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An Engineering Peer Advising Leaders (PALs) Program Expands for Researching Inclusive Student Engagement (RISE)–Work in Progress Paper

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Abstract

A Peer Advising Leaders (PALs) program, initiated in summer 2016 to develop peer advising leadership skills among biomedical engineering student leaders is expanding to integrate research. The program was developed to support new student onboarding and to serve as an extension to the professional academic advisors in the major. Still supporting its initial mission, the PALs programs has successfully trained and cultivated ~45 peer advising leaders, further enhancing student engagement. However, the COVID-19 pandemic necessitated a shift towards more student-centered approaches, prompting the program's evolution into PALs-RISE. PALs-RISE integrates a critical inquiry component, **R**esearching **I**nclusive **S**tudent **E**ngagement **(RISE)**, empowering peer leaders to explore inclusive engagement through critical inquiry and reflection. Maintaining the program's foundational underpinnings - student development and servant leadership theories, the RISE expansion seeks to address: "How can inclusive student engagement in engineering and science be re-imagined, redesigned, and re-framed?"

Using critical incident techniques, PALs analyze their leadership experiences to identify strategies for fostering more inclusivity. This data will inform future PALs program iterations, providing a framework for training student leaders to promote inclusive engagement in their majors and organizations. By merging critical incident research with leadership development, PALs-RISE cultivates leaders capable of addressing post-pandemic engagement challenges and creating equitable learning environments. This Work in Progress (WIP) aims to collaboratively develop evidence-based practices with program directors, academic advisors, educators, and peer leaders, reshaping inclusive engagement in engineering and science post-pandemic.

Introduction

The Peer Advising Leaders (PALs) program, established in 2016, connects engineering students with professional advisors, fostering community and collaborative learning. Founded on principles of student development and servant leadership [1], the program educates, equips, and empowers student leaders to execute in higher learning, cultivating key leadership skills for peer advising [2]. The PALs program has demonstrated success in enhancing student perceptions of academic rigor, problem-solving, and community within the engineering major. However, the COVID-19 pandemic disrupted traditional student engagement, necessitating more student-centered approaches. Recognizing this, the PALs program evolved into PALs-RISE – Peer Advising Leaders Researching Inclusive Student Engagement. PALs-RISE is a leadership and research development program for peer leaders in engineering and science disciplines to investigate inclusive student engagement through critical inquiry technique and critical reflective practices.

The purpose of this Work in Progress (WIP) initiative is to investigate how peer leaders can contribute to re-imagining, re-designing, and re-framing inclusive student engagement in engineering and science disciplines. Inspired by Darroch's [3] assertion that today's students are knowledge workers, PALs-RISE empowers current peer advising leaders to leverage their

leadership experience to research and enhance inclusive student engagement within the engineering and science disciplines. By engaging in critical inquiry and leveraging their problem-solving and reflective skills, these knowledge workers – peer leaders will contribute valuable insights to improve peer and professional advising practices and inform the work of program directors, advisors, and educators in engineering and science majors [3].

Background of the Problem

The COVID-19 pandemic disrupted student networks, strained mental health, and exacerbated existing inequalities in engineering and science education [4]-[6]. This disruption necessitates a re-examination of inclusive student engagement, traditionally a challenge in engineering and science fields [3]. The PALs-RISE initiative aims to redefine "inclusive" student engagement. Inclusive engagement involves active student participation, valuing different voices, and fostering partnerships between students and faculty [7]-[10]. It is crucial for innovation and societal progress in engineering and science fields [5,11]. However, cultural and structural barriers, along with power dynamics, can hinder inclusivity [8,9,12,13]. Rigid curricula, large class sizes, and resource constraints can limit student engagement. To address these challenges, research suggests ensuring diverse representation in leadership and fostering a feedback loop for continuous improvement [14].

Research shows that peer leadership fosters personal growth, interpersonal skills, and a supportive learning environment [15]. Peer leaders often have higher GPAs and better content knowledge [14,15]. They also report a stronger sense of belonging and improved communication skills [15]. Additionally, financial compensation for peer leadership can enhance academic and social outcomes [14,15]. By centering student voices and incorporating research [9,10], the PALs-RISE program will help engineering and science academic advising professionals, program directors, and educators understand how student leaders define inclusive engagement and the support they need to thrive in servant leadership roles [14]. This will ultimately inform the development of future inclusive student engagement initiatives and peer learning spaces.

Traditional peer and near-peer mentoring in engineering often focuses on academic support, social integration, or project-based guidance, with programs varying in formality and structure [21, 22, 24]. While these approaches offer valuable assistance, the PALs program distinguishes itself by explicitly cultivating peer advising leadership skills through critical inquiry and reflective practices [2, 18, 25]. Unlike programs solely aimed at academic tutoring or social acclimation, PALs-RISE empowers students to become active researchers and agents of change within their academic communities. By integrating critical incident analysis and grounding its approach in student development and servant leadership theories, PALs-RISE fosters a deeper understanding of inclusive engagement [1, 10, 21, 25]. This program transcends typical peer support models by developing students who not only guide their peers but also contribute to the evolution of inclusive academic environments, thereby addressing the post-pandemic challenges to student connection in unique and impactful ways.

