

Preparing Students to Thrive in Industry: The Critical Role of a Learning Coach

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Abstract

Iron Range Engineering is an upper-division undergraduate engineering program where students recruited from across the nation spend their last five semesters in experiential and co-op-based learning. One of those five semesters is a preparatory semester (named Bell Academy), where students have just completed their first two years of undergraduate engineering education and have not yet transitioned into full-time engineering co-op work. Students develop their technical, design, and professionalism knowledge and skills during that preparatory semester in order to thrive in their upcoming work experiences. While students are in their full-time co-ops, they are also full-time students, completing their courses in the evening. All learning activities are facilitated to accommodate faculty, staff, and students who are scattered throughout the nation.

The Iron Range Engineering team consists of both faculty and staff members. The faculty members in the program are Ph.D.-holding, tenure-track professors. Within the staff group, there is a unique role called a facilitator. Facilitators all hold bachelor's and/or master's degrees in engineering and have industry experience. In traditional academic spaces, the support of students' development as engineers is shouldered primarily by professors, which does not always address the development of the whole student. The role of a facilitator includes providing support to students from the moment they express interest in the program, throughout their education, and beyond. This role provides successful strategies for a positive student experience in the program. Facilitators guide students through the program assisting with career development, life coaching, community building, continuous improvement, and more. The purpose of this paper is to frame the critical nature of a facilitator's role, specifically as a learning coach. This will be accomplished by analyzing the perspective of five current facilitators, all of whom have participated in the same program before the facilitator role was developed. The paper finishes with lessons learned and recommendations for implementing similar practices, regardless of program type.

Background

Within academia, as shifts happen from traditional educational models to more innovative models, there is a need to revisit student needs when it comes to their support. While professors have traditionally been thought of as the main support for students throughout the navigation of their undergraduate education, mentorship and advising roles do not traditionally translate well to expected job duties, especially within traditional tenure and promotion pathways [1]. Professors just do not have the capacity to balance full student support; life coaching, career coaching, advising, mentoring, etc., are very rarely written into the traditional teaching and

research model of professorship. Depending on the institution, there may be those in advising or student support roles to help with these processes, but many times students must reach out externally to their courses to access these resources versus them being intentionally built into the curriculum and program culture.

Iron Range Engineering (IRE) is an innovative, award-winning [2], [3] undergraduate engineering program that is centered both in project-based and practice-based learning pedagogies. IRE began in 2009 as a project-based learning (PBL) engineering program (based on Aalborg University PBL model; [4]) focused on the last two years of a bachelor's degree. The program shifted in 2019 to a practice, co-op-based learning model (adapted from Charles Sturt Engineering Program; [5]) lasting two and a half years (i.e., five academic semesters plus two summers). Both of these programs culminate in a bachelor's degree in Engineering. The first semester of the five-semester sequence is called the Bell Academy (BA) where students have a bridge semester focused on preparing students in technical, professional, and design competencies to be ready for engineering work experiences for the next 24 months leading up to graduation [6], [7], [8].

In order to adequately prepare students to transition from their first two years of engineering learning, likely at a community college somewhere in the United States, into full-time engineering practice, there must be an intentional effort to develop the whole student from an engineering student into a student engineer. This starts in the BA but continues throughout their entire two and half years with IRE. One of the critical and unique components of providing students with the guidance and support they need is through what IRE has named a facilitator. The facilitators are bachelor's or master's holding engineers who have had industry experience [9]. The facilitator role is multifaceted, but ultimately, they serve as liaisons with the students in various spaces; this helps students to bridge between their technical, design, and professionalism learning and the people involved in each of those spaces, for example, Ph.D.-holding professors, work supervisors, etc. [9]. There are currently 11 facilitators on staff. These facilitators are full-time university teaching staff who have stepped away from industry positions to join the academic realm.

While the role of a facilitator is broad and can involve many different work duties (mentoring, teaching, serving, managing, etc.), one that is continuous throughout the students' two and a half years is the role of a learning coach. During the BA, facilitators and their learning coach students meet at least once a week to check in on their progress, set goals, discuss future opportunities, build a relationship, etc. After the BA, facilitators and their learning coach students meet regularly to continue these discussions and address work experiences. The role of the learning coach is to provide intentional guidance and support as the students navigate their development into full-time engineers [6].

