

SUCCESS FACTORS FOR INTEGRATING APPLIED RESEARCH IN VOCATIONAL EDUCATION AND TRAINING

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ABSTRACT:

Vocational education and training institutions can enhance and enrich student learning while serving the socioeconomic needs of communities by integrating applied research as a form of experiential learning in program curriculum. Applied research provides students with opportunities to engage directly with community or industry partners on real-world problems as they apply both technical and employability skills. This paper explores the successful experiences and proven practices of ten Canadian colleges and recommendations on how they may be applied in other educational institutions. The findings resulted in a framework of success factors for effectively utilizing applied research and innovation to enrich the student learning experience, with a focus on applied research as a pedagogical approach. The factors are: (1) institutional commitment and leadership; (2) instructor development and support; (3) learning approaches; and (4) internal and external collaboration. Also, as an institution's engagement in applied research evolves, there should be consideration of and investment in strategic factors beyond the pedagogical application. The framework guides the implementation of applied research in vocational education and training. Recommendations may be translated into practice, informing policy, programming and organizational decisions, and benefiting vocational education providers seeking to improve teaching and learning methods and outcomes while contributing to the socioeconomic needs of their region.

Keywords: applied research; experiential learning; vocational education and training.

1. Introduction

This study drew upon the proven practices from ten Canadian colleges who developed and fostered an institutional research culture aligned with student learning and community needs. The goal was to share these approaches with other vocational education and training institutions to inform and improve teaching practices and enhance student learning through the integration of applied research and program curriculum. The article begins by describing the context, defining applied research and discussing its benefits in vocational education and training. Then it describes the study's research methodology and methods, outlines the findings and discusses the framework of success factors and recommendations.

1.1. Context

Applied research has become a growing priority for vocational education and training (VET) providers in Canada and many other countries around the world. In fact, Simon and Beddie (2017) highlighted VET applied research as the “missing piece in the innovation ecosystem” (p. 2) and de Witt et al. (2024) called it an “an indispensable component in the evolution of VET” (p. 15). VET providers are uniquely positioned to bring together applied research and innovation to address industry challenges. According to Colleges and Institutes Canada, 95% of Canadians live within 50 kilometres of a public college, institute or polytechnic (CICan, 2025). This makes them accessible not only to learners, but also to businesses and community organizations. In addition, their close ties with regional employers, due to their primary focus on skill development for the workforce, ensure a deep understanding of employment sectors' needs and challenges. Because applied research is focused on solutions to real-world problems, it aligns well with vocational training which emphasizes practical skills and hands-on learning. Applied research projects offer students the opportunity to work on tangible problems that industries face, bridging the gap between theoretical knowledge and practical application.

From an Australian perspective, Simon and Beddie (2017) reported on how the VET sector could broaden its engagement in the country's research and development and innovation systems. Acknowledging that applied research activity often depends on the enthusiasm, knowledge **and**

contacts of a particular teacher or team, they said: “institutional and system-wide support will be needed to embed research in VET practice” (p. 3). Even twenty years ago, an Australian report focused on the role of vocational education and training in economies with strong track records in innovation (Curtain, 2005). The report suggested “the VET sector should have a more direct role in promoting and diffusing smaller scale innovations focused on processes and development ... This would enable the VET sector to diffuse business innovation and enhance its links with business, particularly with small and medium-sized enterprises in general and especially those in regional areas” (Curtain, 2005).

A more recent survey conducted by Chen et al. (2023) with higher vocational education (HVE) colleges globally and especially in China found that there is a mutually beneficial relationship between teaching and research in HVE colleges. They highlighted the following: “Through research activities, HVE colleges can connect global innovation networks and facilitate the acquisition of advanced scientific and technological knowledge in their respective regions. In transitioning from “teaching” to “teaching and research,” HVE colleges carry out academic research activities that improve teachers’ teaching ability and the quality of HVE” (Chen et al., 2023, p. 2).

A recent European initiative highlighted the impact of applied research and innovation activities carried out by VET institutions, saying it improves curriculum for students, creates better-skilled teachers/researchers, contributes to the school becoming indispensable within the innovation ecosystem of its region, and has a long-term impact on society by helping to change the way we deal with problems (van Ginneken, et al., 2024). Researchers in a 2023 study conducted 52 semi-structured interviews with institutions in 13 European countries and six non-European countries; the prevailing finding in the European context was “the absence of a systematic process for applied research within VET organizations” (Etxebeste et al., 2023, p. 20).

