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Understanding the Nuances of Peer Mentoring in Different Project Based Learning Settings

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Understanding the Nuances of Peer Mentoring in Different Project Based Learning Settings

Abstract

This study seeks to further contribute to the literature on the effect of the peer mentoring experience on the mentors themselves in various project based learning (PBL) settings. Peer mentoring occurs when an individual with proficiency in a specific field provides support for another individual similar in age or experience level. In particular, peer mentoring in PBL provides an excellent opportunity for student mentees to gain valuable insights from peer mentors with experience working on long term projects. In these roles, peer mentors often directly interact with mentees to provide tailored assistance in the development of both technical and interpersonal skills. Previous research has explored the effectiveness of peer mentoring programs in traditional PBL engineering courses, highlighting a dual role in supporting both the student mentors and mentees' academic and professional growth. Peer mentoring in PBL engineering courses allows mentors to reinforce their knowledge and teach others with additional faculty support. However, there exists a gap in the literature on peer mentoring programs in student-led environments such as student engineering organizations. In PBL student organizations, mentors are able to develop an additional level of autonomy and self-motivation through their management and teaching of peers due to a lack of faculty involvement.

In this study we seek to explore the effect of the peer mentoring experience on the mentors themselves and compare the outcomes for the peer mentors in traditional PBL engineering courses versus PBL engineering student organizations. Specifically, we pose the following research questions:

R1: How do the benefits and challenges for student peer mentors in engineering PBL courses compare to those for peer mentors working in engineering PBL student organizations?
R2: How does the peer mentoring experience influence a student peer mentor's career aspirations in engineering or academia?
R3: How does the difference in program structures (e.g. faculty-supervision, formal training, etc) in engineering PBL courses and student organizations affect peer mentoring outcomes?

By answering these questions, educators, administrators, and leaders of student organizations can implement or improve peer mentoring programs in order to better serve the mentors involved. To accomplish this, we are investigating peer mentoring performed by students across several engineering PBL courses and student organizations at the University of California San Diego. Student peer mentors with experience in either or both settings were asked to respond to a voluntary online survey assessing their role.

Respondents were asked to contextualize their mentoring experience in either a PBL engineering course, student organization, or both, by describing primary responsibilities, time in their role, and structures such as faculty involvement and formal training. Likert scale and open ended response questions were analyzed to understand respondents mentoring experiences. Questions were tailored to address mentor outcomes in their skills and professional development, challenges, interpersonal and mental health impact, and career aspirations. Responses indicate that, while student peer mentors face additional challenges in stress, self confidence, and balancing their commitments, they benefit from a setting in which they are empowered to use their proficiency in a field to educate their peers and further bolster their career aspirations in academia, engineering, or management.

Introduction

Peer mentoring is a pedagogical structure in which a more experienced student works with one of their peers to supplement their learning. Peer mentoring is often used in addition to a more formal education structure, but may have variance in the level of formality of communication between the mentor and mentees [1]. Peer mentoring can enable students to communicate about their learning easier, feel more confident, improve performance, and become more connected with their communities [2, 3]. Within engineering, peer mentoring often occurs in Project Based Learning (PBL) settings. PBL is a pedagogical structure focusing on learning through engaging students through the life cycle of a project from start to finish. This allows students to engage in a hands-on role in their education, but brings challenges not faced in typical instructional settings; students may experience challenges in project management, teamwork and communication, long term motivation, and putting technical knowledge into practice [4]. The use of peer mentorship in PBL environments can help provide more support to students as they navigate this setting [5]. This study aims to further the understanding of how peer mentoring affects the mentors themselves, especially within the different structures of university level engineering PBL courses and student organizations.

Research on peer mentoring demonstrates its role in engineering education, having an impact on students' and mentors' confidence, academic performance and various interpersonal skills [1, 6, 7]. Often, having a person of similar age and experience tutoring a student of less experience has academic benefits as well as mental and interpersonal benefits for both parties. Mentors can feel that their work is rewarding and develop communication and leadership skills [6, 8, 9]. Mentors get an opportunity to practice and develop their technical communication skills while teaching students, an important skill to develop for roles in their field after graduation [7, 10, 11]. While developing their communication skills, mentors also become more confident in their leadership skills, learning to understand what it takes to organize teams, organize project work, teach strategies for productivity and resolve conflicts [7, 8, 9]. Mentors receive an opportunity to work long term with professors, faculty, and students, forming connections that may be very beneficial as they move forward with their career pursuits [2, 12, 13]. This network of academic colleagues,

as well as the opportunity to reinforce and expand their technical skills through project work, can improve a mentor's performance and confidence in academic pursuits [11, 14]. Mentoring roles offer emotional benefits as well by giving mentors confidence and a sense of satisfaction [9, 15].

