within the department at the institution they were interviewing. They also referenced how the administrative structure was very supportive of EER, which was a key factor in their decision to move ahead with a position at this institution. Institutions can provide different levels of support for EER through resources, infrastructure, and student support. In the case of Dr. Monday, the college and university specified their idea of support for EER during the interview process.

> There's been a bunch of new administrators within the college and the university, but mainly within the college that are very outspoken in their support for an engineering education program. - *Dr. Monday*

Other participants similarly expressed the ability to be able to relate to their prospective new colleagues as an influence on their choice to select their position over other opportunities they had available.

> ... that was a lot of what, you know, drew me to them. Was the people I'd be working with... they've all like reached out to me, like, "Let me know if you need anything." I feel very supported from the people there. - *Dr. Tuesday*

For some it was the opportunity to be able to feel as if they "fit" within the existing department structure that served as an influencer. These individuals mentioned that other faculty members within their department were also focused on EER and attended similar conferences, which made it easy for them to visualize working within that organizational environment.

Additional professional elements that were brought up included the opportunities for collaboration, space/resources provided, and the alignment of the position with the individual's goals (both overall and research specific).

Personal elements that were raised during the participants' discussion of deciding factors in their selection of a final position included location, family needs, being conducive to desired lifestyle, job features (e.g., vacation time, salary, relocation assistance), and the type of position. Location was a particular area of emphasis for our participants as they were striving to find a place that would be a good fit for their family and a place that they would be able to see themselves staying long term:

> And when I was talking with professors at [the location of the institution]...., it's a great town, but there's not a whole lot of diversity. So I didn't want to be the only one of the few [cultural group] families in the town. I wanted my daughter to be exposed to the diversity, which we could provide that by, like, traveling places, but we wanted to be in, living in an area where she got to interact with people from different backgrounds… I also wanted to go to a slightly bigger town. - *Dr. Wednesday*

However even with this goal in mind, the participants found that it could be a struggle to make a decision just based on location as the type of position involved was a factor in need of consideration. These participants would describe that they may come across a really great position that seems perfect for the type of work that they would like to be doing but that if the location was not great, the decision making process turned into quite a struggle. They would then second guess themselves throughout the process as they worried that perhaps they just were not doing a good enough job of imagining themselves in that place.

> If I was not also interested in the location and the people, I probably wouldn't have jumped on it,... if somebody offered me an open ended contract in some place...that I did not care for, which happened, I had to sort of struggle with it a lot…because maybe it's

> different when you get there, or maybe...it's a location you didn't initially imagine yourself in, but then maybe the position outweighs that. - *Dr. Friday*

The other significant personal factor that was spoken about by multiple participants was how family needs were influential in the participant's final decision process. As an example, Dr. Wednesday mentioned how their decision-making process had evolved from the time when they were selecting a grad school to attend, to this next step in selecting a faculty position where family needs were much more important. While in grad school, Dr. Wednesday had not seen the need to select a location on the basis that it could be a permanent area for their family to grow up and expand whereas a faculty position was seen to be more of a long term and high stake commitment.

Dr. Monday shared that they approached this decision-making process differently as they wanted to select a place where members of their family would also feel that they had the opportunity for career success. This approach to the decision-making process led to them asking additional questions during interviews to ensure they had a full picture of the resources available to them at each institution. Similar to Dr. Wednesday, the ability to find a location and institution that would support the needs for their family was a key piece in making their final job selection. For Dr. Thursday needing to navigate the two-body problem, or finding another position (academic or industry based) for their spouse, also was a critical factor in the decision making process.

These examples illustrate how job decision-making for early-career engineering education researchers is quite a complex process and that there are many elements, both professional and personal, that have an influential role on the final decision that is made.

<u>Looking ahead to the new position</u>

Some themes emerged as to what each participant was most excited about or looking forward to as well as anticipated challenges in relation to their upcoming position. Many participants were excited for a new level of freedom over their daily tasks, an ability to have more power over their teaching and research, and the ability to form new relationships with collaborators and future students. However, there were some concerns about the culture of their departments and how politics might impact their roles and experiences at their new institution. All of the participants anticipated some level of challenge in managing their time and balancing the various aspects of their role including teaching, research, service, and family.

Limitations

While this investigation provided a unique insight into the job search process of early-career EER faculty, the limited number of interviews provides only a glimpse into the experiences of individuals transitioning into early-career EER faculty positions. The number of prospective applicants within the field at any given time is unknown and as such it is difficult to assess whether we were able to capture a realistic sample of the population from the number of participants that we interviewed. In addition, the sample interviewed for this study all received and accepted job offers. Some of these individuals received multiple offers and had to decide between them, and others received offers but did not necessarily receive offers for every position applied for. As a result, this study does not describe the process or experiences of those who did not receive an offer.

Based on our participants, the data share insight on only three types of positions of the seven posted job types identified from the ERM listserv. However, some of the participants did indicate that they applied for a variety of position types as well. The use of only the ERM listserv as a source for early-career EER job postings may have also restricted awareness to other types of positions available to EER faculty. Still, due to the engineering education field still being relatively small and the large proportion of job postings that go through this division, it was felt that the analysis completed provided a comprehensive overview of the market for the two and a half job search cycles reviewed.

Despite the similarity in positions taken by participants in this study, each early-career engineering education researcher came from a different academic background. Some participants came from established engineering education Ph.D. programs while others were from technical departments who had research experience in EER or had held a previous position involving EER work. While we did not focus on the background and other identity factors of each participant, we know that each aspect may contribute differently to one's job search process and decision-making.

