# The influence of a Peer Assisted Learning program on the career readiness of its student facilitators

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**Abstract.**

Peer-led supplemental instruction programs have proven effective by a wide variety of measures, and a strong body of literature supports the academic and non-academic benefits enjoyed by the peer educators themselves. Here, we present quantitative and qualitative survey results from 158 former peer educators in a STEM-focused program at a large regional university. We find that participants overwhelmingly credit their experience as a peer educator with helping develop the workplace skills necessary for success in their careers. Moreover, we map specific experiences within the peer educator role to specific career competencies identified by the US-based National Association for Colleges and Employers. This analysis, new to the literature, helps answer not just whether the peer educator experience develops student employability post-graduation, but how it does so.

## Introduction.

This paper studies the specific aspects of student employment in an academic support program and their relation to a set of established career readiness skills. "PALumni" are graduates of California State University, Sacramento who were employed by the Peer Assisted Learning (PAL) program as Facilitators during their undergraduate years. While their primary job duty was leading problem-solving workshops for other students in gateway STEM courses, the rich programmatic structure exposed these Facilitators to a number of social and academic experiences which may benefit them in the workforce after graduation.

Here, we present and analyze the results of a large PALumni survey which map these experiences onto eight "career readiness competencies" developed by the US-based National Association of Colleges and Employers; see Methods for details. While there is substantial literature demonstrating that student employment in similar programs provides workplace skill development, our primary goal here is to tease out exactly which aspects of this employment developed exactly which skills. See Tables 5-7 and Figures A1-A8. We also present results relating to employment status, employment industry, and the roles of the different PAL experiences in obtaining employment and career success. See Tables 1-4 and Figures A9-A10. Among other interesting results, we find that 94% of PALumni agreed that PAL "helped me get a job."

This work is particularly timely given recent mass media reports on fears that many new graduates are not employable due to a lack of soft skills (Blake, 2025; Elting, 2024). Interestingly, Bridgstock and Tippett (2019) suggest that peer educators, serving as academic support staff, may themselves positively impact the employability of their own students. Moreover, universities are beginning to take a deeper

interest in the employability of their graduates (Cheng et al., 2022; Kift, 2019; Smith et al., 2018), and the California State University system itself has recently announced a pivot toward career readiness in its core mission (Watanabe, 2024). Thus, this paper provides evidence that hiring students into academic supplemental support roles aligns well with the needs of both universities and employers.

## The Sacramento State PAL program.

California State University, Sacramento, also known as Sacramento State, is a large, urban, public university, enrolling over 31,000 students annually. It is one of 23 campuses in the California State University system, the largest and most diverse public university system in the United States. Sacramento State holds a number of government-defined demographic designations, such as Asian American and Native American Pacific Islander-Serving Institution, Black-Serving Institution, and Hispanic-Serving Institution; it was ranked the second most diverse college in the Western US by the Wall Street Journal (2023). It is also a designated Primarily Undergraduate Institution, offering Masters degrees and some doctorates, but not PhDs.

The PAL program at Sacramento State employs approximately 50 undergraduate students every semester in the role of PAL Facilitator with union-represented employment status. They are hired to support students in one of approximately 17 courses in Biology, Chemistry, Mathematics, and Physics, all of which suffer from low pass rates. The Facilitator was previously successful in the course. They are paid eight hours per week to lead a PAL workshop, hold office hours, and attend lectures for the course they support.

Leading their own PAL workshop is a Facilitator's most important responsibility, and follows a strict pedagogical model, based on the peer-led team learning (PLTL) structure, a type of supplemental instruction. Students in the parent course can choose to enroll in this workshop, which meets twice weekly for 50 minutes each. Enrolled students earn one unit of course credit, and are graded on a credit/no credit basis according to attendance and participation only. In the workshop, students work in small groups at whiteboards solving problems from worksheets written by Sacramento State course faculty. The Facilitator does not teach, tutor, or even confirm answers. They ensure that groups are on task and all members are participating. When groups are stuck, Facilitators ask guiding questions to get groups back on track. For more details on the PAL model, see Lundmark et al. (2017), Shanbrom et al. (2023), or the program website (www.csus.edu/pal).

By nature of their position as peer support, Facilitators serve as mentors and role models for their students. However, they are exposed to a number of other relevant experiences in addition to those described above and included in the traditional PLTL model as described in Gosser et al. (2001), or those offered by other supplemental instruction programs in general. First, in addition to the employment arm, the program has an academic component: a two-unit graded course, NSM 197, Honors Seminar in Peer Learning. In this course, students study and hone pedagogical methods and complete additional professional development. Most importantly, they complete year-long action research projects of their own design. Following the backwards design model (Wiggins & McTighe, 2005), Facilitators design (in the Fall) and implement (in the Spring) interventions in their classrooms, collect and analyze data, and present a poster at a public symposium.

Second, the Sacramento State PAL program has a unique tiered leadership structure: Facilitators can be promoted to Lead Facilitator for their specific course (which entails mentoring new Facilitators, working

closely with course faculty, organizing recruitment and classroom announcements, and communicating both horizontal and vertically) or further to Supervisory Facilitator for a specific discipline (which entails mentoring Leads, working closely with PAL faculty and staff, observing Facilitators, designing training, and organizing office hours and events). Third, Facilitators have the option of joining one of three grant-supported professional development tracks: the Cultural Competency Ambassadors, the Leadership Development Team, or the Research Activity Discussion Group. In these capacities Facilitators may develop trainings for NSM 197, analyze data or literature on peer instruction, or organize events like mock job interviews, visits from local community colleges, or cultural fairs. Fourth, experienced Facilitators are deeply involved in the recruiting, interviewing, and hiring of new applicants. Finally, the program enjoys a unique community culture which centers student leadership. Teams of Facilitators regularly travel with program faculty to national conferences and present on the program and their research. Supervisory Facilitators organize intramural sports teams as well as regular parties and celebrations both on and off campus. Office hours are held in a dedicated complex of offices where faculty and staff rarely venture, affording a third space on campus for PAL Facilitators and students. More details can be found in Akhavan et al. (2025) and the program website (www.csus.edu/pal).

## Background.

There exists a rich literature on the non-academic benefits enjoyed by peer educators. The extensive bibliography of Arendale (2022) contains 266 papers under the heading "Facilitator and participant report of personal and professional development" and 90 papers under the heading "Future vocation influence for facilitators/participants." Obviously it is not possible to summarize all these findings here, however we will explore some of the most relevant articles and explain how our work fills an important gap in the literature.

In particular, most of the literature focuses on the peer educator experience holistically, while we tease apart the specific aspects of this position as experienced by the peer educator independently. Similarly, much of the literature concerns "soft skills" or "workplace skills" in general, while we home in on a specific list of these skills with specific definitions of each. Combining these two, we believe we are the first to attempt to connect specific experiences inherent in the Facilitator role to specific skills beneficial in the workforce. That is, we attempt to determine not just *whether* PAL helps students prepare for careers, but *how.* Lastly, the literature covers a vast array of peer instruction programs, some of which follow national standards (e.g. Supplemental Instruction, Learning Assistants, PLTL), while the PAL program studied here enjoys certain unique traits (see above) which may develop skillsets not present in other peer programs.

