Improving the Program Revision Process

Using CourseFlow, a Digital Educational Tool

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Abstract

Improving the Program Revision Process Using CourseFlow, a Digital Educational Tool

Bojana Krsmanovic

This research examines the impact of CourseFlow, a cloud-based educational tool, in the program revision process at the Physiotherapy Technology program at Dawson College in Montreal, Canada. Through semi-structured interviews with key stakeholders involved in program revision, the research looks at how CourseFlow supports practitioners in improving their own professional practices, fostering collaboration, and aligning course content with program outcomes, overall improving curriculum mapping and program revision processes. The research also explores how CourseFlow compares to other tools commonly used in program revisions, highlighting both its advantages and disadvantages. Some of the findings highlight that while CourseFlow enhances communication, facilitates more meaningful discussions, and promotes reflective practices within the program revision process, at the same time, it has limited editing capabilities, experiences difficulties with content migration, and provides for a steep learning curve for new users. Recommendations for improving CourseFlow include refining its visual interface, enhancing collaboration features, and enabling more effective side-by-side course comparisons. These improvements aim to further optimize CourseFlow for broader adoption and use. Suggestions for future studies outlined in this research include revisiting the original research design post-pandemic and utilizing the unused data collected during this study.

Keywords: case study, higher education, CEGEP, program revision, instructional design tool, digital educational tool

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Dedication

This thesis is dedicated to:

My father, who influenced me in more ways than I can ever express. You helped shape me into the person I am today, guiding me with your wisdom and strength, supporting me even when you didn't really understand or agree with me, and, at times, challenging me like only a kindred soul could. You were always the force that pushed me forward. Not a day goes by that I don't think of you, and I know you would be very proud of who I've become and what I've accomplished.

Dr. Cvijan Krsmanovic (1956-2019)

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Introduction

Background of the Project

In Quebec, the Quebec Education Program (QEP) acts as a reference point and framework for stakeholders in the education system. It is a heavily competency-based system with elements rooted in all aspects of the contemporary Quebec society. Additionally, complementing each school course, the Progression of Learning outlines the essential knowledge and skills that students need to adopt and be able to use. This tool offers a roadmap for instructors, helping them plan both their teaching and student learning that should happen in their classrooms (Ministère de l'Éducation du Québec, 2021). After completing compulsory elementary and secondary education and before continuing to the university or entering the labor market, students from Quebec move on to college (in Quebec, also known as CÉGEP – collège d'enseignement général et professionnel). The Ministry of Education, Recreation, and Sports prescribes learning competencies (e.g., problem solving, creativity, adaptability to new situations, fostering sense of responsibility, and communication) and outcomes which colleges then rely on to design their courses and programs, making sure that prescribed standards are fully implemented (Ministère de l'Éducation, du Loisir et du Sport, 2009).

Origins of Competency-Based Education

The competency-based education has its roots in nursing education in 1970s, acting as a solution for the gap that existed between the theoretical knowledge nurses-to-be were gaining at school and the practical skills they seemed to be lacking later in their workplaces (Cowan et al., 2007). In the years to come, competency-based education gained a momentum throughout various disciplines and in both formal and informal training, worldwide; competencies and outcomes in the center of an educational strategy have gradually become a standard in graduate public administration (Açıkgöz & Babadoğan, 2021; Rissi & Gelmon, 2014; Perera et al., 2017).

Learning Competencies Versus Outcomes

Since about fifty years ago, learning competencies have been the focal point of attention for researchers and practitioners coming from a multitude of disciplines and perspectives (Meyer & Semark, 1996). They are regarded as underlying features directly linked to the performance in the workplace; they rely on the prospect for better performance and future development (Boyatzis, 1982; Getha-Taylor et al., 2013). In the context of education, competencies describe, in a general way, applied skills and knowledge that allow people to perform in various contexts of life and can aid processes such as developing curricula, planning new educational programs, as well as assessing existing programs (Gosselin, n.d.; Perera et al., 2017).

Although frequently confused with a competency, the term "outcome" stands for very concrete, measurable skills or knowledge that students will have adopted by the end of a unit such as an activity, course, or a program (Gosselin, n.d.). A competency can and often does consist of more than one outcome, and together, they are integral parts of the competency-based approach to education – a key policy in the educational setting of today (Açıkgöz & Babadoğan, 2021; Dodge et al., 2023; Gervais, 2016; Gonczi, 1994, Makulova et al., 2015).

Curriculum Mapping

To better outline the competencies and outcomes alongside other key elements in the context of a curriculum, a number of organizations turn to curriculum maps. A curriculum map helps stakeholders – students, instructors, curriculum planners, evaluators, coordinators, counselors, etc. establish links between what is taught in a course and the objectives of that course and, more broadly, the program the course it is a part of (Perlin, 2011; Rawle et al., 2017; Zouri & Ferworn, 2021). The two main roles of curriculum maps according to Harden (2001) are making the curriculum more transparent and more aligned – showcasing connections between different

elements of the curriculum, such as learning outcomes, learning opportunities, content, and assessment.

The curriculum mapping process can be highly collaborative, and it is vital that staff and faculty involved in the process do not feel intimidated by it and do not regard it as an administrative burden. Instead, ideally, staff and faculty should be heavily engaged in the process, especially in the form of active collaboration to identify strengths and weaknesses of the curriculum (Banta & Blaich, 2011; Kopera-Frye et al., 2008; Oliver et al., 2010; Sumsion & Goodfellow, 2004). Curriculum mapping is also a cyclical, flexible process that looks at the most current requirements of the educational field and faculty (Uchiyama & Radin, 2009) as well as those imposed on students in the form of graduate attributes, sometimes also referred to as an "exit profile" of graduates from the program. Graduate attributes are skills and competencies students who complete a program are expected to have and which can be transferred to a variety of roles they might fulfill in the future (O'Neill, 2010; Trevelaen & Voola, 2009). As educational institutions are expected to showcase the ability of their graduates to successfully engage in the competitive and complex world of today, graduate attributes are seen as one of the most important drivers of the effective curriculum mapping process (Barrie et al., 2009; Oliver et al., 2010; Rawle et al., 2017).

Curriculum Mapping Tools

Curriculum mapping tools generate a visual, data-based representation of how, when, and where different learning outcomes are addressed within the curriculum, and when implemented in an effective way, they can pinpoint to any strengths, overlaps, and gaps in the curriculum of a program (Kilag et al., 2023). There have been a number of curriculum mapping guides, exercises, and tools designed to help faculty and staff facilitate the process in the most effective and efficient way. These tools differ from one another in terms of how fast and simple it is to use them as well as

what kinds of information they gather and how involved the faculty and staff are in the process (O'Neill, 2010).

Digital curriculum mapping tools have been exponentially appearing in the past several years. Some examples of such tools include EDUportfolio (Majerník et al., 2021), an online platform designed to aid the administration, mapping, and evaluation of medical curricula; U-Map (Kertesz, 2015), a tool which facilitates unit design, evaluation, and curriculum renewal while progressively and automatically mapping accreditation requirements; LOOOP (Treadwell et al., 2019), an interactive, web-based curriculum mapping tool aimed at improving transparency and alignment in educational programs; and PS-MAP (Zubek et al., 2023), a tool which focuses on mapping the curricula for professional skills in undergraduate physiology education.

Overall, these digital curriculum mapping tools usually share several key features and commonalities. They are designed to enhance the transparency, alignment, and continuous quality improvement of educational programs, support educators in identifying and addressing curricular gaps, optimizing curriculum design, and ultimately aim to improve student learning outcomes through data-driven insights and collaborative efforts. Interestingly, according to the testimonies of participants in this study, digital tools that are most accessible, affordable, and still heavily used by the practitioners to aid the curriculum mapping process are Microsoft Word and Microsoft Excel.

The Role of Digital Tools in Improving Collaboration Among Stakeholders

The integration of technological innovations in education has been increasingly recognized for its potential to enhance collaboration and thus existing practices among faculty and other stakeholders. Research has shown that digital tools have been instrumental in improving educational practices such as: fostering communities of inquiry, allowing instructors to engage in reflective practice and share insights amongst themselves (Kilag et al., 2023; Martínez-Peláez et al., 2023;

Toukola & Ahola, 2022; Vaughan et al., 2013); supporting effective teaching by encouraging faculty collaboration (Mishra & Koehler, 2006); facilitating deep learning through collaborative environments where instructors co-design innovative teaching strategies (Fullan & Langworthy, 2014; Toukola & Ahola, 2022); enhancing communication, resource sharing, and coordination among instructors and other stakeholders, advocating for institutional support to facilitate the adoption of technological innovations (Bates, 2015; Martínez-Peláez et al., 2023; Mialkovska et al., 2023; Toukola & Ahola, 2022); and promoting flexible, continuous professional development and lifelong learning pathways, enabling stakeholders to collaboratively refine their professional practices (Bennett & Barp, 2008; Brunetti et al., 2020).

Curriculum Mapping Software Developed in Canada

In Canada, a number of higher education institutions turned to developing their own applications for curriculum mapping, even though, to author's knowledge, there is no published research on these specific tools' effectiveness. Examples of such curriculum mapping tools include: Curriculum Links from the University of Calgary (University of Calgary, n.d.), CBlue from Dalhousie University (Dalhousie University, n.d.), and Curriculum Insights from Toronto Metropolitan University, formerly known as Ryerson University (Toronto Metropolitan University, n.d.). The question as to why organizations and educational institutions consistently keep developing their own instructional software when many other similar tools already exist will be addressed below.

CourseFlow is a free, cloud-based, interactive application developed at Dawson College, Montreal. The earliest version of CourseFlow was developed in 2017, but it is constantly and consistently being updated and improved, and, during the process of data collection for this research, the tool was still undergoing significant changes. Enabling an easy-to-understand-and-

visualize approach to curricular and instructional design, one of the tool's main functionalities is that it can be used to aid curriculum mapping at the program level (SALTISE, n.d. -a). This feature of the tool can potentially boost engagement and collaboration among administrative and teaching staff involved in the processes of curriculum mapping and program revision, at the same time improving their own courses within a program as well as professional practices. As discussed next, a primary objective of this study was to undertake an examination of CourseFlow as an effective curriculum mapping tool.

Statement of the Problem and Purpose of the Study

The original idea for conducting this study came to life as a result of the author's personal experience and four-year long involvement with SALTISE (Supporting Active Learning and Technological Innovations in Studies of Education), a learning community service that brings together researchers and practitioners from the field of Education, and that is affiliated with Dawson College in Montreal (SALTISE, n.d. -b) in the capacity of a research assistant (RA). Here, the author worked closely with SALTISE Co-Director and professor at Dawson College, Dr. Elizabeth Charles.

From the earliest days of her engagement with SALTISE, as of November 2019, the author was assigned tasks and projects related to the CourseFlow tool, which was at the time, in its earlier stages of development. In the following years, in an effort to contextually implement and improve the tool with the users it was mainly intended for, CourseFlow was increasingly employed first by individual teaching and non-teaching staff from various learning institutions, and then by whole programs, among a couple of others, the Physiotherapy Technology program from Dawson College in Montreal. Some of the author's roles as a SALTISE RA included hands-on working with higher education practitioners to help them understand and utilize the tool, guiding those who wish to

incorporate it into their own teaching practices, and facilitating efforts to engage entire programs in its use.

This practical experience highlighted a need to systematically explore how CourseFlow aids practitioners, specifically within the Physiotherapy Technology program faculty, who collectively decided to utilize the tool in their program revision process, and identify areas for improvement. The goal was to enhance the tool's utility and effectiveness, thereby encouraging broader adoption across various programs. The research was sparked by a desire to understand the practical impact of CourseFlow on practitioners' existing professional practices and to identify modifications that could make it more beneficial and accessible to a wider range of potential users in the field of Education.

Furthermore, research of the existing literature on the topic of integration of electronic tools into curriculum mapping and design processes reveals the existing gap and critical need for developing new instructional software that enhances alignment and supports interdisciplinary communication and collaboration among various stakeholders by effectively representing the relationships between curricular elements, as highlighted in the systematic mapping study by Melillán et al. (2023). The authors of this study suggest future research to focus on creating tools that more accurately reflect the needs and relationships of curricular components, ultimately fostering better alignment and collaboration in curriculum mapping and design processes (Melillán et al., 2023).

Research Questions

The overarching objective of this research is to examine the impact of CourseFlow on improving practitioners' understanding of own roles as well as their professional practices and then in the context of aiding curriculum mapping, at the same time examining its affordances and

weaknesses in juxtaposition with other tools commonly used in the program revision process. The project was designed to address the following underlying research questions:

1. Does CourseFlow improve the process of program revision allowing for better conversations, audit, reflection, and in the end, a more aligned curriculum – and if so, in what ways?
    a. Can CourseFlow help in the way instructors understand the role of their own course and its place in the program (increase instructor awareness) and if so, how?
    b. Can CourseFlow improve orchestration and if so, how, and can it become a regular tool to be used in the process to see and develop connections among the courses?
    c. Can CourseFlow increase collaboration among stakeholders and if so, how?
2. How does CourseFlow compare to other tools commonly and traditionally used in the program revision process in terms of its advantages and disadvantages?
    a. What are CourseFlow's affordances?
    b. What are CourseFlow's weaknesses?
3. Can CourseFlow be improved further to increase its effectiveness in the process of program revision for future use – and if so, in what ways?

Addressing the Problem

To address the research questions of this study, participants who were actively engaged as key stakeholders in the process of program revision and curriculum mapping were recruited. Through the means of semi-structured interviews, the author gathered the pertinent information and analyzed the common themes in participants' experiences, while considering both their perspectives and her own influence on the research.

Thesis Roadmap

Chapter 2 of this paper (a) reviews the existing literature on the topic, starting from the competency-based education and program revision process, through digital tools that aid curriculum mapping and design and their affordances regarding collaboration among stakeholders, and ending with the overview of CourseFlow, the tool examined for the purposes of this research, as well as (b) looks at the theoretical approach chosen for the analysis of the collected data. Chapter 3 focuses on (a) the practical design of the study, including the participants, research context, and procedure timeline and (b) interview and observation methodologies. Next, Chapter 4 (a) describes the process of handling the research data, (b) looks at data analysis, and (c) gives a detailed insight into research results, addressing research questions and sub-questions, all the while supporting the findings with participants' own words. Finally, Chapter 5 (a) synthesizes the findings in the context of the overarching objective of the study, (b) outlines the challenges encountered such as original study direction and the reasons for its adaptation as well as the author's bias, and (c) identifies potential future research directions and opportunities.

Literature Review

Competency-Based Education

This section provides a brief exploration of Competency-Based Education (CBE), a model that has significantly influenced modern educational practices in the past five decades. The growing recognition of the value of CBE is driving its adoption across various educational institutions, making it an increasingly important model in modern education. The section begins with an overview of the origins of CBE, tracing its development from mid-20th century educational reform movements and nursing education to its adoption in various professional fields. Following this, the core principles of CBE are looked at, explaining what CBE is and highlighting its implications for

both students and educators. Finally, the implementation of CBE is examined, touching on the practical challenges and considerations institutions face when adopting this model.

Origins of Competency-Based Education

Competency-Based Education (CBE) has its roots in the mid-20th century as an educational reform movement, and specifically in nursing education in the 1970s, aimed at addressing the limitations of traditional time-based learning models. The history of CBE is marked by a shift towards a more personalized, outcomes-focused approach to education. This movement emerged as a response to the growing recognition that students' learning needs and paces vary widely, and that education systems needed to be more flexible to accommodate these differences (Cowan et al., 2007; Dodge et al., 2023). Over time, CBE has evolved from a niche approach to a widely adopted educational model, particularly in professional and technical fields where specific competencies are essential for success (Açıkgöz & Babadoğan, 2021; Gervais, 2016; Perera et al., 2017; Rissi & Gelmon, 2014).

