

WIP: Advisor Shifts in Engineering Doctoral Journeys - Perceptions from International Students

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Abstract - This research WIP paper aims to explore the experiences of international engineering students as they transition between advisors during their doctoral studies. The decision to change advisors is a significant step that requires careful consideration, and it can be particularly complex for international students who must adapt to new cultures, academic systems, and language barriers. Our main objective is to investigate the challenges and opportunities that may arise during these transitions and gain insights into how international engineering students navigate this process. While existing literature focuses on the factors influencing advisor changes, with emphasis on gender dynamics in engineering, there is a lack of research on how international students manage this transition. Through this study, we seek to address this gap and provide valuable insights into the motivations, challenges, and outcomes associated with changing advisors for international engineering students. Our study will consider factors such as compatibility in working styles, communication, research interests, academic guidance, financial considerations, and personal issues, to gain a better understanding of the multifaceted nature of the decision to switch advisors. The research questions guiding our study are as follows: What factors influence international engineering students' decision to change their advisors in a foreign academic environment? What support systems do international engineering students receive when navigating the process of changing their advisor, and how does this support impact their decision-making process? What challenges do international engineering students face when changing advisors, and how do they manage or overcome these challenges?

To address these questions, we will utilize the Mentor Role Instrument (MRI) as a framework, with an emphasis on the importance of cultural competencies in fostering successful mentoring relationships. We are currently in the process of collecting data by using surveys and conducting interviews with international engineering doctoral students at a public university. We have identified participants and will conduct in-depth interviews in the summer/fall of 2024. We will analyze the experiences shared by the students to identify common patterns and themes related to changing advisors. This paper is a pilot study on a topic that has great potential for future scholarly investigation but has received little attention in the past. The new knowledge generated from this study will contribute to practical applications for institutions and other stakeholders in engineering education to support the success of international graduate students.

Keywords— *International Students, Engineering, Advisor Change, Advising Dynamics, Cultural Competencies, Support Systems, Doctoral Journey.*

I. INTRODUCTION

Recognizing the profound impact that changing advisors can have on the academic and personal experiences of international engineering PhD students is crucial [1]. Academic advising is an essential component of Ph.D.

education, as it plays a pivotal role in guiding students through their educational journeys and ensuring their success [2]. As students from diverse backgrounds engage with their advisors, they often find that their perspectives shift in response to the evolving nature of their doctoral studies. This change in perspective usually occurs during the later stages of their doctoral studies. It can be influenced by various factors, including cultural differences, language barriers, changing academic requirements, evolving research interests, and a mismatch between the student's and advisor's goals or working styles [3]. These factors can lead international engineering PhD students to reconsider their initial advisor choice and seek out a new mentor who better matches their needs and provides more suitable guidance and support.

Limited comprehensive research has been conducted on the transition of advisors within the specific context of engineering education. The goal of this research study is to explore the experiences of international engineering students who undergo the transition from one advisor to another. The study aims to identify the factors that trigger this change, the challenges encountered during the process, and the ultimate consequences of the transition. To achieve this, the study will review relevant literature from engineering education and incorporate insights from various research groups focusing on students' identity, academic integration, communication, and cultural aspects relevant to international learners.

The research questions guiding our study are as follows:

1. What factors influence international engineering students' decision to change advisors in a foreign academic environment?
2. What support systems do international engineering students receive when navigating the process of changing their advisor, and how does this support impact their decision-making process?
3. What challenges do international engineering students face when changing advisors, and how do they manage or overcome these challenges?

The purpose of this study is to analyze the advising interactions and support systems that are accessible to international engineering students. This work is guided by the concepts of Intercultural Competence and the Mentor Role Instrument. By adopting this methodology, the goal is to provide useful recommendations for tailoring academic support to enhance the retention and success of international students within engineering programs.

II. MOTIVATION

The motivation for this research arises from identifying gaps in existing studies and recognizing the need for further exploration in specific areas. International PhD

students encounter numerous non-academic challenges, including issues regarding their legal status and rights to study and work within the host country [4]. Their visa situation can significantly impact academic decisions and affect stress levels. Additionally, financial concerns are significant, as international students often rely on scholarships, fellowships, or work-study opportunities to cover tuition fees and living expenses. These areas are frequently discussed with advisors, as they directly influence the availability of time and the feasibility of completing the research.

III. POSITIONALITY STATEMENT

As an international student, I have faced numerous challenges while adjusting to a new culture and academic setting. I am grateful for the unwavering support from my family, friends, and mentors, which has allowed me to gain valuable insights into various cultures and communities. These experiences have sparked my interest in exploring the journeys of international students pursuing higher education in the United States. Growing up in a competitive environment has provided me with a deeper understanding of the US education system. Our personal experiences and values heavily influence our perspectives, and it is important to be mindful of their biases. As a researcher, I am dedicated to approaching my studies with a strong sense of ethics, ensuring that my work remains impartial and trustworthy.

