Mapping the Departmental Doctoral Advising Landscape: A Case Study of Engineering Doctoral Advising from Faculty and Student Perspectives

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ABSTRACT

This practice-based case study explores—through the lens of the Community of Practice (CoP) framework—the current practices and attitudes surrounding doctoral student advising in an engineering department, contributing to the broader efforts to institute systemic changes in graduate engineering education. Graduate advising, viewed as a network of social interactions, involves faculty exchanging information and supporting each other and their students. Our study utilizes in analysis specifically the process-based definitions of CoP as the process through which a community generates, applies, and reproduces knowledge and in which an ongoing process of legitimate peripheral participation takes place. While there is not a dearth of advising relationship-focused studies, department-level advising practices are relatively underexplored. This study aims to bridge this gap by considering graduate program administrator and doctoral student perspectives on departmental practices that support advising. Our research questions investigate advising support structures, mentoring resources, feedback mechanisms, and conflict resolution processes. Our results reveal differences in emphasis in faculty and student perspectives. Faculty emphasized a decentralized advising process, relying on graduate school guidelines and sequential communication. The absence of formal requirements allows the adoption of diverse mentoring approaches and mentoring tools at the discretion of faculty members. Further, a significant challenge emerges from the lack of actionable evaluation of faculty advising competencies. In contrast, doctoral students highlighted structured onboarding, a flexible culture, reasonably abundant funding, and a need for more structured protocols to address more serious student concerns, revealing the necessity to consider departmental policies or practices that can solicit student feedback in safer ways. Both perspectives underscore the importance of feedback, but interestingly, faculty concerns about confidentiality differ from students' desire for open communication channels. Further, representing one of the major discrepancies, feedback from the doctoral student focus group participants highlighted an unfamiliarity with diversity climate surveys and how they were used and reported. This was an interesting finding considering how the department typically advocates and emphasizes the use of diversity climate surveys for feedback and information-gathering. This study contributes to the literature on graduate advising and identifies potential gaps in understanding between faculty and students, potentially highlighting misaligned expectations in advising support structures.

1. INTRODUCTION

The primary objective of this practice-based case study is to gain a deeper understanding of the current practices and attitudes concerning doctoral student advising in an engineering department of a college of engineering. This was a part of the college-level's greater effort to institute systemic changes aiming to transform current graduate engineering education, the focus of which is on bringing positive changes to the graduate engineering education system—through improving

numerous interconnected processes to help provide a strong overarching support system that will better allow graduate students to thrive—and by establishing a center for transforming graduate education in engineering through organizational change.

The intricate landscape of doctoral advising within the chosen engineering department is explored through the lens of community of practice. This study examines faculty and student perspectives on current advising processes and procedures, mentoring tool adoption, feedback mechanisms, and conflict resolution. Ultimately, information gained from this project can inform departmental policies and practices that promote more equitable and effective advising practices, thereby fostering an inclusive learning and work environment and enhancing the overall graduate education experience.

2. BACKGROUND AND MOTIVATION

Studies concerning individual advisors and advising relationships in engineering graduate education are of critical importance and contribute immensely to knowledge building in the important research area of graduate student advising (e.g., Prime et al., 2015; Bryson et al., 2023). However, department-level advising practices and related issues are typically not the focus of research studies, even though departments can help facilitate sharing evidence-based "best practices." Department-level studies are important because graduate student affairs tend to be highly influenced by their program specifics, including socialization, funding, norms, practices, etc. (Fleming et al., 2023). Studies or occasional practice notes that delve into prescriptive graduate advising best practices usually have not intentionally featured the voices of students at the receiving end of advising (e.g., Boyce, 2021). Further, some studies are significantly limited in scope in that they are largely concerned with a certain aspect of graduate advising, such as advisor selection (e.g., Artiles et al., 2023; Main, 2012).

Graduate advising can be viewed as a network of social interactions in which faculty within a department can exchange experiences and advising knowledge and practices to support one another and their graduate student advisees. Thus, the Community of Practice (CoP) framework can be applied to shed light on the complex departmental interrelationships, shared norms and knowledge, and collaborative endeavors that characterize the engineering doctoral student advising ecosystem as it is interpreted. Community of practice is an important concept of situated learning theory, most widely known from Lave and Wenger's work (1991). Hoadley (2012) refers to Lave and Wenger's two definitions of CoP: feature-based and process-based. In feature-based definition, a community of practice shares practices and knowledge. Therefore, learning is embedded in cultural practices and in the context of problem-solving—it is a relational property of the practitioners in the community in authentic practice contexts and in interaction with one another. The process-based definition of CoP, on the other hand, refers to the process through which the community generates, applies, and reproduces knowledge in which a "constant process of legitimate peripheral participation" takes place. By this definition, the defining phenomenon or characteristic within a CoP is the process of joining and identifying with a community (Hoadley, 2012).