According to the European Association for Applied Sciences in Higher Education (EURASHE), many higher education institutions are “striving to increase their level of applied research and innovation, encompassing problem-oriented research and development, and solutions to global

societal changes.... This issue is a flagship of the EURASHE narrative around research and innovation, at a time when the European Commission is trying to link education and research” (EURASHE, n.d., para 1). In fact, the European Commission’s priorities for 2024-29 include: putting research and innovation at the centre of the economy, enhancing collaboration between research departments, higher education and business, and promoting vocational education and training (European Commission, n.d.).

A group of interdisciplinary VET researchers conducted research on the future of VET and the changing nature and role of vocational education and training in Europe over a five-year period (Cedefop, 2023). The study sought to gain an in-depth understanding of the future trends in vocational education and training in the 27 member states of the EU, as well as in Iceland, Norway and the United Kingdom. A key point in the report was about the value of the role of VET within knowledge production and how technology and innovation are integrated in VET curricula (Cedefop, 2023). According to the report, future strategies focus on developing practical, teacher-led applied research that feeds back directly into curriculum development and practical skill acquisition.

While de Witt et al. (2024) acknowledged that applied research is indispensable and that VET is at “the forefront of developing a skilled, adaptable, and future-ready workforce” (p. 14), they also recognized that challenges persist. Although there is agreement that there is a clear place for VET institutions in the applied research and innovation ecosystem, the challenges of incorporating research into the institutions’ respective cultures are varied and complex. Implementing applied research and innovation within vocational education is a complex process that requires a “flexible structure adaptable to diverse challenges such as policy environments, local conditions, and institutional needs” (van Ginneken et al., 2024, p. 4). Some institutions are experiencing great success; however, many feel they need new strategies and resources to develop and support their research and innovation activities and more fully integrate them in their institutional culture.

“... one of the common construals of “developing a research culture” seems to be that it means moving from being the domain of a sparse number of isolated individual researcher projects to an environment where research is so pervasive that it appears to be the activity of a large number of interconnected colleagues” (Hill, 1999, p. 4).

Applied research in vocational education and training is of current and future importance to governments, industries and VET institutions internationally. There are different ways a VET institution can engage in applied research and innovation. They could establish a separate entity that is arms-length from the learning environment and is focused solely on meeting industry needs. They could focus only on the learning environment and integrate applied research as a pedagogical approach in program delivery. Or they could implement a blend of both approaches, focusing on creating a culture for applied research across the institution. Blending the two approaches is proposed here as a win-win solution, resulting in mutual gains for all involved. This study was based on the premise that the role of vocational education and training providers is first and foremost about student learning - while also recognizing they have a unique opportunity to serve the socio-economic needs of their communities.

The study drew upon proven practices from ten Canadian colleges who developed and fostered an institutional research culture aligned with student learning and community needs. The goal was to share the approaches with other vocational education and training institutions in the hopes it will inform and improve teaching practices and enhance student learning through the integration of applied research and program curriculum. The article defines and discusses the benefits of applied research in vocational education and training. Then it describes the study’s research methodology and methods, and finally it outlines the findings and discusses the framework of success factors and recommendations for each.

1.2. Applied Research Defined

Applied research attempts to find solutions to existing problems, such as creating new or making improvements to processes, products or services. Applied research requires a partner with a problem to be solved. There are four key components of an applied research project depicted in

Figure 1, starting with an industry or community partner’s practical problem based on their specific needs and parameters and ending with a solution or deliverable.



Figure 1 Elements of Applied Research

As a pedagogical approach, applied research can be considered a form of experiential learning. Co-operative Education and Work-Integrated Learning Canada further defined it as work-integrated learning, “a form of curricular experiential learning that formally integrates a student’s academic studies with quality experiences within a workplace or practice setting” (CEWIL, 2021, para. 1). It has also been described as problem-based learning, project-based learning, and challenge-based learning. Each of these experiential learning methodologies shares a common goal: to provide students with opportunities to apply their skills and knowledge in practical settings, thereby enhancing their learning experience and preparing them for real-world situations.