There are also significant challenges which peer mentors must face in their role as mentors, often taking on a lot of responsibility and work outside of their typical course load. Mentors can easily become overwhelmed with their work as the expectations of their mentees are placed on them [6, 16]. Mentors may also be unsure how much support they should be giving, unclear on the technical knowledge that they need to have and share with their students, or unsure of what level of time commitment they are expected to put into the position [1, 8]. This disparity in expectation may lead mentees to feel that they are under supported, or that their mentors are not available as often as they should be [8]. This may also be caused by loss of motivation in mentoring as the process went on [12]. Mentors are equipped to provide social support as well as academic support, being able to effectively communicate in ways that students may be more receptive to [11]. However, unclear expectations may also lead to mentees loading emotional concerns on the mentors which may be beyond what they are prepared to support [17, 18]. Mentors may also lose confidence in their teaching, having different expectations than the mentees regarding the mentors' technical knowledge and skill sets [16, 19]. These issues may stem from lack of faculty or professor support and lack of training for the mentoring role [7].

Extensive literature exists exploring how student mentors are impacted by peer mentoring structures in PBL engineering courses. However, there is a gap in the literature discussing how peer mentors in PBL student organizations are impacted by their role. This study conducted at the University of California San Diego seeks to contribute to addressing this gap by analyzing student mentors' experiences in PBL engineering courses compared to PBL engineering student organizations. By examining this setting, we hope to improve resources and practices regarding peer mentoring and PBL settings in engineering, while also informing students about the nuances of the peer mentoring experience so they may make informed decisions on investing their time.

The research questions in this study are:
R1: How do the benefits and challenges for student peer mentors in engineering PBL courses compare to those for peer mentors working in engineering PBL student organizations?
R2: How does the peer mentoring experience influence a student peer mentor's career aspirations in engineering or academia?
R3: How does the difference in program structures (e.g. faculty-supervision, formal training, etc) in engineering PBL courses and student organizations affect peer mentoring outcomes?

Method

Students at the University of California San Diego were asked to participate in a voluntary online survey assessing the outcomes of their experiences in engineering PBL peer mentor roles. The

survey asks students to identify as a peer mentor for an engineering PBL course, student organization, or both, at the university. This includes roles in which the student is engaging in teaching or otherwise guiding their peers through the project process. After this initial indication, respondents were asked to contextualize their role as a mentor. This includes brief descriptions of time spent in the roles, primary responsibilities, and mentoring structures such as training and faculty involvement. Likert scale questions on a 5 point scale were asked to address the impact of mentoring on respondents' skills and professional growth, challenges in their roles, and interpersonal and mental health. For each section of Likert scale questions, respondents had the opportunity to provide an open ended response to elaborate on their ratings.

Respondents were then asked to provide a final open ended response to the question "How has the mentoring experience influenced your career aspirations in engineering or academia?". If a respondent indicated that they had participated in both course and student organization mentoring roles, they were asked to fill out this survey for both settings. A total of 21 responses were received, with 9 responses indicating a mentoring role in engineering PBL courses, 10 responses for engineering PBL student organizations, and one response indicating participation in both roles. Likert scale results were evaluated to identify comparisons in response trends between the two mentoring settings. Open-ended responses were thematically analyzed using coding in ATLAS.ti to highlight nuances in the responses.

