Defining the Supporting Roles of Facilitators in Project-Based and Work-Based Learning

Cody Mann

Minnesota State University, Mankato, USA, cody.mann.2@mnsu.edu

Darcie Christensen

Minnesota State University, Mankato, USA, darcie.christensen@mnsu.edu

Abstract:

It is well known that staff roles are critical in higher education. A university in the Midwest region of the United States of America offers unique student-facing support through a work-based learning program by coaching students who learn on the job while working for companies throughout the final four semesters of their undergraduate degree. Prior to the final four semesters of working on the job, students are also supported through a preparation project-based semester. The support staff in this program are referred to as facilitators. This paper aims to address the critical roles of facilitators as they directly pertain to project-based and work-based learning. The unique work-based learning model covered in this paper implements project-based learning in a way that isn't found anywhere else in academia, and it continues to be a successful model of education. The following two questions will be explored: How are facilitators engaging in each of their job description roles? How do facilitators perceive and describe each of their job description roles? This paper will broadly define each role of a facilitator by including an analysis of qualitative reflections by a professor and a director in this work-based program. It will also include quantitative data that discusses the facilitator's self-reported median and average values of time spent in each of the roles. This will result in recommendations to other higher education programs to begin creating facilitator positions that add value to other project-based learning models.

Keywords: Facilitators, work-based learning, project-based learning, higher education, and student support.

1 The Motivation Behind and Background of Iron Range Engineering

Iron Range Engineering (IRE) started as a unique project-based model in a rural part of the upper Midwest in the United States of America in 2009 (Ulseth, 2019). After nearly 10 years of operation, IRE transformed from a project-based model into a work-based learning model. Instead of bringing engineering projects from various industries to the classroom, students began going to the various industries to work on full-time engineering jobs to work on projects in an authentic environment for the final two years of their education (Johnson et al., 2018). While project-based learning is still high-value, work-based learning adds an element to project-based learning as students are situated within an actual practice setting while applying the knowledge gained alongside practicing professionals who assist in the learning process (Mann et al., 2021). The transition to work-based learning freed up physical space on campus that was once approaching a limit at this rural institution. Instead of spending four semesters onsite at a rural institution's campus, students now spend one semester onsite developing skill sets that help them thrive in their classroom-to-workplace transitions (Christensen et al., 2023). They then transition to positions across the country while continuing their education in the evenings. This meant that not only could the IRE program serve more students from the local area, but it could also serve students from various parts of the country and world who have the autonomy to choose their location for the final two years of their education.

Around the time of the transition to the work-based learning model, IRE created a facilitator position. One of the motivators behind IRE's creation of the facilitation position was to provide assistance in increasing student enrollment with a national outreach in the United States of America. Along with the focus on enrollment came the need for additional guidance in the students' job search process and mentorship while they were transitioning from the classroom to the workplace (Fifolt & Searby, 2010; Van den Bogaard & Strobel, 2023). They needed a liaison between their academic studies and work experiences, which was difficult for Ph.D.-holding professors to deliver on their own in addition to traditional responsibilities. The students also needed continuing support in their design and professional growth as they prepared for and participated in engineering positions. Facilitators possess bachelor's and/or master's degrees in an engineering field of study, and most have industry experience of their own to provide valuable expertise when coaching students. Because of these qualifications and the evolving needs of the work-based program, the facilitator role evolved to include six main roles: Career Development, Instruction, Learning Coach, Recruiting, Student Life, and Other. At this point, there has not been any extensive research done on facilitators, but now that the work-based program has been in existence for six years and has graduated six cohorts of students, lessons learned need to be shared. There is also very little existing literature on Facilitators, as this position does not exist anywhere else in higher education. This paper helps to provide insight into the various roles of a facilitator in a higher education work-based engineering program. This will be done based on the facilitators' perceived contributions and experiences, as self-reported.

2 Methods

The two research questions for this study come from a mixed-methods approach, as the first question relates to both quantitative and qualitative research, and the second question is qualitative.

