

Letting your students fail: Overcoming failure experiences in undergraduate work-integrated learning

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Work-integrated learning (WIL) is an expanding practice in Canadian non-clinical health-related undergraduate programs. WIL participants frequently encounter failure experiences, yet there is limited literature exploring how students overcome failure and how instructors can support this process. This study aimed to understand how students overcome and learn from failure experiences in a non-clinical undergraduate health-related WIL program. Using a constructivist grounded theory approach, in-depth interviews were conducted with 10 previous students from an established WIL program. Iterative cycles of data analysis and constant comparison generated a theoretical explanation highlighting how students overcome failure by renegotiating their expectations through 1) experiencing and managing the wave of emotion, 2) modifying expectations of self and others, 3) redefining success and moving forward, and 4) building flexibility of expectations. This research presents failure as a tool for learning and a steppingstone toward success. Findings inform a pedagogical framework to optimize student learning from failure.

Keywords: Failure experiences, undergraduate education, failure pedagogy, work-integrated learning, constructivist grounded theory

In Canada, work-integrated learning (WIL) is an expanding practice in undergraduate education where students learn in workplace or community-based settings, allowing them to gain specific skills that cannot be taught in a classroom. Students translate WIL experiences to knowledge and understanding, advancing their practical and workplace-specific knowledge (Billett, 2009). WIL applied research projects have gained popularity in Ontario post-secondary institutions over the past ten years, especially as institutional mandates are expanded to include applied research (Sattler et al., 2011). WIL builds transferable skills including critical thinking, self-conduct, collaboration, and communication, which benefits students through informed career decisions, enhanced resumes, employability, and networking opportunities (Peters et al., 2014; Reddan, 2015; Sattler et al., 2011).

Within WIL programs, students face the possibility of encountering failure (Edwards & Ashkanasy, 2018; Jungic et al., 2020). Failure has been studied in undergraduate students from a didactic pass or fail lens based on course grades (Fassett & Warren, 2004; Henry et al., 2019; Respondek et al., 2017) and WIL clinical practice evaluations in nursing students (Hughes et al., 2020; Lancia et al., 2013; Rutkowski, 2007). Conducting research on academic performance, in terms of pass or fail in WIL courses, limits our understanding of the extensive learning students can have as a result of a failure with their project. This intangible and subjective type of failure has been coined as *failure experiences* for the purpose of this research. In the literature, a failure experience is generally described as a learning experience whereby learners encounter a problem and must adjust and expand their prior knowledge to accommodate for the new information (Roschelle, 1997; Tawfik et al., 2015). Failure experiences can improve subsequent learning and prepare learners for context-specific problem solving. An instructor in a failure-based learning environment should balance supporting learners and allowing them to face the complexities associated with failure (Kapur, 2015; Tawfik et al., 2015). Undergraduate programs are an ideal low-risk environment for students to experience failure, as they provide opportunities to

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reflect and contextualize the experience, enabling the student to improve their knowledge and skills (Kapur, 2015). Kolb's (1984) experiential learning theory supports failure as a type of concrete experience from which students can observe, conceptualize, and ultimately learn.

Tawfik et al. (2015) discuss experiences in the educational setting, where a failure has individual-level implications on educational safety, that is, the safety of students in a learning environment. Despite the growing field of WIL, there is limited literature discussing how students overcome and learn from failure experiences within WIL. Additionally, there is a dearth of research related to integrating failure into WIL pedagogy and similarly a limited understanding of best practices for instructors to support students through a failure experience. Understanding the implications of this within WIL programs is essential for student learning, program planning, and instructor support. This research study aimed to understand how students overcome and learn from failure experiences in a non-clinical undergraduate health-related WIL program.

The context for this project was the Interprofessional Education for Quality Improvement Program (I-EQUIP), a WIL program in the Faculty of Applied Health Sciences at Brock University for third- and fourth-year undergraduate students in a health-related degree. In I-EQUIP, student participants develop and implement a quality improvement initiative at a health setting in the Niagara Region. For example, a recent project focused on assisting in the improvement of patient care transitions from hospital to long-term care facilities through implementing a new transfer form and opening new pathways of direct communication. Didactic and WIL methods are combined to train students in the scientific principles of health system design and management and encourage practical application. I-EQUIP students meet once each week in the classroom with the course instructor to discuss project progress, share ideas, and learn with one another about core research and concepts to support their projects. Students then work with their interprofessional teams, which generally consist of one or two students, a facilitator from the project organization trained in quality improvement, patients and families, and front-line health care providers including nurses, physicians, ward clerks, unit managers, nurse practitioners, therapists, and data analysts. I-EQUIP aims to provide future health professionals with competence to use quality improvement methods and principles in their careers. Students are assessed based on their written assignments, project reports, and reflections on learning outcomes associated with their WIL project. Their grade in this course is not contingent on project outcomes.