A variety of matching methods have been employed for matching learning coaches and students. Attention is paid to student major, gender identity, racial identity, veteran status, etc., especially for initial placement during the BA, but due to the number of students compared to learning coaches (approximately 10 students per full-time learning coach), alignment in one or more of these areas may not be possible. The current process is to change learning coaches for students every semester, allowing students the ability to build relationships with a variety of people and get a variety of perspectives, but flexibility is built in that learning coach assignments can shift as needed. It should be noted that this paper serves as the first in a series of research that will be conducted to determine what should be focused on in matching learning coaches to students and evaluating the success and growth opportunities of previous learning coaches to learning coach student relationships.

Methods

For this analysis, five current facilitators who serve as learning coaches were asked to write a reflection on their experiences serving as a learning coach. Their only prompting was to include what being a learning coach looks like, including examples of successful experiences and those that maybe did not go well, with lessons learned. After these five reflections were collected, a team of six researchers reviewed the five reflections, using manual preliminary coding methods [10] to take notes of words, phrases, or ideas that emerged. The group then met together to discuss their takeaways. This led to coding the findings into categorical themes of the roles a learning coach takes on to be successful. While these methods were fairly informal, this is a foundation for future research directions that will evaluate the approaches and outcomes of the learning coach to student relationships in both qualitative and quantitative ways.

Participants

Some demographic information relating to the five facilitators who provided written reflections on their experience as learning coaches is reflected in Table 1.

Table 1. Demographic information of the five facilitators who provided written reflections on their learning coach experiences.

Facilitator #	Gender Identity	Time as a Learning Coach (semesters)	Engineering Industry Expertise Areas
1	Woman	8	Mechanical, Quality/Process
2	Man	6	Mechanical, Engineering Management
3	Woman	4	Biomedical
4	Man	13	Chemical, Process, Production, Instrumentation
5	Man	1	Design, Electrical, Environmental, Fabrication

Results

Figure 1 summarizes the six categorical themes that represent roles the learning coach aims to fulfill that emerged through the coding methods described. Each of the following sections will elaborate upon each of those categories. Synthesis for the meaning within each of these categories includes citations from the five facilitator reflections and are cited as such. It also includes gaps being filled by the research team, who are part of the IRE community and are familiar with the learning coach role. Lessons learned with recommendations for implementation in other programs and future research directions follow the thematic summaries.



Figure 1. Categories of the roles learning coaches take on with their learning coach students in order to be successful.

Building Relationships

Building relationships with students is the foundation of the learning coach role, and it begins before the start of a semester. As a learning coach, adaptation of multiple leadership styles can help students grow throughout their education (Facilitator 1). Before the beginning of each semester, an introduction meeting is held. Something that Facilitator 2 has found to be helpful is to “begin each semester by sending out a survey to gather information about their career and educational goals, what they seek in a learning coach, and what interactions with previous learning coaches/mentors have been successful” (par. 2). This strategy and adaptations of it, such as some start with just asking a lot of questions verbally (Facilitator 5), give learning coaches the opportunity to get to know their set of learning coach students before their first conversation during the semester. Facilitator 3 stated that “Every student is so different in the way they learn and communicate, so it is very important as a learning coach to be able to adapt to these styles for each student” (par. 2). Learning coaches need to thoroughly understand their students’ strengths, weaknesses, goals, and aspirations to establish a foundation for tailoring their guidance.

Once learning coaches have started developing the relationships, it is important to continue to check in with each student on a regular basis to foster that connection, which was emphasized by all five facilitators. By developing and fostering this consistency in the relationship, learning coaches can offer more targeted and just-in-time advice, encouragement, and motivation to each student. This is not always easy, as students can choose to “ghost” their learning coach’s communication efforts, but persistence is key (Facilitators 4-5). Those who may need the most help can be the first ones to stop being responsive (Facilitator 2), which calls for even more attentiveness in follow-up. Check-in frequency can vary from student to student (Facilitators 1-4), with the ultimate goal always being to help the students navigate their journey in engineering education more effectively. A recent emergent practice that was deemed successful as an additional checkpoint was having each learning coach facilitate a group meeting with all their learning coach students. This gave the students an opportunity to learn what other students are doing on co-ops and internships, talk about common challenges, and build a sense of comradery with each other.