RQ1 - How are facilitators engaging in each of their job description roles?

RQ2 - How do facilitators perceive and describe each of their job description roles?

A series of six surveys was created to capture data within each of the six primary roles of a facilitator. The surveys were administered via Qualtrics. The Minnesota State University, Mankato Institutional Review Board (IRB) approved all data-gathering procedures for this study. There were 12 participants invited to be a part of the study. The chosen study group represented the entire population of facilitators at the Iron Range Engineering program. Each of the surveys represented one of the six primary roles of a facilitator as outlined by the institution's program director. The goal of administering the surveys was to determine engagement with the six roles of a facilitator's position as defined by their job description and lived experiences. Both quantitative (e.g., hours of work performed in that category) and qualitative data (e.g., How do you contribute as an instructor in the program?) were collected in the surveys. It was communicated to all participants that their decision to participate and the answers they provided would not be a form of job performance evaluation.

The surveys were sent to participants on a rolling basis, meaning none of them were sent on the same day. The reason for this was to capture as much data within each role as possible while also attempting to mitigate survey response fatigue. The surveys were administered during business hours over two weeks. Of the 12 facilitators, 11 participants responded to the career development survey, 10 responded to the instruction survey, 12 responded to the learning coach survey, 11 responded to the recruiting survey, 11 responded to the student life survey, and 10 responded to the "other" survey.

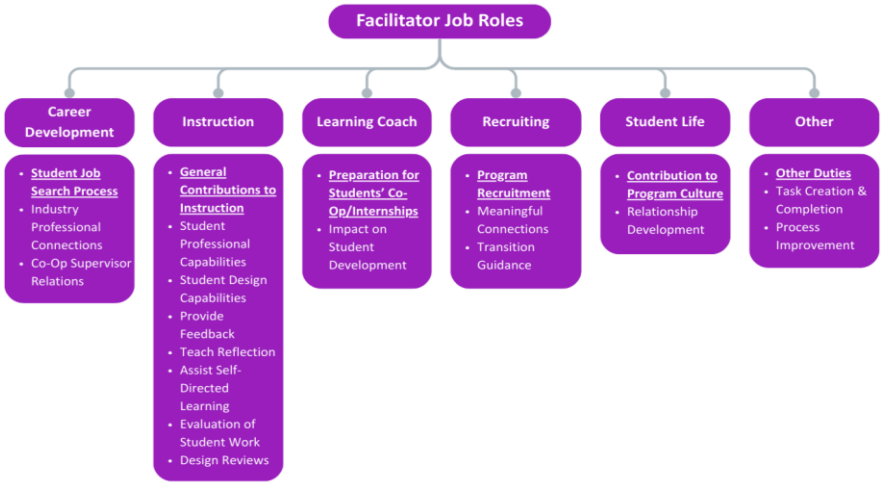
Identifying information was removed from all data before being thematically coded. Generative AI tools (Microsoft Copilot, 2025) were utilized to help in the beginning stages of categorizing job functions. Two coders then took those initial ideas for job functions that fell within each job role and manually coded

participant responses, which led to alterations in the job function coding schemes by combining, adding, and deleting functions. This was done until a consensus was reached.

Figure 1 displays the six job roles of the facilitators and the associated functions within each. Because of the extensive data available in each of these categories and given the scope of this paper, the primary job function (i.e., the first in each of the bulleted lists that are bolded and underlined is focused on their contribution to the overarching purpose of that job role) for each of the job roles is the focus of this study. Future work will utilize the remaining job functions and associated data to further analyze the facilitator perceptions and provide more depth to each facilitator role.