While it differs in many important ways from the classical model (Gosser et al., 2021), the Sacramento State PAL program is indeed pedagogically based on PLTL, and exploring this literature is a good starting point. The most significant contribution related to our work is that of Gafney and Varma-Nelson (2008). Chapter 6 of this book contains a study of former peer leaders with the intent of measuring benefits enjoyed by peer leaders. The results are impressive and this study helped develop our methodology, but there are a few important distinctions. The leaders surveyed in their study worked between 1995 and 2004, while ours all graduated between 2014 and 2024 and the specific experiences focused on are primarily academic while ours are primarily non-academic. More importantly, their outcomes measured impact on learning and personal benefits (confidence and appreciation for teaching) with nothing

specific to employability, career readiness, etc. However, some workplace skills (e.g. communication) are mentioned by respondents in the open-ended questions about people skills.

Table 1 of Chase et al. (2021) includes a summary of papers studying benefits enjoyed by PLTL leaders, but while not content-specific, most of the benefits described are still academic in nature. This paper itself reports on interviews with 10 former PLTL leaders about the transferable skills developed and is a nice complement to our larger but more quantitative study.

Other relevant and interesting papers abound. In PLTL alone, peer leaders in computer science developed communication and leadership skills (Hug et al., 2011); peer leaders in general chemistry increased confidence and leadership (Stewart et al., 2007); peer leaders in biology and chemistry improved their "people skills" (Tenney & Houck, 2004). See Table 4 of Wilson and Varma-Nelson (2016) for even more examples.

# Methods.

### Subject database.

We began by compiling a large database of PALumni: to the best of our knowledge every student employee who worked for the program between the Spring 2012 and Spring 2024 semesters. We removed any individuals who had not graduated from Sacramento State by the end of the Spring 2024 semester. This list contained 379 individuals. We also created a LinkedIn (2025) page for PALumni, with over 150 members, which may enhance employability itself (Bridgstock & Tippett, 2019) but which falls outside the realm of this study.

We then obtained as many email addresses as possible for each individual (1-5 per person), taken from every source available to us. These sources included their official university email address when employed, but the vast majority of these were inactive. Non-university email addresses were obtained from the initial job application, LinkedIn, and two university databases (student center and advising software). A small number were added from the program faculty's personal correspondence with PALumni. We ended with 690 emails addresses for these 379 subjects.

When sending the survey, we found that 177 emails bounced (163 of which were defunct official university addresses). The bounces included the sole known addresses of six subjects. Thus the survey presumably reached 373 individuals at 513 email addresses.

### Survey design.

We built a comprehensive survey using Qualtrics software. Subjects were sent the initial solicitation email with survey link on September 4, 2024, with reminder emails sent and LinkedIn reminder posts on October 7 and 14. The survey closed on October 16. Responses were anonymous and limited to one response per IP address. We requested that each individual only take the survey one time, and only if they had graduated. Respondents were not required to answer all questions, and incomplete

responses were included (except 6 which were completely blank). We estimated 15 minutes to complete the survey. The entire project, including the survey itself and solicitation email, was approved by our institutional review board process.

The survey itself began with an informed consent form, then two parts. Part 1 contained 13 questions focused on the relationship between respondents' experiences within the PAL program and workplace skills. Specifically, we asked respondents to rank on a Likert scale the extent to which different PAL experiences helped them develop each of the different "Career Readiness Competencies" identified by the US-based National Association of Colleges and Employers (NACE). The precise wording of each question appears on the corresponding figure in the Results and Appendix A. Part 1 also contained open response questions meant to identify other meaningful PAL experiences and workplace skills which were not included in our lists.

The eight NACE Career Readiness Competencies are displayed in Table 1 along with the short descriptions included in the survey. For brevity, in our tables we abbreviate certain competencies by the word in brackets. Detailed descriptions of these competencies can be found on NACE Career Readiness website (National Association of Colleges and Employers, 2025); a link to the complete descriptions was included in the survey as well. An extensive report on the development and validation of these competencies is also available, which includes the theoretical underpinnings of this list (National Association of Colleges and Employers, 2022).

***Table 1. The eight NACE career readiness competencies***

| **Competency** | **Description** |
|---|---|
| Career and Self-Development [Development] | Proactively develop oneself and one's career through continual personal and professional learning, awareness of one's strengths and weaknesses, navigation of career opportunities, and networking to build relationships within and without one's organization. |
| Communication | Clearly and effectively exchange information, ideas, facts, and perspectives with persons inside and outside of an organization. |
| Critical Thinking | Identify and respond to needs based upon an understanding of situational context and logical analysis of relevant information. |
| Equity and Inclusion [Equity] | Demonstrate the awareness, attitude, knowledge, and skills required to equitably engage and include people from different local and global cultures. |
| Leadership | Recognize and capitalize on personal and team strengths to achieve organizational goals. |
| Professionalism | Knowing work environments differ greatly, understand and demonstrate effective work habits, and act in the interest of the larger community and workplace. |
| Teamwork | Build and maintain collaborative relationships to work effectively toward common goals, while appreciating diverse viewpoints and shared responsibilities. |
| Technology | Understand and leverage technologies ethically to enhance efficiencies, complete tasks, and accomplish goals. |

The seven PAL experiences included in the survey questions are as follows. For brevity, in our tables we abbreviate each experience by the word in brackets:

1. Running my own PAL classroom [Classroom]

2. Mentoring my students or other Facilitators [Mentoring]
3. Trainings and weekly PAL class [Training]
4. PAL research projects [Research]
5. The diversity of my fellow PAL Facilitators [Diversity]
6. Feeling included in the PAL community [Community]
7. PAL overall [Overall]

These represent some of the things which every Facilitator did or experienced at some point during their employment with the program, which the authors identified as possibly contributing to the development of the skills beneficial in the post-graduation workplace. Details on each of these experiences can be found in the Introduction, as well as on the PAL website (www.csus.edu/pal) and in Lundmark et al. (2017), Shanbrom et al. (2023), and Akhavan et al. (2024).

Part 2 of the survey asked for personal information. Respondents were asked to identify as (1) Employed, (2) Student in a professional or graduate program, (3) Neither, or (4) Prefer not to state. The survey included logic forks for each of the four answers with additional questions. In addition, partly in order to ensure that data came only from Facilitators who had actually graduated, we asked for their graduation year (one respondent had not graduated and they were excluded from our results).

Those who identified as "Employed" were directed to questions pertaining to their employment, including their industry of employment. More importantly, they were asked to rank on a Likert scale which of the seven PAL experiences identified above helped them get a job, and which helped them be successful in their job. The precise wording of each question appears on the corresponding figure in the Results and Appendix A. Open response questions asked for other PAL experiences which helped in both these areas. Those who identified as a student in a professional or graduate program were asked a set of questions not relevant to this report. Those who chose "Neither" were classified as unemployed, and those who preferred not to state had reached the end of the survey.

After the close of the survey, we conducted standard analyses as presented in the next section. Some statistics were provided by the Qualtrics Dashboard feature, while most were computed in Excel after importing the complete dataset.