The applied research project process outlined in Figure 2 illustrates the key elements involved in developing an applied research project for vocational education and training programs. The diagram begins with problem identification, which involves finding a relevant problem that aligns with the course learning outcomes. This could be initiated by the partner, instructor, and or applied research (AR) staff. This is followed by partner needs and parameters, where the partner is engaged to understand their needs, priorities, and constraints, and to define clear project objectives. Next, program or course learning competencies are reviewed by the instructor to identify relevant competencies within the curriculum, ensuring that the project objectives align with learning outcomes. Once the scope and details of the project are confirmed, solution development is facilitated by the student through collaborative discussions with the client on potential solutions, encouraging innovation and considering feasibility and sustainability. Finally, the student’s work is assessed based on the relevant learning outcomes.

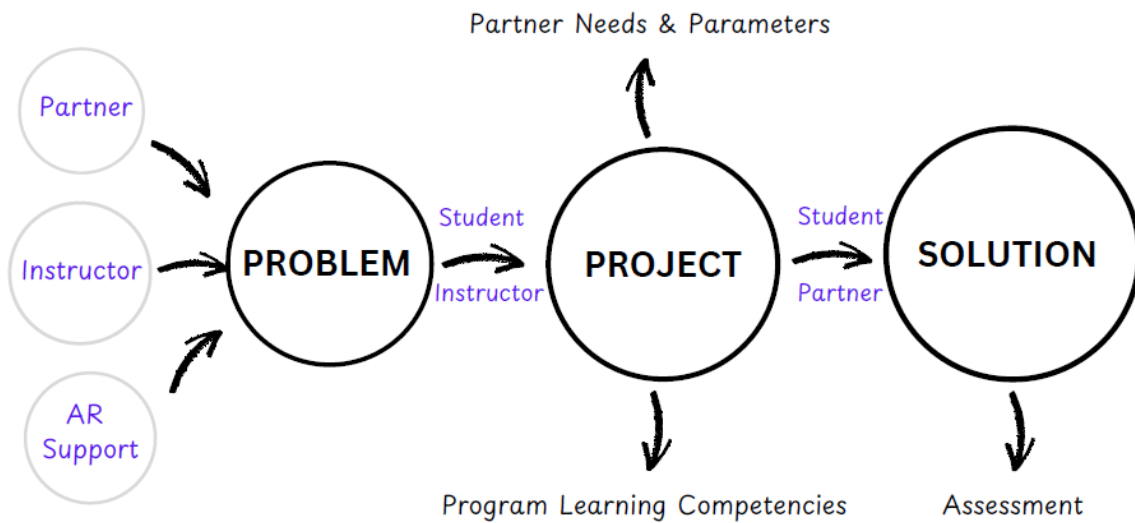


Figure 2 Applied Research Project Process

framework of success factors and recommendations for each.

1.3. Benefits

Much of the literature on VET engagement in applied research and innovation (ARI) focuses on the benefits to industry and community partners and the positive impacts on social and economic development. Applied research and innovation can help companies with product development, diversification and improvement; development of innovative processes and systems; service improvement; technology development, and feasibility testing. Akinci and Utlu (2015) emphasized that companies must constantly renew technology and innovation to improve their performance. In Canada, colleges contribute to the local economy through applied research and innovation by strengthening the economic resiliency and competitiveness of small and medium-sized enterprises (CICan, 2022).

Applied research also benefits the VET institutions by driving industry connections. Engaging with partners on applied research keeps vocational education and training institutions up to date with business requirements and helps improve curriculum. ARI enhances faculty capabilities;

instructors are exposed to current trends and challenges in their fields as well as the tasks and skills that will be required of their students. They also gain access to industry equipment and infrastructure. Maintaining academic program relevancy and keeping instructors up to date in their sectors are also benefits.

Probably the most important reason for an educational institution to engage in applied research is to enrich the learning experience for students. A key “feature of VET applied research is the close link between research and efforts to improve VET pedagogy” (Simon & Beddie, 2017, p. 1). Applied research as a form of experiential education can increase student interest and motivation; real problems are more engaging than textbook cases. Students develop both technical and professional competencies, and they are better prepared for the workforce and further education. Many studies reinforce the benefits of applied research experience for students. The three major benefits for students are skill development, employability competitiveness, and a growth mindset.

Applied research in VET provides students with opportunities to engage directly with real-world problems. It enhances skill development as students are required to apply theoretical concepts to tangible situations, thereby solidifying their understanding. Engaging in research projects develops core employability and professional skills. The process of identifying research problems, conducting research, analysing data and evaluating solutions requires students to think analytically and creatively. A study conducted by Zúñiga (2009) found that student engagement in applied research helps learners gain real world experience, develop communication skills, improve creativity, and assist students in acquiring critical thinking and analytical skills.