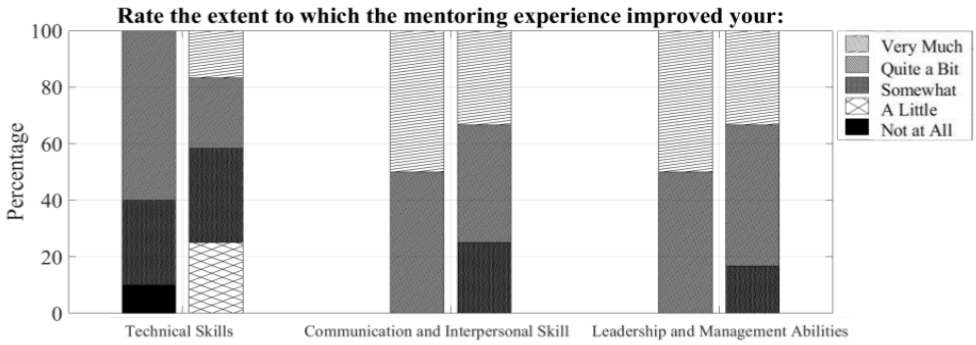
Results and Discussion

R1: How do the benefits and challenges for student peer mentors in engineering PBL courses compare to those for peer mentors working in engineering PBL student organizations?

Analysis of the benefits section of Likert scale questions indicate that mentoring experiences in both PBL courses and student organizations led to improvements in technical skills, communication and interpersonal skills, and leadership and management abilities. However, slightly higher standard deviations across all three categories from student organization peer mentors indicate slightly more varied experiences from those of the course mentors.

Rate the extent to which the mentoring experience improved your …: (1 = Not at All, 5 = Very Much)			
Displaying: Mean (STD)	Technical Skills	Communication and Interpersonal Skills	Leadership and Management abilities
Course (N=10)	3.400 (0.966)	4.500 (0.527)	4.500 (0.527)
Student Organization (N=11)	3.333 (1.073)	4.083 (0.792)	4.166 (0.717)

Box 1: Table providing mean (standard deviation) of perceived ratings of benefits for mentors in PBL courses (N=10) and student organizations (N=11).



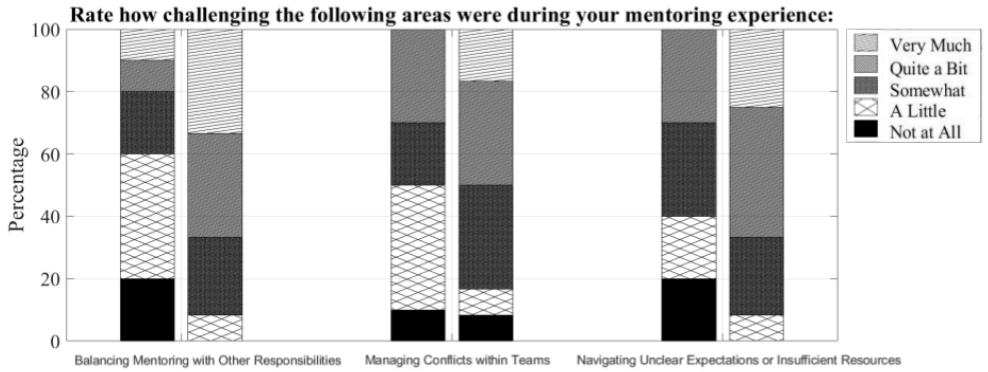
Box 2: Bar chart showing distribution of 5-point Likert scale responses on perceived benefits for student peer mentors in PBL courses (left bars, N=10) and PBL student organizations (right bars, N=11).

Qualitative responses from mentors give insight into the nuances of skill development in these roles. While mentors in both settings reflected technical skill improvement overall, responses from student mentors in a course setting suggest reinforcement of these skills while mentors in student organizations indicated development of new technical skills from their role. One respondent discussed developing machine shop skills in their organization, stating, *"Through workshops, I was able to learn how to use some of the machines in the makerspace. Most notably, I consider myself proficient in CAD and able to use the laser cutters efficiently."* The most common code identified for student organizations was developing management/leadership skills (6 codes). In responses for course peer mentors, the skill development was more equally spread, with the most common being communication (6 codes) and teaching (5 codes).

Likert scale results regarding challenges indicated that student peer mentors in student organizations may face larger amounts of challenges compared to those in courses. shown in both the mean ratings and distribution of results shown in boxes 3 and 4. Balancing mentoring with other responsibilities was significantly more challenging for student organization mentors than for course mentors. Similarly, managing conflicts within teams and navigating unclear expectations or insufficient resources were reported as more difficult for mentors in student organizations compared to courses. However, the standard deviation and distribution of results indicate a high amount of variability in experiences for both mentoring scenarios.