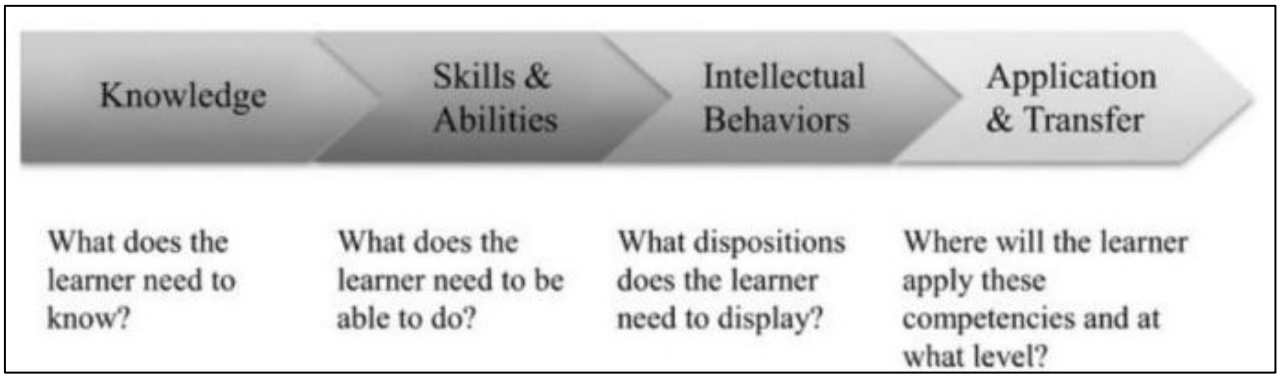
What Is a Competency?

Competencies are defined as the specific skills, knowledge, and behaviors that students must master to be deemed proficient in a particular area of study or professional field. Unlike traditional education models that often focus on time spent in class or completion of coursework, competencies serve as clear, measurable outcomes that guide the learning process in CBE. Competencies are typically aligned with industry standards or professional requirements, ensuring that the education students receive is directly relevant to their future careers (Açıkgöz & Babadoğan, 2021; Scheopner Torres et al., 2018). The role of competencies in CBE is central, as they form the foundation for designing curricula, developing assessments, and measuring student progress. Competencies also aim to ensure that graduates are not only knowledgeable but also capable of applying their skills in

real-world settings, thereby bridging the gap between education and professional practice (Dodge et al., 2023), as it can be seen in the illustration in Figure 1 below. This competency-focused approach helps prepare students to meet the demands of a rapidly changing workforce, making them more adaptable and better equipped to succeed in their chosen fields (Cowan et al., 2007; Gervais, 2016).

Figure 1

Representation of a Competency



Note. *Graphic representation of a competency* [Illustration]. Reprinted from *A leader's guide to competency-based education: From Inception to Implementation,* by L. Dodge, D. J. Bushway, C. S Long, & A. Laitinen, 2023, New York: Routledge.

What Is CBE and What Are Its Implications?

CBE is fundamentally an educational model that prioritizes the mastery of specific skills and competencies over the completion of a set number of hours in a classroom. In this model, students progress through their education by demonstrating their mastery of predefined competencies (Açıkgöz & Babadoğan, 2021; Cowan et al., 2007; Scheopner Torres et al., 2018). Therefore, CBE allows for more personalized pacing, enabling students to progress as soon as they demonstrate their competence in a particular area (Dodge et al., 2023; Gervais, 2016; Scheopner Torres et al., 2018). This approach is particularly effective in fields where practical skills and knowledge are critical, as

it ensures that graduates are fully prepared to meet the demands of their chosen fields (Açıkgöz & Babadoğan, 2021; Gervais, 2016).

The implications of CBE are significant, as it has the potential to transform the educational landscape by making learning more student-centered and aligned with real-world needs. One of the key advantages of CBE is its ability to address the diverse needs of students, including non-traditional learners who may require more flexibility in their educational journey. Additionally, CBE is gaining momentum today because of its potential to reduce time to degree completion and increase the relevance of education to the job market (Açıkgöz & Babadoğan, 2021; Cowan et al., 2007; Dodge et al., 2023; Gervais, 2016; Scheopner Torres et al., 2018).

Implementation of CBE

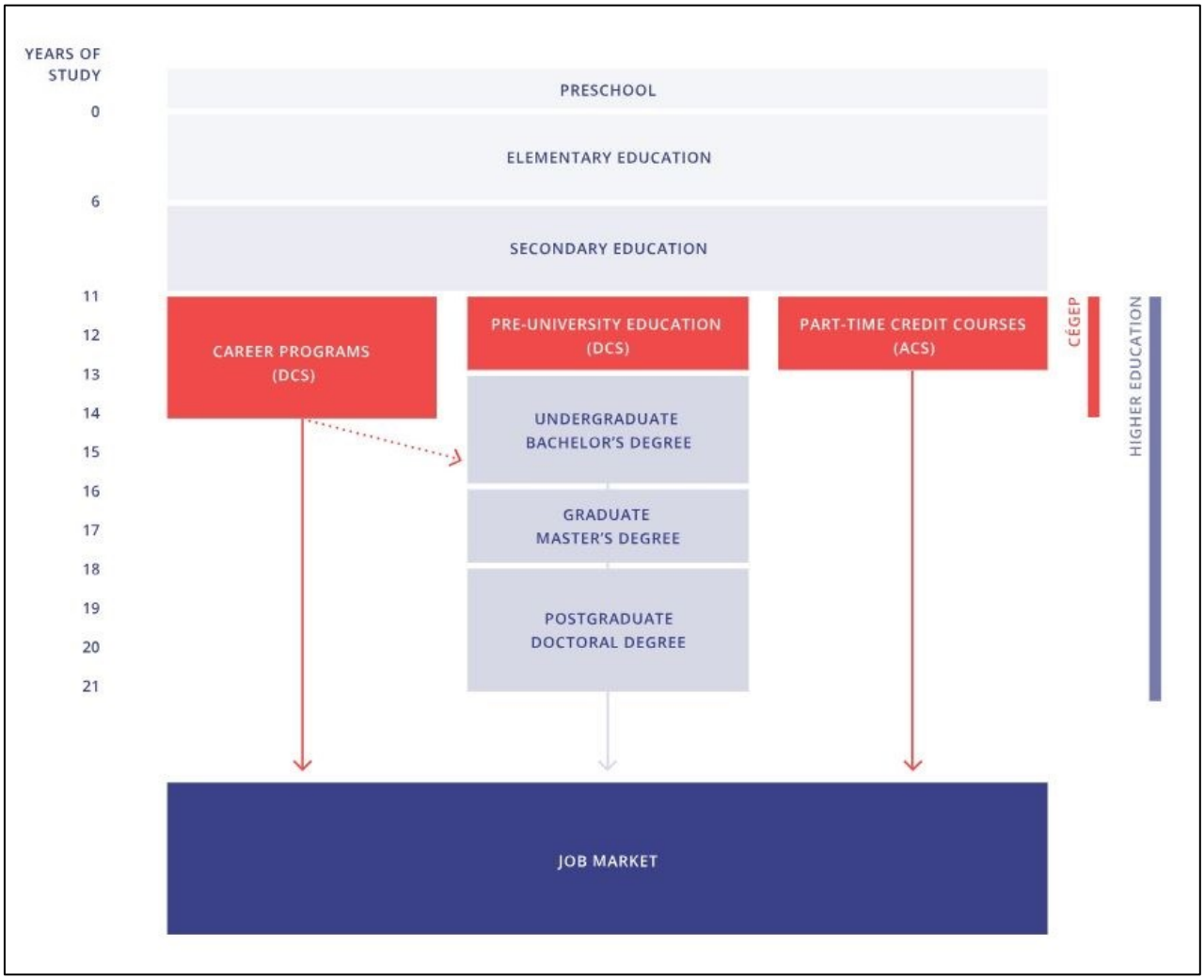
The implementation of CBE is a complex process that requires careful planning and a shift in traditional educational practices. Successful implementation of CBE relies on changes in policy, practice, and assessment. Policy changes are necessary to support instructional approaches that allow students to progress at their own pace, which may require moving away from traditional educational models. Practice adjustments involve teachers adopting new roles as designers, facilitators, and mentors, and adapting their own instruction to accommodate students' individual learning paces. Assessment must be reimagined to align with competencies, requiring educators to collaboratively define proficiency and ensure student mastery is accurately measured. (Dodge et al., 2023; Scheopner Torres, et al., 2018). Despite these challenges, the growing demand for personalized and flexible learning experiences is driving the adoption of CBE, as it offers a more learner-centered approach that can better meet the diverse needs of students (Dodge et al., 2023; Gervais, 2016; Scheopner Torres et al., 2018).

CEGEP System in Quebec

In Quebec, colleges represent the first level of non-compulsory education, bridging the gap between secondary school and university (Cégeps du Québec, 2024), as can be seen in Figure 2 below. According to the Government of Quebec (2024), Quebec's college system includes a variety of institutions, and in particular, 48 public colleges (CEGEPs – Collèges d'enseignement général et professionnel), approximately 70 private colleges, and four affiliated public establishments.

Figure 2

CEGEPs' Place in the Quebec Education System



Note. Reprinted from Cégeps du Québec. (2024). *Quebec school system overview* [Illustration]. cegepsquebec.ca. https://www.cegepsquebec.ca/en/cegeps/presentation/systeme-scolaire-quebecois/

CEGEPs offer a unique educational pathway, distinct from other Canadian provinces, by providing both pre-university and technical programs. CEGEPs maintain strong connections with industry and public institutions, aligning their programs with the needs of the job market. These partnerships ensure that students acquire relevant skills and expertise, contributing to their high employment rates post-graduation. CEGEPs also host college centers for the transfer of technologies, promoting applied research and supporting key sectors in Quebec's economy (Cégeps du Québec, 2024; Gouvernement du Québec, 2024).

While the majority of CEGEP programs are taught in French, there are five English-speaking CEGEPs available, catering to the province's anglophone population. This bilingual approach ensures that a wide range of students can access high-quality education in their preferred language (Cégeps du Québec, 2024; Gouvernement du Québec, 2024).

Structure of CEGEPs and Types of Programs Offered

As per the Government of Quebec (2024), the academic year in CEGEPs is divided into two 16-week sessions, held in fall and winter, with the possibility of shorter summer sessions. Courses are typically allocated 45 hours, distributed as three-hour units over 15 weeks; these numbers may differ depending on the type of program. To maintain full-time student status, individuals must complete a minimum of 180 hours per session.

CEGEPs offer two main types of programs leading to the Diploma of College Studies (also known as Diplôme d'études collégiales – DEC): 1. Pre-University, two-year full-time programs which prepare students for university education, focusing on specialized academic subjects that provide a solid streamlined foundation for further studies and 2. Technical, three-year full-time

programs designed to meet the demands of the labor market. These programs sometimes include mandatory work placements, ensuring that students gain practical, hands-on experience. While their primary focus is on equipping students with job-ready skills, technical programs also allow for university progression if certain academic requirements are met (Cégeps du Québec, 2024; Gouvernement du Québec, 2024).

Lastly, CEGEPs also offer shorter-term programs leading to an Attestation of College Studies (or Attestation d'études collégiales – AEC). These programs can take anywhere between six and eighteen months to complete, depending on the institution, and they are typically technical training programs aimed at immediate entry into the workforce, with curricula that evolve to meet current market needs (Cégeps du Québec, 2024; Gouvernement du Québec, 2024).

Institutional Framework and Affiliations

According to the Government of Quebec (2024), Quebec's CEGEPs are governed by the General and Vocational Colleges Act, while private institutions operate under the Private Education Act. Additionally, affiliated public institutions fall under the jurisdiction of other ministries. All programs leading to a DEC are recognized by the Ministry of Higher Education, ensuring that graduates receive a valued diploma. AECs, awarded by CEGEPs, also hold significant value in the Quebec job market.

The College Education Evaluation Commission (Commission d'évaluation de l'enseignement collegial – CEEC) plays a vital role in maintaining the quality of education within Quebec's college system. It is tasked with contributing to the continuous improvement of educational standards. The CEEC's responsibilities include overseeing the implementation of regulations that govern college education, which encompass admission policies, program

administration, learning assessment, and the certification of studies (Gouvernement du Québec, 2024).

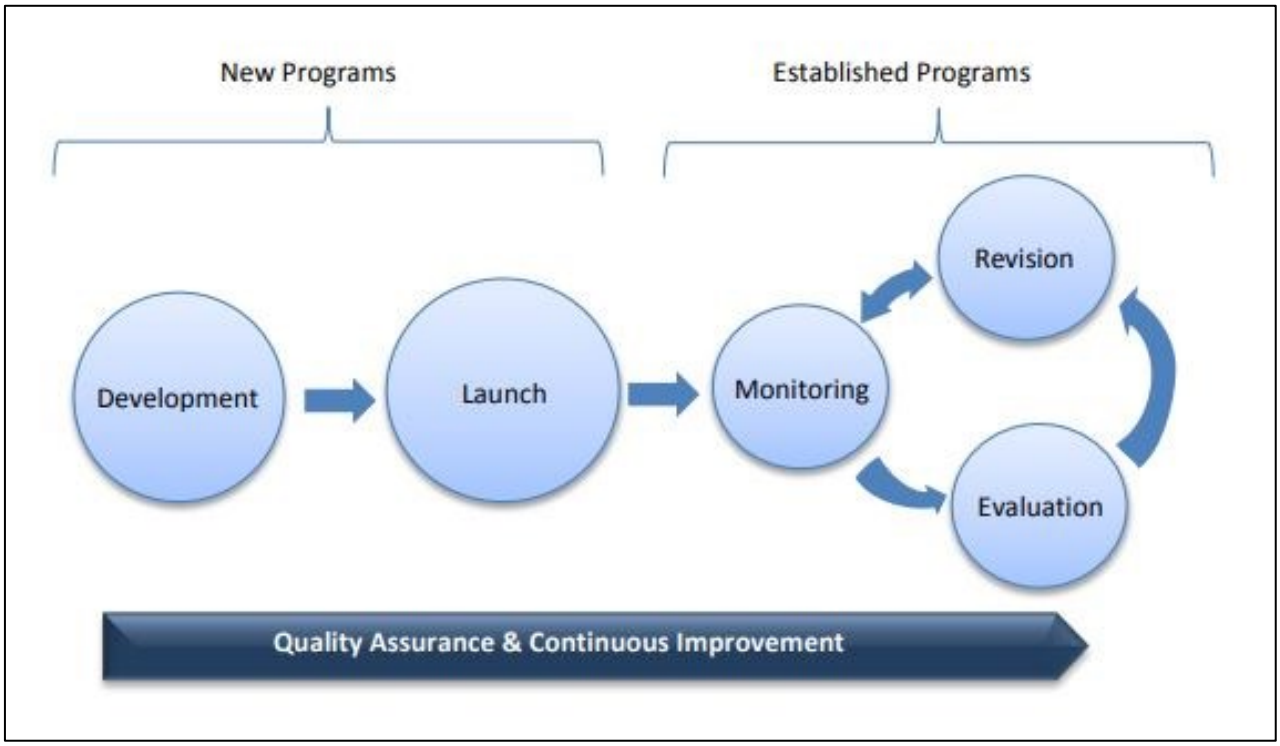
CEGEP Program Administration and Management

Regarded as “the foundation of college education” (Marianopolis College, 2019), an academic program can be defined as a cohesive collection of learning activities and courses, structured to guide students toward attaining specific competencies and learning outcomes as defined by established standards and goals (Champlain Regional College, 2015; Marianopolis College, 2019; Ministère de l’Emploi et de la Solidarité sociale, 2024, s.1, art.1; Vanier College, 2019). To successfully develop, implement, and evaluate programs as well as overall oversee and manage them (Vanier College, 2019), a college designs and sets in place a mechanism known as “program management cycle”, also referred to as “program management policy” or “program evaluation policy” depending on the institution employing the term.

The program management cycle is an iterative process that ensures the continuous improvement and quality of educational programs (Champlain Regional College, 2015; Dawson College, 2019; Vanier College, 2019). This ongoing process ensures that programs remain pertinent and successful over time, while keeping a strong focus on aligning local program development with the standards set by the Ministry of Education and ensuring that programs meet the CEEC's six quality criteria: 1. coherence, 2. relevance, 3. effectiveness, 4. teaching methods and student support, 5. human, material, and financial resources, and 6. governance (Dawson College, 2019; Marianopolis College, 2019; Vanier College, 2019). Although there are some variations in the stages of the program management cycle across different institutions (see examples of representations of the program management cycle from three CEGEPs in the Figures 3, 4, and 5 below), its core elements remain consistent.