Figure 1

Primary Facilitator Job Functions Associated with Each of the Six Facilitator Roles



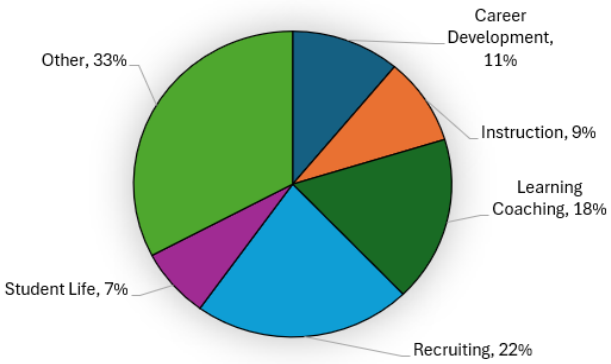
Note: the function of interest for this study is bolded and underlined

3 Results

From the data collected, it was found that the median weekly hours reported across the job description categories for all of the facilitators was 27 hours, and the average was 33 hours. It should be noted here that some facilitators are full-time and others are part-time, so a number lower than 40 hours is anticipated, and the median better captures the overall time spent. Also, it is recognized that some facilitators spend more time in certain categories than others; for example, some facilitators focus more highly on recruiting, while others are more in charge of student life. Thus, the median is more representative of the time spent., The facilitators also did not respond to all of the surveys at the same time, so they may not have tracked the number of hours that they had reported on the other surveys. Figure 2 shows the percentage of time spent in each job description category based on median times.

Figure 2

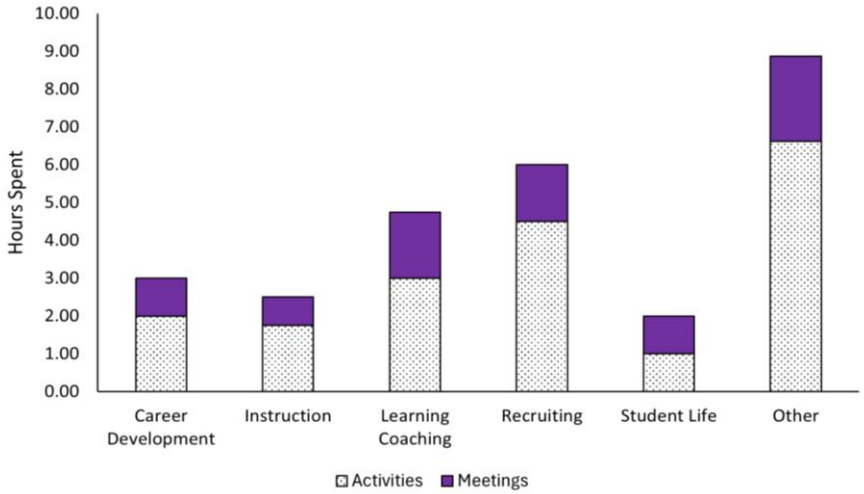
Percentage Breakdown of Facilitators' Time Spent in Job Description Categories



Facilitators also reported how much time was spent on meetings versus activities in each category. This breakdown is shown in Figure 3, which is also based on the median reported times.

Figure 3

Median Hours Spent on Activities versus Meetings in Job Description Categories



As shown in the methods, there were multiple functions under each role category. The first function for each of these is based upon the general involvement and contributions made within that role. That primary function will be discussed in the upcoming sections, with the emerging themes within each function being bolded and elaborated upon with examples, summaries, and representative quotes. Quotes from participants may have grammatical errors as they were left unedited to maintain the authenticity and integrity of their original words.

Career Development

As part of the student job search process within career development, facilitators **regularly have discussions** with students about their job search progress. These one-on-one job search discussions happen weekly or biweekly. Facilitators also **lead career development workshops.** These workshops consist of topics like writing cover letters, conducting interviews, and building resumes. Students in the program receive **personalized support** from facilitators, which includes guidance on future planning, professional references, guidance on further developing a cover letter and resume, mock interviews, and shared best practices in the job search process. Working on developing **industry connections** is another way facilitators add value throughout the job search process. These connections help students find viable options for work opportunities. They also help obtain industry projects for students to work

on and develop design skills in the Bell Academy semester. As one facilitator stated, “These projects sometimes act as ‘feeders’ into internship and co-op offers” (F10). The last theme for facilitators helping in the student job search process is **giving general career advice**. This includes guiding students who are in need of immediate or future employment, answering questions regarding the application process, providing general job search tips, and generally being very involved in the student job search process.