Rate how challenging the following areas were during your mentoring experience: (1 = Not at All, 5 = Very Much)			
Displaying: Mean (STD)	Balancing Mentoring with Other Responsibilities	Managing Conflicts within Teams	Unclear Expectations or Insufficient Resources
Course (N=10)	2.500 (1.269)	2.700 (1.059)	2.700 (1.159)
Student Organization (N=11)	3.916 (0.996)	3.416 (1.164)	3.833 (0.937)

Box 3: Table providing mean (standard deviation) of perceived ratings of challenges for mentors in PBL courses (N=10) and student organizations (N=11).



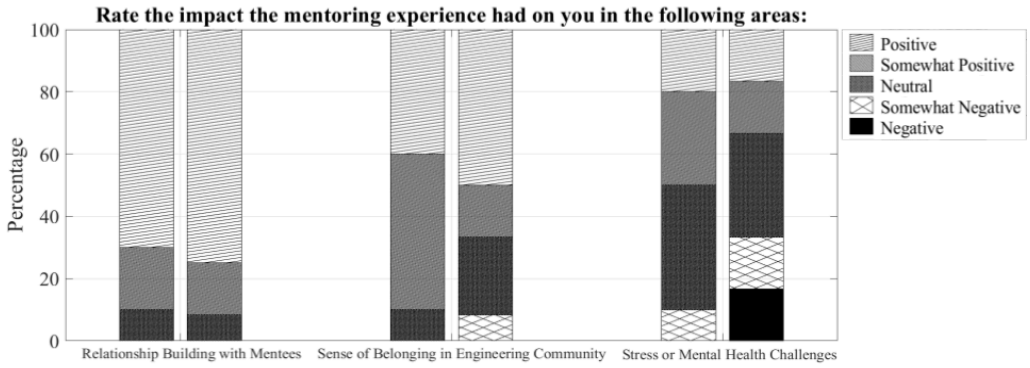
Box 4: Bar chart showing distribution of 5-point Likert scale responses on perceived challenges for student peer mentors in PBL courses (left bars, N=10) and PBL student organizations (right bars, N=11).

Responses from student organization peer mentors indicate struggling with confidence in their role and having challenges with their level of technical knowledge. One respondent said, *"I (personally) struggled a lot with fitting in and feeling like I deserved to be a leader - I had a lot of good leadership skills but struggled with technical knowledge"* addressing that the technical knowledge that engineering projects demand can be challenging for peer mentors. Mentors in PBL courses discussed having challenges with managing their workload and team conflicts with the students they mentored. The most common challenges identified in responses from organization mentors were technical knowledge (5 codes) and workload/time management (4 codes). Course mentors' most common challenges identified were workload/time management (4 codes) and team conflict (3 codes).

Comparisons of the interpersonal and mental health impact of the mentoring experiences indicates a general positivity from both course and student organization mentors. Results indicate that in both mentoring scenarios, students can expect to foster relationships with their mentees and the greater engineering community. However, the impact of mentoring on stress or mental health challenges varied with a high distribution between groups, with course mentors indicating slightly more positive mean results.

Rate the impact the mentoring experience had on you in the following areas: (1 = Negative, 3 = Neutral, 5 = Positive)			
Displaying: Mean (STD)	Relationship Building with Mentees	Sense of Belonging in Engineering Community	Stress or Mental Health Challenges
Course (N=10)	4.600 (0.699)	4.300 (0.674)	3.600 (0.966)
Student Organization (N=11)	4.666 (0.651)	4.083 (1.083)	3.000 (1.348)

Box 5: Table providing mean (standard deviation) of perceived ratings of challenges for mentors in PBL courses (N=10) and student organizations (N=11).



Box 6: Bar chart showing distribution of 5-point Likert scale responses on perceived challenges for student peer mentors in PBL courses (left bars, N=10) and PBL student organizations (right bars, N=11).