# Results.

Our survey received N=158 non-blank responses, representing a response rate of approximately 42%. The mean and median graduation year was 2020. The median number of semesters working for the program was 3, the mean was about 3.5.

Employment status appears in Table 2. Of the two individuals responding "Neither", one was "Looking for work", while the other was "Unemployed by choice." Of those employed, 44% have already earned a graduate or professional degree and 75% identify as employed in STEM.

***Table 2. Employment status (N=116)***

| Employed | Student in graduate or professional program | Neither | Prefer not to state |
|---|---|---|---|
| 74% | 23% | 2% | 1% |

Industries of employment appear in Table 3. Those responding "Other" listed industries of agriculture, behavioral analysis, banking, childcare, construction, education technology, environmental compliance, food manufacture, housing, medical education, and retail.

***Table 3. Employment by industry (N=80)***

| Education | Engineering | Health Care | Other | Scientific Research | Technology |
|---|---|---|---|---|---|
| 21% | 10% | 33% | 20% | 10% | 6% |

Our main results appear in Appendix A. The ten figures contained therein give the complete survey responses to the questions asking participants whether each of the seven PAL experiences described in the Methods section helped develop the eight NACE Career Readiness Competencies as well as whether they helped our PALumni obtain and succeed in their jobs. We will highlight here some particularly notable results.

## Employability and workplace success.

Considering PAL overall, Table 4 shows that 90% of respondents agreed that PAL helped them get a job, and 94% agreed that PAL helped them succeed in their job. Here "agree" means they chose either "Somewhat agree" or "Strongly agree." In both questions zero respondents disagreed with the statements; the remainder chose "Neither agree nor disagree." See Figures A9 and A10. See the Methods section for descriptions of the PAL experiences in the columns of Table 4.

***Table 4. Percentages of respondents agreeing with the statements "The following PAL experience helped me get a job" (N=79) and "The following PAL experience helped me be successful in my job" (N=80)***

| | Classroom | Mentoring | Training | Research | Diversity | Community | Overall |
|---|---|---|---|---|---|---|---|
| Get a job | 89% | 86% | 70% | 59% | 67% | 65% | 90% |
| Succeed in job | 99% | 98% | 80% | 68% | 81% | 80% | 94% |

Note that respondents felt that the experiences of running their own classroom and mentoring (the primary employment responsibilities) were significantly more valuable in their careers than the other experiences listed. The research projects (the primary academic responsibility) were the least valuable but still saw a majority of respondents agreeing that they were helpful in both obtaining and being successful in their jobs. The majority of PALumni felt that every one of the six experiences helped them both get a job and succeed in their job.

Zero respondents disagreed with the statement that mentoring students or other Facilitators helped them get a job. Zero respondents disagreed with the statement that running their own classroom helped them be successful in their job. For every one of the six PAL experiences, zero respondents chose "Strongly disagree" when asked whether the experience helped them succeed in their job.

For both of the two questions considered in this subsection ("helped me get a job" and "helped me be successful in my job"), in every one of the seven PAL experiences (including PAL overall) the most commonly chosen response was "Strongly agree." That is, in each of the 14 histograms in Figures A9 and A10, the rightmost bar is tallest.

## Career readiness competencies.

Our primary goal in this project was to map the diverse real-life work experiences encountered by our student employees to the skills needed in their post-graduate careers. Table 5 summarizes this result, with further detail appearing in Figures A1-A8. Each competency appeared as a separate survey question; see the Methods section for descriptions of the competencies in the rows and the PAL experiences in the columns.

***Table 5. Percentages of respondents agreeing with the statements "The following PAL experience helped me develop the skill of [competency in first column]" (N= 133, 133, 132, 122, 122, 121, 121, 121 for the rows, respectively)***

| | Classroom | Mentoring | Training | Research | Diversity | Community | Overall |
|---|---|---|---|---|---|---|---|
| Development | 98% | 97% | 83% | 72% | 88% | 87% | 97% |
| Communication | 98% | 98% | 89% | 85% | 88% | 86% | 97% |
| Critical Thinking | 97% | 98% | 82% | 88% | 79% | 77% | 97% |
| Equity | 95% | 95% | 87% | 71% | 98% | 92% | 94% |
| Leadership | 100% | 100% | 90% | 81% | 78% | 82% | 100% |
| Professionalism | 97% | 97% | 83% | 81% | 81% | 83% | 95% |
| Teamwork | 95% | 95% | 98% | 95% | 88% | 93% | 99% |
| Technology | 67% | 61% | 59% | 73% | 50% | 50% | 66% |

A large numerical matrix like Table 5 can mask many of the most interesting results, so Tables 6 and 7 serve to illustrate which experiences were most impactful on which competencies. It is also worth pointing out a few important features here. In particular, note that every single respondent agreed that PAL overall helped develop the skill of Leadership. Further, every single respondent agreed that their experiences running their own classroom and serving as a mentor helped develop the Leadership skill.

In addition, all 56 entries in Table 5 are at least 50%; the majority of respondents felt that every single PAL experience was helpful in developing every single career readiness competency. If we exclude the last row corresponding to Technology (see Discussion below), we find that all 49 entries are at least 71%. In Figures A1-A8 one sees that "Strongly agree" was the dominant response in 52 of the 56 graphs, with all four exceptions relating to the skill of Technology.

While not displayed in Table 5 (but implicit in Figures A1-A8), the disagreement numbers are also telling. Zero respondents disagreed that PAL overall helped develop skills of Equity and Inclusion, Leadership, and Professionalism. Each of the 56 disagreement percentages (all seven experiences versus all eight competencies) was 8% or lower.

In Table 6 we associate to each of the NACE career competencies the PAL experiences which participants found most helpful. We see that the experiences of running their own classroom and mentoring were reported as most helpful for developing most of the competencies, in agreement with results above. However, the three experiences of training and PAL class, research projects, and the diversity of fellow Facilitators were each reported as most impactful for one of the eight competencies. That is, five of the six PAL experiences (not including PAL overall) were most impactful for some skill; the only exception was feeling included in the PAL community (see Discussion).

***Table 6. The most impactful PAL experiences for each competency, measured by percent agreeing***

| **Competency** | **Primary Experience** | **Secondary Experience** |
|---|---|---|
| Development | Classroom | Mentoring |
| Communication | Classroom, Mentoring (tie) | n/a |
| Critical Thinking | Mentoring | Classroom |
| Equity | Diversity | Classroom, Mentoring (tie) |
| Leadership | Classroom, Mentoring (tie) | n/a |
| Professionalism | Classroom, Mentoring (tie) | n/a |
| Teamwork | Training | Classroom, Research (tie) |
| Technology | Research | Classroom |

In Table 7 we associate to each of the PAL experiences the NACE career competencies which participants felt were most developed. We see that PAL develops Leadership and Teamwork more than any other competencies, in agreement with Table 5. However, the competencies of Development, Communication, Critical Thinking, and Equity all appear as a top skill developed by some PAL experience. The only competencies missing from this table are Professionalism and Technology (see Discussion).