Instruction

Facilitators provide general contributions to instruction in four primary ways. **Grading and evaluation** is the first theme, and this consists of grading design papers (i.e., papers capturing their design learning in the workplace or on projects), fundamental principle exams (i.e., cross-cutting exams that require retrieval practice for students to reflect on all of their engineering learning), systems engineering exams, design reviews, weekly learning journals, student-led advanced (SLA) courses (i.e., courses students are developing in conjunction with their engineering work and interests), and IRE Talks (i.e., a TED-like Talk). Facilitators **provide workshops and review sessions** as needed, such as professionalism workshops (e.g., time management, emotional intelligence, leadership, etc.), design workshops (e.g., poster creation, conflict management, SCRUM, etc.), lab sessions, and industry exchange sessions that emphasize public speaking development on engineering topics. Facilitators also provide **design project coaching and mentorship**, which consists of instructing various parts of the design process, project management, general professional skills, explaining design assignments, and sharing best practices in hands-on engineering design work. Lastly, **planning and creating curricular deliverables** play a large role in facilitator instruction. As one facilitator states, “prepping fundamental principle quizzes, helping plan and lead industry exchange, [and] scheduling the learning journal assignments” (F3) are all part of their instructor role. Facilitators also spend time working on collaborative teams with professors and other facilitators to plan and create curricular deliverables.

Learning Coach

Personalized student coaching is a critical role of each facilitator. One function of this role is to prepare students for their co-op/internships. It starts by **setting expectations and sharing best practices.** This includes reminders on what to bring for the first day of work, to take good notes, to ask questions, and to meet and network with co-workers. Facilitators serving as learning coaches also discuss how the students’ experiences in the Bell Academy semester (Christensen et al., 2023) have prepared them to be successful on the job. Learning coaches set expectations in the first meeting with their students. This includes being on time, taking initiative, being mindful, and being self-aware. They also discuss employer expectations to ensure they are growing on the job. Learning coaches provide **personalized career development support and guidance**, which slightly crosses over with the career development role, but focuses on each individual instead of the entire student body. In addition to job search assistance, the learning coach discusses the need for students to be properly equipped with personal protective equipment (PPE). A learning coach will also spend time discussing career choices, developing communication skills, solving open-ended problems, transitioning between co-ops and internships, and explaining how students should interact with their supervisors.

Real-life scenarios emerged as another theme, as learning coaches share tips regarding lessons learned from successes and failures from their own experiences working as engineers in various industries. Facilitators serving as learning coaches will also coach students through working with other people. As one facilitator stated, “I often tell students that engineering is easy, it’s the people that are difficult” (F8). Learning coaches also emphasize **open communication**, which includes answering any questions students have and remaining available if anything comes up at work, at home, or in their personal lives. The last theme related to learning coaches preparing students for their internships and co-ops is **well-being & time management.** Facilitators will coach students on building out a schedule to balance their

school work with co-op/internship work, as well as their personal lives. Many of the weekly or bi-weekly coaching conversations start with assessing the student's well-being with a list of prompting questions. As one facilitator said, "If the student is stressed and worried, then I help build up their confidence by letting them know they are not alone and reassure them that they are going to be okay" (F5). If students are nervous, learning coaches will provide tools to help alleviate the nerves. Facilitators help students to handle a wide variety of topics they may experience along their engineering journey. As stated by one facilitator, "I think I help support them through the unknowns and hurdles they face. They know they have someone unattached to the company and work they are doing that they can talk to and go to for advice. I often help them come up with action items to help them deal with situations that arise or navigate different scenarios. This allows them to work on their communication skills with myself while also learning professional skills for navigating on-the-job situations themselves. I also am always there to celebrate their successes and I have had a number of students personally reach out to me with exciting news and accomplishments related to their co-ops. I believe this positive reinforcement gives students additional confidence as they continue with their work" (F6).