METHOD

A constructivist grounded theory approach was employed for this research as described by Charmaz (2006). Two methods of data collection were employed: intensive interviews and memo-writing.

In-depth open-ended interviews were conducted with each participant, lasting approximately one hour. Each interview was recorded and transcribed verbatim within one day of the interview. A semi-structured interview guide approach was used to complement grounded theory, as it offered opportunities for further inquiry into emerging ideas while encouraging rigorous systematic inquiry. Questions were developed based on Fenwick's (2001) description of theoretical questions as they relate to each cycle of Kolb's experiential learning theory. The interview guide evolved throughout the course of the interviews. The questions aimed to understand participants' perceptions of failure, their failure experiences, the course of action they took to address the failure, and what they learned from the experience.

Memo writing elaborated on categories, concepts, and codes, specifying their properties, determining relationships between them, making comparisons, and identifying gaps in analysis.

Participants

The researchers recruited, via email, 10 graduated I-EQUIP students from Brock University. Purposeful sampling was used to interview information-rich cases to obtain suitable and sufficient data (Charmaz, 2006; Patton, 2015). The first three participants were recruited using a convenience sampling technique. The subsequent seven participants were recruited through inductive grounded and emergent theory sampling, where data collection was open-ended to allow selection of informants based on emerging ideas (Patton, 2015). Demographic information was not collected due to the small size of I-EQUIP and potential for participant identification. The interviewer had previously met some of the participants, though she had never worked with any of them inside or outside the academic environment. The researchers believe this familiarity encouraged participants to trust the interviewer with their experiences, promoting honesty and depth in their responses.

Sensitizing Concepts

Sensitizing concepts, in alignment with the constructivist grounded theory method, position and inform the research process. They provide a starting point for theoretical ideas to pursue and research questions to pose, however are not a framework for analyzing the data. Three main theories were used to inform the sensitizing framework including Kolb (1984), Dewey (1938), and Piaget (1977). Kolb's (1984) experiential learning theory describes learning as using reflection to form cycles of abstract conceptualization and experimentation which eventually lead to understanding. Dewey (1938) referred to failure as problematic experiences, framing it as a subcategory of the experiences from which learning evolves. Piaget (1977) defined failure as perturbations and described them as essential for learning as they facilitate reorganization of cognitive schema at a higher level, forging a new foundation for problem-solving. Gartmeier et al. (2008) expanded on Kolb's experiential learning theory to incorporate failure as negative knowledge, which is especially relevant to workplace learning to help manage and avoid future failures. These models were used to define learning and position it from the context of experience.

Within the constructivist framework, there are specific attributes of a failure experience. Learners must be engaged in a concrete experience to begin the learning process (Fenwick, 2001). If the learner identifies this as a failure experience, they can then move through cycles of failure-based problem solving to expand and modify their knowledge, ideally resulting in a subsequent successful experience (Tawfik et al., 2015). Within the experience, learners should have the support of an educator to coach them in their learning. Continuous focused reflection throughout is essential for building knowledge. Ideas and hypotheses can then be created and tested, adapted as necessary, and accepted by the learner as knowledge (Fenwick, 2001). These models were used to frame the conversations about defining and understanding failure experiences.

Data Analysis

Constructivist grounded theory analysis involves concurrent data collection and analysis, constant comparison, theoretical sampling, and integration of memos at multiple points in the research (Charmaz, 2006). The researchers moved fluidly between analysis steps as necessitated by the data and each new finding informed subsequent steps in the research process. Analysis of interview transcripts was conducted through four coding steps.

First, initial coding transformed the interview transcripts into codes using the line-by-line technique. Initial codes were short, open, and remained close to the data. In-vivo coding was employed as much

as possible to reflect participants' language and meanings, converting the first word of the code into a gerund as Charmaz (2006) recommends. For interviews following the first one, initial codes were compared with the data from previous interviews.