IV. BACKGROUND

In this paper, we have used several terms that may be unfamiliar to those outside the academic or intercultural communication domains. Inter-cultural sensitivity refers to an individual's ability to communicate effectively with people from different cultures in cross-cultural settings [5]. When we refer to 'developmental networks' in mentorship, we are describing a concept that goes beyond a one-to-one mentorship relationship [6]. It encompasses additional related and available resources for the development of the individual involved. Understanding these terms is salient for providing general recommendations and addressing the challenges discussed in our study.

A. Globalization of Higher Education

The impact of globalization on higher education has been significant, especially with the increase in international students pursuing graduate programs worldwide. This trend necessitates an understanding of its effects, particularly in the realm of academic advising. The internationalization of higher education fosters a diverse environment where students from varied cultural backgrounds come together within academic institutions. It is essential to recognize the need for advising methods that address the different requirements of international students, especially in STEM education settings in the United States. Consequently, it is vital for graduate-level programs to have a global reach, and in doing so, it is important to comprehend the significance of advising methods [7]. Advisors play an important role in the doctoral process, which becomes even more intricate due to cultural and language barriers, as well as the navigation of a new academic environment.

The increasing trend of globalization, especially in the STEM fields, emphasizes the importance of diversity in

boosting team dynamics and fostering innovative solutions. After graduation, many of these students take part in Optional Practical Training (OPT) programs, which allow them to gain up to 3 years of work experience in their field. This helps to address critical talent shortages and support the American economy. However, international graduates encounter challenges when navigating the American labor market, particularly due to visa limitations and cultural differences in workforce relations. Urban & Palmer (2016) highlighted some of the issues that arise from visa restrictions and cultural differences and emphasized the need to address them to help international students transition smoothly into the job market [8]. This indicates that higher education institutions are redesigning their career services to effectively assist international students with resources and support tailored to their specific needs. This encompasses guiding visa regulations, cultural sensitivity training, networking support, and job search strategies. By actively addressing these challenges, colleges and universities can enable international students to more effectively navigate the job market and leverage their unique skills and perspectives. It is significant to establish a supportive advising rapport with international students, wherein advisors help them overcome barriers that could hinder their career success.

B. Engineering as a Profession

One driving force behind engineering as a profession is its demand. In doctoral engineering programs, faculty advising plays a pivotal role as students maintain a close relationship with their advisors, greatly influencing their research progress [1]. However, the existing literature on changing advisors primarily focuses on gender dynamics rather than the experiences of international students in engineering.

The study by Spencer-Oatey and Franklin in 2012 was based on mentoring in the 21st century, which encompasses cross-cultural mentoring and is particularly relevant to engineering students from different nations [9]. Being an engineering major, it becomes imperative to come to terms with the cultural influences that impact mentoring relationships and academic achievements as the world becomes more globalized [9]. By analyzing the reasons behind the switching of advisors among international engineering students, this research study aims to reveal critical issues within the engineering profession and provide suitable interventions to make mentorship experiences more effective for students from diverse cultural backgrounds.

C. Growing Recognition of Mentorship in STEM:

Mentoring in STEM fields is rapidly acknowledged as a critical component in nurturing students' academic growth and professional progress. This realization includes considering cultural and identity factors within mentorship and underlines the requirement for a sophisticated grasp on how these aspects affect advising interactions, particularly in STEM domains [10].

By exploring the reasons why international engineering students decide to switch advisors, the present research aims to initiate a conversation in the broad STEM mentoring world [10]. These findings will inform best practices for mentoring and support during doctoral programs, resulting in

international engineering students' academic success and retention [11].

In general, the motivation behind the research is to identify and mitigate the impediments faced by international engineering students upon changing their advisors in foreign learning environments [9] and strengthen mentorship and support networks in PhD programs.

V. LITERATURE REVIEW

The review of the literature reveals the intricate landscape of international engineering students' academic experiences, with a primary focus on their perspectives regarding cultural variances and their conduct when changing advisors. The academic journey of international students is significantly influenced by cultural differences; the review aims to explore how cultural variances impact advisor changes, the type of support system students seek during this transition, the challenges typically faced by international students during this process, and the role of gender in advisor-student relationships. This review will examine various sources to comprehend the diverse aspects of academia and the barriers associated with international students when interacting with their academic advisors.

A. Cultural Competence and Perception

According to Deardorff (2006), intercultural competence is best described as a broad and evolving concept that has emerged from the collective consciousness of academic Intercommunication scholars, universities, and institutions. This term is widely used in many disciplines and contexts, referring to one's capacity to function and communicate interculturally [13]. However, it is somewhat ambiguous thereby instigating a need for more specific descriptive approaches. This assertion has led to extensive research within the global community, emphasizing that interculturality is a continually developing concept that demands ongoing enhancement in comprehension and application [13].