Mentors' responses regarding the mental health impact of their role point to a very nuanced experience. A large number of mentors discussed how they made friends and bonded with their community through their role, in both courses and student organizations. However, they also say that mentoring is very stressful and demanding on their mental health. One student organization mentor noted, *"While I build great relationships and felt a sense of belonging with most of my peers and mentees, it was pretty taxing, in particular dealing with interpersonal conflicts. This is ultimately what led to me taking a step away from a leadership position.*" Comments sharing similar sentiments were more often expressed among student organization peer mentors, with four out of six open-ended responses indicating feeling stressed or overwhelmed by their position; contrarily, only one of five open-ended responses for peer mentors in courses indicated similar stresses. However, all of these statements were clarified in similar manners to the above, with students stating that their overall experience was enjoyable and allowed them to feel a part of the engineering community. Overall, student organization peer mentors discussed building social connections and increased stress (6 codes each), followed by noting a negative impact on, or due to confidence (4 codes). These respondents said they had challenges with confidence about their own skills for their role. Responses from course peer mentors mentioned stress much less (1 code), instead mentioning the positive mental impacts of increased social connections (5 codes) and confidence (3 codes).

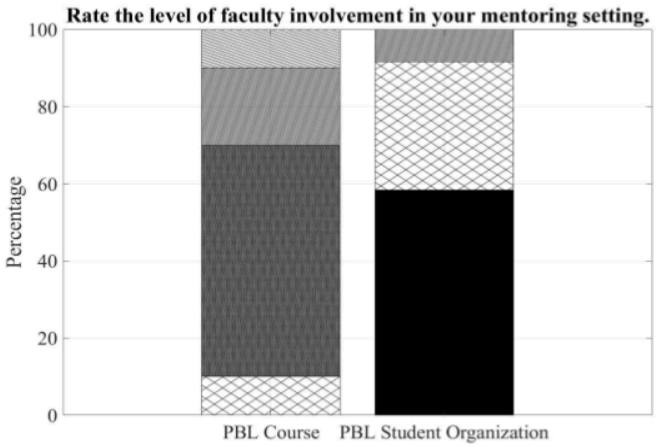
R2: How does the peer mentoring experience influence a student peer mentor's career aspirations in engineering or academia?

Both course and organization mentors expressed an impact on their career aspirations from their mentoring experience, sharing a common sentiment that their role reinforced their career interests. Five responses from course peer mentors indicated an interest in pursuing a career in academia or teaching after their role as a peer mentor. One respondent stated, *"It has made me far more sure of myself in regards to being able to actually get a job in the field of engineering, as it was my first non-entry-level job. It has also made me far less afraid of ending up in a more managerial role during the course of my career, as mentoring has greatly improved my*

interpersonal skills to the point where I feel I could actually be quite good at a leadership role." In a similar vein, 9 student organization peer mentors indicated an interest in pursuing a career in an engineering management or other leadership position due to their roles. A student organization peer mentor states, *"[...] I realized how much better off I was working on a team, both as a leader and member, and now strive to find a career that will put me working on a team, as well as having the growth potential to let me lead a team as well."*

Some mentors noted that their mentoring role influenced them to change their career interests or take a step away from leadership roles. For example, one organization mentor commented, *"It helped me realize what type of work I could expect to do as a manager and as an engineer in the field I was mentoring for and gave me a good idea of whether or not this was a career I want to pursue. Thanks to that experience I realized that I wanted to focus on other things instead."* This sentiment was not shared among course peer mentors, which could indicate that additional challenges present in mentoring for student organizations can be overwhelming for some students. Overall, the majority opinion of respondents in the survey is that the mentoring experience positively impacts their future career aspirations by providing additional guidance to roles that they may enjoy.

R3: How does the difference in program structures (e.g. faculty-supervision, formal training, etc) in engineering PBL courses and student organizations affect peer mentoring outcomes?
Likert scale ratings indicate a significantly higher level of faculty involvement for mentors in course than for mentors in student organizations. However, elaborations on the level of faculty involvement for courses comment that faculty mostly operated in an overseeing manner rather than directly involved in weekly engagement in the student projects. Most respondents saw this as a benefit by being able to rely on faculty if needed, but being able to maintain confidence in their role and authority; one course mentor responded, *"Although as a new mentor I needed help at times, I felt that the lack of faculty made it easier for students to open up within the space as I was one of their peers. As the immediate person in charge, I felt more confident that I would be listened to as well."* Mentors in student organizations shared similar sentiments. However, some student organization mentors indicated a frustration with issues typically handled by faculty members in PBL courses: *"Currently, I would argue students have to navigate the management of student organizations as if they were their own independent businesses, which is [not] a recipe for success without more resources and oversight from the university."*