Discussion & Conclusions

Since the first Engineering Education graduate in 2006 [12], the spectrum of candidates and prospective positions for EER graduates has drastically evolved. Early-career engineering education researchers now come with a wide array of training, interests, and professional expectations [13,14], which we are also seeing in job postings. Academic position opportunities for early-career engineering education researchers vary in focus from teaching and research to student support and administration. This variation provides graduates with an ever growing number of opportunities to find a position that matches their interests and goals. With this growing diversity in roles, comes the necessary need for knowledge of how to navigate the job market.

The results highlight how the job search process can extend for more than a year from drafting teaching and research statements through on-site interviews, with variation between the process for teaching and research based positions. Early-career engineering education researchers who have an awareness of this timeline will be able to plan how they will market themselves in an effective way. This information can help allow early-career engineering education researchers on the market to better prepare their schedules and prioritize job application materials as necessary for the jobs tailored to their professional and personal goals. This preparation is particularly important when considering the timing of research focused positions versus teaching focused positions. Many of the participants noted that research focused positions tended to come out earlier in the job posting cycle compared to teaching focused positions.

For early-career engineering education researchers on the job market it is necessary to not only look at the job roles, responsibilities, and expectations listed in the job posting, but also to be prepared to ask clarifying questions in the interview process to learn about organizational culture and to determine if the position is the best “fit”. Several of our participants mentioned that having a list of questions when going into the interview process really helped them in acquiring information that they would later use as part of their decision-making process. Types of questions that were mentioned as helpful included those focused on current research projects within the department, collaborations between departments/offices on campus that work in areas of importance for EER such as diversity/inclusion, and the role a faculty member can serve in a

collaborative research project. Other elements to consider are what types of positions are out there; for instance, do you want a teaching focused or research focused position? What type of institution are you looking to be a part of, one focused solely on undergraduate student education or one with more research focus (e.g., D/PU, R2, R1)?

Using resources and knowing how to expand the resources used during the job search process will help with the development of application materials, the preparation for interviews, and the final job selection decision-making process. Fortunately, throughout the job search and decision process there are a variety of resources that one may find useful in navigating the process. For example, utilizing career centers, libraries, and both current and previous advisors and/or mentors throughout the process to prepare job application materials and practice for interviews. Advice from senior faculty and advisors can provide a great deal of insight on how to prepare documents, what to expect during an interview, and things to ask for when negotiating an offer. Peers can provide narratives about their own experiences and things that applied to them or to be mindful of during interviews and visits. Reaching out to networks in the field or the networks of those around you may provide opportunities that are not yet posted or that you may not have considered. The use of resources is certainly based on one's own relationships, level of comfort and access, but the use of a variety of resources nonetheless can be beneficial in navigating and finding a position that is the best for the individual.

The final decision of selecting a position can be challenging as pros and cons must be weighed with any offer. Elements that are both professional and personal must be considered and again vary by individual. The participants in this study highlighted their areas of excitement in entering new positions, many of them around the ability to have greater control over the work that they are passionate about and the relationships that they could build in doing that work. Keeping in mind also the culture of a department and/or university and its priorities can have significant impact on accomplishing one's professional and personal goals. The journey of beginning a career in engineering education research can lead to success when leveraging valuable insight into the market and its timeline, the use of various resources and consideration of what professional and personal priorities drive your future.

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Appendix A - Interview Protocol

Priming questions

- *Tell me about yourself*
- *What are your hobbies?*
- *Have you moved to your new city yet?*
    - *What are you looking forward to doing in your new city?*

Pathway into Engineering Education and Career Plans

- **1. Could you describe your pathway into the Engineering Education Research community?**
    - What other pathways were you possibly interested in?
    - What sparked your interest in EER over other paths?
- **2. What position will you be starting in the fall? Describe your expected roles and responsibilities.**
    - How does this position fit with your long term career goals?
    - What kinds of positions were you seeking? Were you considering different kinds of positions, institutions, etc?
    - What led to you accepting this position in particular?

Job Search Process – maybe get a timeline to help probe.

- **3. Could you describe your experience on the job market?**
    - When did you start searching or what was your general timeline?
- **4. What resources did you use? Why?**
    - What resources were helpful? Why?
    - Who did you reach out to throughout the process? Why?
    - What resources would have been helpful in the job search process? Why?
- **5. What do you wish you would have known going into the process?**
    - What advice would you give to someone going on the job search?

Expectations and Preparation

- **6. In what ways do you feel prepared to be a faculty member?**
    - In what ways do you not feel prepared to be a faculty member?
    - What resources have you used in preparing yourself for this faculty position?
- **7. What do you expect from a typical work week/day?**
- **8. What are you most excited about regarding starting your position?**
    - What short-term challenges (i.e., during Year 1) do you expect to face in your new position?

Upon answering the previous questions, is there anything else you would like to add that you believe is important to your experience transitioning from a graduate student/post-doc to a faculty position?

Additional questions

- What was the most challenging part of the job search process? What would have helped there?
- What do you think it means to be a faculty member?
    - Where did/How did you develop this definition?
- What are your long-term career goals?
- In what ways did you receive help from your advisor/university/department to prepare for your next position?
- What are your professional goals over the next year?
- What are you most nervous about regarding starting your position?
    - Could we ask this at a more micro-level….

Conclusion

- Upon answering the previous questions, is there anything else you would like to add that you believe is important to your experience transitioning from a graduate student/post-doc to a faculty position?