Second, focused coding organized the initial codes into 12 in-vivo categories. Memos from initial coding were integrated and new memos were written to describe each category and how they related to one another. Constant comparison was employed to compare emerging findings with all the previous transcripts and codes individually, then as a whole.

Third, theoretical coding examined how the categories related to one another, developing four concepts to hypothesize how categories related to one another in a manner that addressed the research question. Key theoretical categories were adopted as concepts. Memo writing and constant comparison further refined each concept and the categories within it. Then, the theoretical concepts were compared with the categories, codes, and raw data from each participant to ensure they adequately described the data.

Fourth, a theoretical explanation was generated that linked the concepts, and by extension the categories and codes, together to address the research question. Constructivist grounded theory views theory construction as an interpretive process that emphasizes understanding, not explanation, of the studied phenomenon (Charmaz, 2006). All memos were re-written in the context of the emerging theoretical explanation, which further refined the analysis.

The 10 interviews were conducted in three cycles of three interviews, plus one additional interview. After eight interviews, there were no new theoretical insights and the properties of the core concepts and categories were clearly outlined. Analysis of the ninth interview yielded a slight reorganization of the categories to best fit the theoretical explanation. The tenth interview was analyzed and compared to ensure saturation was achieved and the findings were applicable at the individual level.

Ethics

Ethical approval was granted by the Research Ethics Board at Brock University. Participants were emailed a letter of invitation and an informed consent form, which they signed and returned electronically. All participants consented to participation and recording of their interview.

FINDINGS

Expectations described anticipation of something with confidence of its fulfillment. Whether implicit or explicit, all participants held expectations for themselves and how they were going to act, how others like their team members were going to act, and how their project would unfold. A failure experience caused participants to challenge and adapt their expectations to form a new project direction and achievable definition of success. Analysis of the collected data yielded a theoretical explanation of how students overcome failure, presented in four primary concepts rooted in renegotiation of expectations. Overcoming failure required renegotiation of expectations in four ways:

1. Experiencing and managing the wave of emotion
2. Modifying expectations of self and others
3. Redefining success and moving forward
4. Building flexibility of expectations

Experiencing and Managing the Wave of Emotion

Discouragement, frustration, disappointment, and fear compounded in a wave of emotion that hit participants immediately following a failure experience. Their initial reluctance to accept failure was demonstrated by statements like “failure is not an option.” These emotions stemmed from participants’ expectations being broken, as their initial plan could no longer be enacted, causing uncertainty. An example of this stems from a statement from one participant who outlined that, “I didn’t know what to do next. And I was like, I can’t make progress or do anything because I don’t know what I’m supposed to be doing.”

Feeling the wave of emotion encouraged reflection on their initial expectations, so these could be adapted moving forward. Emotional regulation, peer group support, and a failure-norm culture were key elements to assist participants through their wave of emotion.

Emotional regulation involved being conscious of and attempting to control the initial wave of emotion. Participants emphasized the importance of celebrating success and acknowledging failure in a manner that provided motivation moving forward. Self-reflection helped most participants understand why their emotional response occurred, which helped them manage it.

Peers formed a community where participants could vent about their frustrations and receive empathy in return. They shared similar experiences, providing a perspective of failure as normal within the I-EQUIP environment.

Normalizing failure experiences required a culture that viewed failure as a normal, acceptable component of learning. “If I’m having challenges...I feel more comfortable going and talking to people...rather than just kind of working through it on my own until it gets to a point where I can’t manage it.” When participants were in an environment they did not perceive as failure safe, they would refrain from acknowledging their failure and internalize their emotions. For example, one participant said:

If there's some sort of structure or dedicated time to do that, where everybody's actually going to sit down and reflect on their experiences and be willing and open to share. That'll kind of get people more comfortable with having these discussions and reflecting in that way, and identifying the learnings that they can um pull out of what could be otherwise seen as negative situations.

Modifying Expectations of Self and Others

Participants held expectations for themselves related to their responsibilities for the project. These included decisions about project requirements, taking responsibility for outcomes, sustaining motivation over time, and taking initiative during times of success, failure, or otherwise. Participants described a fear of personal responsibility and repercussions for failure like poor grades, disappointing others, and “feeling like a failure.”