Employers highly value the skills acquired through applied research. In fact, most job postings identify professional skills, such as communication and problem-solving, in addition to technical skills as requirements for employment. Applied research skills are important to creating an innovative workforce (Simon & Beddie, 2017). A survey by the Higher Education Quality Council of Ontario (2021) found that graduates who had participated in research projects during their studies were more likely to secure employment in their field within six months of graduation. A

CICan (2018) report indicated that by working closely with potential employers, students improve their competitiveness in the job market, and many students obtain positions at the company or organization where they did the research.

Applied research instils a mindset of inquiry and continuous learning. As noted by Hathaway et al. (2002), students who engage in research are more likely to pursue further education and training throughout their careers. Billett (2014) noted that applied research experiences not only prepare students for specific job roles but also equip them for a dynamic work environment where adaptability and continuous learning are essential. Students who engage in applied research during their VET education are also better prepared for advanced studies. Billett (2014) highlighted that this preparation can open pathways to further education and career advancement, ensuring that students are well-equipped for future academic and professional challenges.

2. Research Methodology & Methods

This qualitative action research study is situated in the interpretivist paradigm as it sought to understand what was happening from the inside perspective. The role of the researcher was to “understand, explain, and demystify” reality through the direct experiences of the participants (Cohen et al., 2007, p. 19). Although a limitation of interpretivist action research is that results may be difficult to generalize to other situations, “its goal is the creation of local theories for practice rather than generalizable findings” (Mack, 2010, p. 4).

Based on the participatory nature of action research and its objectives to inform and change practice, the study was approached using an appreciative inquiry (AI) methodology, focusing on what worked versus what did not work (Reed, 2007). Cooperrider and Whitney (2005) explained that appreciative inquiry is an affirmative approach and described it as an important advance in action research. It aligns with action research in that it aims to understand, inform and change practice, but it differs from traditional action research in that it focuses on achievements rather than problems (Reed, 2007). “Put simply, AI concentrates on exploring ideas that people have

about what is valuable in what they do and then tries to work out ways in which this can be built on..." (Reed, 2007, p. 2).

The appreciative inquiry methodology is "a positive strengths-based approach" to research and the implementation of change (Cooperrider & Whitney, 2005, p. 1). While many businesses have used the AI methodology to advance organizational change, it also has benefits as a mode of inquiry. Derived from social construction and action research theories, appreciative inquiry is, in essence, action research that focuses on positive attributes to inspire change (Whitney et al., 2019). Even though appreciative inquiry has been criticized for solely focusing on the positive, Willoughby and Tosey (2007) believed that by employing the right approach, AI can be a far-reaching alternative to the problem-solving or problem-focused approach.

It is important to note that the researcher was considered an 'insider,' or part of the research culture being studied, which according to Reed (2007) can be both an advantage and a limitation. Familiarity with the context makes engagement and collaboration easier, but it also requires the researcher to be critically aware of assumptions and expectations (Reed, 2007); therefore, validation of results with the participants was an imperative part of the research process.

2.1. Phase One: Appreciative Inquiry Interviews

Interviews were conducted with applied research leaders from ten colleges across Canada. The colleges selected were single and multi-campus institutions from across the country, varying in size, with student populations ranging from approximately 3000 to 30,000. All ten of the colleges were engaged in and successful in conducting applied research in their regions and were recognized on Research Infosource's (2023) list of Canada's top 50 research colleges. Although the ten colleges selected represent just 20% of the list, they are representative in terms of size, scope and geography.

This phase of the study involved in-depth conversation-style interviews that employed appreciative inquiry to help the researcher develop a comprehensive understanding of the processes involved in the successful integration of applied research in the learning environment. This approach assumes that "questions and dialogues about strengths, successes, values, hopes,

and dreams are themselves transformational” (Whitney & Trosten-Bloom, 2003, p. 1). Through reflecting on and sharing positive stories of successful practices, participants may create more success. In fact, one of the core assumptions of AI is “what we focus on becomes our reality” (Hammond, 2013, p. 20).