***Table 7. The competencies most impacted by each PAL experienced, measured by percent agreeing***

| **Experience** | **Primary competency developed** | **Secondary competency developed** |
|---|---|---|
| Classroom | Leadership | Development, Communication (tie) |
| Mentoring | Leadership | Communication, Critical Thinking (tie) |
| Training | Teamwork | Leadership |
| Research | Teamwork | Critical Thinking |
| Diversity | Equity | Development, Communication, Teamwork (tie) |
| Community | Teamwork | Equity |

Finally, it is important to recognize that Tables 4-7 are coarse in the sense that they collapse the two types of agreement and the two types of disagreement ("Somewhat" and "Strongly"). While this simplifies the analysis, it masks the fact that nearly all the "agrees" were actually "Strongly agree" and nearly all the "disagrees" were actually "Somewhat disagree." This finer distinction is clear in Figures A1-A8, where the rightmost bars dominate nearly all of the histograms, and the leftmost bars are nearly absent. For example, while Table 5 asserts that 100% of respondents agreed that the experience of running their own classroom helped develop the skill of Leadership, Figure A5 shows that 98% of respondents actually agreed strongly. As another example, in Figure A10 all of the leftmost bars are absent, as nobody chose "Strongly disagree" for any of the seven questions relating PAL experiences to

career success; every “disagree” was a “Somewhat disagree.” Thus we consider the results in Figures A1-A10 to be both stronger and more nuanced than those in Tables 4-7.

**Qualitative analysis.**

Our survey was limited to asking explicitly about only six PAL experiences (chosen by the authors) and eight workplace skills (as identified by NACE). We therefore also asked respondents to identify any experiences or skills they thought were relevant but missing from these lists. Answers were very diverse, but we present here a simple thematic analysis of the responses. Moreover, we asked whether any PAL experiences missing from our list helped participants obtain a job or be successful in their job.

In reference to the eight NACE career competencies, participants were asked “What other PAL experiences, if any, helped you develop these skills?” We received 64 responses, in which two themes clearly stood out. The first, representing 15 responses, was a family of experiences related to professional communication. Participants described making classroom announcements, communicating with course faculty in both verbal and written form, and presenting at conferences as instrumental in honing this important skill. Consider, for example, the responses “Advertisement of PAL at the beginning of each semester helped me develop skills of persuasion, critical thinking, and teamwork” and “Attending conferences as a PAL facilitator helped with communicating professionally with coworkers and other professionals.”

The second theme, constituting 13 responses, concerned the additional leadership opportunities within the program: serving in an extra leadership role of Lead Facilitator or Supervisory Facilitator, or joining one of the three optional development groups (Cultural Competency Ambassadors, Research Activity Discussion Group, or Leadership Development Team; see Introduction for details). Representative responses include “[The Leadership Development Team] program really helped me improve on my leadership and critical thinking skills” and “Being a supervisor helped greatly in my career to delegate and become comfortable leading a group.” Sometimes these two themes overlapped within a response, such as “Being a Lead Facilitator required communication with course directors, which was beneficial to my professionalism and communication skills.”

Outside these two main themes we observed many other PAL experiences recurring in the responses to this question, including the interview process (both as an interviewee and interviewer) and the mentorship offered by the PAL faculty and other Facilitators. One participant wrote, “The faculty in the program and their support played a huge role in developing these skills,” with another stating that, “Having supportive and caring mentorship allowed me to freely explore what it meant to be a leader.” These responses are in agreement with the literature showing that work identity is significantly influenced by mentor relationships (Bartlett, 2021; Hyams-Ssekasi & Caldwell, 2019). Thus, there are many additional experiences available within the PAL program to further strengthen workplace skills, other than the six explicitly chosen by the authors.

Participants were also asked “What other workplace skills, if any, did PAL help you develop?” This received 70 responses. The most common theme (15 responses) was the skill of time/task management. Runners up included the skills of confidence (9 responses) and organization (8 responses). Other themes receiving at least 4 responses included the skills of responsibility/accountability, adaptability, conflict management, empathy, persistence, public speaking, and patience. These are largely distinct from the eight NACE competencies, but represent an important

set of soft skills valued in many workplaces. Other responses of interest, not necessarily apparent in the themes above, include the following skills:

- "Understand(ing) that it is okay to make mistakes and know that you can seek help"
- "Having difficult conversations that are respectful, healthy, necessary, and constructive"
- "Understand(ing) different perspectives"
- "Get(ting) comfortable saying 'I don't know'"

We also asked "What other PAL experiences do you believe helped you get a job?" and "What other PAL experiences do you believe helped you be successful in your job?" We received 40 responses to each question. Many of the responses to the first of these questions echoed the themes present in the responses to the question "What other PAL experiences, if any, helped you develop these skills?" which was discussed above. Specifically, examples of professional communication and opportunities for additional leadership experiences were again highlighted. In addition, seven respondents specifically mentioned discussing PAL in their job interviews, for example "Many employers were very interested in the structure of the program and wanted to know more about how this experience shaped my goals for leadership in my career." Some offered abstract experiences like cultivating "emotional intelligence" or "building relationships." Others gave concrete examples of networking, like getting a job through a former PAL co-worker, or leveraging letters of recommendation written by PAL faculty.

The final free response question – concerning career success rather than acquiring employment – led to very similar answers: many just wrote "same as before" or something similar. Once again the themes of professional communication and leadership development were front and center. Two new sub-themes emerged: developing cultural competency and learning scaffolding as a problem-solving tool. Some other interesting responses included:

- "Acknowledgment of failures and having grit to be successful.... Working with various cultures and learning styles"
- "Understand[ing] when I'm in over my head and needing to ask for help was huge character development for me"
- "I learned how to manage others, work alone for some things, and work in groups for others"
- "Being a facilitator improved my understanding of others, and the importance of my choice in words"

One final quote taken from this last question acutely summarizes most of the themes simultaneously:

*Through PAL, I honed my ability to communicate complex ideas clearly and effectively, a skill essential for mentoring students and now equally crucial in professional settings when collaborating with colleagues or presenting information. The "scaffolding" method we used in PAL taught me the power of guiding others to discover solutions independently, which I now apply in problem-solving and team dynamics, empowering others to think critically and take ownership of their tasks. Additionally, PAL instilled in me the importance of empathy and cultural humility, ensuring I approach every interaction with understanding and respect for diverse perspectives. These skills—communication, leadership, and empathy—have been vital in building strong relationships and fostering a positive and productive work environment.*

The complete, unedited set of responses to these four free response questions is available at https://www.csus.edu/pal.

## Discussion.

The results of the previous section clearly demonstrate that serving as a PAL Facilitator was beneficial in developing the non-technical skills necessary for success in the modern workforce. Table 4 is the most obvious data point here, showing in particular that 94% of respondents agreed that PAL helped them succeed in their job. But these results show more specifically that each of the primary experiences associated with the Facilitator role is in itself beneficial, and further that each of these experiences helps develop every one of the career readiness competencies as identified by the National Association of Colleges and Employers. Hence this paper fills an important gap in the literature: while many researchers have demonstrated that various academic and work experiences have increased employability, here we show exactly *how* the PAL program prepares students for careers, and in a way which is translatable to other programs and institutions.