An unquestioned hierarchy of power was present in all projects and teams. Power was the ability to be heard and listened to, enact changes that encountered resistance, and was associated with experience and credibility. Given the hierarchical influences, student participants held different degrees of leadership on their teams. Those with a high degree of leadership took more responsibility for the project during a failure experience.

We were put in this like leadership position in a group of people where like the undergrad student was not the natural leader...but we were kind of, in a way like the forced leader...it was like unnatural for me because they would kind of look to me to say like, you're the leader like, tell us what you want.

Participants who held less leadership acted in a supportive role for the team members responsible for adapting the project to accommodate for the failure.

While our team was always so welcoming and they didn't really ever make us feel like we were just students...[peer partner] and I realized that compared to some of the working professionals there we just had the least amount of input...So at a certain point in time we were just like...we'll just do whatever it is the rest of the team wants.

Redefining Success and Moving Forward

To move the project forward, participants altered their expectations to create a new definition of success. Moving forward required action that addressed the failure experience in a productive manner. Finding the root cause of the failure, modifying the project plan, and sharing knowledge obtained from the failure helped participants move forward.

Understanding why the failure experience occurred helped participants take effective action to ameliorate it.

I'll kind of sit with it and first like process my emotions to understand why I'm feeling that way. And then I'll kind of take the more analytical approach where I'll actually look at it from like a factual or logical standpoint.

Drawing on existing knowledge provided insight into why the failure occurred. Knowledge came from team members, peers, literature, or prior experience.

Considering on a deeper level what might be happening. So instead of taking the failure...at face value, just think about why it didn't work. Because it's not...about you, it's about what works for the people you're trying to implement for.

Participants adjusted their expectations for the project trajectory to create a new plan and goal. Team members played a key role at this stage, providing advice and methodological support.

People just will help you as much as they can...they know kind of like the struggle that you're going through so just to alleviate that, it made it really easy for us to reach out to seek any help that we needed.

Recognizing the failure as a valuable part of the experience was necessary to redefine success.

I might allow myself to be upset about it kind of at first. But if you think about it, give a little bit of time, I think you can start to see the positives in it. And that kind of includes the learning experience.

An appreciation of the failure emerged from recognizing its value as a learning opportunity. "I think even though I, I had to deal with those challenges...it's through failure that you grow and I think that

happened for me for sure.” These positive views of failure allowed learning to be the successful outcome .

Building Flexibility of Expectations

Flexible expectations denoted expecting the unexpected. Flexibility acknowledged failure as a possible occurrence, encompassed a willingness to adapt and alter expectations, and required application of previous knowledge and experience to address failure. Building flexibility resulted from overcoming a failure experience; thus, participants were more prepared to handle subsequent failures. Associated with flexibility was the ability to plan for failure, or “go into [an experience] with the mindset that nothing’s gonna go smoothly.” Having a plan for failure allowed participants to feel secure in their preparedness, as they had a first step to take when they experienced failure.

It's very rare that starting off so early, you'll have a great success right off of the bat. And that research is all about constant learning, and trying to find a better solution and that as your career goes on you'll continue to get more experience and find better solutions as you progress.

Mentors coached participants through managing and evolving their expectations during a failure experience. They helped participants alter their expectations to accept the new project direction and appreciate the failure. Mentors facilitated more efficiently developing an open mind or a mindset expecting failure. When asked what could have improved their experience, all participants responded with a consistent idea: building flexibility before encountering a failure experience.

DISCUSSION

The focus of this research was to understand how undergraduate students overcome and learn from failure experiences in WIL. The constructivist definition of failure articulated for this research encouraged the discussion of a wide range of experiences. A failure forced participants to re-evaluate and alter their expectations, developing a new definition of success and taking action that aligned with these new expectations. Upon review of the literature, this appears to be the first research to identify expectations as the central component of overcoming failure in WIL. Findings support implications for WIL programming that promote successful learning through failure at the individual student-level, team or group level, and organizational level.