While learning coaches are rotated each semester so that students have the opportunity to learn tips, techniques, knowledge, and more from multiple facilitators, students and learning coaches alike are always welcomed and encouraged to reach out to past learning coach relationship participants if desired. In the end, Iron Range Engineering hopes “that our relationship(s) can evolve from ‘learning coach’ to ‘lifetime mentor’” (Facilitator 3, para. 3).

Adapting to Student Needs

Once the foundation of the relationship is established and regular checkpoints are set, the learning coach sessions can be tailored to match students' needs to truly support them in the situations they encounter as student engineers (Facilitator 2). These sessions need to adapt to “each student’s learning style and personality” (Facilitator 3, para. 1). Initial assessment as a learning coach is needed of students’ abilities and needs in different areas of their lives, such as time management, communication, academic progress, career development (e.g., interviewing techniques, resumes, cover letters, etc.), open-ended problem-solving, job etiquette, personal life matters, and more (Facilitators 1-5). Once a baseline is determined for these needs and abilities, learning coaches are able to work together with their learning coach students to make small changes and grow in those areas.

With the differences that come with each student, it is important that a learning coach shifts the way they interact with each student so they can add value during their interactions. In some instances, a student may need to change learning coaches mid-semester if it is determined that is what’s best for the student; a specific example of this is when a facilitator works part-time and is not on campus as often as full-time facilitators for those BA students who are on-site in Northern Minnesota (Facilitator 3). Especially for those students who may be struggling to adapt to a new academic and/or work situation, conversations may need to shift from “learning, professional, and career development to managing emotions and overcoming overwhelmingness, anxiety, depression, and other mental health concerns” (Facilitator 2, para. 4). Being able to make these shifts throughout the semester and from student to student based on needs is a critical part of being a learning coach.

Facilitating Career Development

Of the many goals in higher education, a universal goal of many programs is to develop students into high-performing professionals in various industries. The best way to learn how to perform in industry is by working in the industry; at IRE we put a premium on this value. The expectation during IRE is for students to work for two full years as student engineers while completing their bachelor’s degree. There will be times when students have a gap time between co-ops in which industry-based design projects, similar to what they complete during their BA semester, are available. To ensure students are able to achieve this goal, learning coaches work with their learning coach students to establish their knowledge and fill in knowledge gaps over a wide range of topics that include job searching and interviewing skills, resume and cover letter feedback, general professional etiquette, negotiation, development of an online presence and work-life balance (Facilitators 4-5).

A crucial mindset of a successful learning coach who can add value to their students at any experience level is to stay “one step ahead of the student and assist them in setting goals for finding their next job” (Facilitator 4, para. 4). A benefit of the current model at IRE for facilitators is that all learning coaches have industry experience, so they have lived experience in these career development realms as a student and professional, allowing the learning coach to be more relatable (Facilitator 5). Their knowledge in these realms can assist them in helping students manage their emotions throughout the entire process, as each career development experience is unique, and some journeys can take several months of searching to find the correct fit to advance the student’s career.

While professors are able to arm students with the technical knowledge they need to thrive in industry, students’ interpersonal skills often need development. Many students who are out on co-op mention how challenging it is to balance work, school, and their personal lives and need support in this area of career development (Facilitators 1 & 4). Through regular check-ins, learning coaches are able to actively guide their students through the wide gamut of experiences the students will experience in their early engineering opportunities (Facilitators 1, 3-5). This coaching is happening in real-time, so instead of retroactively dwelling on the career development process, there are more impactful learning opportunities and reflection for active adjustments to happen in the current process through regular communication with a learning coach. Learning coaches also have current connections with the student’s supervisor (Facilitator 4) to make sure adequate growth is happening while students are physically away from campus.

Leading by Example

One of the greatest values shared by all learning coaches is having a continuous improvement mindset, which is a core value at IRE [11]. All learning coaches are engineers with industry experience and knowledge (Facilitator 5). Although valuable, learning coaches must continually acknowledge that their experiences in industry alone do not define nor fully represent the person they are today. Instead, learning coaches focus on the ever-changing needs of the various engineering industries and adapt their teachings and mentoring to those needs (Facilitator 3), all because of their willingness to grow and learn.

Expectation setting is critical to the success of students (Facilitator 4). Some of the expectations learning coaches have of their students include but are not limited to using professional language, being responsive (e.g., responding to emails, phone calls, and texts), and promptness (e.g., being on time, responding within one business day). Actions speak louder than words, so learning coaches focus their time and energy on continuously leading by example through their own actions. Learning coaches provide many opportunities for students to practice meeting these expectations.