In viewing the department as a CoP and consistent with our overall top-down systemic approach, we conducted a focus group with departmental graduate program faculty and administrators (i.e.,

graduate program director, graduate program coordinator, director of graduate education, and another faculty coordinating faculty development efforts), to understand their perspectives on the department's advising practices. These perspectives were enriched by an additional focus group with doctoral students recruited from within the same department. In particular, we sought to bridge a gap in the literature by advancing our understanding of departmental practices and processes that support engineering doctoral student advising. We pose several key research questions (RQs) that focus on specific departmental advising supports.

RQs: What are the perceptions of departmental graduate program faculty/administrators and doctoral students in regards to:

1. Current departmental advising support structures and expectations, specifically, how advising expectations are communicated?
2. The departmental adoption of mentoring resources, tools, and processes?
3. Feedback mechanisms and culture monitoring within the department?
4. How issues between advisors and doctoral students are addressed within the department?

3. METHODS

We conducted focus group interviews to collect qualitative data from the participants. Focus groups are most appropriate "when the interaction among interviewees will likely yield the best information, when interviewees are similar and cooperative with each other…" (Creswell & Poth, 2016), along with other criteria, which aptly describe and characterize our two distinctive groups of participants. The information obtained was then analyzed, organized, and presented in a way that provides answers to our research questions.

3.1 Case Context

Two focus groups of about an hour duration with four to five participants each were conducted in the fall of 2023 with participants invited from a department of engineering at a large R1 institution with sizable engineering graduate student enrollments. One of the groups was made up of department faculty and graduate program administrators from an engineering department that volunteered to participate in the focus group. The other group was attended by PhD students from the same department (This included a recent PhD graduate of the department now working as a postdoc at the institution).

In recruiting faculty participants, an effort was made to recruit the departmental leadership team who were most closely involved with or informed of the department's graduate student advising practices. To this end, the graduate program director and graduate program coordinator were both in attendance and actively participated in the focus group conversation. The faculty and administrator focus group of four participants comprised an equal number of males and females, all of whom were incidentally white. The department name and faculty's areas of specialties have been redacted to maintain confidentiality.

The doctoral student participants were recruited through email solicitation with the provision of a small gift card compensation. Demographic information of the five students, who had enrolled in the PhD for at least a year at the time of the focus group interview, is presented in Table 1.

Although in qualitative studies we emphasize in-depth exploration of perspectives and experiences, focusing on the richness and relevance of the data rather than on the statistical representativeness of the participants and generalizability, the participants—especially the doctoral student group—appeared to be largely representative of the population that showcased a range of experiences from different groups. It should also be noted that this study has specific reasons to focus on engineering PhD students instead of all graduate students in the engineering department. We had no intention to diminish the importance of insights that may be gained from including master's students; but a focus is necessary for this study in that doctoral and master's students are likely to have vastly different experiences. With a shorter degree duration, master's programs typically require a lower level of time commitment and thus, their successful completion are less dependent on having a strong advising relationship with faculty advisors; this is especially true if the student is on a non-thesis track.

TABLE 1 Demographic information of the doctoral student focus group participants

Characteristic	Number of students
Race	
Asian	2
Black or African	1
White	2
Gender	
Female	1
Male	4
Origin	
Domestics	2
International	3

Approval from the Institutional Research Board (IRB) at the institution was obtained prior to the interviews. The faculty focus group participants were informed of the key objective of the session, our broader goals to contribute to transforming engineering graduate education, and how our findings may be shared. Similar consent was obtained from the doctoral student focus group participants.