Deardorff proposed that there should be regular evaluations of intercultural competence to address these challenges. She emphasizes the importance of conducting high-quality research using standardized tools. This method aims to provide a comprehensive understanding of what intercultural competence encompasses, covering various aspects of cultural relationships and interpersonal communication [13]. By implementing comprehensive and consistent assessment strategies, professionals in the fields of research and education can align their methodologies, thus enhancing their accuracy and credibility. This continuous process of improving effectiveness and precision is key for advancing knowledge and promoting understanding between cultures in academic, professional, and other formal settings. Through systematic approaches, learners and professionals can effectively navigate the complexities of this concept, reducing potential confusion about its implications for intercultural interactions [13].

B. Expanding Understandings of Culture

Spencer-Oatey and Franklin (2012) offer a different interpretation of the word culture, and they provide quotations that demonstrate the historical evolution of its meaning [9]. They present three distinct understandings of

culture: first, regarding Matthew Arnold's distinction between "high culture" and "popular culture," emphasizing the importance of intellectual or artistic pursuits; secondly, Edward Tylor's concept of culture as a "complex whole," encompassing the knowledge, beliefs, and customs shared by all members of society without regard to social status differences, and finally, Franz Boas's emphasis on the uniqueness of each culture. These varying perspectives illustrate the diverse nature of culture, encompassing both tangible and intangible elements such as conformity, societal norms, beliefs, and symbols [14]. Furthermore, the structure also illustrates the political and ideological implications of various notions of culture, ultimately linked to the need for a deeper understanding beyond straightforward categorizations. In general, this literature emphasizes the complexity of defining the notions of culture, thus stressing the multidimensional nature of intercultural interaction both inside and outside academia.

C. Mentorship and Support Systems

The landscape of contemporary mentorship has evolved significantly, as described by Ragins and Kram in 2008. This new mentorship model includes concepts such as developmental networks and the dynamics of reciprocity inherent in some forms of mentoring. Current approaches to mentorship recognize its dynamic and varied facets, expanding the traditional relationship between a mentor and a mentee to that of learning associates. These interactions are increasingly important in addressing the needs of international students in higher education, given the complexities of academic systems. The significance of such diverse mentoring roles is underscored by their contribution to the intellectual and overall development of culturally diverse learners [11]. Building on this notion, Gordon and Steele, in a 2015 publication, discuss the significant role of mentors in helping students who have not yet chosen their major. They argue that mentorship should not only be based on research but also focus on program innovations. This approach helps guide students who need clarity in their academic choices, thus allowing for a more deliberate academic path [15].

D. Role of Academic Advising

Drake (2011) shared an inspiring story about achieving enhanced and acceptable learner outcomes congruently with the intended learner's success and adequate and timely coaching/mentoring support [16]. In his discussion, Drake discusses Bernie's narrative in which advice transforms into a guide for students to make sense of their interactions and look for their place and purpose among their peers [16]. Finally, identifying areas that concern Bernie, such as lack of self-confidence and shyness, categorically demonstrates that some international students are dampened in their academic self [16]. However, thanks to the kind intercession of the professor with Bernie, he not only overcame all the shortcomings but also sometimes even advanced academically to the extent of graduating with honors. This specific story thus draws attention to the need to educate one's students on good relations with their pupils and how to handle their counterparts, students' personal affairs, and any related concerns.

These studies relate to particular issues that hinder international students in engineering specialization, and they fill the gap of understanding in the selection and change of advisors and the current state of graduate education in STEM. It is necessary to first situate international engineering students' particular difficulties and resources within the larger conversation on cultural intelligence, professional guidance, and coaching for success. From this perspective, we intend to identify factors that can improve their learning experiences and adjust expatriation in foreign academic contexts.

III. THEORETICAL FRAMEWORK

A. Identifying Key Concepts

International Students in Engineering Doctoral Programs: These include engineering students who pursue doctorate degrees in other countries and usually encounter cultural adaptation problems, language barriers, and academic expectations.

- 1) *Advisor Changes:* Identifies the critical decision process in which students of the doctoral level leave one academic counselor and start to handle their academic studies with another. This transition could significantly change students' research achievement, mentorship experiences, and general health [16].
- 2) *Cultural Competence:* The capacity to handle and communicate efficiently across cultures is crucial for successful intercultural communication in academic institutes [17].
- 3) *Mentorship:* The central relationship between a mentor (academic advisor) and a mentee (doctoral student) is the primary factor that helps students pursue their academic and professional goals [11].
- 4) *Support Systems:* This can be institutional support, other students, and other resources such as mentoring which students can employ in the process of changing advisors [18].