Individual-Level Considerations

Previous literature has focused on motivation and self-efficacy as drivers to promote success and avoid failure in undergraduate students (Freudenberg et al., 2013; Greene, 2018; Lent et al., 1984). This ties in with the body of literature highlighting how fear of failure can prevent risk-taking and the resulting learning (Choi, 2020; McKinnon & Lowry, 2012). In contrast, the current research highlights the acceptance of constructivist failures as a positive experience, important for and conducive to learning. However, there are conflicting views about how much failure contributes to learning. Some educational scholars agree students learn best when they are challenged, but the degree of challenge is contested. Wilson et al. (2019) found that learning was optimized when failure occurred 15% of the time. Contrarily, Eskreis-Winkler and Fishbach (2019) found that failure can undermine learning, and that on average, people learn less from failure than from success. The caveat is those with greater experience and high motivation feel less threatened and can learn through failure, a concept called aversion learning (Eskreis-Winkler & Fishbach, 2019). This is paralleled by failure-based problem solving as per the unified model of failure, where a learner undergoes an inquiry process that results

in an expansion of their mental model to account for the new knowledge they acquired from the experience (Tawfik et al., 2015). Approaches like a learning goal orientation and growth mindset promote development of knowledge, skills, and competence, and are associated with enhanced motivation (Brez et al., 2020; Dweck, 2008; French, 2018; Shepherd et al., 2016). Presenting failure as a valuable tool for learning contradicts the negative connotations often associated with it. This re-framing may have implications on how failure is perceived, especially in a WIL setting where failure is often viewed negatively.

Ajjawi et al. (2020) found that experiencing failure compounds all stressors and can have an exacerbating effect on negative emotions. Shepherd et al. (2016) used the term grief to describe the negative emotional reaction to entrepreneurial project failures. They link grief to self-determination theory, stating that failure can threaten psychological wellbeing and motivation (Shepherd et al., 2016). The current research found when a failure was experienced participants persevered through the wave of emotion, which may be attributed to the fact that they held high expectations for themselves. Aspects of the I-EQUIP program helped alleviate these negative emotions through support from peers, team members, and the instructor's mentorship, encouraging students to practice emotional regulation. A model of self-compassion proposed by Shepherd et al. (2016) described how positive emotions generated from self-kindness, humanity, and emotional mindfulness at both the organizational and individual level can mediate the negative emotions that come with failure. While emotional regulation contained all three components of self-compassion, it also encompassed the ability to evaluate and control emotions. WIL programs should acknowledge the emotional response and support students in their individual context through promoting emotional regulation, mindfulness, and self-compassion. As demographic information was not collected, this study is limited by its inability to explore nuances as failure relates to participants' backgrounds, a relationship that should be explored in future research.

While it has been proposed that failure should be incorporated into pedagogy (McKinnon & Lowry, 2012; O'Gorman & Werry, 2012), this research presents actionable guidelines for doing so. It is impossible to predict and plan for any possible failures that may occur. Instead, WIL pedagogy should focus on teaching students to adapt and use their existing knowledge during a failure experience. Accepting failure as a possibility makes individuals more willing to act, despite the possibility of failure, and better able to learn from their experiences (Shepherd et al., 2016). Introducing students to the idea of failure and preparing them for its possible occurrence at the beginning of the program should lay the foundation for later building skills related to flexibility and adaptability. Tools, like contingency planning and open discussions about failure experiences, can help build a flexible growth mindset.

Team and Group Considerations

The roles and responsibilities of participants and their team members were altered in the face of failure. This adjustment of expectations aligns with existing team literature (Bosch-Sijtsema, 2007). Knowledge of the motivation driving each team members' commitment to the project helped provide mutual understanding and align goals. Mickan and Rodger (2000) described how a common focus helps teams stay engaged with a project. This further highlights the importance of WIL projects to clearly outline all expectations including goals, responsibilities, and objectives and continuously reaffirm or update these. One of the key steps important for overcoming failure was identifying the root cause of the failure, obtaining advice to support next steps, and adapting the project plan as a team to overcome the failure experience. Tawfik et al., (2015) also integrated inquiry and root cause identification into their theory of failure-based problem solving. Participants used existing knowledge to assist with root cause

analyses, decisions about subsequent project directions, and back up their ideas and decisions. Team-based supports such as context-specific knowledge and resources are important for effective team function when developing and strengthening teams (Gilley et al., 2010; Mickan & Rodger, 2000). Mickan and Rodger (2000) described flexibility as a core component of effective teams, requiring openness, honesty, self-knowledge, reflection, and regulation. The synergistic relationship theory promotes building positive, comfortable, and non-threatening communication with team members to encourage discussion failure without fear of repercussions (Gilley et al., 2010).