Figure 3

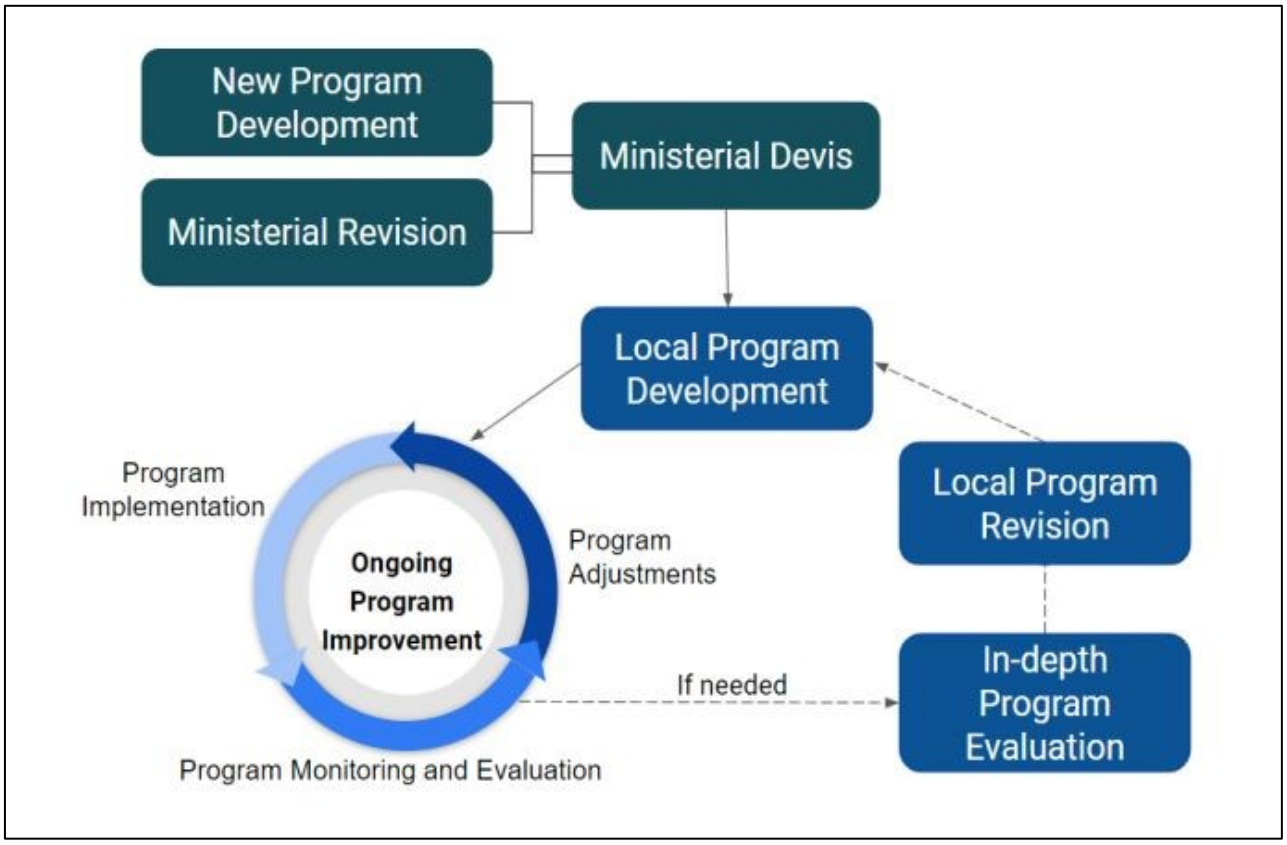
Representation of the Program Management Cycle at Champlain Regional College



Note. Reprinted from Champlain Regional College (2015). *Program management cycle* [Illustration]. champlainsaintlambert.ca. https://champlainsaintlambert.ca/wp-content/uploads/2022/12/Institutional-Policy-on-the-Management-of-Academic-Programs-IPMAP.pdf

Figure 4

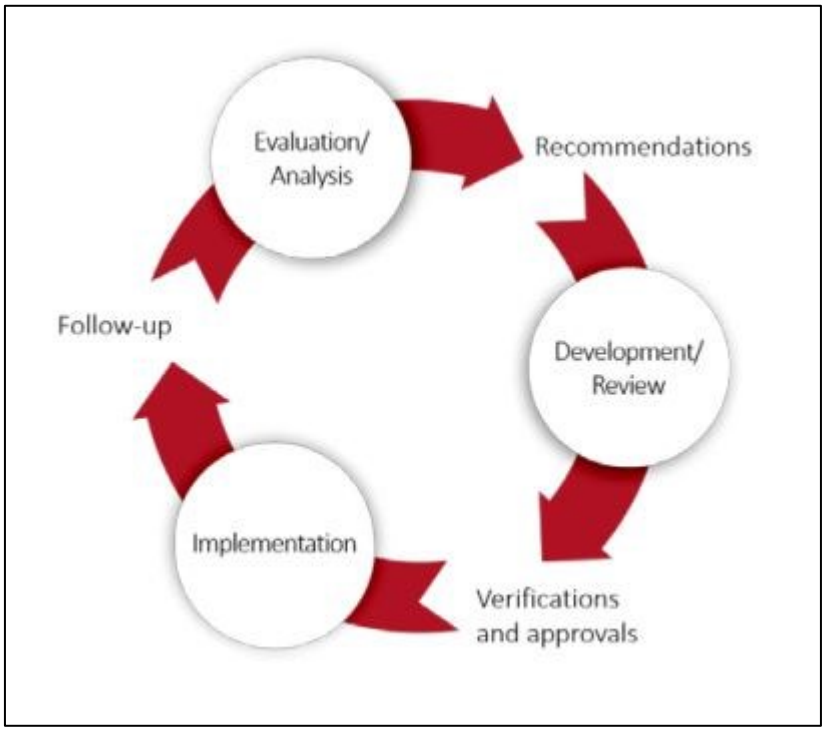
Representation of the Program Management Cycle at Marianopolis College



Note. Reprinted from Marianopolis College (2019). *Marianopolis College program management cycle* [Illustration]. marianopolis.edu. https://www.marianopolis.edu/wp-content/uploads/2023/01/Program-Management-Policy-2019.pdf

Figure 5

Representation of the Program Management Cycle at Vanier College



Note. Reprinted from Vanier College (2019). *Core program management cycle* [Illustration]. vaniercollege.qc.ca. https://www.vaniercollege.qc.ca/bylaws-policies-procedures/files/Program-Management-Policy.pdf

Core Stages of the Program Management Cycle

Implementation. Once a program is proposed, designed, and approved, it moves into the implementation or launch phase, which marks the initial delivery of the program. During this stage, feedback is collected to assess the effectiveness of the initial setup and make necessary adjustments. The stakeholders in the process are continuously supported by being offered guidance, resources, and necessary tools. The results of the implementation are then fed back into the evaluation phase of the core process. Implementation activities are recorded in the program's annual report, and the assessment is duly documented (Vanier College, 2019).

Monitoring and Evaluation/ Analysis. After a program is implemented or launched, it enters a delivery phase, during which it undergoes regular monitoring and evaluation to ensure its quality and effectiveness. Monitoring involves the routine review of data through tools such as dashboards, course success reports, and feedback from committees and stakeholders, identifying areas that may require additional analysis or improvement. Evaluations, guided by criteria established by bodies like the CEEC, offer a more comprehensive assessment, focusing on aspects such as program coherence, relevance, teaching methods, resources, and governance. When no immediate issues are detected, the program may concentrate on previously unassessed criteria. However, if any issues arise in key performance indicators, a full-scale evaluation may be required following the approval of a proposed evaluation framework which details the process, roles, responsibilities, and timeline for necessary revisions and implementations (Marianopolis College, 2019; Vanier College, 2019).

Development/ Review/ Adjustment. If the findings from the previous stage in the program management cycle require so, programs may undergo revisions to improve their effectiveness and ensure they meet the evolving needs of students, the labor market, and societal expectations. Revisions can be minor adjustments made annually or more significant ones following comprehensive evaluations or external reviews, and they can trigger modifications in various aspects of a program, all of which must be approved by relevant stakeholders. The cyclical nature of this process allows programs to remain dynamic and responsive to internal and external changes (Champlain Regional College, 2015; Vanier College, 2019).

Roles and Responsibilities of Stakeholders Within a Program

Various stakeholders are involved in the program management cycle in the Quebec CEGEP system, each contributing to one of the core elements of the process - implementation, evaluation,

and review of educational programs. Below is a summary of key roles involved in this process, as per Champlain Regional College (2015), Dawson College (2019), Marianopolis College (2019), and Vanier College (2019), with descriptions highlighting their responsibilities and contributions.

1. Program Committees manage and evaluate academic programs, ensuring alignment with institutional goals and coherence across course offerings.
2. The General Education Committee ensures interdisciplinary coherence and quality across general education components, working with various stakeholders to maintain consistency of educational standards.
3. Program Coordinators facilitate program management, liaising between committees and departments, and presenting program materials to the Academic Council in an effort to advocate for the program's needs.
4. The Program Coordination Committee advises the Associate Dean, Programs on matters regarding program management, fostering a college-wide perspective on student learning experience.
5. Academic Departments provide disciplinary expertise, develop course frameworks, and ensure program needs are met and the curriculum stays relevant.
6. Pedagogical Counsellors offer guidance and support to Program Committees and Academic Departments in developing program materials, at the same time ensuring curriculum alignment with institutional and ministerial standards.
7. The Associate Dean, Programs, oversees all components of program management, aligning it with the college's strategic plan and mission.
8. The Academic Dean is responsible for the quality of programs, ensuring alignment with the college's values and strategic plan as well as all aspects of program management, including supporting faculty in the process.

9. Academic Advisors support students in tackling their academic journey and making informed decisions about course progression and enrolment as well as university eligibility and registration.
10. Program Deans manage specific programs, ensuring quality and alignment with college policies and student needs, at the same time collaborating with other stakeholders to oversee the implementation of action plans and program evaluations.
11. The Academic Council makes recommendations on all stages of the program management cycle, ensuring adherence of the curriculum to educational standards and institutional goals.
12. The Board of Governors approves new and revised programs, ensuring they align with institution's academic and administrative objectives.

Program Revision Process in CEGEPs

This section provides an overview of the program revision processes at CEGEPs in Quebec, focusing on the distinct approaches for DEC and AEC programs as well as the stages involved in ministerial and internal revisions. Additionally, the section explores the roles of the Program Committee and Academic Council in ensuring that revisions are thoughtfully planned, approved, and implemented.

Revisions of DEC programs are often necessary due to changes in Ministry specifications, evolving industry needs, or insights gained from ongoing program evaluations. These revisions, which may involve adjustments to course content, hours, assessments, or prerequisites, require a structured process that includes developing a revision proposal, obtaining approvals from various institutional bodies, and ensuring timely implementation. Unlike DEC programs, AEC program revisions are more flexible and designed to quickly adapt to changing industry demands (Champlain Regional College, 2015; Vanier College 2019).

When the Ministry issues a new “devis” (document which outlines goals and competencies) for a program, the college undertakes a comprehensive revision process that involves analyzing the changes, evaluating current program data, and developing a revised program framework. This process is managed by the Program Committee in collaboration with the Program Dean and pedagogical counsellors, culminating in a proposal that is reviewed and approved by distinct college bodies, such as the Academic Council and the Board of Governors. On the other hand, internal evaluations and revisions are initiated by concerns such as changes in accreditation standards or significant shifts in student outcomes. The Program Committee, guided by a pedagogical counsellor, is responsible for developing an evaluation plan that outlines the process, methods, and timeline for the evaluation process. Following a thorough evaluation, the findings and recommendations are compiled into a report, which may lead to further revisions similar to those in a ministerial revision (Champlain Regional College, 2015; Marianopolis College, 2019; Vanier College 2019).

The Program Revision Committees, consisting of faculty, pedagogical counsellors, and academic advisors, are tasked with driving the revision process at the local level. Their responsibilities include establishing a vision for the revised program, ensuring pedagogical consistency, consulting with relevant departments, and developing key program documents like the exit profile and competency map, all of which are eventually recommended to the Academic Council (Marianopolis College, 2019).

Digital Tools That Aid Curriculum Mapping and Design

In this section, to begin with, several digital instructional design tools will be discussed. Secondly, the section will look at a few examples of specifically Canadian-developed tools, and the most common features of such digital educational software will be synthesized. Next, the role of

digital instructional design tools in improving collaboration among stakeholders will be examined. To conclude the section, the tool which is the focus of this study, CourseFlow, will be discussed.

Examples of Digital Instructional Design Software

EDUportfolio is an online platform designed to improve the management, mapping, and analysis of medical curricula (Majerník et al., 2021). The platform was developed based on needs identified by curriculum designers, teachers, and managers from five universities across Europe, where the tool's usability and effectiveness were validated through pilot mapping of anatomy curricula. Majerník et al. report that EDUportfolio facilitates the harmonization and optimization of outcome-based medical curricula by visualizing and analyzing curriculum data, revealing hidden relationships, overlaps, and gaps (2021).

In his paper, Kertesz (2015) examines the U-Map tool, the software that extends beyond traditional curriculum mapping by incorporating features for dynamic curriculum visualization and analysis. The tool facilitates a comprehensive understanding of how curricular elements align with institutional goals and learning outcomes and emphasizes the importance of not only mapping the curriculum but also utilizing the mapped data for ongoing curriculum improvement and strategic planning.

LOOOP (Learning Opportunities, Objectives, and Outcome Platform) is an interactive, web-based curriculum mapping tool aimed at improving transparency and alignment in educational programs (Treadwell et al., 2019). It allows for detailed tracking of learning objectives and outcomes across different courses and modules. The platform supports collaborative input from various stakeholders, ensuring a holistic approach to curriculum development and continuous quality enhancement.

According to Zubek et al. (2023), PS-MAP focuses on mapping the curriculum for professional skills in physiology education. It provides a structured approach to aligning course content with desired competencies and skills. The tool helps educators identify gaps and redundancies in the curriculum, promoting a more coherent and targeted educational experience. It also facilitates the integration of assessment data to refine and optimize teaching strategies.

Instructional Digital Tools Developed in Canada

Curriculum Links, developed by the University of Calgary, is a customizable online platform designed to simplify curriculum mapping for academic programs. It helps faculty members visualize how various elements of a curriculum, such as course outcomes and assessments, align with program goals. The tool fosters reflective teaching practices by encouraging educators to closely examine the relationship between learning activities and outcomes. Curriculum Links has been praised for its flexibility, ease of use, and its ability to generate comprehensive visual maps that support curriculum review and development processes (University of Calgary, n.d.).

. It allows faculty to map and review courses in relation to program-level learning outcomes, ensuring that educational goals are being met across the curriculum. The platform also supports identification of any gaps and redundancies, facilitating data-driven decisions for curriculum improvement (Toronto Metropolitan University, n.d.).

In medical education, CBlue, a tool created by Dalhousie University, is a curriculum map visualization platform designed to help faculty and administrators track and analyze the coverage of learning objectives across different courses and programs. The system provides a detailed overview of how curriculum elements are aligned, which supports curriculum development and continuous improvement efforts at the university (Dalhousie University, n.d.).

Key Features and Commonalities Among Educational Digital Tools

1. Visualization and analysis: These tools provide a visual, data-driven representation of curricular elements, facilitating a comprehensive understanding of how learning outcomes are taught and assessed across programs. For example, the EDUportfolio platform developed by Majerník et al. (2021) as well as Curriculum Insights from Toronto Metropolitan University (n.d.) enable users to visualize and analyze curriculum data and identify any overlaps and gaps.
2. User-friendly interfaces: Digital instructional design tools are generally designed with user-friendly interfaces to streamline the documentation, analysis, and revision of curriculum components. This accessibility ensures that educators can easily interact with the platform and utilize it for curriculum improvement. The examples of tools with particularly user-friendly interfaces are U-Map (Kertesz, 2015) and Curriculum Links from the University of Calgary (n.d.).
3. Dynamic and interactive elements: Tools like U-Map and LOOOP offer dynamic and interactive features that go beyond traditional curriculum mapping. These platforms support ongoing curriculum improvement and strategic planning by providing real-time feedback and enabling collaborative input from various stakeholders.
4. Alignment and integration: The focus is on aligning curricular content with institutional goals and learning outcomes, ensuring coherence and targeted educational experiences. This alignment helps in identifying curricular strengths, overlaps, and gaps, thereby promoting continuous improvement. For example, the PS-MAP tool developed by Zubek et al. (2023) specifically aims at aligning course content with desired competencies in physiology education, highlighting the importance of targeted educational experiences.