Theoretical Framework

The PALs-RISE program draws upon key theoretical frameworks, including student development, servant leadership, and critical reflection, to guide its approach [1], [17-20]. Student development theory emphasizes holistic growth through integrated academic, co-curricular, and personal experiences [21,22]. This framework is central to the PALs program, where peer leaders gain knowledge, skills, and confidence through developmental experiences, such as training workshops and peer-to-peer interactions [23]. The program also emphasizes servant leadership, prioritizing the needs of others while fostering the development of both individual and organizational skills [1,20]. Aligned with student development theory, servant leadership emphasizes meaningful interactions and the development of critical leadership competencies, such as active listening and problem-solving [24]. These principles are crucial for cultivating authentic and trusted peer-to-peer connections. Critical reflection, a cornerstone of transformative learning [19], plays a vital role in connecting servant leadership and student development [1,18,19]. By engaging in critical reflection, peer leaders can:

- **Examine their own assumptions and biases:** This helps them understand how their own perspectives might influence their interactions with peers and their ability to foster inclusive environments [19].
- **Analyze their leadership practices**: By reflecting on their successes and challenges, peer leaders can identify areas for growth and refine their servant leadership skills [1,20].
- **Connect theory to practice:** Critical reflection allows peer leaders to connect the theoretical frameworks of student development and servant leadership to their real-world experiences, deepening their understanding and application of these principles [1,19,20,25]
- **Develop self-awareness:** Through reflective practices, peer leaders gain insights into their own strengths, weaknesses, and values [1,19,20]. This self-awareness is crucial for personal and professional growth.

By integrating student development theory, servant leadership principles, and critical reflection practices, the PALs-RISE program aims to cultivate a deeper understanding of peer leadership in engineering and science, empowering students to become effective agents of change and foster more inclusive and equitable learning environments. Cultivating critically reflective and inclusive servant leaders becomes the ultimate legacy of the PALs program and the basis of the RISE expansion [18,19,24].

The RISE Program Expansion Overview

The PALs-RISE program, an expansion of the existing PALs program, integrates critical inquiry research into peer advising leadership development. Current PALs document their experiences in critical incident journals, reflecting on their leadership practices within the context of student engagement and inclusive peer-to-peer interactions. By connecting their service leadership roles with research, PALs contribute valuable data to inform the development of a future iteration of the program. This data will be used to identify research gaps in inclusive student engagement, particularly focusing on how factors such as academic, cultural, social, and economic experiences impact student engagement in engineering and science disciplines.

PALs-RISE Critical Incident Analysis (CIA) Activity

The PALs-RISE program incorporates critical incident analysis as a key research method. Through journal entries, PALs reflect on their experiences, addressing questions such as:

- How does the PALs program impact student engagement and leadership development?
- What specific actions contribute to effective peer leadership and inclusive practices?
- How do specific initiatives impact student perceptions of inclusivity?
- What challenges contribute to feelings of exclusion or disregarding among students?

These reflections encourage peer leaders to connect their experiences to theoretical frameworks, such as servant leadership and student development, while critically examining their own leadership practices. By analyzing these critical incidents, program administrators can gain valuable insights into the challenges and successes of inclusive student engagement initiatives. This data will inform the development of more effective strategies for future peer leaders in engineering and science disciplines. The use of critical incident analysis, as employed in the PALs-RISE program, provides a structured approach for peer leaders to engage in reflective practice [25,26]). By analyzing specific events and their own responses, peer leaders can gain deeper insights into their leadership behaviors, the impact of their actions, and areas for improvement [25]). The critical incident analysis process fosters self-discovery, critical reflection, and community building among peer leaders [19,26].

Future Work

This Work in Progress (WIP) paper provides an exploratory process to integrate a research component, Researching Inclusive Student Engagement (RISE), to an existing Peer Advising Leaders (PALs) program. In the program, peer leaders explore inclusive student engagement through a post-pandemic lens, using a qualitative research approach, critical incident technique, to aid in re-imagining, re-designing, and reframing inclusive student engagement. The PALs-RISE initiative provides a strong foundation for future iterations of the program, focusing on developing research and leadership fellows. To further refine the program and achieve the research goal of re-imagining, re-designing, and reframing inclusive student engagement, the program must explicitly adopt varying student experiences and accessibility principles, while expanding the research scope to include qualitative data from students, academic advisors, and program research professionals.

Future research will prioritize developing robust evaluation and transferability strategies for the PALs-RISE program, ensuring the critical incident technique and reflective journaling approaches can be effectively replicated. To maximize the impact of new data insights on improving peer leadership and fostering inclusive student engagement across engineering and science disciplines, a systematic approach is essential. This includes collaborative pilot testing of the PALs-RISE process with similar programs in other majors, as well as conducting training

workshops to facilitate broader adoption. By focusing on these efforts, we aim to establish PALs-RISE as a model for enhancing peer mentoring and leadership development in STEM fields

Moving forward, key priorities for this Work-in-Progress program include refining the PALs-RISE curriculum to enhance learning experiences and align with specific academic and career goals. To ensure replicability and impact, we will develop a structured framework, encompassing detailed documentation of the RISE process and a best practice guide for implementing critical incident techniques and reflective journaling in similar peer leadership programs. Finally, disseminating research findings across varied networks and scholarly communities will be crucial. By continuing this evidence-based practice and program model, PALs-RISE can evolve into a blueprint for fostering inclusive student engagement and developing the next generation of leaders in engineering and science.

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