For example, in Table 6 we see that five of the six PAL experiences were among the top two most impactful experiences for at least one of the eight career readiness competencies. This shows that nearly all of the experiences are themselves crucial for developing a well-rounded skill set. The one exception is the experience of "feeling included in the PAL community." While this experience does not appear in Table 6, survey respondents still overwhelmingly reported its value in workplace skills development. This is evident in Table 5, where at least half of respondents agreed that this experience helped develop every one of the eight career readiness competencies. Excluding the competency of Technology, the percentage of respondents agreeing ranges from 77% to 93% for the remaining seven competencies. These numbers are remarkable given the lack of apparent connection between a feeling of inclusion and the development of skills like Critical Thinking and Technology, which are seemingly less social in nature. Finally, it is important to note that there is a vast literature connecting employability to inclusion, sense of belonging, and third spaces; see for example Cook (2022), Luke and Bartlett (2024), Morina and Biagiotti (2022), and Ng (2022).

In Table 7 we see similar results showing how well the individual experiences within the PAL program map onto the distinct workplace skills identified by NACE. Here, however, we see that six of the eight competencies were reported as one of the top two most strongly developed by at least one of the programmatic experiences; that is, nearly every one of the competencies is targeted by a specific PAL experience. The exceptions in this case are the competencies of Professionalism and Technology. However, Table 5 shows that Professionalism is extremely well developed by each of the PAL experiences, with at least 81% agreeing that each of the experiences helped develop this skill, and 95% agreeing that PAL overall did. Thus, while not appearing in Table 7, it is clear the Professionalism is indeed a skill enhanced by every aspect of the program.

The skill of Technology, on the other hand, is in fact a clear outlier when considering both Table 5 and Figures A1-A8. This is not particularly surprising given the nature of the PAL Facilitator position, which does not explicitly require any technological skills or training. However, the results for this skill, while clearly not as strong as the other seven skills, are surprisingly impressive. Table 5 shows that 66% of respondents still agreed that PAL overall helped them develop the skill of Technology, and the two lowest rated experiences, the diversity of fellow Facilitators and feeling included in the PAL community (neither of which has any ostensible connection to technology) still garnered agreement rates of 50%. Moreover, in Figure A8 we see that the most popular Likert response was "Strongly agree" when asked whether running their own classroom, conducting research projects, and PAL overall helped develop the skill of Technology. Certain research projects did in fact utilize specific software, programming, and

statistical methods, so this is perhaps not surprising. Running a PAL classroom does not ostensibly require any technological tools, however many Facilitators chose to use tools like Excel, OneDrive, or Discord to take attendance, manage files, and facilitate communication. Moreover, a subset of participants worked for PAL during the Covid-19 pandemic, holding their classes and office hours online, which required them to become proficient with Zoom, Microsoft Teams, and various other tools like virtual whiteboards. Lastly, it is likely that Facilitators are already quite competent with technology due to the nature of their academic studies – many develop these skills in programming courses and laboratories. So it makes sense that they would not experience a big impact from their work in PAL, but more importantly, this (not-so-soft) skill is likely less important for these technically-trained STEM students to develop when compared to the other more socio-cultural and emotional workplace skills.

As with any such research, this study suffers from many limitations. The survey format alone is flawed as of course not all program alumni responded, and those who did may not be representative of the group as a whole. In particular, those who have obtained a career of which they are proud may be more inclined to respond, or those who felt more positively toward their experiences within the PAL program, including those who served in leadership roles or had closer relationships with program faculty. It also may be the case that more recent graduates were overrepresented in survey respondents, as we had more reliable email contact information for these individuals. A response rate of 42% is good but not great, and there is no reason to believe that this sample is representative.

Additionally, PAL program alumni are not representative of college students in general, or even students in their academic program or institution. Hiring for this position is competitive, so PAL Facilitators already possess certain workplace skills to a higher degree than applicants that were not hired (although this should not affect their subjective assessment of whether PAL experiences helped the further develop these skills, at least in theory). Moreover, they are all STEM majors (including health sciences), which is obviously a very specific subset of any university's student body. This should be taken into account along with the fact that the NACE career readiness competencies are in no way STEM-specific. Finally, the authors subjectively chose exactly which PAL experiences were to be included in the survey and the wording used to describe them. While we strove for neutral language, it is plausible that the wording of any survey question can subconsciously affect the responses.

Despite these limitations, our results provide compelling evidence that participation in the PAL program helps develop all eight of the critical career readiness skills as reported by NACE. Further, we can explicitly see precisely which aspects of the PAL program contribute to each of these skills individually, and to what extent. This mapping of experiences onto skills is the primary research contribution of this paper. Finally, it is worth noting that while the NACE framework is more focused on employability of individuals and economic success, the PAL experiences which develop these traits are rooted in teaching and serving others (Cook, 2022; Akhavan et al., 2024).

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# Appendix A.

In this Appendix we provide graphs of our results on whether the seven PAL experiences helped develop the eight NACE competencies (Figures A1-A8) and helped Facilitators obtain and succeed in their jobs (Figures A9-A10).