The interviews focused on detailed, in-depth information and the understanding of processes, such as the development and delivery of educational programs that incorporate applied research as a method to achieve key competencies and learning outcomes. Utilizing open-ended questions and storytelling, the inquiry sought to find the best in college educational practices. The appreciative conversations were approximately 30 minutes in duration and were conducted over the telephone. The guiding questions were as follows:

1. In terms of enriching student learning and supporting effective teaching practice through applied research, what do you think is the most important thing you and I should be talking about?
2. What is front and centre of your mind when you consider what your college has done to successfully integrate research and curriculum? What have you done well? How have you done it? What is the process?
3. Tell me about a time when instructors were effectively engaged in the process of embedding research and innovation in program curriculum. What happened?
4. Tell me about embedding research and innovation in curriculum at your college and the positive impact it has had on student learning. Do you have an example or story to share?
5. What is the ideal for college applied research that contributes to the richness of the learning experience and contributes to economic growth? What should we strive for?

The interviewee responses were explored during data analysis to determine themes, proven practices and variables that affected the successful incorporation of applied research in community college programming. The interviews provided rich narratives, describing proven practices which have been more effective at delivering the desired outcome than any other

approach and therefore are integrated into the organization’s processes as a standard way of working. The researcher examined and documented the themes and elements common to the learning institutions along with their reported high impact practices. The number of mentions and level of emphasis determined key elements for success that were grouped into related themes.

Four key themes emerged were compiled along with the proven practices associated with each one. The themes were organized in a simple success factor framework (Table 1). Each success factor included a set of recommendations for implementation and practice. The interview findings were shared with the participants to be used internally as a means for continuous improvement.

Table 1: Framework for Success

1	Institutional Commitment & Leadership	Ensure the institution’s leadership is committed strategically and operationally to applied research.
2	Instructor Development & Support	Provide orientation and professional development on applied research as a pedagogical approach and ongoing support to instructors.
3	Learning Approaches	Integrate applied research as a form of experiential learning in program design and delivery.
4	Internal & External Collaboration	Build relationships and collaborate with internal units and external partners.

Table 1 Framework for Success

2.1 Phase Two: Follow-up Survey

The researcher contacted the research leaders from the same ten colleges again later, with a request to validate and update the initial interview findings by reviewing the success factor

framework and completing a short online survey. Although the colleges were the same, three of the ten leaders were new and had not participated in the appreciative inquiry interviews. All ten leaders agreed to participate. They were sent the framework and summary along with the survey link. The survey consisted of nine questions in total. The first two questions were: Is the attached four-factor framework for success still relevant today? If not, why? What do you suggest changing?

Questions three through six addressed each of the success factors, listing the related practices and asking the respondents to check which ones contributed most to success in incorporating applied research in the college learning environment. Question seven asked for the respondents' thoughts on moving elements of one factor to another category. The last two questions were more open-ended: Are there any other factors or proven practices that you would like to share that perhaps fall outside the above categories? Please list your additional recommendations for successful applied research. Do you have any additional comments?

3. Results

All ten of the college leaders who were invited to participate completed the survey. Their responses validated the initial framework, with some additional suggestions provided. The responses and commentary from the survey were then shared with the participants to further validate the data, ensure the experiences shared were accurately represented, and identify any misinterpretations or errors.

The first question inquired whether the four-factor framework for success was still relevant today. Nine participants said yes, and one was unsure. Question two invited suggested changes to the framework. Two respondents made suggestions. Both said that while the success factors are still relevant and necessary, the focus on teaching and learning is not sufficient, though they recognized that it is important. One added there needs to be investment in advanced equipment and facilities in strategic areas of importance, while the other added that as a college moves deeper into the applied research ecosystem, there may be fewer academic staff and more full-time research staff involved.

The next questions related to each of the success factors. Respondents were asked to choose practices in each category that they felt contributed the most to success in incorporating applied research within the college learning environment.

3.1. Institutional Commitment & Leadership

Colleges who have the most success exhibit a strategic organizational commitment to the integration of applied research and curriculum. Operational leadership is also required for the implementation of applied research in VET. Successful institutions ensure resources are committed to implementing and sustaining applied research activity. For institutional commitment and leadership, the top five practices identified were:

- Incorporate applied research in the institution's strategic planning process.
- Develop appropriate metrics that focus on the quality of the student experience and the outcomes for the partners.
- Ensure senior executive support, as well as their influence and active participation.
- Use strategic advocacy for the creation of funding opportunities specifically for applied research.
- Develop policies and procedures to support successful integration.