Students are not just observing during the scheduled conversations. It is important that learning coaches act professionally in all settings and live by their ideals and values. Facilitator 4 recalls an experience shared by a student when prompted to reflect on the most impactful experience of their education. Apparently, early in the first semester of this student's experience, another student was attempting to make jokes that were perceived as inappropriate and unprofessional. This was done off to the side with a learning coach, as the student tried to make them join in and lower their professional behavior standards. This learning coach would not crack but remained friendly, indicating they intended to remain professional. The two in the conversation did not know that anyone was paying attention, which made the learning coach's choice all the more meaningful to the reflective student. In their eyes, this was an act of leadership and inspired them to be this type of difference-maker throughout their education and career.

Leading by example is a professional commitment that goes beyond a student's education. Many learning coaches fall short of meeting these expectations every day and have to navigate with their own personal struggles in work and life (Facilitator 2). In fact, one of the expectations is that all people will fall short from time to time, so learning coaches must accept living in that humility and own up to the shortcomings with students when they happen, offering a space to learn from failures for both coach and student (Facilitator 4).

Providing Continuous Feedback & Checking Mindset

From the initial contact and establishment of the relationship, multiple approaches are utilized to continually check in with students. At IRE, it is recognized that multiple forms of expression may be beneficial. Thus, both oral and written means are available for students to work with their learning coach on their progression. One is via those live learning coach conversations that happen regularly. As mentioned in previous sections but summarized here, these conversations can include learning, professional development, and career development, which are very academic success related, but can also feature managing emotions, time management, overcoming being overwhelmed, anxiety, depression, and mental health concerns in general (Facilitators 2 & 4). Since the facilitators are not licensed mental health professionals, part of this may be providing university resources available to serve them. These regular, more casual conversations allow learning coaches to give oral feedback to students where grades are not associated. Learning coaches can help students to set "appropriately challenging...yet attainable" (Facilitator 5, para. 3) goals to push them forward.

While live learning coach conversations are a critical part of checking in on students' progress and setting goals, the learning journals assigned weekly are graded by learning coaches, allowing "additional insight into the mindset of students" (Facilitator 2, para. 2). Students may be willing to express their thoughts and vulnerabilities in a different way than during the oral learning coach conversations. Since grades are associated with the learning journals, students also may

feel a different sense of motivation to invest in these reflections. Insight into the IRE grading scale that is used for these learning journals is included in Singelmann, Wang, & Christensen [12]. The learning journals provide an opportunity for the learning coach to give written qualitative feedback tied to a quantitative score. The topics in the learning journals vary to give students at any stage opportunities to reflect professionally and personally on their progress, including multiple learning journals where they get to choose their own prompts that may be relevant at the time.

In summary, because learning coaches are continually updated on their student's progress, they are able to know the details of their lives and successes, especially those successes that have come after much trial and failure. This allows learning coaches to learn things to support their own personal growth as well as gives opportunities to share these stories anonymously program-wide to help encourage and motivate other students who may be struggling to see the light at the end of the tunnel (Facilitator 4). Learning coaches can “be the person to assist in goal setting, positive attitudes, and be a person of accountability at a more frequent rate than what a typical class structure would [provide]. Instead of being only evaluated by a final or various projects in course work, [learning coaches] are able to be a lower stakes, but equally important point of accountability and show that it is okay to fail, as long as we aim to continuously improve and learn lessons from what we failed at” (Facilitator 5, para. 4).

Finding Own Support

Serving as a learning coach can be a difficult experience. Each facilitator comes into the role with a background in engineering, but more than that might be needed to meet every challenge encountered. One facilitator noted that each student is very different and requires different leadership and teaching styles” (Facilitator 1, para. 2). It is essential, then, that learning coaches are supported and provided with opportunities to learn and grow as well while they serve as students' first point of contact. The program aims to provide this support in several ways.