3.2 Data Collection

A list of the questions asked, mapped to our research questions, is provided in Table 2 for the departmental focus group meeting with faculty and administrators. Note that some of these questions were not explored exhaustively due to time constraints or were limited to the breadth and depth of information voluntarily shared by the faculty members. Nevertheless, the full set of questions is included here for completeness and reference. Even though this work was initially guided principally by the top-down approach that aims to initiate changes in the engineering graduate education systems, students' perspectives were actively sought by engaging doctoral

students from the department in a focus group. Broadly similar interview questions, designed to better focus on our research questions and adapted to fit the target group, were asked of doctoral students, as presented in Table 3

TABLE 2 Mapping overarching research questions: faculty and administrator focus group

Targeted Questions
RQ1: Current General Advising Support Structures and Expectations 1. Please outline the strategies or initiatives your department employs to foster effective graduate student advising. Specifically, how does your department ensure these advising practices cater to the diverse needs of all students and promote an inclusive and equitable environment? 2. How are expectations communicated to faculty and students regarding graduate student advising? 3. Could you describe a particularly successful advising relationship within your department and what you think contributed to its success?
RQ2: Current Departmental Adoption of Mentoring Tools 1. Can you tell us about any mentoring tools (e.g., Individual Development Plans, aligning expectations worksheets, mentoring compacts/agreements, etc.) currently in use in your department to support graduate student advising? 2. Are there formal or informal ways faculty share mentoring tools, resources, and best practices with each other?
RQ3: Feedback Mechanisms and Culture Monitoring 1. Does the department currently have any system in place for faculty to receive feedback on their advising practices? If so, could you describe this system? 2. What are your thoughts on implementing a more formal, anonymous feedback mechanism that allows graduate students to evaluate their advisors? How receptive do you think faculty in your department would be to this idea? 3. Could you describe any existing systems or processes your department uses to monitor the culture within the department or to collect feedback from graduate students about their overall experience? 4. If a new system were to be implemented for evaluating and providing feedback on advising relationships, how would you envision this process? What would be the key considerations or concerns from your department's perspective? 5. Considering potential new strategies like a formal feedback system, culture monitoring surveys, or specific mentoring tools, what kind of resources (e.g., time, funding, personnel) does your department currently have? What additional resources would be necessary for implementation?
RQ4: Departmental Processes for Addressing Advisor-Advisee Concerns 1. How does the department currently deal with grievances of graduate students concerning their advisors? 2. Could you tell us about any departmental processes that exist to assist students transitioning to a different advisor? 3. Could you describe any challenges your department has faced in advising graduate students and how you addressed them?

TABLE 3 Mapping overarching research questions (RQs): doctoral student focus group

Targeted Questions
RQ1: Current General Advising Support Structures and Expectations 1. To what extent do you think the advising needs of PhD students are currently being met by the department (i.e., by the various support structures and efforts)? 2. How (and how well) are the various expectations communicated to the students? 3. What suggestions do you have on areas that may need improvements? (e.g., about degree milestones and performance, assistantship funding offers and expectations, and etc.)
RQ2: Current Departmental Adoption of Mentoring Tools 1. What are the primary ways, such as policies/processes, that your department has in place that support doctoral students (in advising/mentoring)?
RQ3: Feedback Mechanisms and Culture Monitoring 1. Did the department ask for feedback from its PhD students? If so, what are your thoughts on how feedback is given and its effectiveness? 2. Have you taken climate surveys and what are your thoughts on them? 3. Are there any other alternatives that you think would be better for soliciting student feedback?
RQ4: Departmental Processes for Addressing Advisor-Advisee Concerns 1. Is there anything else that you would like to say concerning PhD student support in your department? (e.g., support for students having issues with their advisors, process for addressing concerns, funding issues, etc.)

4. FINDINGS

4.1 Faculty and Administrators Departmental Perspectives

4.1.1 Graduate Student Advising Support Structures and Expectations

Overall, the department has a fairly informal process for monitoring graduate student advising. The department largely relies on Expectations for Graduate Education by the graduate school as guidelines. There is a relatively clear sequential chain of communication (from 1 to 6) that graduate students are expected to follow if any issue arises, namely: (1) advisor, (2) area coordinator, (3) graduate coordinator, (4) graduate director, (5) department head, and (6) the graduate school. To assist with the advising process, the department has held seminars on various topics in the past, such as breaking down communication barriers and how to interact, communicate, and survive within research groups. Students receive guidance in putting together a mentor package and are encouraged to carefully consider their needs when choosing their mentors. Faculty members have also facilitated discussions with students in their introduction seminar by program areas to promote awareness of faculty research interests.

The faculty in this department were encouraged to participate in a training program offered by the Center for the Improvement of Mentored Experiences in Research (CIMER) in recent years. This training program provides resources for organizations to improve research mentoring relationships. CIMER also has a "training the trainees" model in which faculty members receive training to train others through a certification program. However, the current Faculty Annual Report (FAR), though asks about advising effectiveness and goals, does not meaningfully assess faculty advising competency (compared to other areas). The Assistant Department Head (ADH) of the department revealed that, typically, 80% of advising-related issues stem from about 10% of the faculty.