5. Data-driven decision making: Providing insights into curriculum effectiveness and identifying areas needing improvement support data-driven decision making. This feature is critical for ongoing curriculum refinement and optimization. For instance, CBlue (Dalhousie University, n.d.) and Curriculum Insights (Toronto Metropolitan University, n.d.) have continuous curriculum improvement as one of the projected goals of the tool.

The Affordances of Digital Tools Regarding Collaboration Among Stakeholders

Digital tools significantly enhance collaboration among educators and other stakeholders by fostering communities of inquiry, supporting reflective practice, and enabling the co-design and implementation of innovative teaching strategies. Vaughan, Cleveland-Innes, and Garrison (2013) emphasize that blended learning environments sustain dialogue and knowledge sharing among faculty while organizing and providing access to shared resources. Fullan and Langworthy (2014) similarly argue that integrating technology is essential for creating collaborative environments that align teaching practices with contemporary educational needs, allowing educators to address challenges collectively and improve education quality. Findings from more recent studies have further expanded on these affordances. For instance, Martínez-Peláez et al. (2023) highlight how digital platforms enable real-time collaboration across diverse educational settings, fostering a shared understanding among stakeholders. Additionally, Mialkovska et al. (2023) find that digital tools play a pivotal role in connecting geographically dispersed teams, facilitating continuous and synchronous communication that enhances collective problem-solving efforts.

Furthermore, digital platforms for professional development, such as online peer observation, support collaborative efforts by providing flexible and accessible means for educators to engage in continuous feedback and refinement of their teaching practices. Bennett and Barp (2008) argue that online tools can facilitate collaborative professional growth, allowing educators to

share insights and collaboratively enhance their instructional methods. This use of technology not only fosters individual professional development but also strengthens the collective efficacy of educational communities. In addition, Toukola and Ahola (2022) emphasize that digital tools contribute to the development of a collaborative culture by enabling transparent communication and sharing of best practices, while Brunetti et al. (2020) argue that technology facilitates the integration of interdisciplinary perspectives, thus enriching the collaborative process and contributing to improved educational outcomes.

Overall, these studies collectively highlight the transformative potential of technological innovations in fostering collaboration among stakeholders. By leveraging digital tools, working environments that are more dynamic, interactive, and supportive can be created, ultimately enhancing both professional development and student learning outcomes.

CourseFlow

The information on CourseFlow presented here mostly originates mostly from the conversations with the developer of the tool, one of the participants in this study, and was obtained during the data collection stage of the research. Since it does not address the research questions of the study, which are outlined in the Introduction section, this particular information was not included in the Results section of this research but rather featured here, as it is relevant for depicting the history and evolution of the CourseFlow tool.

Origins of CourseFlow. CourseFlow first came to be as a project sponsored and supported by SALTISE, where the developer of the tool, then a research assistant working closely with Dr. Charles, spearheaded its initial development. Around 2015 or 2016, an initiative was launched to collect and visually map out teaching activities from educators. Initially, these activities were represented through rudimentary flow charts, illustrating the steps of each activity with icons

denoting various tasks and social planes (individual, group, or class work). Despite their effectiveness in depicting pedagogical elements, these flow charts lacked aesthetic appeal and clarity.

To address this shortcoming, a method for creating cleaner and more informative flow charts using the LaTeX software system was introduced. This approach enhanced visual quality and facilitated easier comprehension of the activities at a glance. However, the process of creating these flow charts was labor-intensive and required proficiency in LaTeX, presenting a barrier to widespread adoption of the tool among practitioners. Consequently, the concept of developing a more user-friendly tool emerged, aiming to simplify the process for a broader audience.

Workflow Maker and Transition to CourseFlow. Motivated by the need for an accessible tool, in 2017, a prototype was developed that enabled users to generate visual representations of activities without extensive training. After a brief period of intensive coding, the developer of the tool presented this prototype to Dr. Charles, who instantly recognized its potential. Thus, Workflow Maker was launched as a basic yet functional tool, allowing users to produce flow charts with minimal training.

As a next step, the concept further evolved to encompass not only activities but entire courses. This idea, possibly suggested by SALTISE members during brainstorming sessions, led to the creation of a version that could map out courses and eventually programs. Turning to programming in JavaScript facilitated a comprehensive rebuild of the tool, better accommodating these new features. Initial challenges in defining the key components of a program were addressed by focusing on making the course-level tool feature outcomes-oriented.

Evolution of CourseFlow. The pivotal transformation of CourseFlow was marked by two significant developments. Firstly, the offer from Scivero, a web development and data science

consulting firm specializing in building, hosting, and maintenance (Scivero, 2024), to host CourseFlow on their server, providing proper logins and cloud-based data storage, laid the foundational support for a robust database backend. This transition enabled a complete reconstruction of CourseFlow, enhancing its functionality and user experience.

Secondly, collaboration with key stakeholders was instrumental in refining the program level of the tool, making it invaluable for curriculum designers and as an aid in the curriculum revision process. These advancements transformed CourseFlow from a basic JavaScript application into a comprehensive tool for visualizing and managing educational activities, courses, and programs, significantly aiding educators and curriculum developers in their work.

How Does It Work? CourseFlow was developed under the design research paradigm, based on the notion of orchestration by Pierre Dillenbourg. Orchestration (at the level of a lesson) underlies how the resources available as well as constraints of the system are managed by the instructor. In his research, Dillenbourg looks at the different social planes (individual, small group, whole class, and the society) and makes a clear distinction between what goes on inside and outside of the learning space (Dillenbourg, 2009, 2012; Dillenbourg & Jermann, 2010; Dillenbourg et al., 2011).

The CourseFlow development incorporated these notions to highlight that when one is engaged in Active Learning, there are only three kinds of engagements/modalities that are possible: individual engages on its own, individual engages with another, and individual engages with the whole class. Students can be engaged outside or inside the classroom, these activities still constituting a lesson. CourseFlow provides an easy visualization to the instructor of how their lesson progresses by having an overview of tasks that students are engaged in so that the instructor can better understand how they are moving their students through the learning process (E. Charles,

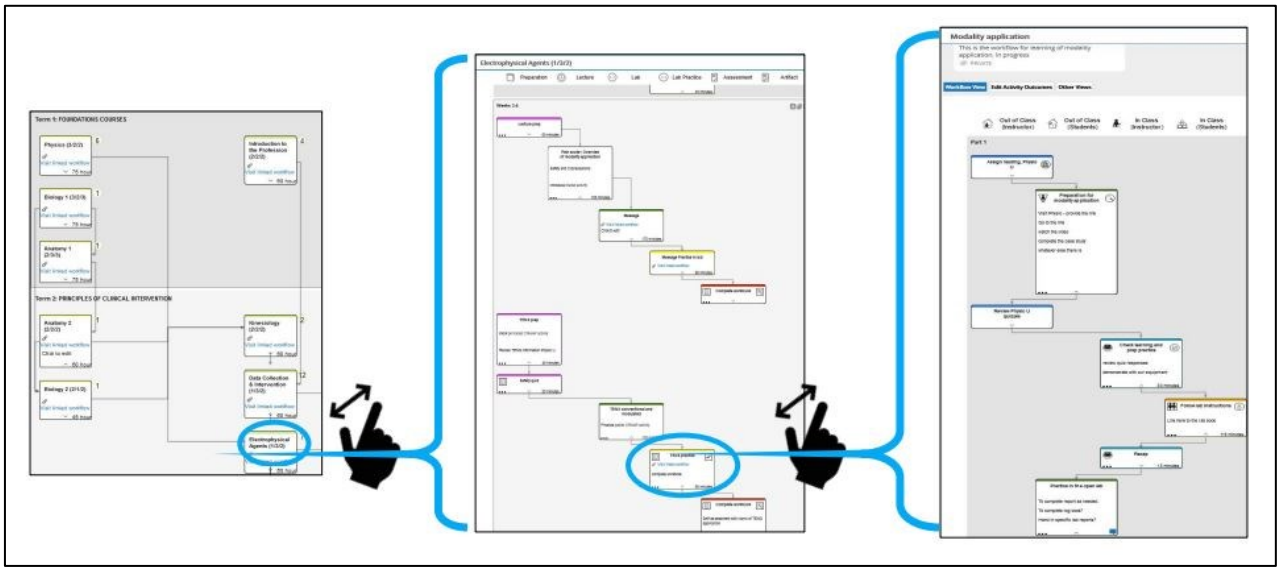
personal communication, March 19, 2021). The actual doing of things is taken from Dillenbourg's notion of scripts (Dillenbourg & Jermann, 2007). CourseFlow also examines what scripts look like (e.g., jigsaw as a well-known instructional strategy script) and assigns names to the sequences of tasks instructors use in their lessons (E. Charles, personal communication, March 19, 2021).

CourseFlow allows users to map out curricular and pedagogical elements within a customizable template, creating comprehensive workflows. A workflow functions similarly to a flowchart, mapping out the components of an instructional unit based on intended learning goals by the means of elements such as nodes, category columns, and sections, which are all customizable. The default template follows two conventions – nodes are read from left to right and from top to bottom, with connections between nodes indicating the sequence of actions.

There are three types of workflows within CourseFlow, as shown in Figure 6 below: 1. Program workflow, which maps out the sequence of courses within an academic program, allowing for the examination of alignment between course outcomes and program objectives; 2. Course workflow, which visualizes the sequence of course components (such as lessons, projects, and assessments) throughout the course, showing how course objectives are addressed across the semester; and 3. Activity workflow that represents the sequence of tasks within a lesson unit, showing how a course objective is addressed within a single or multiple class sessions. These workflows can be interconnected across levels to create a comprehensive curriculum ecosystem.

Figure 6

A Three-Level Curricular View in CourseFlow: Program, Course, and Activity



Note. Reprinted from SALTISE (2024). *Relationship of the workflows by level* [Illustration]. saltise.ca. https://www.saltise.ca/wp-content/uploads/2023/12/Getting-Started_CourseFlow_primer.pptx.pdf

Theoretical Design of the Study

This section will discuss the theoretical design of this study. Firstly, the section will look at the postulates of Constructivism and Socio-Constructivism, as well as their implications in qualitative research. Next, Case Study as chosen approach for this research will be examined, followed by the overview of Instrumental Case Study. Lastly, the section will discuss the employed coding methodology, from the definition of a code to an overview of First and Second Coding Cycles.

Constructivism and Socio-Constructivism

Foundations of Constructivism. Constructivism as an epistemological perspective has its roots in cognitive psychology and the works of prominent authors with Jean Piaget and Lev

Vygotsky at the forefront, who emphasized the active role of individuals in constructing their own understanding and knowledge through previous experiences and interactions with the world, creating a cohesive and personally meaningful body of knowledge (Funa & Talaue, 2021; Gale, 1995; Tomljenović & Tatalović Vorkapić, 2020; von Glasersfeld, 1995). A core postulate of constructivism is that learning is a process of meaning-making, where learners are not merely recipients of information but co-creators of their own cognitive frameworks. Constructivist theory emphasizes the importance of context, prior knowledge, and active engagement in the learning process, asserting that understanding is constructed through the interaction between the individual's internal cognitive structures and external stimuli. This perspective underscores the idea that there is no single, objective reality but rather multiple constructions of reality that vary from person to person (Lincoln & Guba, 1994; Tomljenović & Tatalović Vorkapić, 2020; von Glasersfeld, 1995).

Foundations of Socio-Constructivism. Socio-constructivism extends the principles of constructivism by emphasizing the critical role of social interaction in the learning process. This theory is strongly influenced by the work of Lev Vygotsky, who argued that learning is inherently a social process that occurs through interactions with more knowledgeable others, such as teachers, peers, or mentors. Vygotsky introduced the concept of the Zone of Proximal Development (ZPD), which describes the range of tasks that a learner can perform with guidance but not yet independently. This zone is where the most effective learning occurs, as it pushes learners beyond their current capabilities with the support of others (Miller & Manderfeld, 2021). Socio-constructivism also highlights the importance of cultural and linguistic tools in shaping cognitive development. According to Vygotsky, these tools are passed down through social interactions and are essential for developing higher-order thinking skills. Language, in particular, is a crucial tool for thought and learning, as it allows individuals to communicate, reflect, and build on their experiences (Gale, 1995; Miller & Manderfeld, 2021). In educational settings, this theory implies that

collaborative learning, peer tutoring, and dialogic teaching are effective strategies for fostering deep learning and understanding (Crotty, 1998; Miller & Manderfeld, 2021; Suchman, 1985; Tomljenović & Tatalović Vorkapić, 2020).

Implications for Qualitative Research. The principles of constructivism and socio-constructivism have profound implications for qualitative research, particularly in shaping the ways researchers understand and explore human experiences. Constructivist and socio-constructivist paradigms align closely with qualitative methodologies, as both prioritize the subjective and socially constructed nature of reality.

Constructivist Implications. In qualitative research, a constructivist approach emphasizes understanding how individuals construct meaning from their experiences. Researchers operating from a constructivist viewpoint are interested in participants' subjective realities and the ways in which their personal experiences, beliefs, and contexts shape their understanding. This approach often involves in-depth interviews, open-ended questions, and the analysis of personal narratives to uncover the meanings that individuals ascribe to their experiences (Creswell & Plano Clark, 2018). Constructivist qualitative research is often iterative, with data collection and analysis occurring simultaneously and informally evolving as new insights emerge. This process allows researchers to remain responsive to the data, adjusting their focus and methods as they gain a deeper understanding of the research problem. In this context, the researcher's role is that of a co-creator of knowledge, working alongside participants to uncover and interpret the layers of meaning embedded in their experiences (Tomljenović & Tatalović Vorkapić, 2020).

Socio-Constructivist Implications. Socio-constructivism extends these ideas by emphasizing the social and cultural contexts in which knowledge is constructed. In qualitative research, this perspective encourages a focus on the interactions and relationships that shape participants'

experiences. Methods such as ethnography, case studies, and participatory action research are well-suited to a socio-constructivist approach, as they allow researchers to explore how social interactions, cultural norms, and shared practices influence individuals' perceptions and behaviors. Researchers may use methods such as participant observation, focus groups, and collaborative inquiry to understand how meaning is co-constructed in social settings. The focus is on broad, open-ended questions to allow participants to construct meaning from their experiences, often emphasizing the interactions and contexts in which people live and work. Researchers also acknowledge how their own backgrounds influence their interpretations, positioning themselves within the research to reflect their personal, cultural, and historical perspectives (Creswell, 2014; Miller & Manderfeld, 2021).

Case Study

Case study research is a qualitative approach that involves the in-depth exploration of a bounded system, such as an individual, group, organization, or event, within its real-life context (Creswell, 2014). This method is particularly valuable for gaining a comprehensive understanding of complex phenomena that cannot be captured through other research methods (Schoch, 2020). Case studies allow researchers to delve into the intricacies of the subject, often using multiple sources of data like interviews, observations, and documents to construct a detailed picture (Stake, 1995). A key characteristic of case studies was highlighted by Stake (1995), who emphasized the importance of the case study as a method for understanding the uniqueness of a particular case, highlighting the role of the researcher in interpreting the data through a lens shaped by their own experiences and knowledge. This interpretive approach allows for a rich, nuanced understanding of the case, which can contribute to theory development and practical application in various fields.

Instrumental Case Study. This is a specific type of case study where the researcher focuses on a particular case primarily to gain insight into a broader issue or to refine a theoretical understanding (Stake, 1995). Instrumental case studies use the case as a tool to explore or illuminate something else beyond the immediate context of the case, often with the aim of providing generalizable findings, contributing to theoretical or practical advancements in the field (Creswell, 2014). In instrumental case studies, the case is of secondary interest; it plays a supportive role in facilitating our understanding of a larger phenomenon or issue. Researchers often choose instrumental case studies when the case is a representative or illustrative example of a broader trend or concept that they wish to study in more detail (Creswell, 2014; Schoch, 2020).

Saldaña's Coding Methodology

Saldaña's coding methodology emphasizes the iterative nature of coding, where the process is seen not as a linear sequence but as a cyclical act that requires revisiting and refining codes as the analysis progresses (2009). This approach helps researchers develop a deeper understanding of the data and uncover patterns and themes that are crucial for interpretation. This section will look at what a code is and then summarize the processes of first and second cycle coding.