The first is through twice-weekly facilitator meetings. Facilitators use these meetings to update one another on student progress and identify any students of concern. From there, the meetings lead to discussions about strategies and best practices based on previous experiences. Since the role of a learning coach rotates each semester, facilitators have the opportunity to discuss individual student plans with their previous learning coaches. This is especially important because learning coaches “know where their students work, where their next job is going to be, what their life-work balance looks like, how their time management skills are developing, and even more” (Facilitator 4, para. 3). Using this knowledge, the learning coach can develop a plan for how to meet the needs of each student better, as illustrated by this facilitator:

“After some reflection and talking with this student, I determined that they have a much easier time opening up during face-to-face conversations. We had only been having check-ins over the phone due to me working from home. I brought this up to the other learning coaches who are on-site every week and was able to shift conversations with this student to a different learning coach” (Facilitator 3, para. 1)

Outside of facilitator meetings, the program also holds all-staff meetings each week. As the name implies, these meetings include every staff member, bringing instructors, advisors, and learning coaches together. Similar to the facilitator meetings, this offers opportunities to address students of concern or recognize patterns across cohorts. The remaining time is spread across going over program updates, upcoming events, or holding workshops based on current program needs.

In addition, each facilitator has the space to utilize professional development time and funds from the university to grow in their desired ways, technically, professionally, or personally. They have to recognize and give themselves grace in learning and failing. To be a learning coach requires life-long learning in order to face the never-ending challenges associated with the role. As one learning coach commented, “I’ve been a learning coach for 3 (maybe 4) semesters...I still feel like I’m learning a lot.” (Facilitator 3, para. 1).

Lessons Learned

Based on this analysis undertaken by the research team, four primary lessons learned emerged, which are shown in Figure 2. In the following paragraphs, the lessons learned and potential takeaways for other programs will be discussed.

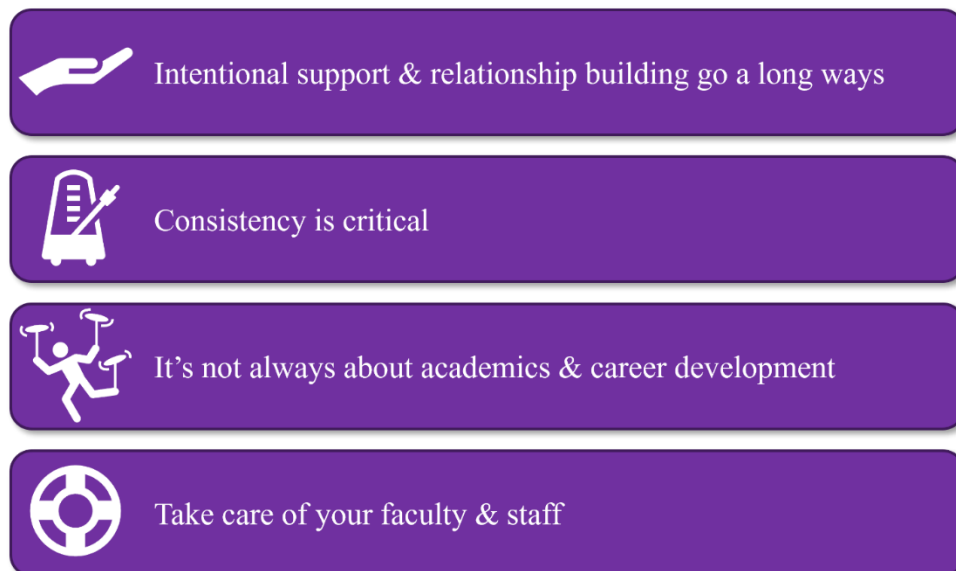


Figure 2. Summary of lessons learned from the analysis of learning coaches' reflections.

Intentional Support & Relationship Building Go a Long Ways

As evidenced throughout the summary of the emergent themes, it takes a lot of intentionality to show up as a learning coach. From day one of building a relationship through the end of a semester through times when you are no longer a student's learning coach, it takes intentional effort. A learning coach is cognizant of student needs and struggles and life happenings and on and on - paying attention to those details and following up is an important part of feeling successful. The struggle from a learning coach's perspective can be that students may not return the same level of intentionality. They may ignore efforts to reach out. They may not follow through on things they said they would, etc., but as evidenced throughout the learning coaches' reflections, these efforts feel like the difference maker in being able to truly build trust and help students in any facet of their lives.