4.1.2 Current Departmental Adoption of Mentoring Tools

Research compacts, specific mentoring guidelines, or expectation documents are used by some faculty members' research groups for new students. Nevertheless, the department currently has no formal process to require faculty to use mentoring pacts. Individual faculty members typically go with what has already worked well for them in the past, resulting in a range of perspectives on best practices. It was suggested that the department would likely encounter significant pushback if the use of a mentoring tool was made a requirement instead of a recommendation.

4.1.3 Feedback Mechanisms and Culture Monitoring

As a feedback mechanism, the department conducted graduate student climate surveys in the fall of 2021 and 2022. The response rate for the first year was 50%, while for the second year it was less than 20%. Currently, it has decided to facilitate this survey every two years. The results were used to identify issues that may require immediate response, and identify areas to be given more focus to in the next survey. However, there were possible issues with layers of confidentiality as students were asked to identify their specific program area within the department. Several of the program areas are smaller with few faculty members. Valid concerns were brought up about feedback being traceable to certain students or a group of students, which may lead to students' having a fear of retribution that hinders their ability to provide genuine feedback. The ADH of the department concurred that issues sometimes might have surfaced simply due to unreasonable or unmatched expectations. It was mentioned that it would be desirable to see student feedback being coupled with proactive, empowering ways for students to organize their own destiny—in terms of how they can choose the "right" advisors and committee members.

4.1.4 Departmental Processes for Addressing Advisor-Advisee Concerns

Students are encouraged to try to resolve conflict with their advisors, and to have a positive voice in initiating communication and seeking clarity on their mutual expectations. When issues cannot be resolved at this level, the department typically helps facilitate a meeting involving the student and the advisor with the ombudsman. In terms of switching advisors, individual counseling is arranged, aiming for fair facilitation and honest communication. The ADH brought up the issue regarding advisors not having documented the points of concern that led up to their decision to cancel their graduate students' funding. However, due to a lack of documented evidence, the department would almost always rule in favor of the students in such scenarios.

4.2 Doctoral Student Input

4.2.1 Onboarding and Supportive Practices and Policies for Graduate Advising

It was observed that the department places significant emphasis on providing incoming students with a carefully planned new student orientation, which includes the distribution of a handbook that encapsulates all relevant departmental policies. Incoming students also participate in supplemental meetings with advisors, principal investigators (PIs), and their fellow graduate students. Notable aspects of this process included the department's practice of hosting open house events for newly accepted applicants. These events provided prospective students with a unique opportunity to interact with potential faculty advisors to explore potential fits and funding opportunities, which was seen as a pivotal step in nurturing supportive relationships. The graduate coordinator was repeatedly commended for her accessibility and responsiveness to student inquiries. Additionally, the department's official website was highlighted as a valuable resource for students seeking information. Annual progress reports were discussed as an integral part of the department's approach to monitoring the academic progress of its graduate students, encompassing achievements, successes/challenges, courses taken, and progress toward dissertation and degree milestones.

4.2.2 Departmental Culture

Participants also noted that the department fostered a culture of flexibility, where students felt at ease switching research projects and/or advisors. This adaptability was attributed to faculty members' clear specializations, which facilitated students' capacity to switch projects and advisors as their research interests evolved and, in many cases, switch advisors while maintaining the engagement of their original advisors as co-PIs or committee members for the interest and benefits of the students. The flexible culture was observed as a testament to the department's commitment to fostering productive and dynamic, collaborative research environments that benefits graduate engineering education.

4.2.3 Funding and Other Opportunities

Participants underscored the availability of graduate teaching assistantship (GTA) opportunities within the department. It was noted that they did not believe there was a shortage of GTA positions, in addition to instructor of record positions that may be available to more senior students. Advisors typically provided funding options to ensure that doctoral students were always funded either as graduate teaching assistants (GRAs) or GTAs (if GRA funding was not available). This led to a highly valued norm practiced by the department/faculty to always ensure doctoral students have funding support. Further, the participants shared that students attended GTA workshops to receive guidance on teaching. Additionally, though not required, they were also given opportunities to participate in grant-writing endeavors by faculty advisors.

4.2.4 Communication of Expectations

Participants acknowledged the department's efforts in communicating expectations to students. The graduate coordinator was again identified as a central figure in this process, sending weekly emails and updates that kept students well-informed about requirements and deadlines. However, the group felt that a more structured protocol was needed for addressing more serious concerns. It

appears that the roles of the graduate program director in directly communicating with the students did not appear to be as prominent as that of the graduate coordinator.