What Is a Code? A code in qualitative research is a word or short phrase that symbolically assigns an integrative, key attribute to a portion of data, either visual or based in language. Codes serve as the foundational building blocks of analysis, enabling researchers to categorize, summarize, and interpret the raw data collected during their study (Saldaña, 2009). Coding has been characterized as "the 'critical link' between data collection and their explanation of meaning" (Charmaz, 2001, as cited in Saldaña, 2009).

First Cycle Coding. The initial stage of the coding process where the researcher applies codes directly to the data is also referred to as first cycle coding. It involves identifying portions of

the data, anywhere from one word to an entire paragraph, and labeling them with codes that encapsulate the core meaning of the text. Among the various methods used in first cycle coding, structural coding and descriptive coding are particularly notable for this study. Structural coding is applied to segments of data that correspond to a specific research question, hypothesis, or topic, helping to organize the data into manageable parts. This method is especially useful for large datasets, as it provides a clear structure for further analysis. Descriptive coding, on the other hand, assigns basic labels to data segments to summarize the primary topic or idea of that segment. It is often used in the early stages of analysis to create an inventory of topics covered in the data, making it easier to identify patterns later on (Saldaña, 2009).

Second Cycle Coding. This is a more advanced phase of the coding process where the researcher refines and reorganizes the codes from the first cycle to identify broader patterns and themes. This stage is critical for synthesizing the data into a coherent narrative or theoretical framework. Focused coding, a method often employed in second cycle coding, involves selecting the most significant or frequent codes from the first cycle and using them to categorize large amounts of data. This method helps in developing the major themes or categories that will form the foundation of the analysis. Focused coding requires the researcher to make decisions about which codes best represent the data, thereby moving from descriptive to more analytical levels of interpretation (Saldaña, 2009).

The following chapter provides a detailed overview of the methodology employed in this research. It begins by outlining the overall design of the study, followed by a description of the participants involved in the research. The chapter then presents an overview of the Physiotherapy Technology program and the progress made regarding curriculum development and mapping within the program. The Procedure section delves into the author’s role in the research as well as the

timeline of the study. In the Materials section, the chapter provides details on the observation and interview protocols used to collect data, as well as a discussion on the methodological rigour employed to ensure the credibility and reliability of the research findings.

Method

This case study examines the experiences and viewpoints of both teaching and non-teaching staff in the Physiotherapy Technology program at Dawson College, including the developer of the CourseFlow tool – all closely collaborating with each other in the process of using the tool for the revision of the Physiotherapy Technology program. The analysis of this instrumental case study allows for the focus to be on the program revision process at Physiotherapy Technology – the role and adaptation of the tool in the process of designing course frameworks and mapping of the new and existing courses and overall curriculum as done by the stakeholders (teaching and non-teaching staff in the program).

The author looks at the steps of implementation of the tool into the curriculum mapping segment of the program revision process and reports on (a) which aspects of the process are working and which are not, (b) what are the reasons behind its relative effectiveness, and (c) how the process might evolve. The author examines both the advantages and impediments to using this tool and how to overcome the latter, as well as what improvements need to be made on the software to make the tool an asset for this program and potentially other programs in the future.

In the course of data collection portion of this research, multiple types of data were gathered in the span of ten months, including notes, video and audio recordings, interview transcripts, and various artifacts, such as tables, diagrams, schematics, and screenshots. The data were obtained from three main sources – conversations with a pedagogical counselor from Dawson College, meetings with the teaching faculty at the Physiotherapy Technology program, and interviews with three most

prominent stakeholders in the process of introduction and application of the CourseFlow tool in program revision of Physiotherapy Technology.

Design

This qualitative research study lends itself nicely to the postulates of Constructivism, where knowledge is viewed as a dynamic, fluid view of the world surrounding us – a manifest of individual constructions of knowledge and meanings based on personal experiences (Funa & Talaue, 2021; Gale, 1995; von Glasersfeld, 1995). These constructed realities primarily serve the purpose of acknowledging unique viewpoints of individuals as valid (Lincoln & Guba, 1994; Tomljenović & Tatalović Vorkapić, 2020). As a corresponding perspective, Socio-constructivism (also known as Social Constructivism) places an emphasis on learning that takes place as a result of collaboration in social environments, reflecting the socially influenced learning process that is predicted to be happening in the various stages of this research. Knowledge is constructed through social interaction and negotiation, stemming from conversations with a community (Crotty, 1998; Miller & Manderfeld, 2021; Suchman, 1985; Tomljenović & Tatalović Vorkapić, 2020). This framework reflects the collaborative processes underwent by the faculty of the Physiotherapy Technology program as they were utilizing a new digital tool for the first time.

To address the research questions, the Case Study approach was chosen as the most pertinent. It appropriately complements Socio-constructivism, enabling close focus on the cases of interest. By means of a variety of data-collection procedures such as interviews, observations, and pertinent documents, the author gathers participants' own experiences and views, allowing for an in-depth analysis of the case (Creswell, 2014; Schoch, 2020; Stake 1995). The instrumental case study allows for examining a single issue through selecting a unique, clearly identifiable and bounded case

to tackle it (Creswell, 2014; Stake, 1995), in the instance the process the Physiotherapy Technology program engaged in while adopting the CourseFlow tool to aid their program revision process.

Analysis of the data was done in accordance with Saldaña's coding methodology (2009). Saldaña recommends performing data analysis in multiple phases and two distinct cycles to enhance the reliability and depth of the findings. To best cater to the data obtained and based on the semi-structured interview as means of collecting them, in the initial cycle, the author first utilized Structural (Holistic) Coding followed by Descriptive Coding techniques. For the second cycle, the author applied Focused Coding to further refine and categorize the data.

Participants

For the purposes of this research, the author aimed to select and recruit participants who are first and foremost staff members of a technical program that is in the early stages of program revision and is, at the same time, making efforts to introduce the CourseFlow tool to aid them in the process. This coincided with the task the staff from the Physiotherapy Technology program was undertaking - the author focused on recruiting the faculty involved in the process for her project.

Participants involved in this research are members of teaching and administrative staff at Dawson College, and predominantly, the Physiotherapy Technology program. The instructors, as faculty/practitioners, are in charge of courses offered throughout the duration of the program. The whole Physiotherapy Technology program faculty participated in the curriculum mapping process, including courses of a general-education nature, such as biology, physics, and psychology instructors. These general education courses are part of every program in the CEGEP network and are normally offered at the same time as the specialized education courses. The staff teaching specialized courses in the Physiotherapy Technology program such as kinesiology, neurology, and anatomy were most involved in the process.

Apart from the course instructors in the Physiotherapy Technology program, this project involved close work with the developer of CourseFlow, who is also part-time Dawson College faculty, as well as a pedagogical counselor from Dawson College, who was assigned to the program and was instrumental in assisting the teaching staff in the early stages of the program revision process.

Physiotherapy Technology Program

The Physiotherapy Technology program is a 6-term long program which leads to a diploma of collegial studies, and Certification with the *Ordre professionnel de la physiothérapie du Québec*. Students in the PT program move through all the offered courses in the program divided in two groups within their cohorts. The size of a cohort extends to approximately 40 students, so the instructors get to know their students very closely, which allows for a more personalized approach. To move from one term to another, there is a set requirement of courses that need to be successfully passed. If one of the core (prerequisite) courses is failed, the student moves from their original cohort and waits for the entire year to re-take the same course - these rules for moving forward are outlined in the curriculum. A student can decide to take the courses part-time, which extends the amount of time to complete the program. One cannot take more than five years to complete the whole program and cannot take more than two years to finish a given year.

An internship component of the program starts from term three and ends in term six of the program. In terms three and four, two clinical components of this internship happen under the direct supervision of the faculty and in terms five and six, students are placed at a clinic for a practical portion of the internship and supervised by on-site supervisors. These external supervisors are only slightly involved in the curriculum mapping process – they were consulted in the beginning of the curriculum development process with regard to how they perceive an ideal graduate and what

elements of the program they think can be improved. This input in turn informed the analysis and deliberations of the study participants.

The Physiotherapy Technology program recognizes an exit profile (see Appendix A) of a successful graduate. This profile reflects an attainment of the overall competencies of the program on a meta level as well as the "Dawson graduate profile" that describes the transversal skills and competencies (e.g., critical thinking, teamwork, communication, etc.) that any student graduating from college education and Dawson in particular is expected to have acquired. Once the exit profile of a student is developed, following the backward design approach, the staff then designs a comprehensive examination the purpose of which is to assess the exit profile of students. As the exam is not associated with any specific course, it requires active involvement and evaluation from all faculty members. All elements are graded on a pass-fail basis. This assessment, also referred to as "comprehensive examination" (CE), takes place in the last term of the program and typically includes an exam, a portfolio, and a practical assessment of the student's clinical skills. In Winter-Spring 2024, there were discussions in the Physiotherapy Technology program regarding the change of the exam format. The decision has been made to exclude the exam from the CE, which will now be comprised of three parts: (a) a portfolio assignment related to the integration course, (b) a community-based project connected to the health promotion course in term six of the program, and (c) the final internship. These components will form the comprehensive assessment, evaluated on a pass/fail basis. Before the revision, the CE only included the internship grade. The integration course may still include an exam or a "case study fair", but these will be kept separate from the CE to maintain flexibility for that course. (C. Roy, personal communication, July 13, 2024, email message). This change was deemed to better reflect the competency-based nature of a professional certification program in Physiotherapy, i.e., *Ordre professionnel de la physiothérapie du Québec.*

Progress Regarding the Curriculum Development and Mapping Within the Program

From an informal conversation with one of the study participants, the author learned that in mid-April 2021, the program faculty started working with CourseFlow more actively to tackle the curriculum development and mapping within the program, the process described in the Literature Review section of this thesis in more detail. The goal of developing course frameworks for at least the first-year courses of the program was introduced – collaboratively, instructors were working in small groups and giving each other feedback on the courses they were assigned. Following the summer break of 2021, the curriculum mapping/alignment process in the Physiotherapy Technology program resumed in September 2021, in the beginning of the new school year.

By Fall 2021, when they turned to using CourseFlow, among other software, to aid the program revision process, Physiotherapy Technology program had developed their curriculum using an Excel-based curriculum development tool employed by instructors to outline learning outcomes, the placement of the courses in the program, and the connections between the courses. The staff used this tool with some degree of success, depending on how much attention an individual instructor paid to the placement of their course in the program matrix. The resulting program matrix draft (see Appendix B) showcases the competencies prescribed by the Ministry of Education (the role of the Ministry and the certification are outlined and discussed in more detail in the Introduction section) over the course of six semesters, covering all the courses in the program and how they address the recommended competencies. The curriculum development process took about a year to tackle, and it was done under the leadership of three key faculty members (the ‘Revision Committee’/’Core Team’ comprised of the Program Coordinator - Chair of the Department and two more members who had a teaching release to partake in the process). Other faculty members gave their input and feedback on the product.

Each faculty member was then required to develop a course that would target its prescribed competency and describe the learning outcomes so they were integrated effectively at the appropriate level. At the same time, the faculty were expected to take care that these learning outcomes were not redundant in relation to other courses that were supposed to address similar target competencies.

The author was observing the process during the time when the Frameworks for term one were being implemented. The process of data collection for this project ended in September, 2022, and the data analysis was completed by November, 2023. By the end of December 2023, the Frameworks for terms two, three, and four were approved and implemented. Presently, the program is in the process of implementing the fifth term of courses out of the total of six, to be completed in Fall 2024. The Frameworks for term six are scheduled to be approved by the end of December 2024 to be implemented in 2025.

Procedure

Role of the Author

During the data collection process, the author's role was predominantly that of a nonparticipant observer (Ciesielska, 2018; Creswell, 2007; Eldh et al., 2020). She attended the meetings of the Physiotherapy Technology faculty in the "fly on the wall" style to observe the process of curriculum mapping and take in the information required for the project/thesis. In the same fashion, she attended conversations between the pedagogical counselor and Dr. Charles.

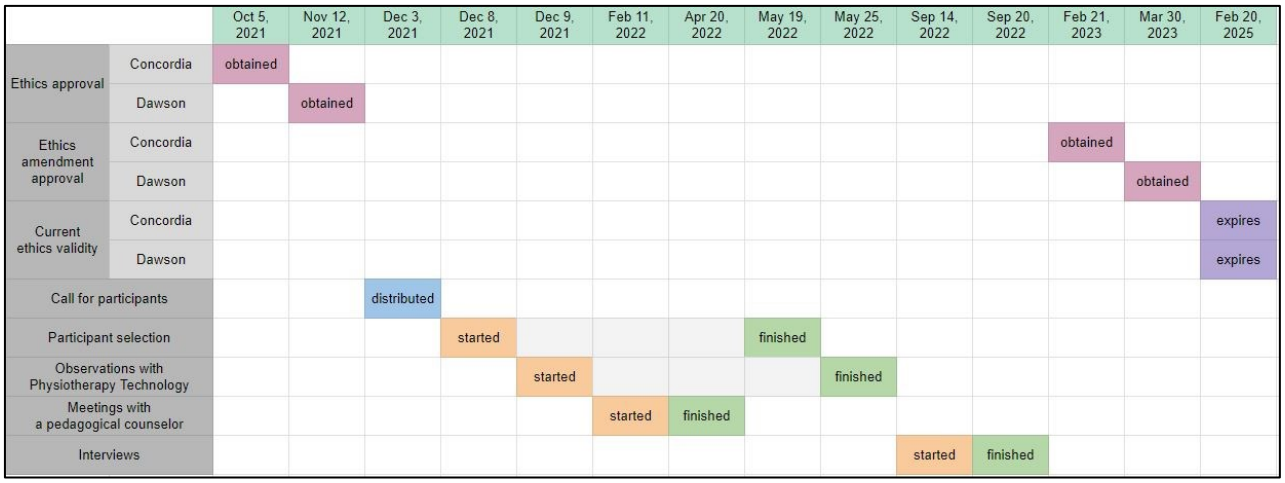
As an actual participant in these meetings, the author would not be able to objectively access and interpret the data. Playing an active role in the process could "contaminate" the outcome. Being a nonparticipant observer, the author could observe and chronicle the process around the curriculum

mapping and alignment as well as note the thoughts of the pedagogical counselor with regards to program revision – this makes the processes more authentic, as the author was not intervening.

Procedure Timeline

Figure 7

Timeline of the Research Process Stages



Since the research involved human participants, and more specifically, staff from Dawson College, obtaining ethics approval from both Concordia University and Dawson College was a necessity. The ethics certificate was obtained from Concordia University on October 5, 2021, which can be seen in Figure 7 above, and with this document, the author applied for the ethics approval at Dawson College. The Dawson ethics certification was obtained on November 12, 2021, marking the beginning of the participant selection and data collection processes.

In the beginning of December 2021, the Call for Participants (see Appendix C) was sent out to the faculty of the Physiotherapy Technology program as well as to the Dawson pedagogical counselor involved in the revision of the program. Initially, within the following week, a total of fourteen people answered the Call for Participants and then signed the Information and Consent Form (see Appendix D), all prior to the beginning of the data collection process, agreeing to be

profiled as participants in the study. The author aimed to first attend program meeting observations and then schedule a brief interview with each of the participants/staff members who signed the Information and Consent Form. The purpose of these interviews was to follow up on the observations of the revision process in the program.

In the time span of six months, from December 9, 2021, to May 25, 2022, the author attended and observed a total of five virtual and in-person meetings of the Physiotherapy Technology program faculty, in which the first steps of the program revision process were discussed and implemented. The purpose of this was to explore how the teaching faculty responds to the introduction of a new instructional software (CourseFlow) to facilitate the program revision process as well as to understand the faculty roles and dynamics during this process within the program.

In the first Physiotherapy Technology meeting the author attended as observer, she briefly communicated the details of the project and participant requirements and rights to the instructors and the pedagogical counselor, which they already were familiar with from the Call for Participants and the Information and Consent Form they were sent. She made herself available to answer any further questions they might have on her own time, in the form of a virtual meeting.

Next, from February 11, 2022, to April 20, 2022, the author attended a series of nine Zoom and Microsoft-Teams-based conversations between the Dawson pedagogical counselor assigned to the Physiotherapy Technology program and Dr. Charles regarding the program revision process and the ways it could unfold from a pedagogical counselor's perspective and depending on the educational institution undertaking it. These gave the author a first-hand view to enable her to grasp the complexities and common practices to tackling the task of program revision. Following the adaptation of the main study objectives as the result of multiple participants withdrawing from the

study, the data from these sessions are not included in the Analysis and Results section of this study, as will be further justified in that section.