***Figure A1. Career and Self Development***

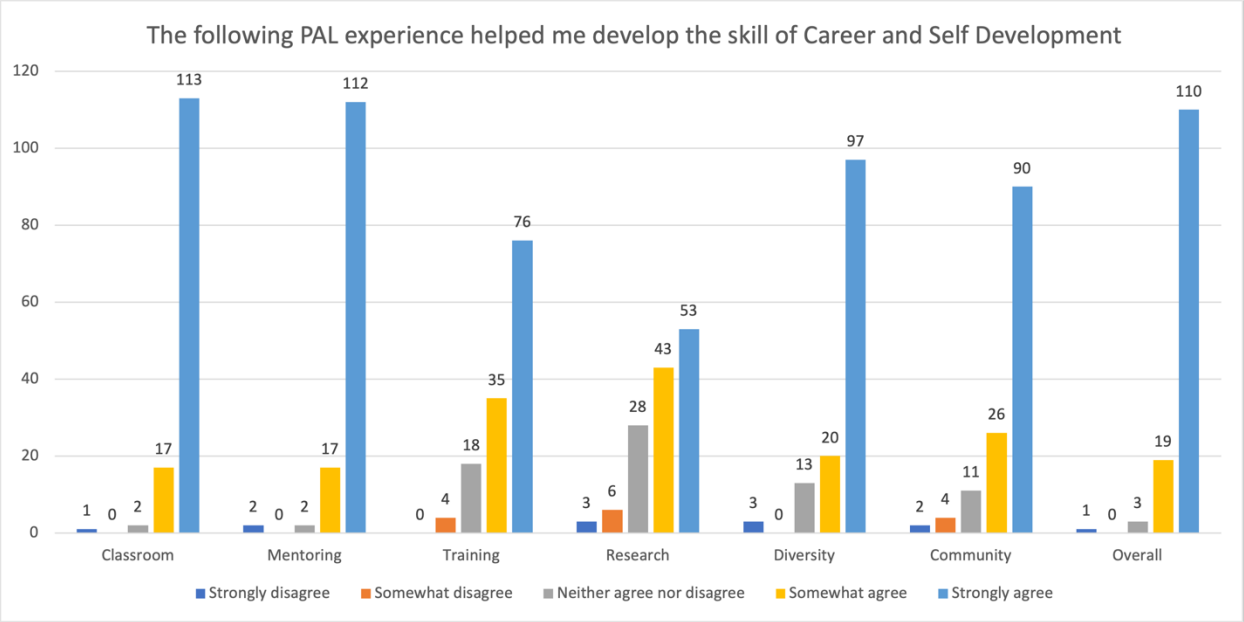


***Figure A2. Communication***

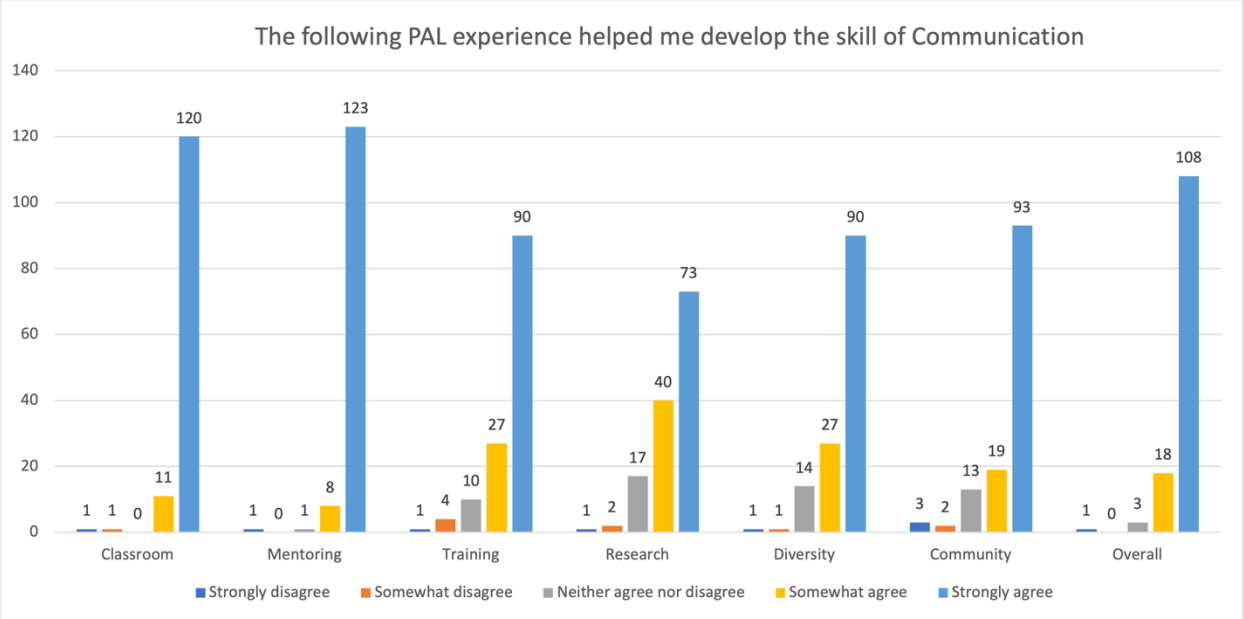

***Figure A3. Critical Thinking***

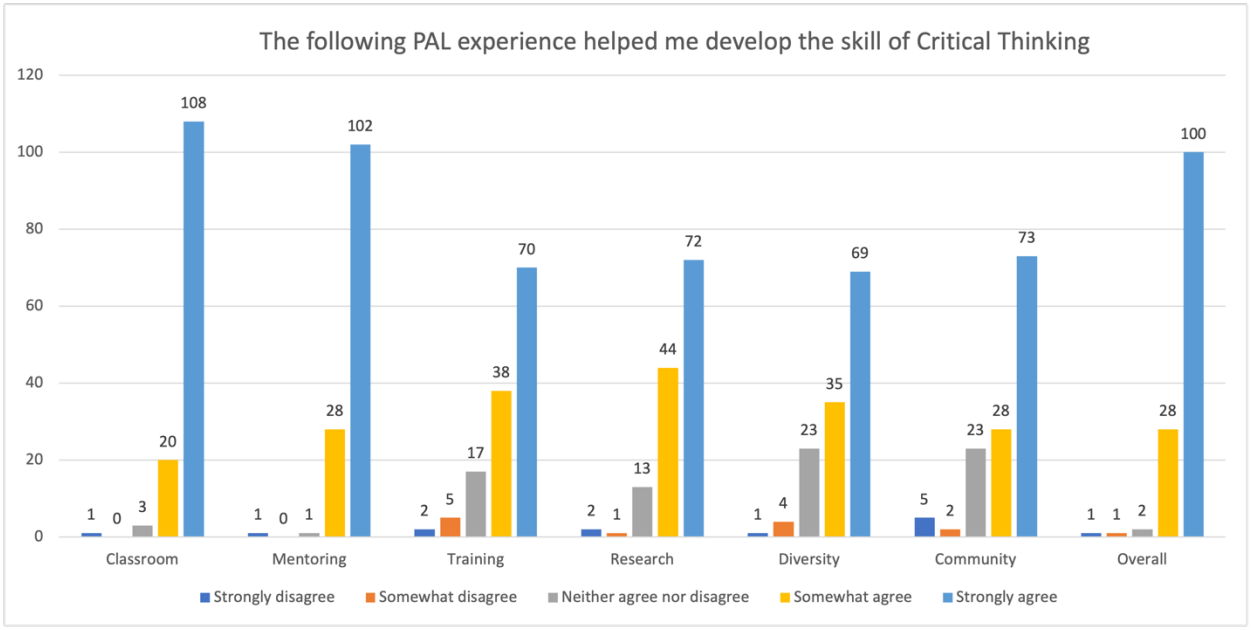