The peer group formed a community of co-learners with similar experiences. It made participants feel less isolated in their failure experiences. Shepherd et al. (2016) noted a similar effect they called organizational common humanity. Although their research focused on group projects, the current research demonstrated the same phenomenon when individuals working on their own projects came together in a community of support. Similarly, research groups act as socializing environments to help students deal with the uncertainties of their own research (Delamont et al., 2006). Zheng et al. (2013) propose that individual failures can promote organizational learning through peer group interaction. I-EQUIP encouraged peer interaction through the didactic portion of the program, where students met weekly with their instructor and classmates. WIL programs should similarly incorporate a peer group component into the learning environment.

Organization-Level Considerations

Previous literature identified that individual, situational, and institutional pressures interact to impact students' feelings and perceptions of failure (Ajjawi et al., 2020; Edwards & Ashkanasy, 2018; Lucas & Kline, 2008; Najimi et al., 2013; Schein, 2010; Tesar, 2020). However, this appears to be the first research to identify the dual organizational cultures affecting WIL participants. A failure-averse culture has historically been fostered in academia and education in general which perpetuates a lack of discussion about failures and discourages publication of studies that are not considered successful (Dickersin, 1990; Edwards & Ashkanasy, 2018). Although the health organization culture affected the dynamics of participants' projects, they were evaluated by their professor, so their failure-induced stress and anxiety was associated with the perception of failure in academia. While researchers like Edmondson (2011) have extensively highlighted organizational culture and its impact on failure at the organizational level, there is no research about how culture impacts WIL students at the individual level, especially when multiple organizations are involved. Further research in this area could elicit a deeper understanding of these complex influences on students.

At the group and organizational level, it was important for participants to perceive themselves in a culture where failure was normalized, safe, and accepted. This aligns with the necessity for fostering psychological safety among health care workers, so they are free to succeed and fail without fear of blame (Valadares, 2004). It also aligns with Edmondson's (1999, 2011) research about fostering psychological safety and a learning organization. A learning organization fosters a supportive environment in the workplace that reinforces learning from failure and promotes asking questions, owning up to mistakes, and taking risks (Garvin et al., 2008). Similarly, a self-kind organization promotes an objective perspective of failure without harsh judgement, which reduces the negative emotions individuals experience during failure, making them more receptive to learning from it (Shepherd et al., 2016). The WIL environment should seek to build a perceived failure-safe culture to optimize the learning experience. Recommendations include structure and designated time to discuss failures, full participation and equal willingness from everyone to share failures, and no personal responsibility or academic penalties for failure. An educator should facilitate reflections, using probing

questions to elicit understanding about the learnings obtained. Support for failure without judgement is important for educators and facilitators of WIL programs to integrate in order to enhance the student experience, personal growth, and overall learning.

Failure was not an endpoint but a valuable component of developing knowledge and skills. Implications of this necessitate integration of failure pedagogy into Canadian WIL programs and a cultural shift on how failure is viewed as an academic society. Recognizing and appreciating the learning from failure promoted a shift in perspective over time, revealing what was initially considered a failure was a pathway to success.

CONCLUSION

The expanding practice of WIL in undergraduate degrees requires a focus on failure experiences students inevitably encounter in these programs. This study developed a theoretical explanation of how students overcome and learn from failure experiences in a non-clinical undergraduate health-related WIL program through experiencing and managing the wave of emotion, modifying expectations of self and others, redefining success and moving forward, and building flexibility of expectations. Failure is presented as a tool for learning and a steppingstone toward success when in the context of a failure-norm culture and with appropriate supports. The findings identified the importance of integrating a proactive understanding of failure and supports for failure early in the curriculum. Designing in-class learning opportunities that allow students to build flexible thinking and understand how to deal with failure is essential in the post-secondary sector, especially with the push for further WIL experiences to prepare students for the workforce. Findings also propose integration of expectations as the central component to overcoming failure into failure-related pedagogical theories. This deeper understanding of how students define and perceive failure, and harness these experiences as learning opportunities, highlights opportunities for improvement within WIL programs.

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