In any program, this means having multiple means of communication with students - phone calls, texts, emails, regular meeting times, etc. for those who interact with the students. While programs may not have the formality of a job position titled "facilitator" or "learning coach," there are those who are "academic advisor," "faculty advisor," "research advisor," "life coach," "career coach," etc. who are formally present that warrant these same techniques. Especially for those students who struggle personally, professionally, or academically (or in all three), intentionality from a facilitator standpoint is critical in retaining them and helping them on the path to success. This also comes with the recommendation to start the relationship building early and with care for the whole student, not just the small section of students you may be assigned to focus on, such as a pathway to graduation, research, etc. All parts of them are interconnected.

Consistency is Critical

Consistency - in meeting times, in expectations, in follow-up, in professional behavior - is critical to being a learning coach who not only shows intentional support sometimes, but regularly. They lead by example always. They show up on time and live the expectations agreed upon in the relationship. And potentially most importantly, they follow up when they make mistakes and fail, adding authenticity and relatability to the relationship. While each learning coach may function differently, consistency in communication and professional behavior remains a foundation for students throughout their education at IRE.

This can apply in any academic position to help ground students in what to expect from you. For professors, this can be consistent when you follow up with feedback after grading. For advisors, this can be regular emails scheduled at the beginning of the semester to remind students of important deadlines and meeting times for planning. For career specialists, this can be having regular office hours to review resumes. So many things can shift and change on a daily basis in

life that building some sort of consistency that students can rely on, which reflects the consistency and care of the person in general, can be a difference maker.

It's Not Always About Academics & Career Development

There is so much more to a student than can merely be seen in a formal academic setting, such as a class that occurs for one hour three times a week where they are surrounded by peers. Learning coaches have the opportunity to learn these things as they go, and as they are consistent and make intentional efforts to connect with students, the shift from being primarily concerned about academic or career success to just surviving and helping someone connect with the mental health resources they need to manage life may occur.

There is a lot of hesitation in academia to involve the personal side of faculty or staff with students, but the value that comes from shared experiences with people who have been through similar things can be helpful in truly being able to mentor and be an example for students. Share stories and experiences, obviously with cognizance to being professional and detaching from situations as needed for personal well-being, but having role models and mentors who can bring interpersonal comfort and relatedness from similar characteristics, attributes, and experiences is valuable [1].

Take Care of Your Faculty & Staff

Even small efforts, such as meeting regularly to relate with those who are in a similar position to you in helping students, can make a big difference. This allows for working together to plan, support, and brainstorm in ways not possible individually. Learning coaches can take on a high mental load in building these relationships, being consistent, showing up, sharing their experiences, etc., and need space to debrief and have a different perspective.

Collaboration amongst peers can be a simple yet strong way to gain support for faculty and staff. Even if it is simply a consistent weekly meeting for only 15 or 30 minutes, just as the lessons learned above emphasize, those intentional efforts can allow space to develop professionally and personally, gaining the support needed to better support students more thoroughly.

Limitations & Future Work

As mentioned in the Methods section, the protocols in this research were fairly informal, but for strong reasons. This study was to serve as a baseline for the future work that needs to be done at IRE to fully evaluate the current facilitation model of learning. Nothing beyond a sentence or two in other papers about the IRE model really focuses on what being a facilitator means or is like, which is a problem as it is such a large part of our student support model. Being only in the

fifth year of having full-time facilitators serving as learning coaches, a background reflection of the experiences of those who serve as learning coaches was warranted to serve as a springboard for future work. The goal is to explore students' experiences with the current facilitation model in both qualitative and quantitative ways. This will include student perspectives and outcomes, which were not included here, as well as additional perspectives from other facilitators since less than half of the facilitators were included in the reflections. Ph.D.-holding faculty may also be included in future efforts to further define the critical role of a facilitator in contrast to traditional models of academic support that stem primarily from Ph.D.-holding faculty.

Conclusion

The Iron Range Engineering program's success stems from many different factors, including the indispensable learning coach role played by the facilitators. With a focus on holistic student development, the facilitators guide and support students through their educational journey. As seen in the reflection of the five current learning coaches, the nature of the learning coach role can have a transformative impact on the student experience and the facilitators themselves. Pursuing an engineering education is a challenging path but with the help of a learning coach, students can have much more of the support they need. The complementary guidance and support that is offered by those who have practiced engineering allows professors, who do not always have the capacity to offer whole-student support, to focus on delivering high-quality technical education in the classroom. This reflection from current learning coaches gives a solid foundation of what a learning coach is. The lessons learned can translate nicely into guiding other institutions in the creation of the learning coach role in their respective programs.

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