Several months later, in May 2022, the author recruited another study participant, the developer of CourseFlow in order to provide a more in-depth understanding of the "developers/user" interface. It was not until September 2022 when the author conducted semi-structured interviews on Microsoft Teams with each of the three key stakeholders in the revision of the Physiotherapy Technology program– the pedagogical counselor, the teaching faculty who was appointed lead in the program revision process in the program, and the CourseFlow tool developer. Each of them was invited for one interview, estimated to take a maximum of an hour of their time. The goal was to examine the implementation of the tool in the program from three different perspectives as well as to grasp the skillsets the participants brought to the process and dynamics of the collaboration among these stakeholders in the process of utilizing the tool at the course and program levels, for the purpose of course design and curriculum mapping and development.

In June 2022, after the observations of the Physiotherapy Technology faculty meetings were completed and the follow-up interviews with each of the participants were to be arranged, three instructor-practitioners decided to withdraw from the study, as they felt that, due to the lack of experience using CourseFlow, they are not well suited and prepared to discuss the affordances and constraints of the tool in the program revision process. The author reached out to the remaining teaching faculty from the Physiotherapy Technology program twice to schedule interviews. However, most of the staff either never replied to the emails or responded stating that they currently had no time available or they are simply not proficient enough in using the CourseFlow tool to be comfortable discussing their processes in the interview with the author. As the result, three participants were left in the study, the pedagogical counselor, one faculty-lead in the program

revision process at the Physiotherapy Technology program, and the developer of the CourseFlow tool. It is important to mention here that the data collected from the program meetings are not included in the results of this study. Considering the stage of the program revision process the Physiotherapy Technology was at at the time of data collection for this study, the level of CourseFlow utilization by the faculty, and with many participants eventually opting out of the research, the information obtained was insufficient and largely unrelated to the study's objectives. Further explanation for this decision can be found in the Analysis and Results section of this paper.

Lastly, to add to the ethics certification a secondary researcher, a postdoctoral student sharing the supervisor and research interests with the author, she applied for the amendment to the previously received ethics approval. These documents were obtained from Concordia on February 21, 2023, and Dawson on March 30, 2023. Finally, following the submission of the annual research report, the current ethics certification for the research was obtained, and it expires on February 20, 2025, for both Concordia University and Dawson College. These documents can be found in the Appendices E and F, respectively.

Materials

As mentioned above, the author collected data in three distinct ways. Firstly, meeting observations, meeting notes, video and audio recordings, and artifacts (tables and screenshots) were collected, and access to the program's shared CourseFlow user profile was obtained, where the collective activity and progress in the tool environment was monitored. Secondly, from the conversations/observations, collected were meeting notes, video and audio recordings, and various artifacts: tables, diagrams, and schematics. The data obtained in aforementioned ways were ultimately used indirectly, for the purposes of meeting the rigour criteria for the research. Lastly, the interviews resulted in interview recordings and transcriptions as well as the author's notes collected

during and following the process. The observation protocol as well as the interview protocol used in the data collection portion of this study are outlined below.

Observation Protocol

The observation protocol employed followed a systematic approach for examining how Physiotherapy Technology faculty engage with CourseFlow during the program revision process. The observations would start with documenting the setting, including the seating arrangements as well as presence and accessibility of technology such as laptops and projectors. Additionally, the overall atmosphere of the meeting and whether the environment appeared conducive to collaboration or individual work were noted (Bogdan & Biklen, 1992, as cited in Creswell, 2014).

Special attention was given to the both verbal and non-verbal cues of the faculty members, such as body language and facial expressions, regarding CourseFlow and assessing their familiarity, confidence, as well as hesitation or obstacles to using the tool. The manner in which faculty navigate the tool, the ease with which they access necessary features, and any difficulties they encounter were carefully observed. The observation also focused on the collaborative dynamics facilitated by the tool. This included examining how the tool affects communication among faculty members, whether it fosters discussion, helps to reach consensus, or causes confusion.

As a nonparticipant observer, the author recorded her reflections throughout the process, considering any personal biases that might influence observations and interpretations Furthermore, she noted any questions or areas of interest that emerge during the observation that could be explored in future research (Creswell, 2014).

Interview Protocol

Throughout this stage of data collection process, the following interview protocol was used. Once interviews commenced, the initial questions reflected the focus on gathering background information about the participants, which served to relax them and establish the context for discussion. Next, the main body of the interview delved into discussing specific issues identified and outlined in the research objectives. During this process, follow-up questions were asked to determine the meaning of the participant's words and clarify any descriptive terms they used. The extended list of interview questions can be found in the Appendix G. Finally, interviews concluded with the author asking for any further comments on the interview questions, allowing participants to reflect and summarize their experiences and viewpoints in a conclusive manner (Hunter, 2012).

In the following week, interview recordings as well as transcripts were sent back to the three interviewees for transparency and to confirm each of them is comfortable with their own responses to questions (member checking). In addition, the interviewees were reminded that they would be able to withdraw any information shared with the author prior to the publication of the research. This concluded the data collection portion of the study.

Methodological Rigour of the Study

To assess rigour of this study, the author used "the Four-Dimensions Criteria" (FDC) for qualitative research created by Lincoln and Guba (1986). The FDC include credibility, dependability, confirmability, and transferability of a study (Forero et al., 2018). The purpose of credibility criterion is to make sure that the results are true and credible, from the viewpoint of participants. To achieve this, the author spent several months closely engaging with the participants and establishing rapport as well as attending or conducting debriefing conversations through videocalls or via email. Next, dependability stands for ensuring the findings are repeatable within

the same context and including the same participants. To meet this criterion, detailed study protocol as well as a track record of the data collection process were prepared. Further, to conform to the confirmability criterion, corroboration of the results of the study by different researchers must be possible. To ensure confirmability, the author applied data triangulation in the study by using a variety of data sources - namely, meeting notes, observations, and interviews, as described earlier in this section. Lastly, transferability stands for the possibility of transferring the results to a different context. To achieve this criterion, the author employed purposeful sampling of participants for the study.

It is important to note here that, with the significant loss of participants and adaptation of the direction of the study, the criteria of confirmability and triangulation described above are significantly compromised. This will be further discussed in the Limitations of the Study subsection of the Discussion section of this research.

In the next chapter, the author is offering justification for excluding some of the collected data from the analysis process. Next are the sections on data handling and analysis, followed by a comprehensive overview of the results of the study, addressing each of the research questions and subquestions in detail.

Analysis and Results

To address the research objectives of this project and to ensure better and more objective understanding of the process of implementing an instructional software in the program revision process in a CEGEP-level course, the author collected various types of data in three distinct ways. Firstly, meeting observations, meeting notes, video and audio recordings, and artifacts (tables, diagrams, schematics, and screenshots) were collected, and access to the program's shared CourseFlow user profile was obtained, where the collective activity and progress in the tool

environment was monitored. All of these illustrate and explain different approaches to the program revision process, from a viewpoint of a pedagogical counselor. Lastly, the interviews resulted in interview recordings and transcriptions as well as the author's notes collected during and following the process.

The global pandemic significantly influenced the data collection process and the resulting data. Initially, the author planned to conduct in-person interviews and on-site observations, but the imposition of social distancing measures necessitated a shift to remote methodologies, such as virtual interviews and (mostly) online meeting observations. The author considers herself lucky to have been able to attend a couple of Physiotherapy Technology staff meetings in person, during a window of time when this was a possibility, with the condition of taking necessary precautions (such as wearing facial masks and practicing physical distancing). In any case, this overall transition to virtual introduced several challenges, including technological barriers and disrupted access for participants with poorer internet connectivity. These adaptations, while ensuring the continuation of the research, inevitably affected the data's quality and quantity, potentially limiting or otherwise impacting participants' extent of participation and depth of responses.

Justification for Excluding Data from the Analysis Process

The initial overarching objective of this research, as proposed before data collection began, was to primarily examine the alignment between the courses and the progression of learning outcomes on the program level in the context of curriculum mapping and program revision and then look at the tool, CourseFlow, and how it aids the process. At that time, the following research questions were posed:

1. How are practitioners operationalizing competencies and learning outcomes into their courses and then on the program level?

2. Is CourseFlow making this process more effective allowing for better conversations, audit, reflection, and in the end, a more aligned curriculum?

    a. Can CourseFlow help in the way instructors understand the role of their own course and its place in the program (increase instructor awareness)?

    b. Can CourseFlow improve orchestration and can it become a regular tool to be used in the process to see and develop connections among the courses?

    c. Can CourseFlow increase collaboration among instructors?

The participants and sources from which to collect the pertinent information were chosen to address the aforementioned questions, but the data, compromised due to the COVID-19 pandemic, were scarce and not relevant to the study questions, and participants largely withdrew from the study, as mentioned in the Methods section of this paper. For this reason, with the support of her thesis supervisor, the author made the decision to change the direction of the study to shift the primary focus to the tool and its affordances as aid in the program revision process as opposed to the practitioners and how they integrate competencies and learning outcomes into the courses and then the program.

Therefore, the new, adapted aim of this research became to look at how CourseFlow influences the processes of curriculum mapping and program revision through practitioners' implementation of competencies and learning outcomes on course and program levels. With this new direction of the study, some collected data came out to be redundant to addressing the study's *updated* research questions – firstly: *Does CourseFlow improve the process of program revision allowing for better conversations, audit, reflection, and in the end, a more aligned curriculum – and if so, in what ways?*, and, more specifically, *Can CourseFlow help in the way instructors understand the role of their own course and its place in the program (increase instructor awareness) and if so,*

how?; *Can CourseFlow improve orchestration and if so, how, and can it become a regular tool to be used in the process to see and develop connections among the courses?*; and *Can CourseFlow increase collaboration among stakeholders and if so, how?*, secondly, *How does CourseFlow compare to other tools commonly and traditionally used in the program revision process in terms of its advantages and disadvantages?*, and particularly, *What are CourseFlow's affordances?* and *What are CourseFlow's weaknesses?*, and thirdly, *Can CourseFlow be improved further to increase its effectiveness in the process of program revision for future use and if so, in what ways?*. These modified questions attend to the original objectives of the proposal, but provided a more focused attention to the perspectives of key end-users of the tool, those best positioned to assess its utility. Fortunately, core initial methodological features of the study were able to address these concerns in a valid fashion.

With this in mind, the data non-relevant for this project were excluded from the analysis process. As the result, included in the analysis are the data collected from the interviews with key stakeholders in the process of using the CourseFlow tool in the revision of the Physiotherapy Technology program, while largely excluded from the analysis are the data collected through observations of staff meetings from Physiotherapy Technology program. The information gathered in conversations with the pedagogical counselor was referred to in the Literature Review section of this paper and, more specifically, the subsection that looks at the program revision process-related practices but was also largely excluded from the analysis and findings of the study. That said, considerations of qualitative rigour, such as triangulation, did impact on data integrity. The rationale for these decisions is provided below.

Data Handling

Following the data collection process and in preparation for coding as part of the data analysis process, the author followed a series of steps to get the data ready for the subsequent phase of the research. Firstly, as the interviews were conducted on Microsoft Teams, to facilitate transcription, the author chose the in-app option to both record and live-transcribe the interviews. The recording and the transcript of each interview generally become available for reference in the personal account Teams data storage of the meeting participants. Since the meetings were organized by the author, the recording and transcripts of all interviews were only accessible to her, on her password-protected Teams account, as well as to each of the interviewees in that specific meeting.

Next, the initial, rough transcripts of the interviews were closely looked at and cleaned up. At this stage, the author engaged in a lengthy process of going over the interview recordings, comparing the audio to the transcript phrase by phrase, and manually correcting anything that was an obvious error in app's live transcription text file, at the same time highlighting any words and phrases that were challenging to understand and transcribe.

The author then, as promised to the participants in the stages preceding the meetings, shared the individual transcripts of interviews with the participants involved within a week after the interviews. She asked each of the participants to go over the text file, clarify the words and phrases that were previously highlighted, and inform the author should there be any information shared in the interviews that they wish to withdraw in the hindsight. After receiving the clarifications and removing the communicated information participants did not want to be shared upon closer consideration, the author was left with transcripts of the interviews that were ready for the next stage of the process.

The transcripts were next anonymized and cleaned up, at the same time paying attention not to remove the emotional context and depth from the data collected through the interviews. The three interviews transcribed to 56 Microsoft Word document pages or 33,110 words. All the transcribing and coding of the data were done manually, with the help of the Microsoft Teams live transcription software and in Microsoft Word as well as in the web version of Microsoft Excel application, respectively. The author did not resort to using any transcribing or coding software for several reasons: strict financial constraints to purchase any software licence, inability to travel to Concordia University to make use of applications accessible to current students, and conviction that it would be straightforward and undemanding to tackle this task without any help. In hindsight, this process could have been approached from a different standpoint, utilizing a coding software to remedy the time consuming and labor intensive process of manual coding as well as avoid any potential for human error. On the other hand, manual coding did enable the author to achieve a deeper familiarity with the transcribed interviews, allowing her to better capture the nuances and understand the contextual elements of the conversations.

All the gathered data were password-protected on the author's personal laptop computer and thus not accessible to anyone other than her, her supervisor, and the second researcher who was later granted access to data for their research purposes. Any secondary storage (backup) was located on the supervisor's University account, thus fully protected. The data will be destroyed five years after the end of the study, as stated in the Information and Consent Form document which was disseminated to the prospective study participant prior to any data being collected.

Data Analysis

Coding of data was done manually, in accordance with Saldaña's coding methodology (2009), in multiple phases and two cycles to ensure the reliability and depth of findings. The first

cycle coding methods included Structural (Holistic) Coding and Descriptive Coding, while as the second cycle coding method, the author employed Focused Coding.

To begin with, Structural Coding (MacQueen et al., 2008; Namey et al., 2008) is characterized as an indexing tool, intended to result in a broader overview of data thus allowing for quick access. It is reported to be well suited specifically to researchers-beginners who do not have much or any experience with the process of data coding as well as data collected through interviews where the questions posed to the participants shape the formulation of the codes. Prior to the interviews, the author shared the tentative list of interview questions with each of the participants (see Appendix G) and veered only slightly if at all from it during the interviews. The questions were designed to loosely reflect the topics and questions the author wanted to address in this study. Once the data were gathered, it was fairly easy to assign them with pertinent codes for their initial grouping. The open-ended questions were for this purpose transformed into affirmative sentences to make structural codes, and the answers received to those particular questions were coded under the corresponding positive sentences. For instance, where the interview question was: “How many years have you been working as college teacher?”, the appropriate structural code assigned to the participant’s response was: “Experience working as college teacher”.

Secondly, Descriptive Coding (Miles & Huberman, 1994; Saldaña, 2009; Wolcott, 1994) was used as it captured pertinent topics of the conversation. Apart from the codes (“parents”), as part of this coding method, the author also identified sub-codes (“children”), which resulted in a more detailed classification of the data. At this stage of the coding process, after going over the data multiple times, the author started noticing emerging themes in the participants’ responses. Most of these themes could be further divided into sub-themes and the patterns in the gathered data started slowly surfacing. The sub-themes would repeat themselves in different themes, so the sub-codes

were then consolidated to unique words instead of being denoted by synonyms or different forms of same words. If the parent code consisted of multiple words, these would be divided by underscores, and that parent code would be divided from its child code with a hyphen. If the child code contained multiple words, those would also be divided with an underscore and so on. To exemplify, for the descriptive parent code "Course_design", determined were sub-codes: "Course_design-experience", "Course_design-learning", "Course_design-process", "Course_design-challenges", and "Course_design-stakeholders". There were also such descriptive codes as "Program_revision-experience" and "Program_revision-learning", for instance.

Finally, following this step, as part of the second cycle of coding, the author used Focused Coding (Charmaz, 2006), which further enabled her to organize the codes, categorize the data, and continue noticing emerging concepts. This method also allows for a more streamlined comparison of the codes across the multiple participants' data. Further studying of the collected information resulted in noticing further granularity of themes tackled in participants' responses and enabled the author to dig even deeper in the search for more intricate concepts to be assigned focused codes. Some of the examples of these codes are: "Tool_CourseFlow-history_and_implementation", "Tool_CourseFlow-affordances", "Tool_CourseFlow-constraints", "Tool_CourseFlow-comparison_with_other_tools", "Tool_CourseFlow-contribution_to_planning", and "Tool_CourseFlow-contribution_to_program_revision_process". As can be seen from the examples, the naming of focused codes followed the same principle as for the previously established descriptive codes, mentioned above.