3.2. Instructor Development and Support

Under the category of instructor development, the proven practices focused on faculty orientation, professional development, recruitment and hiring. For instructor development and support, the top five practices identified were:

- Include applied research as an experiential learning methodology in new instructor orientation and instructor development programs.
- Ensure faculty orientation and ongoing professional development demystifies applied research and innovation and demonstrates how it is a form of experiential learning.
- Allocate funding and/or time for other types of relevant PD including workshops, mentorships, conferences, and publications.

- Develop a professional development series on the theory and application of applied research as experiential learning and utilize faculty champions as facilitators.
- Ensure instructor applicants are made aware in the recruitment process that problem-based teaching through applied research is part of the institution's culture.

3.3. Learning Approaches

In the initial interviews, there were many suggestions for effectively utilizing applied research as a learning approach. The survey helped to highlight the ones most recommended. For learning approaches related to program curriculum and learner competency development, the top five practices identified were:

- Integrate applied research through capstone projects or technical reports, particularly in the final year of a program so that students can apply the technical skills they have learned as well as other essential skills.
- Offer formal research courses in specific programs.
- Incorporate applied research as a form of experiential learning and align with other existing teaching and learning models and methods, such as work-integrated learning, problem-based learning, project-based learning, challenge-based learning, inquiry-based teaching, and Boyer's model of scholarship.
- Encourage disciplinary and interdisciplinary teamwork, such as student teams working on different aspects of the research or engaging various programs.
- Develop processes for course-based applied research projects.

3.4. Internal and External Collaboration

While internal collaboration is crucial, industry/community collaboration is also an essential component of VET applied research and innovation. Applied research must involve a business or community partner and be related to their needs.

In the internal and external collaboration success factor, the top five practices were:

- Establish a research office or dedicated position(s) to facilitate research activity, liaise with industry, funnel course-based projects to applicable programs, access funding,

deal with paperwork and administrative details, provide support to faculty and students, and manage relationships.

- Educate and maintain ongoing communication with supporting departments, such as human resources, finance and information technology, on the unique requirements of applied research.
- Ensure industry retains intellectual property; the VET interest is in improving curriculum and student learning.
- Focus on building and sustaining partner relationships for the long-term.
- Engage in frequent community and industry outreach.

The seventh question asked whether internal communication would be a better fit with institutional commitment. There were mixed responses to this question. Three respondents agreed, indicating if there is no institutional commitment, collaboration and support from internal units will be challenging. A couple of respondents indicated it could fit in either place. However, three others suggested leaving internal collaboration with external collaboration, and thus they remained together. The justifications provided for leaving them together were:

- “Internal collaboration is ideally married to external collaboration.”
- “Institutional commitment seems more about leadership/advocacy/providing funding/ recognition/space; it's a mindset.”
- “The tactics required to achieve leadership commitment can be much different than the tactics required to entice collaboration.”

3.5. Other Factors

Question eight asked for other factors, proven practices or recommendations that might fall outside those already covered in the current framework. Seven people responded with two suggesting the four buckets provided already encompass all the factors for applied research success. The other five respondents provided the following additions:

- Build infrastructure capacity.
- Use a collaborative delivery model, such as having the applied research unit design and deliver the capstone term.

- Be strategic about pursuing funding.
- Provide a research opportunity fund to which any staff member can apply to do a small research project that is relevant to the college's strategic goals and that can be with or without an industry partner to foster a culture of innovation and provide an entry to applied research for those who want to try it.
- Offer innovation internship programs with the applied research office.
- Offer prizes for the best applied research capstone projects.
- Ensure clear, concise, and updated applied research policies and clear pathways for how the community can engage with applied research.
- Regularly reach out to departments and classes at the beginning of semesters to telegraph potential opportunities for students.

There was a final question simply seeking additional comments and this provided two respondents with an opportunity to elaborate on points raised in question two.

One highlighted that the survey emphasized course-based and curriculum-related applied research. This person acknowledged that while many of the students at their college who are exposed to research do so in this way, government-funded research projects with industry have a major impact on the companies and the economy. This respondent further reiterated that “when it comes to government-funded industry collaborative projects, we DO want mission-critical projects for the companies because we want them involved, with skin in the game, ready to commercialize the IP and contribute to economic development, wealth generation, and job creation.” They suggested that non-critical projects that companies give for the purpose of student learning don't necessarily achieve this impact. They felt there could be a greater emphasis on “the type of applied research that helps the economy directly, not just through better graduates.”