Recruiting

Unlike many other university programs that have designated recruiters, facilitators play a major role in program recruitment to continuously improve enrollment numbers. **High school and college outreach** is the main way facilitators recruit students to the program. They build connections with community college and high school faculty and staff so they can go out on a recruiting trip to present to students in their classroom(s). These classroom presentations help to introduce the program and raise awareness about the work-based engineering program at Iron Range Engineering. Students are then invited to attend a **campus visit**, which is the next step in the process, where facilitators (as well as other staff and faculty in the program) help in the recruitment process. Community college students from around the country and local high school students visit Iron Range Engineering's campus to learn more about the program and network with facilitators, professors, and students.

Program recruitment also includes **background work**, such as analyzing colleges or high schools for potential new partnerships, managing the prospective student database, scheduling application interviews, and sending program acceptance emails to students who apply. Facilitators focus on **engagement and personality** throughout the program recruitment process. As one facilitator stated, "Personality is significantly more likely to help you succeed than intelligence. I try to be interesting, relatable, and fun" (F2). As with many parts of their roles, facilitators focus on **networking and building relationships** to help with recruiting efforts. Facilitators have unique experiences working as engineers in various industries before transitioning into a staff position within higher education. They share these experiences with prospective students to build relationships. Facilitators also network with community college instructors and administrative staff from around the country. As one facilitator stated, "Building trust with students and their instructors is the real key to building a student base. Students today are not swayed by slick marketing so much as they are swayed by the word of those they know and trust" (F8). Once a facilitator connects with a student in their community college or high school classroom, they work closely with each prospective student. The last themes that emerged within program recruitment are **marketing and events.** This includes leading on-campus events, such as Engineering Expos (i.e., hands-on engineering information sessions), #Night (i.e., women in engineering event), and annual open house events. There are a few facilitators who collaboratively work with professors on the Iron Range Engineering marketing team, and that team oversees social media posts and website design.

Student Life

Facilitators make significant contributions to program culture. They start by creating and fostering a **positive and supportive environment** for all students**.** An example of this is having facilitators lead

student life activities to boost the morale of the group by creating an inclusive and welcoming environment. As one facilitator stated, “It was also important for me to dedicate events and little acknowledgments here and there to relieve stress and give students a break from the daily grind of engineering work. This promoted a caring and helpful culture” (F6). Students receive **personal support** from facilitators in the form of celebrating the diversity and successes of all students. Facilitators will also work with students on fun projects in the labs and at the local Makerspace. Facilitators focus on **engagement and activity** when it comes to student life events that contribute to program culture. They help to plan, execute, and take part in all student life activities that the program puts on for students. For example, many facilitators participate in welcome week activities, community meals, happiness week activities, and EngFest! (i.e., end-of-the-semester celebration event) activities. Facilitators work to provide opportunities for students to build strong relationships with others in their on-site Bell Academy semester, and they also help to plan virtual events for students working on co-ops and internships.

Another theme that emerged is that facilitators practice being **consistent and reliable** to ensure all students have an outlet to escape the stress they may be under at school, work, or in their personal lives. Facilitators recognize that many of the students at Iron Range Engineering are away from their families and friends, so it’s important to be consistent by having a regular and open presence for students. Facilitators also try to live by program ideals. As one facilitator stated, “I also try to maintain the IRE values and all things out if behavior goes outside the bounds” (F2). The last theme that emerged in the facilitator’s contributions to program culture is **safety and security**. Examples of this include truly taking care of students and helping them to achieve goals, promoting self-care, and maintaining a safe learning environment for all students. As one facilitator puts it, “If students don’t feel safe, it would be extremely harmful to the culture. If it isn’t a safe, collaborative, inclusive space, the entire culture of the program suffers” (F10).