As during data collection, in the course of the data analysis stage of the study, the author frequently employed the memoing technique, which helped her looked at the data from a new viewpoint. These memos would range from quickly jotted down notes to more intentional

exploration on emerging topics and questions. They were consistently referred to during the coding phase, often inspiring new analytical insights and contributing to a deeper understanding of the research context (Birks et al., 2008; Charmaz, 2006).

Results

To best address the three overarching research questions of this study, the author first looked at the topics closely related to the issues brought forward by them and developed relevant subquestions accordingly, where approplriate. Hence, these subquestions were designed to better shape the insights that would lead to the study's overall conclusions. It is important to note here that CourseFlow further evolved in the time following the conclusion of the data collection process. This section reports on the findings that emerged from the information gathered for the purposes of the study.

Does CourseFlow Improve the Process of Program Revision Allowing for Better Conversations, Audit, Reflection, and in the End, a More Aligned Curriculum – and if so, in What Ways?

This, first research question of the study consists of three subquestions that are addressed below. These subquestions are: *Can CourseFlow help in the way instructors understand the role of their own course and its place in the program (increase instructor awareness) and if so, how?*; *Can CourseFlow improve orchestration and if so, how, and can it become a regular tool to be used in the process to see and develop connections among the courses?*; and *Can CourseFlow increase collaboration among stakeholders and if so, how?* The answer to the research question one and the visual representation of the results are given at the end of this subsection, followed by the relevant codes that yielded the answers to the research question.

Can CourseFlow Help in the Way Instructors Understand the Role of Their Own Course and Its Place in the Program (Increase Instructor Awareness) and if so, How?

CourseFlow prompted deeper conversations about the specific way in which to organize course content over semesters as well as how to structure individual course units effectively. This was crucial to avoiding designing courses that would have similar outcomes but different structures, which could confuse students and hinder learning processes. The tool encouraged early and intentional planning of course content, fostering alignment in the team's vision. The collaborative use of the tool further supported the team in defining and organizing course content, leading to valuable pedagogical discussions and a positive approach to constructing knowledge within the discipline. A participant stated that:

> At a higher level, [CourseFlow] forces us to have these discussions about pedagogy and how we think about the courses and sort of align our vision of how we see constructing knowledge in our programs, so that's been really helpful and interesting.

All in all, CourseFlow helped in creating a coordinated scaffolding of skills across courses in the Physiotherapy Technology program, enhancing the overall curriculum design. The tool has the potential to be helpful in the process of discovering and developing connections among courses, primarily through improved planning and consistency. A participant noted that:

> Because [CourseFlow] lets us look at the whole student scheduling, that workflow, visual interface at the program level, lets us see the student experience better, and, and in the old process and the old documents, we didn't have anything. (...) It just reminds us that, oh, they're taking a gym course this term. Also, they're taking a French course. They're taking it. What are the links between what we're doing with them and those courses, but also just thinking about workload implications for them? It lets us keep as we're looking at the program level workflow. It helps us keep in mind what the student experience is. So we have that in mind as we're, as we're designing our activities and assessments.

Can CourseFlow Improve Orchestration and if so, How, and Can It Become a Regular Tool to Be Used in the Process to See and Develop Connections Among the Courses? The tool can improve orchestration and enhance the planning process, though its impact may vary between theory and practice. One participant noted that while CourseFlow "helped definitely with [their] planning process" by increasing clarity and transparency and facilitating better communication with students, its practical impact in the classroom was less significant. In the words of one of the participants:

> I think that putting my course into CourseFlow made me really examine student workload, ponderations, communication and to sort of ask myself how explicit am I being about what I'm asking students to do, what are my expectations in terms of preparation and work for the course. So yes, it's made me a better teacher in that way. But in terms of what I'm actually doing in the classroom, I don't think it has that much impact.

In short, by mapping courses in CourseFlow, instructors could better manage student workload and expectations, develop consistent practices, and ensure tasks were reasonable and well-structured. However, despite the conviction of the developer of CourseFlow that one of its biggest advantages over other tools is "the very quick way that you can readjust things on the fly", there is some skepticism about its influence on in-the-moment classroom activities as expressed by another participant of this study, suggesting that instructors might revert to familiar methods when faced with real-time challenges. According to this participant:

> There's always a gap between what we know we should do and what we would like to do. And then, you know, in the moment in the classroom (...), we adapt on the fly and sometimes we are reverted back to comfort zones.

CourseFlow can improve orchestration by providing mechanisms that prompt teachers to check for alignment between program competencies and course outcomes. This reflective practice leads to more aligned courses. CourseFlow also encourages mindfulness in planning and enhances transparency by making other teachers' work accessible, which is often lost with traditional course frameworks. As one participant formulated it:

> As a program, you could see how other teachers are working on their courses. It makes what other teachers are doing more transparent, more accessible, which sometimes with course frameworks is not so much because course frameworks end up in a folder that nobody remembers exists and nobody sees it.

However, its effectiveness depends on active engagement and consistent, intentional use by educators. The tool itself is not inherently smart, but it shows a lot of promise when supported by proactive individuals who keep it updated and relevant. As one participant noted, "It has a lot of potential. I'm an example of how much the tool can teach you".

Can CourseFlow Increase Collaboration Among Stakeholders and if so, How? The process of collaboration and negotiation around curriculum planning using CourseFlow involves a high level of involvement and detailed discussion among colleagues. Initially, there was significant involvement to ensure consistency, but as smaller teams of instructors developed their own processes, flexibility was allowed and welcomed. This approach led to, as one participant put it, "interesting discussions about pedagogy and how [the instructors] think about these courses", particularly around course organization and content structuring.

The process of collaboration and negotiation among staff around the curriculum planning process using CourseFlow was deeply collaborative and involved extensive meetings and meaningful discussions. Instructors worked together to plan, review, adapt, and approve learning

outcomes for each course. However, the process required negotiation as faculty members had varying perspectives and levels of understanding regarding the new program. In the words of one participant:

> It was a very, very collaborative process. It required some negotiation because (…), even though there was a good common understanding of the program, not everybody had exactly the same view for the courses, and also, different people had different levels of understanding of the revision. So, they might know the program as it is now, but they didn't all have the same vision for the new program.

Despite this, the collaborative effort ensured a cohesive approach to curriculum planning. The culture of collaboration was described by one of the participants as a "natural reflex" among the instructors, emphasizing strong, inherent teamwork within the program.

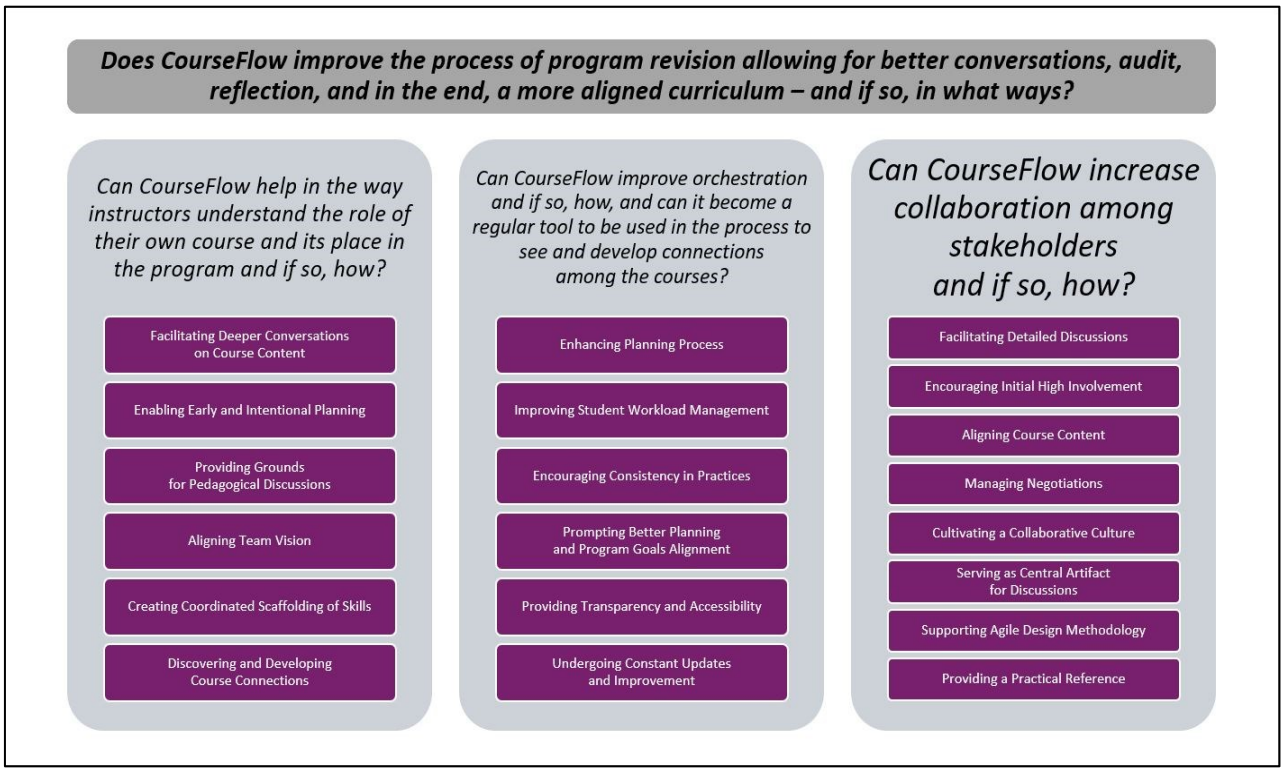
Echoing the above, for the developer of CourseFlow, the tool can significantly improve collaboration by serving as a "running prototype" and a central "artifact" to motivate discussions. Its ability to be quickly updated and create new versions allows for an agile design methodology, facilitating ongoing adjustments and testing. This continuous iteration process enables instructors to discuss and refine course elements in real time, addressing what works and what does not. By always having a version of CourseFlow to reference, instructors can more effectively collaborate and develop connections among courses, as it provides a practical means to "test [their] ideas on and use as the basis to further develop" the tool.

Overall, to address the first research question of this study, "*Does CourseFlow improve the process of program revision allowing for better conversations, audit, reflection, and in the end, a more aligned curriculum – and if so, in what ways?*", CourseFlow makes the program revision process more effective by fostering deeper conversations, intentional planning, coordinated

scaffolding of skills, improved orchestration, increased transparency, and collaboration among stakeholders. It aligns course content with program competencies and facilitates reflective practice, ensuring a more aligned and effective curriculum. The visual summary of the findings to address this research question can be seen in the Figure 8 below:

Figure 8

Visual Summary of the Findings to Address the Research Question "Does CourseFlow Improve the Process of Program Revision Allowing for Better Conversations, Audit, Reflection, and in the End, a More Aligned Curriculum – and if so, in What Ways?"



The examples of relevant codes that supported these results concerning the first research question, on the structural coding level are: "Roles of stakeholders and the participant in course design/program revision", "Reflection on the processes of collaboration, coordination, and negotiation in the process", "Description of the process of collaboration and negotiation with

colleagues around the curriculum planning process using CourseFlow", "Planning process on the program level using CourseFlow", and "Ways in which the curriculum mapping/program revision process using CourseFlow can help reflect on own professional practices"

Secondly, on the descriptive coding level, pertinent sub-theme exemplars are: "Curriculum_mapping-interpersonal_skills", "Curriculum_mapping-collaboration", "Program_revision-stakeholders", "Tool_CourseFlow-planning_program_level", and "Tool_CourseFlow-contribution_to_program_revision". Lastly, on the level of focused coding, some of the relevant themes are: "Course_and_curriculum_design_and_program_revision-experience_and_knowledge", "Course_design_and_program_revision-stakeholders", "Curriculum_mapping-skills", "Tool_CourseFlow-contribution_to_planning", and "Tool_CourseFlow-contribution_to_program_revision_process".

How Does CourseFlow Compare to Other Tools Commonly and Traditionally Used in the Program Revision Process in Terms of Its Advantages and Disadvantages?

The second research question of the study is comprised of two subquestions that are addressed below. These subquestions are: *What are CourseFlow's affordances?* and *What are CourseFlow's weaknesses?* The overall answer to the research question two, the visual summary of the results, and the list of pertinent codes that lead to these results are to follow at the end of this subsection. It is important to note here that the part of the research question that pertains to comparing CourseFlow to other tools that aid program revision process should not be understood literally, as this was only achieved implicitly – with the loss of participants in the research discussed above, the author was left with not enough data to address this particular part of the research question. There were, however, no obstacles to answering the subquestions.

What Are CourseFlow's Affordances? To provide a comprehensive overview, the numerous affordances of the tool as reported by the study participants have been consolidated and presented here as a list of advantages. Each advantage is accompanied by specific examples or citations to illustrate the tool's practical application and benefits from the viewpoint of the participants. This structured approach should ensure clarity and facilitate a better understanding of the tool's capabilities.

Alignment and Traceability. CourseFlow allows users to tag every node with learning outcomes and trace these back to the competencies as prescribed by the Ministry. This feature is particularly valuable for demonstrating program alignment, ensuring that all course elements are consistently aligned with original competencies and that the faculty is not "evolving slowly away from what the original vision was". This process encourages reflection that may not be natural for many instructors and it leads to a more aligned course if done mindfully.

Visualization. The tool offers a pleasant visual interface with an integrated database, allowing users to create, view, and modify complex course structures easily. According to one of the participants:

> So, you can have the visual of the program course sequence, you can have, in that same visual, the relationship between the competencies and the courses, and you have a number of views that allow you to see then how a competency is developed over a number of courses or by term, how different courses contribute to different competencies, so you're able to slice it in different ways to view the program. At the same time, as you can go in, zoom in to a course and work on the course or the components of the course framework without leaving that tool that allows you to go back and forth quickly between the program and the course level. So, that's the strength of CourseFlow.

Secondly, the tool helps users hold the “big picture” of the curriculum, ensuring all moving parts are considered. It offers various views to analyze competency development across courses and terms, supporting both program-level and course-level planning. The tool enables instructors to, as one participant put it, “represent that complexity [of the program] visually, which helped everybody understand that a bit more”.

Lastly, by allowing instructors to visualize the complexity of their courses, which can potentially be overwhelming for students, CourseFlow helps keep the student experience in mind when designing activities and assessments and facilitates better and more transparent communication of instructors’ expectations to students . This holistic view can lead to more balanced and effective course planning.

Continuous Improvement. Collaboration with developers allows for the ongoing improvement of the tool. Any identified weaknesses are getting systematically communicated to the developer by the users, as reported by the participants, and they are “slowly getting crossed off the list” one by one, enhancing the tool’s functionality and user experience over time. In the words of one participant: “I think the weaknesses, they slowly go away because of [the] relationship with the developer. Every time we identify a weakness, we give that feedback and (...) many of the things that were weaknesses are now already fixed.”

Customization and Flexibility. Users of the tool have the freedom to rename columns, increase their number, and define courses according to their preferences, “how [they] want them to be”. The tool enables further flexibility in what it is used for and in what way, and in the words of one participant:

> You can plan by topic, you can plan by unit, you can plan with any kind of sequence of pedagogical activities in mind, you can plan with just your traditional lab and lecture every

> week, or you can plan with this is what the students do for homework, you can plan with this is what I do in prepping as a teacher, with much more granularity as to what the teacher is expected to do each week.

CourseFlow also provides for the flexibility to export so documents can be downloaded in a variety of formats, consolidating everything into one document and thus eliminating the need to transfer information across multiple files. Further, the tool offers instructors a convenience of quick access to competencies directly within the platform, providing them with a possibility to "readjust things on the fly", unlike having to access them through consulting separate documents. This allows for easy navigation between multiple competencies attached to the course. Finally, the more the tool evolves, the more flexibility is offered to its users. This provides a tailored approach to course planning and management.

Staff Onboarding. CourseFlow can be used to onboard new instructors by providing a structured flow of course activities, integrated with learning outcomes and immediate access to necessary documents, rather than just presenting them with a folder containing weekly materials. One participant reports that:

> Instead of giving the teacher (...) a folder just with the PowerPoints for week one, week two, they give the teacher sort of the flow of the activities for a course with access to different documents, but in a workflow that is connected to the learning outcomes as well.