The second additional comment was very much aligned with the first: “I sense that the philosophy/goal for applied research that is presented here is different from my own, and admittedly the ‘fork on the road’ is whether one is supporting primarily students' goals or supporting industry (which also supports students' goals).” The respondent indicated that their

college focuses on business clients with pressing needs and so they need dedicated researchers who work year-round to provide timely research and development. “This approach does not work well if you're attempting to tie applied research to curriculum.” The respondent acknowledged that students can still participate and get a rewarding experience; they can engage through paid positions and can participate in a formal training program supporting technical skills and soft skills.

4. Discussion

This study was limited to a focus on integrating applied research as part of the learning experience, though some broader perspectives were raised and acknowledged. The balancing act required to focus on student learning and meet industry needs was identified as a challenge. The four over-arching themes provide a framework of success factors and recommendations that can be considered, adapted and implemented as appropriate and relevant for interested VET institutions.

Probably the most important factor in starting up and growing an applied research program is to have institutional and senior leadership commitment. This means it is part of the organization’s strategic plan, performance indicators are established, and some core funding is provided. Secondly, faculty engagement is critical. Identifying early adopters and engaging them to orient and train others creates momentum or a ‘flywheel effect.’ Demystifying applied research for faculty and students helps to remove resistance and encourage engagement. This can be done by incorporating applied research as a form of experiential learning that aligns with existing teaching and learning models and methods, such as work-integrated learning, problem-based learning, or challenge-based learning. Applied research is especially effective in the final year of a student’s program as a capstone project so that students can practically apply the technical and professional skills they have learned. Finally, establishing strong collaborative relationships will enable success. Collaboration with internal support units, such as finance, human resources and curriculum development, can ensure a smooth execution of required processes and procedures. External partnerships are a critical component; applied research requires partners with problems to be solved, and the partnership relationships must be nurtured and maintained.

As engagement in applied research evolves, there should be consideration of and investment in strategic factors beyond teaching and learning. Regional industry and community needs will vary, and VET institutions should be clear and focused on their areas of expertise, funding sources, facilities, equipment and faculty/researcher availability. A strategic research plan with focused research pillars and dedicated resources should be established to address the points raised by participants about developing capacity for timely and ‘mission-critical’ applied research.

As stated previously, results of action research may be difficult to generalize in other contexts. For example, in the European context, Cedefop (2023) suggested involvement in applied research might be more applicable to higher-level VET rather than VET in general. One significant contextual difference is that the average age of students in the participating Canadian colleges ranged from 24-31. Students in upper secondary vocational education and training are 21 years in OECD countries and 20 years in most EU countries, though in Finland, the average age is 28 years (Ministry of Education and Culture, 2021). The age difference is an important consideration because students in their late twenties typically bring previous education, work experience and skills that can contribute to successful applied research initiatives with industry partners. Another difference to consider between the Canadian and other countries’ contexts is culture. Referring to the introductory commentary in this paper about creating an institutional culture for applied research, VET institutions may need to find ways to influence the culture of their education sector to recognize the value of and implement a vision for applied research as a pedagogical approach.

5. Conclusion

The advantages of and best practices in enhancing and enriching student learning through applied research and innovation were explored. The findings resulted in a validated framework of four key success factors for effectively utilizing applied research and innovation to enrich the student learning experience, with a focus on applied research as a pedagogical approach in program delivery. These factors are: (1) institutional commitment and leadership; (2) instructor development and support; (3) learning approaches; and (4) internal and external collaboration. Although this exploration was limited to a focus on the student learning experience, a further finding is that as a VET institution’s engagement in applied research evolves, there needs to also

be consideration of and investment in strategic factors beyond the pedagogical application, such as industry needs, funding, facilities, equipment and human resources. Further research could delve into the success factors of vocational education and training institutions that have been able to optimize educational goals and respond to more pressing industry needs through applied research.

The results of this study may benefit vocational education providers seeking to improve teaching and learning methods and outcomes while contributing to the socioeconomic needs of their region. It is anticipated that the framework will be useful as it provides guidance for the implementation of applied research and outlines how the recommendations are translated into practice which could help with policy, programming and organizational decisions. The author believes that success can be collective, and the framework is a vehicle for sharing success with others. VET providers are encouraged to explore the dynamic space afforded by serious engagement in applied research.

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