Other

There are five job roles above that capture specific elements of a facilitator’s job responsibilities. The remaining job roles and functions are determined to be other duties, and many of these other duties are niche areas of work that may only apply to a select few facilitators. For example, a few facilitators do very intensive work related to **event planning**. This includes tremendous logistical planning and organizing for events such as EngFest!/graduation week, which involves student travel and transportation, meals, lodging, activities, and more. Some facilitators also have a critical role in updating and maintaining **facilities and vehicles, as well as providing IT support**. Two or three facilitators lead in this area, but many contribute to helping the leads out with tasks such as oil changes, cleaning out lab spaces, and organizing facilities. Facilitators also work a lot within the realm of **program administration**. Examples of this include participating in divergent thinking sessions for program innovation purposes, staff meeting participation, search committee participation, purchasing card reconciliation, general email management, administrative paperwork, shipping items to students, taking professional headshots/photos of students, utilizing and learning modern tools, and meeting with campus visitors or stakeholders of the program. Many facilitators focus on **community engagement** to ensure there is time for team bonding, support for all students, faculty, and staff, and building meaningful relationships with colleagues. The last theme that emerged within other duties is **team coordination**. Many facilitators work on collaborative teams with other facilitators and professors, and examples of these teams include the accreditation and assessment team, the scholarship committee, and the campus visit team. Some facilitators help coordinate with other campus personnel to reserve spaces for events, create effective cleaning schedules on campus, and troubleshoot any network/wi-fi issues. One facilitator said, “I try to be the learning coach for the other facilitators the best I can. That means stepping up when needed for them or sometimes taking on additional duties when they need to step back” (F2).

4 Discussion & Recommendations

The results from this research have generated insight into the facilitator position directly from the facilitator's perspective. The many quotes highlighted the uniqueness of this position in higher education, and there were many ties to meeting the needs of students in project-based and work-based learning environments. There are many student needs in every higher education program. Once the student needs have been identified within each institution, these facilitator positions could be implemented and utilized to meet said needs within these roles.

While examining the qualitative and quantitative results, it was recognized that the facilitator's role has three distinct divisions: **direct formalized student support/mentorship, community building and support, and program development and maintenance**. Facilitators spend about one-third of their time in each of these three areas. Direct formalized student support/mentorship is a student-facing category. Developing and maintaining the program includes non-student-facing or "behind-the-scenes" work. Community building and support includes both student-facing and non-student-facing work. It is suggested from this data analysis that all institutions considering implementing the facilitator position should carefully plan work within these three distinct divisions to ensure student needs are being met, a strong culture and community are being developed, and the program continuously improves.

With regard to **direct formalized student support/mentorship**, it was apparent that mentorship is key in this space. While students traditionally have professors and peers they can turn to, facilitators serve as mentors in between those two spaces - someone who isn't at the exact spot they are but also doesn't have as large a perceived power differential that may exist with a professor who is leading their technical learning. As such, other programs should consider ways that they can provide approachable mentors who are integrated with their programs formally but also have experience and job titles that may serve as extraordinary resources throughout the learning process in project-based and work-based learning models.

Regarding **community building and support**, a positive and supportive environment is highlighted as a critical element in boosting overall morale and building an inclusive community. While formal support is important to student success, it's also critical to be consistent and reliable in showing up for students outside of the structured learning environment. This is where deeper connections can be made with students, which can also create safe spaces for students to ask for any form of help from mentors when needed. Other programs should consider their community and culture and work to foster it.

With regard to **program development and maintenance**, facilitators provide support within the realms of administration, IT, facilities, fleet services/vehicles, and events. Instead of having faculty and staff solely rely on the support of other departments within the same institution, facilitators can help provide similar supportive services while fully integrating with the program. This results in quick fixes, continuous improvement processes, and logistical support that can reduce the cognitive load of professors and students. The tasks performed within this section by facilitators were related to the niche roles that some take on that aren't shared responsibilities with other facilitators, and focused more on the tasks that students don't necessarily see. For example, not all facilitators plan events, and not all help upgrade lab spaces. Other institutions should consider how to spread this load among different facilitators.