Displaying: Mean (Standard Deviation)	
Course	Student Organization
Rate the level of faculty involvement in your mentoring setting. (1 = None, 5 = Extensive)	
3.300 (0.823)	1.583 (0.900)

Box 7: Comparison of perceived faculty involvement in PBL courses and PBL student organizations. Bar chart shows distribution of responses across a 5-point Likert scale. Table provides mean (standard deviation) of ratings.

Three respondents indicated that they had received formal training for their mentoring role in a course, while none of the respondents in student organizations indicated that they had received formal training for their mentoring role. For courses some respondents indicated that the extent of their training was mostly informal, relying on other peer mentors with prior experience as well as weekly meetings with faculty. This sentiment was shared by peer mentors in PBL student organizations, who learned how to operate through previous mentors or collaborations with other current mentors. A mentor for a PBL course stated, *"Early on it was a bit frustrating, but I think the model contributed well to getting me to be more independent and develop teaching and leading skills."* Similar sentiments were shared by mentors in PBL student organizations, with students feeling that the lack of training can be daunting but a strong way to promote self growth.

Limitations of the Study

While the study provides some insights into the nuances of the peer mentoring experience in PBL courses and student organizations, some limitations must be addressed alongside with the results. The data collected in this study is entirely self-reported and based on the individual perceptions of the student completing the survey. One student's experience in a mentoring role does not define the experience other mentors may have, including what constitutes faculty involvement, formal or informal training, or other experiences while in their role as a mentor. Additionally, respondents were not required to indicate the specific course or student organization they mentored for, as well as the specifics of the project their course or organization aims to complete. This introduces some additional ambiguity to the results of the study as mentors can have different experiences between various courses or student organizations. The survey also obtained 21 total responses; a larger sample size would allow for a wider amount of student voices and experiences to be obtained and analyzed.

Conclusion

In this study, engineering student peer mentors at the University of California San Diego were surveyed on their experiences in PBL courses and student organizations. Responses indicate that both settings offered students the opportunity to improve or reinforce their technical skills, communication, leadership, relationship building, and development of a sense of identity as a member of the engineering community. Mentors in both settings also felt that their experiences provided guidance in their future career interests, especially in academia, engineering, or leadership and management roles. While both scenarios have challenges, responses indicate that mentors in student organizations may face more adversities due to a lack of formal structures provided by faculty guidance. However, by empowering peer mentors with greater authority in the instruction of the project, mentors can further their self growth working through these challenges. By illuminating the benefits and challenges associated with peer mentoring programs in various settings, this study equips students to make more informed choices on where to invest their time at university. Additionally, it provides a basis for faculty, administrators, and coordinators of peer mentoring programs to re-examine the support structures for their mentors and seek action to further improve these experiences.

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Appendix

Survey Questionnaire Used in this Study:

Section 1: Information and Consent for Participation

Thank you for your interest in participating in this study! This survey is conducted by the Engineering Pedagogy and Design Lab at UC San Diego, investigating the impact of peer mentoring experiences in engineering. Specifically, in this study we are aiming to understand how peer mentoring in engineering project-based learning (PBL) environments such as courses and student-led engineering organizations influences the mentors' skills, professional growth, and career aspirations.

Your responses will provide valuable insights that may help educators and student organization leaders improve mentoring programs to better support mentors. Participation in this survey is voluntary, and you may choose to stop at any time without penalty. Each section of the survey will have a short description with more information on how to respond.

All responses will remain confidential and will only be used for research purposes. No personally identifiable information will be linked to your responses. If you have any questions regarding your responses please feel free to email undergraduate researcher Richard Vallejo Jr at revallejo@ucsd.edu.

By proceeding with the survey, you acknowledge that:

- You have read and understood the purpose of this study.
- You voluntarily agree to participate in this survey.
- You understand that your responses will remain confidential.

□ "I agree to voluntarily participate in this survey. I understand that my responses will remain confidential and will be used only for research purposes."