4.2.5 Climate Surveys and Feedback

While not all participants were intimately familiar with the department's climate survey (particularly newer PhD students who had not yet had an opportunity to complete such surveys), those who were felt comfortable providing feedback. Participants expressed the belief that if issues arose, they could easily be addressed directly with the department through direct contacts with the graduate coordinator, for instance. During the discussion, one participant looked online and mistakenly confused the published results of a general university human resource department climate survey with the departmental climate survey, incorrectly assuming that the results were freely available to students; this attested to a certain level of unfamiliarity with departmental climate surveys. It was likely that the results of the surveys were never shared with the students. Thus, it was difficult to gauge the transparency and accountability of the department, as well as what steps/initiatives have been taken in response to students' feedback. However, it was brought up by some participants that they did not have any negative comments or changes/improvements to suggest so they would not anticipate any of such initiatives.

4.2.6 Other Feedback Mechanisms

The focus group interview concluded with a discussion focused on feedback mechanisms beyond climate surveys. Participants noted that apart from the annual progress report and climate survey, the department had limited mechanisms for graduate students to provide feedback to the department. Occasionally, the department reaches out to students who are not performing well in coursework. The college-wide exit survey was mentioned during the discussion, but its details were not further explored because none of the participants had taken the survey and were therefore not familiar with it.

5. ANALYSIS AND DISCUSSION

5.1 Process-based lens of Community of Practice

Analyzing the informal advising process within the department through the Community of Practice Framework—specifically grounded in the process-based definition of CoP by Lave and Wenger—graduate advising in the department can be conceived as an ongoing process of legitimate peripheral participation by faculty in the departmental community. In this framework, CoP is characterized by constant knowledge generation, application, and reproduction, highlighting the dynamic nature of engagement.

Within this framework, the diverse adoption of mentoring tools reflects the autonomy of individual faculty members as distinct nodes in the advising network. There are no formal requirements concerning doctoral student mentoring to support graduate advising and faculty members are free to adopt tools (or not) that they perceive to be most appropriate or work best. However, the CIMER program allows faculty members in the department to receive training to train others, it is through this initiative that other faculty in the more peripheral mode of participation get to learn from trained experts; it is important for faculty to be considered "on the periphery," legitimately, while enculturing themselves to the developing community practice. Learners need to have readily

available access to experts; this is equally essential as an important criterion in the view of CoP (Hoadley, 2012).

5.2 Aligning Faculty and Student Perspectives

The faculty perspective on graduate student advising and expectations reveals a relatively informal monitoring process. The department relies on guidelines from the graduate school, with a clear sequential chain of communication for addressing student issues. Seminars and training programs are put in place to assist faculty in mentoring, yet their effectiveness is not meaningfully assessed in the Faculty Annual Report. The department lacks a formal process to require mentoring tools, leading to varied perspectives on best practices. Further, the graduate student climate surveys identify issues, but there are concerns about confidentiality and traceability that hinder genuine feedback. Further, the department encourages conflict resolution at the student-advisor level, involving the ombudsman if necessary.

The doctoral student input helps shed light on supportive advising practices and policies. The emphasis on a carefully planned orientation, open house events, and supplemental meetings was noted, which fosters an open and nurturing environment. The department's culture promotes flexibility, allowing students to switch projects and advisors. Funding opportunities, especially through teaching assistantships, are thought to be abundant, ensuring financial support for doctoral students. Communication of expectations is maintained largely through the graduate coordinator's efforts, but participants express a need for the availability of structured procedures and established protocols for addressing more serious issues or concerns. While a certain level of unfamiliarity with climate surveys still exists, there are doubts about their transparency and accountability, with limited mechanisms for feedback beyond annual reports and surveys.

In comparison, it is of interest to note that faculty and doctoral students emphasized different components or areas of similar issues. The faculty perspective emphasizes a decentralized advising process with informal mentoring tools, while the student perspective highlights a relatively structured onboarding process and a flexible culture. The faculty focuses on addressing conflicts through a sequential chain of communication, while students expressed a desire for more structured protocols for serious concerns. Both perspectives emphasize the importance of feedback mechanisms, though faculty concerns about confidentiality and traceability differ from students' expectations of open channels for feedback and communication. This reveals a potential gap in understanding and aligning expectations between faculty and students regarding advising and mentoring support structures. The following table (Table 4) concisely compares the faculty and administrators' departmental perspective with the doctoral student perspective across various aspects of graduate student advising and departmental practices.