As the authors of this paper, we suggest that there could be future improvements to the current facilitation model and believe that further research can be done to uncover best practices within the given context. We also suggest that others adopt similar facilitator positions within their own institution to provide more support for their students, faculty, and staff. There are student needs in project-based and work-based programs left to chance, and the facilitators at IRE provide the structure necessary to meet many of these needs.

5 Limitations & Future Work

The main limitation of this study was that the population was limited since the facilitator position largely only exists in the IRE model, which limits the amount of data and the generalizability of the work. Nonetheless, diving deeper into the facilitation model from multiple perspectives is warranted based on the positive outcomes of the IRE model. Since the facilitator position does not widely exist, no instruments related to gathering this data exist. Future iterations of this survey outside of this pilot study could be revised and more fully validated.

For the instrument, one limitation is that facilitators were asked at just one time point how much time they were spending. These were one-time estimates. Future work could have them track their time spent in each of these bins for multiple weeks at different times of the year, since they work on a 12-month contract, but the academic year is only 9 months.

One-on-one follow-up through semi-structured interviews will be conducted as member-checking to see if there is anything missing in the data that can be identified by facilitators after sharing the themes with each of them. Also, this follow-up could provide further context and clarification surrounding the themes that uncover best practices. Future research related to the impact of the facilitator position from the students' and professors' perspectives could provide another form of motivation for other institutions to adopt facilitator positions. Additionally, the rest of the functions related to each of the six facilitator roles will also be explored. Facilitators completed the surveys in this study separately for each of the roles, which may have skewed the time reported for each role. A time-tracking activity for the facilitators may help support a more accurate portrayal of the hours spent in each role.

References

Christensen, D., Singelmann, L., Mann, C., Johnson, B., & Ulseth, R. (2023). The Bell Academy: A bridge semester where engineering students transform into student engineers who thrive in industry placements. *European Society for Engineering Education (SEFI).* https://doi.org/10.21427/BXVQ-XR47

Fifolt, M., & Searby, L. (2010). Mentoring in cooperative education and internships: Preparing protégés for STEM professions. *Journal of STEM Education*, *11*(2), 17–26. https://www.jstem.org/jstem/index.php/JSTEM/article/view/1515/1290

Johnson, B., Ulseth, R., & Wang, Y. (2018, October 19-21). Applying design based research to new work-integrated PBL model (The Iron Range Engineering Bell Program) [Paper presentation]. 7th International Research Symposium on PBL (IRSPBL), Beijing, China. https://cornerstone.lib.mnsu.edu/ie-fac-pubs/43/

Mann, L., Chang, R., Chandrasekaran, S., Coddington, A., Daniel, S., Cook, E., Crossin, E., Cosson, B., Turner, J., Mazzurco, A., Dohaney, J., O'Hanlon, T., Pickering, J., Walker, S., Maclean, F., & Smith, T. D. (2021). From problem-based learning to practice-based education: a framework for shaping future engineers. *European Journal of Engineering Education*, *46*(1), 27-47. https://doi.org/10.1080/03043797.2019.1708867

Microsoft CoPilot. Accessed 2025-01-31. *Prompt: 'Using themes, create a 150-word summary of this data'* Generated using https://copilot.microsoft.com/.

Ulseth, R. (2016). *Self-Directed Learning in PBL* (Vol. 18) [Doctoral dissertation]. https://doi.org/10.5278/vbn.phd.engsci.00091

Van den Bogaard, M., & Strobel, J. (2023). Workplace spaces as learning spaces - Engineering students' experiences with co-op. *2023 SEFI Conference*. https://doi.org/10.21427/V28R-5847