Section 2: Identification

Peer mentoring in project-based learning (PBL) involves experienced students providing guidance, support, and knowledge to their peers as they work on long-term, hands-on projects. In engineering, two common forms of this mentoring dynamic can be seen in:

1. Project-Based Courses
2. Project-Based Student Organizations

Q.2.1 Which of the following roles have you been involved with as a mentor at UCSD?

□ A: Tutor, Reader, TA, or otherwise assisting in an engineering PBL course

□ B: Student Leader, Mentor, or similar title in an engineering PBL student organization

□ C: Both

Section 3: Peer Mentoring in Engineering PBL Courses (Answer only if you have answered A or C to question Q.2.1)

This section focuses on your experiences as a peer mentor in a project-based engineering course. Please answer the questions based on your mentoring role, the support provided, and your overall

experience in this setting. If you have mentored in multiple quarters/semesters of the course, you may consider your overall experience when responding.

Subsection 1: Context

Q.3.1.1 How many quarters have you served as a peer mentor?

□ 1 □ 2 □ 3 □ 4 □ 5+

Q.3.1.2 Briefly describe your primary responsibilities as a mentor. (Open-ended)

Q.3.1.3 Rate the level of faculty involvement in this mentoring setting. (1=None, 5 = Extensive).

□ 1 □ 2 □ 3 □ 4 □ 5

Q.3.1.4 How did faculty involvement, or lack thereof, influence your mentoring experience? (Open-ended)

Q.3.1.5 Did you receive formal training for your mentoring role?

□ Yes □ No

Q.3.1.6 Please briefly describe any training you have received. (Open-ended)

Subsection 2a: Skills and Professional Growth

For the following questions, rate the extent to which mentoring in this organization improved your: (1= Not at All, 5 = Very Much)

Q.3.2a.1 Technical skills (e.g., engineering design, problem-solving, etc.)

□ 1 □ 2 □ 3 □ 4 □ 5

Q.3.2a.2 Communication and interpersonal skills

□ 1 □ 2 □ 3 □ 4 □ 5

Q.3.2a.3 Leadership and management abilities

□ 1 □ 2 □ 3 □ 4 □ 5

Q.3.2a.4 Elaborate on any of the above ratings regarding Skills and Professional Growth (Open-ended)

Subsection 2b: Interpersonal and Mental Health Impact

For the following questions, rate the impact of mentoring in this organization on the following areas: (1= Negative Impact, 5 = Positive Impact)

Q.3.2b.1 Building relationships with mentees

□ 1 □ 2 □ 3 □ 4 □ 5

Q.3.2b.2 Sense of belonging in the engineering community

□ 1 □ 2 □ 3 □ 4 □ 5

Q.3.2b.3 Stress or mental health challenges

□ 1 □ 2 □ 3 □ 4 □ 5

Q.3.2b.4 Elaborate on any of the above ratings regarding Interpersonal and Mental Health Impact (Open-ended)

Subsection 2c: Other Challenges

For the following questions, rate how challenging the following were during your mentoring experience: (1= Not at all, 5 = Very)

Q.3.2c.1 Balancing mentoring responsibilities with other academic or personal commitments

□ 1 □ 2 □ 3 □ 4 □ 5

Q.3.2c.2 Managing conflicts within teams

□ 1 □ 2 □ 3 □ 4 □ 5

Q.3.2c.3 Navigating unclear expectations or insufficient resources

□ 1 □ 2 □ 3 □ 4 □ 5

Q.3.2c.4 Elaborate on any of the above ratings regarding Other Challenges (Open-ended)

Subsection 3: Reflection

Q.3.3 How has the mentoring experience influenced your career aspirations in engineering or academia? (Open-ended)

Section 4: Peer Mentoring in Engineering PBL Student Organizations (Answer only if you have answered B or C to question Q.2.1)

This section focuses on your experiences as a peer mentor in student-led engineering organizations. Please answer the questions based on your mentoring role, the level of support available, and your overall experience in this setting. If you have mentored in multiple organizations, you may reflect on your overall experience when answering.

Subsection 1: Context

Q.4.1.1 How many quarters have you served as a peer mentor?