B. Evaluating and Explaining Relevant Theories

To inform our theoretical framework, we draw upon two fundamental models: 1) *Intercultural Competence Framework:* From Deardorff's (2006) cultural competence development model, it is evident that cultural competence is suitable for addressing intercultural relations [13]. It is a model that provides the best understanding of the skills and competence that could be helpful in the process of the team's effective cooperation across/with the cultural divide. Based on the diversity of international students' origin and the cultural implications inherent in advisor-student relations, this can be viewed as a meaningful conceptualization of students' perceptions when they have to face the change of advisors.

2) *Mentor Role Instrument (MRI):* Social network theory informs MRI and highlights the fact that the relationships within the context of mentoring are reciprocal and can encompass various aspects of the participants' lives [11]. Through the studies of aspects like working style compatibility, communication, and research interests, MRI shows us that the circumstances in the occurrence of the advisor change among international engineering students around the globe can be understandable. It highlights the role of cultural competencies in forming solid mentoring

relationships and following the intercultural competence framework, providing a theoretical basis for our project [19].

C. How Our Research Fits into Existing Research

This study aims to contribute to the existing literature by investigating the experiences of international engineering students during academic advisor changes. Even though past investigations are aware of the impact of advisor changes and mentorship, more attention needs to be paid to the experiences of international students in engineering doctoral programs. Using the Intercultural Competence Framework and the Mentor Role Instrument, our study contributes insights into how cultural issues can affect advisor-student relationships and the advisory systems accessible to international students who experience a change in their advisor [20]. Our research contributes to creating appropriate support mechanisms for international students, thus improving their academic achievement and retention in engineering Ph.D. programs.

IV. METHODOLOGY

A. Research Design Overview

Qualitative approaches have been chosen to understand how people's subjective perceptions may impact the adviser-student interaction, which can be complex. Data will be collected through demographic surveys and semi-structured interviews to capture diverse opinions and adjust the study accordingly [20]. Thematic analysis will be used to analyze the data, enabling the identification of patterns and themes within the results and enhancing the understanding of factors contributing to these mentoring relationships [21].

B. Recruitment Process

The study has received all the relevant IRB approvals. The recruitment process for this study has been completed. Fifteen participants were recruited through community outreach, the engineering department, and referrals. The study included students from various U.S. institutions. Recruitment involved emailing international Ph.D. students across engineering disciplines via advising offices. A purposive sampling technique was used to select participants with relevant experiences and insights, focusing on international students. The consent process took place after potential participants expressed interest.

C. Data Collection

Data is collected using two main methods: a demographic survey, which was emailed by the institution's advising department, and semi-structured interviews. The demographic survey gathers basic information such as age, gender, major, home country, year in the program, and relevant experiences. Semi-structured interviews are currently being conducted. We chose to conduct semi-structured interviews due to their flexible nature in gathering detailed information regarding the experiences and opinions of the participants. The selection criteria included students of non-US origin, their status as student visa holders, their educational experiences outside the US, and have switched advisors during their Ph.D. journey.

D. Data Analysis

After the interview process is completed, we will assign pseudonyms to the participants to ensure anonymity. We will use thematic analysis, specifically DEDOSE, to analyze the data and identify patterns and themes through coding, memo writing, and charting. Our analysis will be conducted in two steps. The first step will be deductive, based on the research questions and theoretical framework of the study. The next step will be inductive, aiming to identify emerging themes and patterns in the data. This comprehensive approach will provide insights into advising dynamics through a detailed analysis of the participants' experiences and perspectives, helping us gain a better understanding of the subject [22].

E. Quality and Validity

When research is being conducted, the personal biases and cultural inclinations of the researcher can influence the findings. As an international student, I might have preconceived notions about the experiences of other international students, which could restrict my comprehension of the data. To address this issue, I intend to implement a reflexive approach in my research. This will involve introspection about my perspectives, seeking input from peers and faculty members, and fostering an atmosphere of open discussion and cooperation within the research community.

One potential issue during data analysis is confirmation bias, where an individual may collect data to support their pre-existing beliefs or theories. To avoid this bias, we will use open coding and regularly compare my findings with those of research participants. Additionally, we will maintain memos and reflective journals to document my thought processes during data analysis, which will help me identify instances of confirmation bias and make necessary adjustments. Our individual beliefs and views might influence the data and the interpretation of findings. To address this bias, we will utilize member checking, which involves presenting the findings to participants and seeking their feedback. This will help ensure that the evidence accurately reflects their experiences rather than being influenced by my own experiences.

V. FUTURE WORK

The next steps for this research involve completing the semi-structured interviews for comprehensive data collection, followed by transcribing and analyzing the interview data using both deductive and inductive coding approaches with the DEDOSE software. We will conduct member checking, maintain reflective journals, and address potential biases through peer debriefing. Finally, we will draft manuscripts for academic publication to share the study's insights and implications with the broader research community.

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