***Figure A4. Equity and Inclusion***

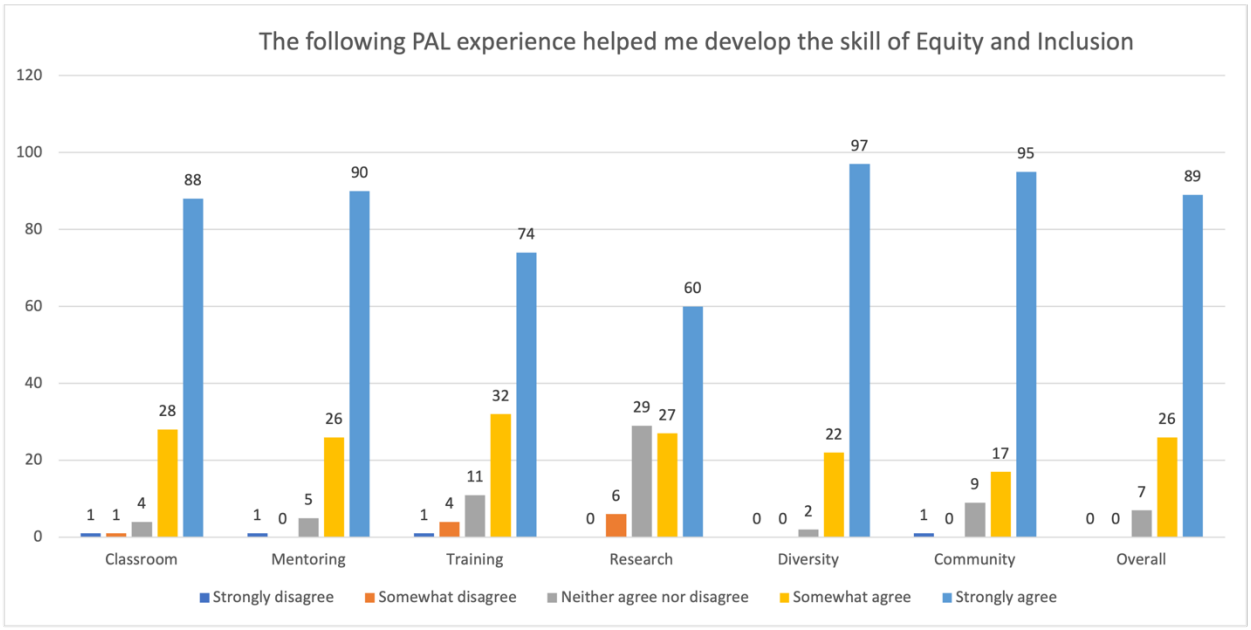

***Figure A5. Leadership***

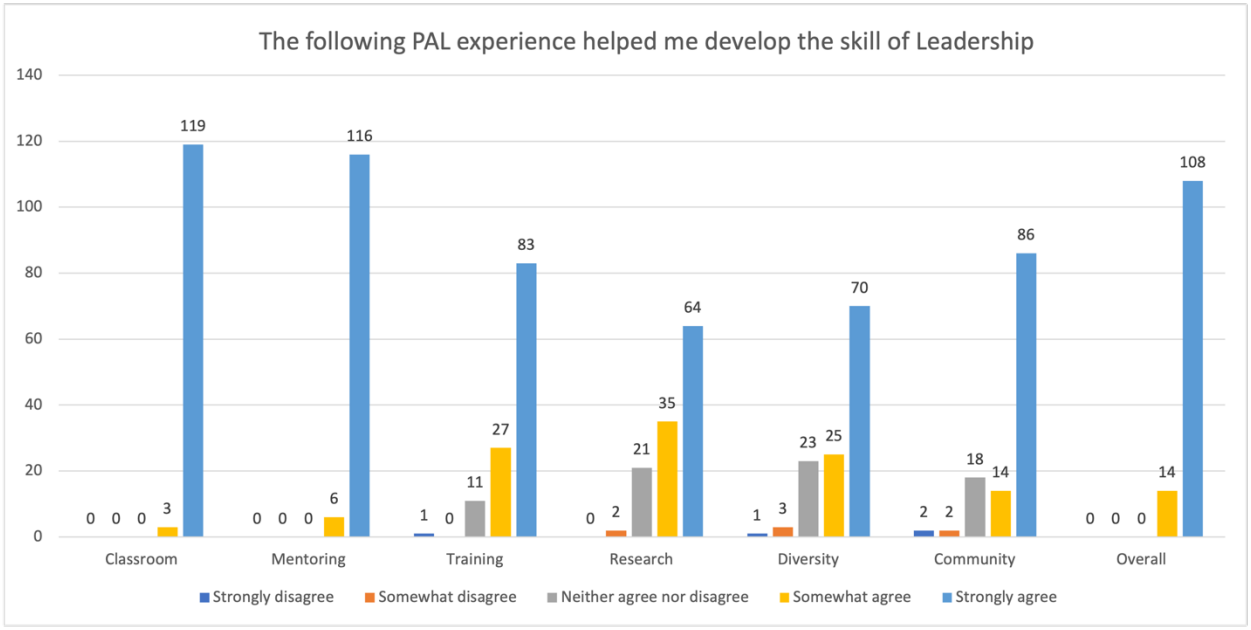


***Figure A6. Professionalism***

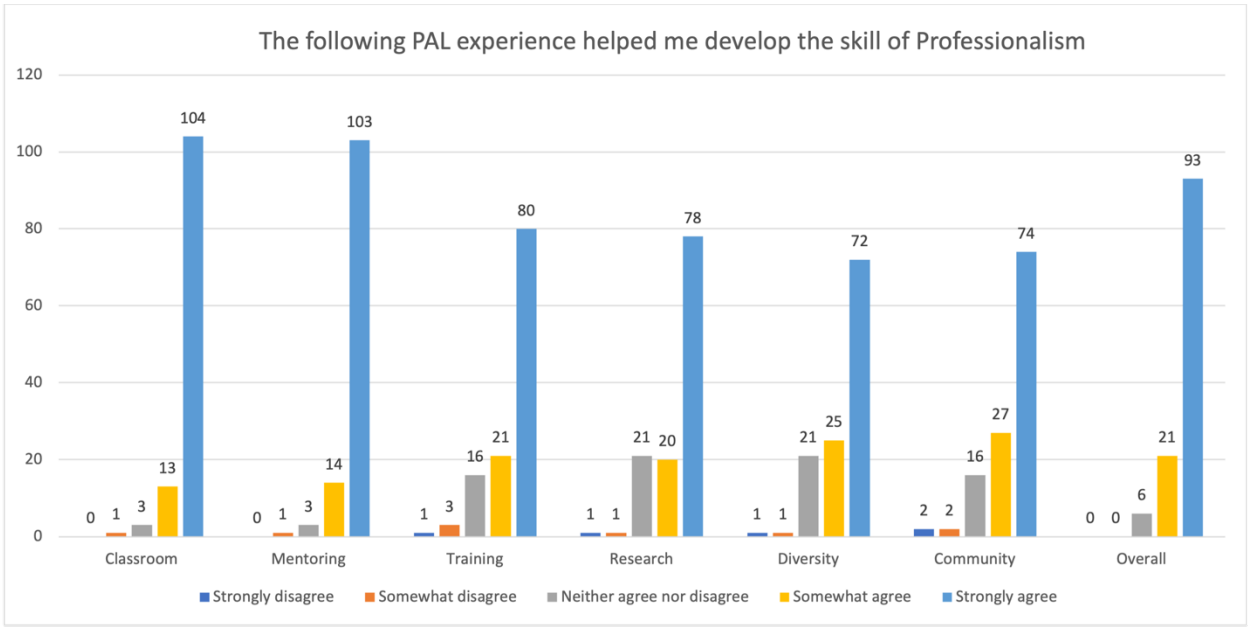