□ 1 □ 2 □ 3 □ 4 □ 5+

Q.4.1.2 Briefly describe your primary responsibilities as a mentor. (Open-ended)

Q.4.1.3 Rate the level of faculty involvement in this mentoring setting. (1=None, 5 = Extensive).

□ 1 □ 2 □ 3 □ 4 □ 5

Q.4.1.4 How did faculty involvement, or lack thereof, influence your mentoring experience? (Open-ended)

Q.4.1.5 Did you receive formal training for your mentoring role?

□ Yes □ No

Q.4.1.6 Please briefly describe any training you have received. (Open-ended)

Subsection 2a: Skills and Professional Growth

For the following questions, rate the extent to which mentoring in this organization improved your: (1= Not at All, 5 = Very Much)

Q.4.2a.1 Technical skills (e.g., engineering design, problem-solving, etc.)

□ 1 □ 2 □ 3 □ 4 □ 5

Q.4.2a.2 Communication and interpersonal skills

□ 1 □ 2 □ 3 □ 4 □ 5

Q.4.2a.3 Leadership and management abilities

□ 1 □ 2 □ 3 □ 4 □ 5

Q.4.2a.4 Elaborate on any of the above ratings regarding Skills and Professional Growth (Open-ended)

Subsection 2b: Interpersonal and Mental Health Impact

For the following questions, rate the impact of mentoring in this organization on the following areas: (1= Negative Impact, 5 = Positive Impact)

Q.4.2b.1 Building relationships with mentees

□ 1 □ 2 □ 3 □ 4 □ 5

Q.4.2b.2 Sense of belonging in the engineering community

□ 1 □ 2 □ 3 □ 4 □ 5

Q.4.2b.3 Stress or mental health challenges

□ 1 □ 2 □ 3 □ 4 □ 5

Q.4.2b.4 Elaborate on any of the above ratings regarding Interpersonal and Mental Health Impact (Open-ended)

Subsection 2c: Other Challenges

For the following questions, rate how challenging the following were during your mentoring experience: (1= Not at all, 5 = Very)

Q.4.2c.1 Balancing mentoring responsibilities with other academic or personal commitments

□ 1 □ 2 □ 3 □ 4 □ 5

Q.4.2c.2 Managing conflicts within teams

□ 1 □ 2 □ 3 □ 4 □ 5

Q.4.2c.3 Navigating unclear expectations or insufficient resources

□ 1 □ 2 □ 3 □ 4 □ 5

Q.4.2c.4 Elaborate on any of the above ratings regarding Other Challenges (Open-ended)

Subsection 3: Reflection

Q.4.3 How has the mentoring experience influenced your career aspirations in engineering or academia? (Open-ended)

Section 5: Demographics and Background

In this section, we aim to gather information about your academic background and demographic details to better understand the diversity of experiences among peer mentors. Your responses are optional and will remain confidential, used solely for research purposes. Please answer to the extent you feel comfortable.

Q.5.1 What academic level were you when you served as a mentor?

□ Undergraduate □ Master's □ PhD □ Other □ Prefer not to say

Q.5.2 What is your major?

□ _____ □ Prefer not to say

Q.5.3 What is your gender?

□ Male □ Female □ Non-binary □ Other:_____ □ Prefer not to say

Q.5.4 Please select all ethnicities that you identify with.

□ Hispanic or Latino □ White □ Black or African American □ Asian

□ American Indian or Alaska Native □ Native Hawaiian or Other Pacific Islander

□ Middle Eastern □ Prefer not to say

Q.5.5 Do you identify as a First Generation student?

□ Yes □ No □ Prefer not to say

Thank you for reaching the end of the survey. If you are open to being contacted for potential follow-up questions or updates about this research, please provide your name and email below. Providing this information is completely optional and will not affect your participation or responses in any way. Your information will remain confidential, unlinked to your responses, and will only be used for research purposes.

Q.5.6 Full Name _____

Q.5.7 Email _____

Q.5.8 Please ensure your information above is correct and that you agree to the following consent.

□ "I am comfortable being contacted for follow-up questions or updates about this research."

Thank you for taking the time to complete this survey! Your responses are invaluable to our research and will help improve peer mentoring programs in engineering. If you have any questions please feel free to contact Undergraduate Researcher Richard Vallejo Jr at revallejo@ucsd.edu.