TABLE 4 Comparison of points of emphasis: faculty and administrator vs. doctoral student focus groups

Aspect	Faculty and Administrator	Doctoral Student
RQ1: Graduate Student Advising Support	Informal monitoring, reliance on graduate school guidelines, sequential chain of communication, meaningful assessment of	Structured onboarding, open house events, supplemental meetings, ease in switching projects and advisors, commitment to fostering collaborative research

Aspect	Faculty and Administrator	Doctoral Student
Structures and Expectation Communication	faculty's mentoring skills in Faculty Annual Report is lacking	environments, recognition for graduate coordinator's accessibility and timely communication
RQ2: Adoption of Mentoring Tools/Process	Varied perspectives on best practices, no formal requirement for mentoring tools, some faculty use research compacts, Some faculty participate in CIMER training	Annual progress report, GTA workshops for teaching guidance, opportunities in grant-writing training with advisors
RQ3: Feedback Mechanisms and Culture Monitoring	Graduate student climate surveys, concerns about confidentiality, and traceability	A degree of unfamiliarity with departmental climate surveys, limited mechanisms beyond annual progress reports and surveys
RQ4: Processes for Addressing Advisor-Advisee Concerns	Sequential conflict resolution, possible involvement of ombudsman	Desire for more structured protocols for serious concerns

6. LIMITATIONS AND FUTURE DIRECTIONS

There are some inherent limitations in this study. Primarily, consistent with the format of focus group interview, the number of participants was small. While this format enabled a setting that was conducive to getting more in-depth elaboration of perceptions or meanings, a quantitative survey covering a larger number of participants and targeting the areas uncovered by this study would be beneficial to allow for greater generalizability. Alternatively, additional focus groups may improve the breadth (and possibly depth) of responses. Further, additional focus groups with participants from other departments or at different institutions, especially with detailed context information provided, can improve the transferability of research findings.

7. CONCLUSION

This study contributes to the literature on engineering departmental graduate advising practices to support advising and identifies potential gaps in understanding between faculty and students, potentially highlighting misaligned expectations in advising support structures. The exploration of the departmental doctoral advising landscape within the engineering department through the Community of Practice Framework provides a nuanced understanding of the interconnected dynamics. The advising community of practice approach to advising, mentoring tool adoption, feedback mechanisms, and conflict resolution reflects a commitment to shared values and continuous improvement.

The importance of communal efforts to refine and document advising practices, establish clear communication protocols, and enhance transparency and inclusivity in feedback mechanisms is

underscored. As the advising community of practice context within the department continues to evolve, fostering a supportive and dynamic advising environment requires ongoing collaboration, communication, and a shared commitment to excellence. The principles of the Community of Practice Framework can serve as a guidepost for studying the department's collective journey towards continuous improvement and the creation of a receptive graduate advising community—one that is well on the way to defining exemplary standards of practice in graduate engineering advising.

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REFERENCES

Artiles, M. S., Knight, D. B., & Matusovich, H. M. (2023). Doctoral advisor selection processes in science, math, and engineering programs in the United States. *International Journal of STEM Education*, 10(1), 1-16.

Boyce, A. S. (2021). Strategies for mentoring and advising evaluation graduate students of color. *Canadian Journal of Program Evaluation*, 35(3), 350-362.

Bryson, T., Kowalske, M., Wilkins-Yel, K., & Housh, K. (2023). The Influence of Advisors' Advising Style on the Career Interests of Black and Latinx Students in STEM Graduate Programs. *Journal of STEM Education: Innovations and Research*, 24(1).

Center for the Improvement of Mentored Experiences in Research (CIMER). (n.d.). https://cimerproject.org/

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.

Fleming, G. C., Borrego, M., & Knight, D. (2023). Engineering Graduate Education in the United States. *International Handbook of Engineering Education Research*.

Hoadley, C. (2012). What is a community of practice and how can we support it? In D. H. Jonassen & S. M. Land (Eds.), *Theoretical foundations of learning environments* (2nd ed., pp. 287–300). New York, NY: Routledge.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. New York: Cambridge University Press.

Main, J. B. (2012, June). *Trends in doctoral education: Engineering students' perspectives on faculty advising*. In 2012 ASEE Annual Conference & Exposition (pp. 25-1378).

Primé, D. R., Bernstein, B. L., Wilkins, K. G., & Bekki, J. M. (2015). Measuring the advising alliance for female graduate students in science and engineering: An emerging structure. *Journal of Career Assessment*, 23(1), 64-78.