***Figure A7. Teamwork***

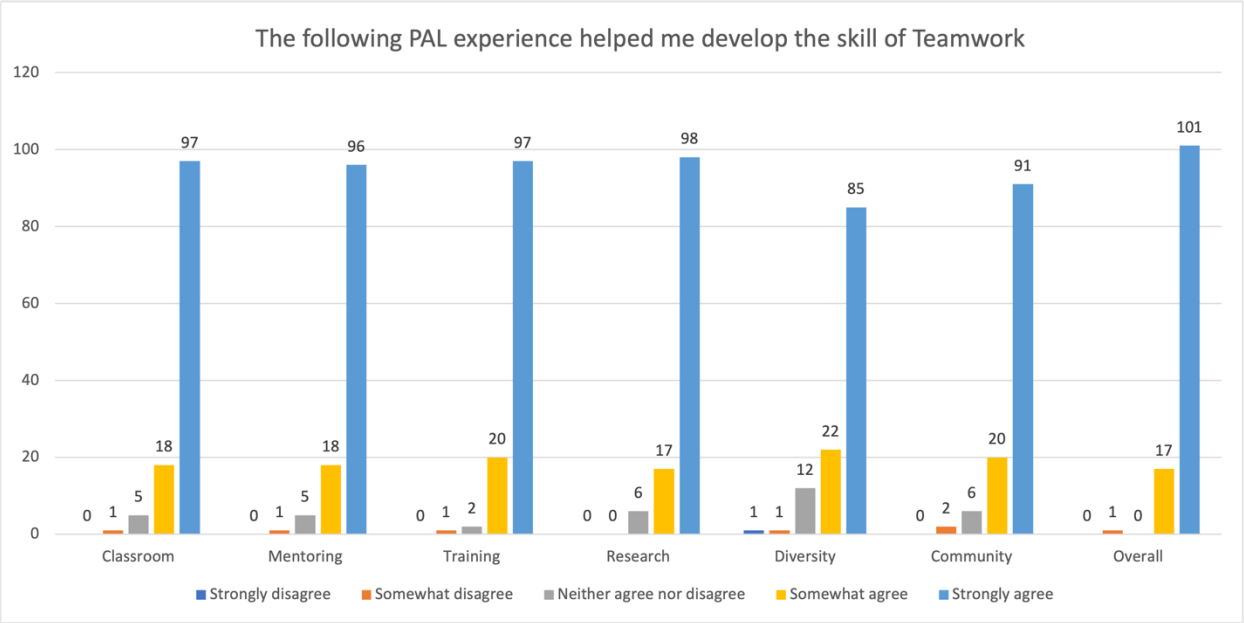


***Figure A8. Technology***

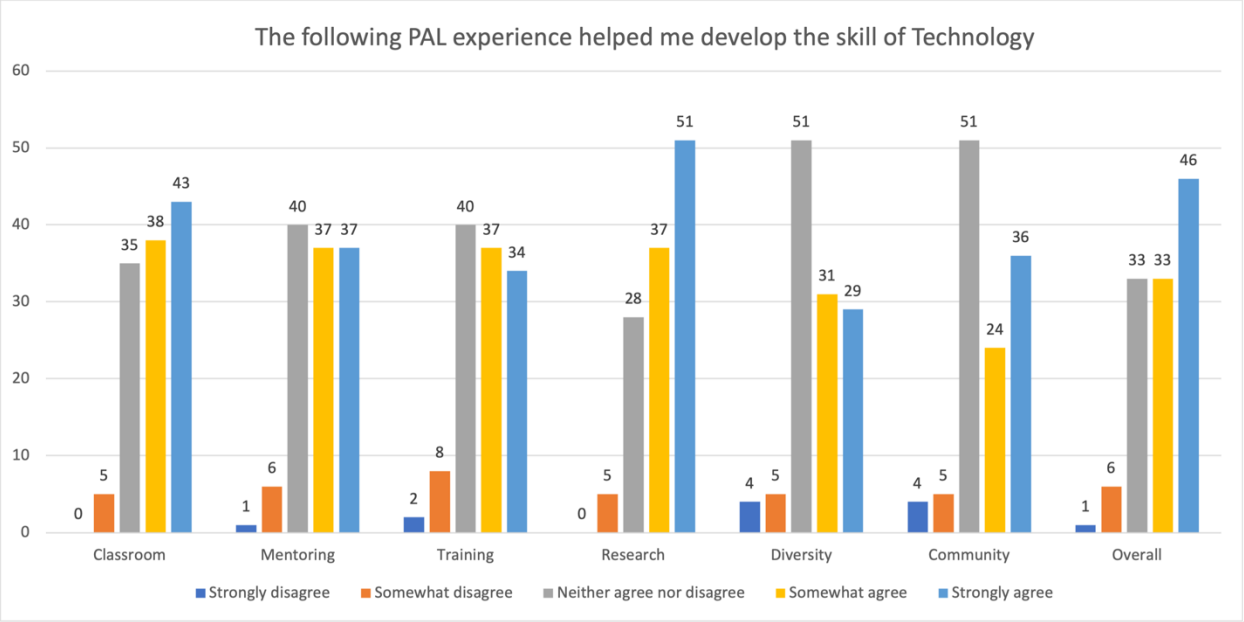

***Figure A9. Obtaining a job***

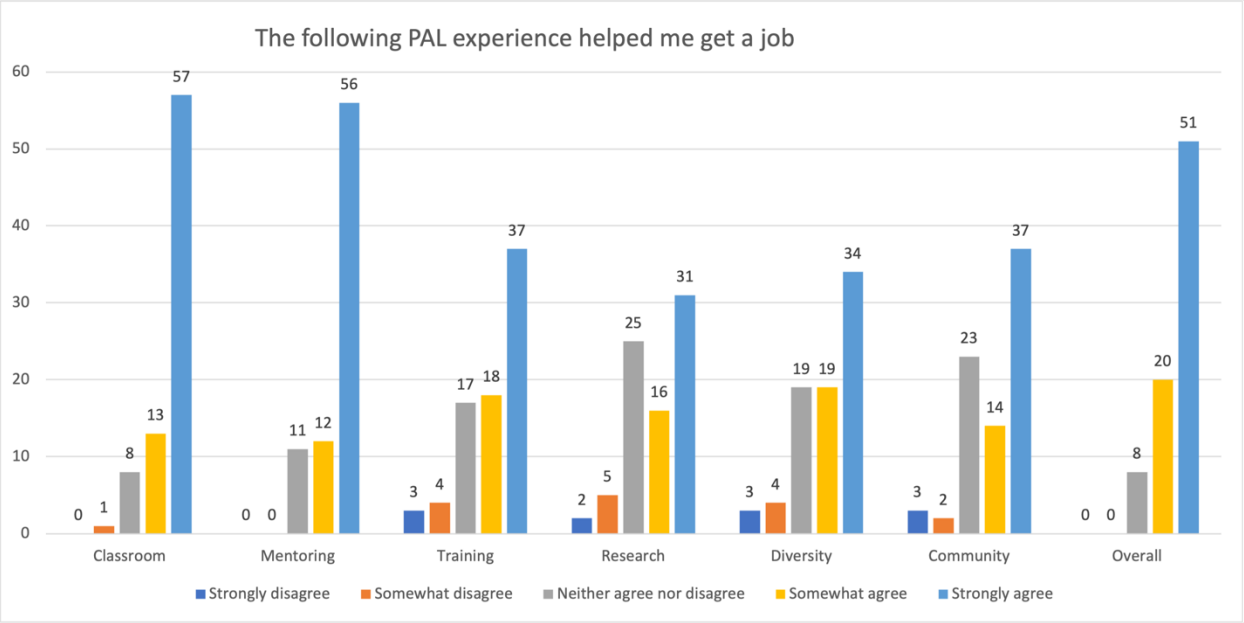


***Figure A10. Success in job***