Likewise, the tool has a potential to help onboard new pedagogical counselors, ensuring a better understanding of the programs they oversee through a visualization of competency development across courses and, in doing so, it can be a valuable analytical tool for deeper understanding of curriculum alignment and competency-based programs. CourseFlow can assist pedagogical counselors in future discussions with the programs. According to a participant:

> Using [the tool] to make sense of the programs that [one] has to be a ped counselor for, and it's helping visualize competency development (...). And it's going to, hopefully, help [pedagogical counselors] have those conversations with the programs later. It's still in progress, but (...) it is a useful analytical tool to understand the programs.

Transparency and Accessibility. CourseFlow allows teachers to see and understand how their colleagues are working on their courses, enhancing transparency and accessibility. Unlike other tools, where course frameworks often get forgotten in folders, CourseFlow ensures that all pertinent documents as well as everyone's work is visible and accessible. In the words of a participant:

> Our big ministerial document and our descriptors [are] in that 150 page document. Nobody looks at that document. And unless you're doing this curriculum review process, it's too big of a thing to have to scroll through. So [CourseFlow] lets us hold all that information, and it reminds us that it's there.

Furthermore, the tool allows for direct linking to resources like PowerPoints and activities, making it easier for instructors to organize and access their materials.

Outcome-Based Approach. CourseFlow is designed with an outcomes-first approach, promoting good pedagogy by keeping the focus on learning outcomes throughout the course design process. This structure encourages teachers to reflect on the alignment between activities and outcomes, potentially leading to better-designed courses. In the words of one participant:

> In terms of course design, (...) there is a possibility that, after you go into the nitty gritty of your 15 weeks or planning your course, usually teachers lose sight of the learning outcomes. Yes, they sort of had them in mind at the beginning, but then once you're in lecture for week 13 on this topic, who cares what learning outcome this is about? But then, [in CourseFlow] there is the possibility and almost the requirement if you want this to come out as a course

> framework, to tag your learning outcomes on to each of the activities, so that reflection of, ok, what is this activity for? What outcome was it that I was supposed to develop here? You know, it's forced in the teachers to have that reflection.

What Are CourseFlow's Weaknesses? Similar to the section on tool's strengths, the various weak features of the tool, as per study participants' accounts, have been consolidated and are presented here as a list of disadvantages. As reported by the participants, the current constraints are minor and mostly involve small glitches; all of the issues are expected to be resolved in the short term or potentially over time, but the overall usability of the tool is extremely high. The list items contain relevant citations or examples to reflect and support viewpoints of the participants.

Limited Editing and Sharing Capabilities. According to the participants, CourseFlow users must grant full editing rights to their colleagues to facilitate collaboration, as the tool's sharing features are somewhat limited. In the words of one participant:

> There was view and there was definitely not just commenting level. So you had to give someone full edit for them to be able to comment. So the sharing levels were not there yet. So we (...) took on CourseFlow and we started to migrate some of the process in there, but the limited editing abilities at that time basically made us move into Word documents.

Therefore, this shortcoming of the tool might prevent users from migrating all processes to CourseFlow and instead rely on other tools with better editing capabilities. Moreover, sharing with students is reported to currently be difficult. Despite having their course framework produced by CourseFlow, the course outline which is given to students still needs to be produced outside the tool. To do so, instructors are forced to transfer the planned 15-week course structure to another format or document and then to another tool. A participant remarked:

> For me, the biggest weakness up until this point has been the shareability outside, and I know that feature is coming within weeks. You know the ability to share a link with students so that they can then see the detailed course plan, so I think, you know, its usability for teachers is, is going to be improved by anything that will reduce their workload or duplication of work and putting information in many duplicate tools or places.

Another participant added: “I can’t plug it in and have my students be directly involved with CourseFlow. (...) That's a major constraint. And, in fact, sharing anything from CourseFlow with students is currently, at least for another week, very difficult, very difficult.”

Challenges with Content Migration. Moving content between courses as well as copy-pasting and moving of nodes are problematic in CourseFlow. In the words of one of the participants:

> I guess, the ability to move content from one course to another and the copy pasting and moving of nodes in the back end and the database from one area of a project into another area of the project is still not that easy. (...) I have to play with those features.

Non-Intuitive Terminology. The tool’s terminology is confusing for some users.. This results in frequent referencing to understand the meaning of terms used by the tool as well as in conscious shifting to the terminology used by the tool rather than employing familiar vocabulary. A participant stated that: “A lot of it is not intuitive to me because it’s not the terminology we use. So (...) we need to shift to the terminology used in CourseFlow.”

Visual Overwhelm and Display Issues. According to one of the participants, the interface can be “a huge visual overwhelm” due to the amount of information displayed. Also, competencies are depicted in the way that can be confusing for the users. A participant noted: “This other issue that we were discussing again in the different meeting this morning is the way that CourseFlow

displays competencies [which] is a bit misleading on one of the workflows, and that can be confusing."

Steep Learning Curve for New Users. For some instructors, especially those less familiar or comfortable with new technologies, adopting a tool like CourseFlow presents a steep learning curve. This gap in tech proficiency varies across programs, with some faculty being quicker and others more hesitant to embrace new tools. Understanding the tool also requires prior knowledge in course design, alignment, and learning outcomes, which the Physiotherapy Technology faculty already possesses. According to one study participant:

> Technology is still a bit foreign to some teachers, and a new tool requires understanding a new language, it can be a bit of a learning curve for a few teachers. So, that could be a constraint that not in all programs people are as tech savvy as they are in Physio Tech, for example, and as quick to adopt new tools. (...) Understanding the tool also has some prerequisite knowledge when it comes to course design that the Physio Tech team already had and the prerequisite knowledge of course alignment and learning outcomes that, if you don't have, then it's not just the technology part but the adoption of the tool becomes more difficult because you don't have that background knowledge.

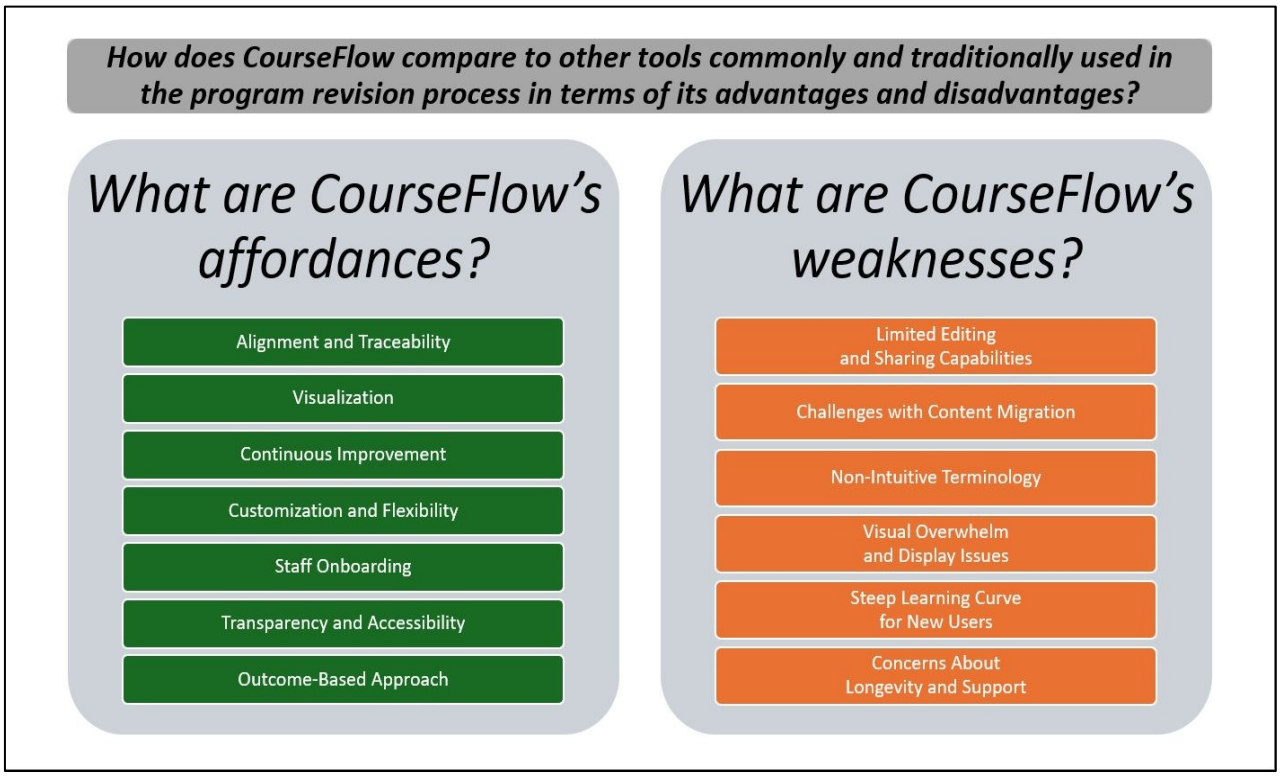
The tool currently lacks the capability to train teachers in course design or understanding competency-based programs. It assumes users already possess this knowledge, in the words of a participant, "but if you don't have that understanding, then the tool doesn't give you that extra knowledge", thus limiting its effectiveness for those without prior familiarity with the process. Without this foundational knowledge, using the tool effectively becomes more challenging, potentially leading to misuse or misunderstanding of its pedagogical intent.

Concerns About Longevity and Support. Participants report that the users often worry about the tool's long-term support and reliability and cannot help but wonder, as a participant put it, "What happens if CourseFlow goes away at some point?" This uncertainty affects users' confidence in relying on CourseFlow long-term and might influence them to opt for other tools, such as Microsoft Word, which they are certain would be around for a long time.

In conclusion, answering the second overarching research question of the study, "*How does CourseFlow compare to other tools commonly and traditionally used in the program revision process in terms of its advantages and disadvantages?*", CourseFlow stands out for its alignment capabilities, visual interface, continuous improvement potential, and support for staff onboarding, making it a valuable tool for program revision and enhancing the curriculum design process. However, it does have some disadvantages. These include limited editing and sharing capabilities, challenges with content migration and non-intuitive terminology, visual overwhelm, and a steep learning curve for new users. Finally, there are concerns about the tool's longevity and support. The Figure 9 below visually summarizes the answer to this research question.

Figure 9

Visual Summary of the Findings to Address the Research Question "How Does CourseFlow Compare to Other Tools Commonly and Traditionally Used in the Program Revision Process in Terms of Its Advantages and Disadvantages?"



The examples of structural codes that yielded the above answers to the second research question are: "Constraints/limitations of the tools used for curriculum creation and mapping", "Strengths and affordances of the tools used for curriculum creation and mapping", "Adjustment to the new software", "Preference of CourseFlow over tool(s) previously used for the process", and "Strengths of CourseFlow in addressing needs",

On the descriptive coding level, examples of relevant sub-themes are: "Tool_CourseFlow-advantages", "Tool_CourseFlow-disadvantages", "Tool_CourseFlow-comparison_with_other_tools", and "Tool_CourseFlow-contribution_to_program_revision". Finally, on the focused coding level, some of the pertinent themes are: "Tool_CourseFlow-affordances", "Tool_CourseFlow-constraints", "Tool_CourseFlow-comparison_with_other_tools", "Tool_CourseFlow-contribution_to_planning", and "Tool_CourseFlow-contribution_to_program_revision_process".

Can CourseFlow Be Improved Further to Increase Its Effectiveness in the Process of Program Revision for Future Use and if so, in What Ways?

At the time the study took place, the tool was largely comprehensive and meeting needs of most of its users. No major features additions or changes were planned at this time, but some tool optimization and minor updates were still required. The tool shows major potential in its effectiveness in the program revision process. The areas for the minor improvements and tweaking of the tool's functionalities as per participants' suggestions with the goal of further improving the affordances of CourseFlow in program revision are outlined below. The summary of the answer to the research question three and its visual representation are offered at the end of this subsection, followed by a list of relevant codes that yielded answers to the research question.

Consistent Terminology and Flexibility at the Program Level. To enhance clarity and consistency, the flexibility of CourseFlow should be extended to the program level, and the terminology used, particularly in alignment tables, should be adjusted. As one participant noted, it would be beneficial "if we can take that flexibility up to the program level and to (...) the terminology used in the tool, so the outcome of the alignment tables". The adjustment in terminology that would be flexible enough to be understood by various groups but specific enough to be clear is needed. This would help teachers quickly understand what they are looking at without having to click on each item to remember its content.

Stable Visual Interface. To facilitate onboarding, guidance, support, and the establishment of departmental policies, the visual interface of CourseFlow should be re-organized and updated to one "that always looks the same no matter which course you click on", as one participant put it. This would ensure a consistent structure across all courses.

Enhanced Collaboration and Communication Features. CourseFlow lacks a feature to collect and notify users of comments, which means there is no way to easily track or be alerted to new comments unless actively checking. Other tools offer tagging and better mechanisms to aggregate and manage conversations and feedback across content within the tool. To further improve collaboration and communication among its users, the ability to "at-tag" people should be introduced to CourseFlow, which would instantly notify them of the activity for a facilitated real-time teamwork. According to one of the participants:

> I wish that you could "at-tag" people in CourseFlow and that they would get a notification when you "at-tag" them because this is very, very helpful that sometimes, when you're working on something, you need a little input from someone, or confirm a decision, whatever.

To take this one step further, ideally, the tool should offer that kind of connection through platforms like Microsoft Teams for fast notification and seamless communication. In the words of a participant:

> I think the communication is the big key, so having it be collaborative online with commenting and different levels of sharing access or (...) being able to "at-tag" people and then get a notification, if it could somehow tie into Teams, this would be (...) my dream.

Improved Sharing and Delegation Tools. To improve shareability with students, the tool should allow for easy sharing of course outlines or daily planners, though this does not currently address task delegation or administrative decision-making. A participant noted, "Increase shareability with students by allowing versions of course outlines or daily planners to be shared easily. This does not currently help with task delegation and administrative decision-making".

Side-by-Side Course Comparison. The prospect of the ability to view courses side by side in CourseFlow is seen as a significant advantage because it would allow faculty to easily compare assessments, activities, and workload across multiple courses within the same term. Comparing 15-week plans across different courses would be especially crucial for single cohort programs that require alignment of schedules and assessments, and it would facilitate identifying potential issues such as exam overlaps or excessive workload, which could otherwise go unnoticed when navigating different course outlines separately. By visualizing all course components together, faculty can collaboratively analyze and ensure a balanced student learning experience with varied assessment types and appropriate workload distribution. As one participant stated:

> We've asked for that side-by-side feature where we can grab columns from a particular course or from a set of courses and, really, any two courses because it would be great to be able to look vertically as well and say, ok, how did these learning activities line up, how are we scaffolding this student learning experience, but then also to look at the same courses in the same term and say, ok, have we given them a variety of assessments, not just this one course, but over the term (...)? Are we giving them a variety of ways to show us their knowledge? Are we overloading them (…)? What's the value of those assessments? (...) And having that all be accessible in one place. Let's look at it together as faculty. And I think it will bring to surface issues because there's too many moving parts. (...) So we could easily do checks without having to have everyone in the same room looking back into their course outlines.

Therefore, this comprehensive view has a potential to support proactive adjustments and enhance overall coordination among faculty members. This would, in turn, promote smoother term planning and better alignment of educational objectives.

Data Management and Usability Enhancements. Firstly, improving features like a universal “collapse all” or “expand all” button would enhance visual clarity and manageability of data, especially in alignment tables where vertical display is critical. Simplifying navigation to show specific course outcomes associated with elements rather than entire data sets could streamline usability since, in the words of a study participant, “it gets too long and then you can’t find what you’re looking for”. A suggestion for a solution akin to a cart comparison tool found in shopping websites could aid in visually comparing data side by side, potentially addressing issues of data overload and improving overall user experience.

Secondly, creating a feature that allows for exporting a comprehensive course outline directly from the 15-week planning framework would minimize manual transfer efforts and encourage more instructors to utilize the tool by offering enhanced convenience and efficiency. A participant remarked:

> Right now, teachers have to transfer whatever 15-week work they do, somehow manually, to a course outline. And so, that's a barrier and that’s a constraint, so if (...) 15-week [preparation] somehow gets a an export of some form, then that will be an extra step. And I think that will be an additional incentive for teachers to use the tool.

Faster Performance and Optimization. The long load times should be addressed. This could be achieved by optimizing how the system handles the extensive data of program outcomes, competencies, and performance indicators. Optimization is needed to handle these data more efficiently. In the words of a participant:

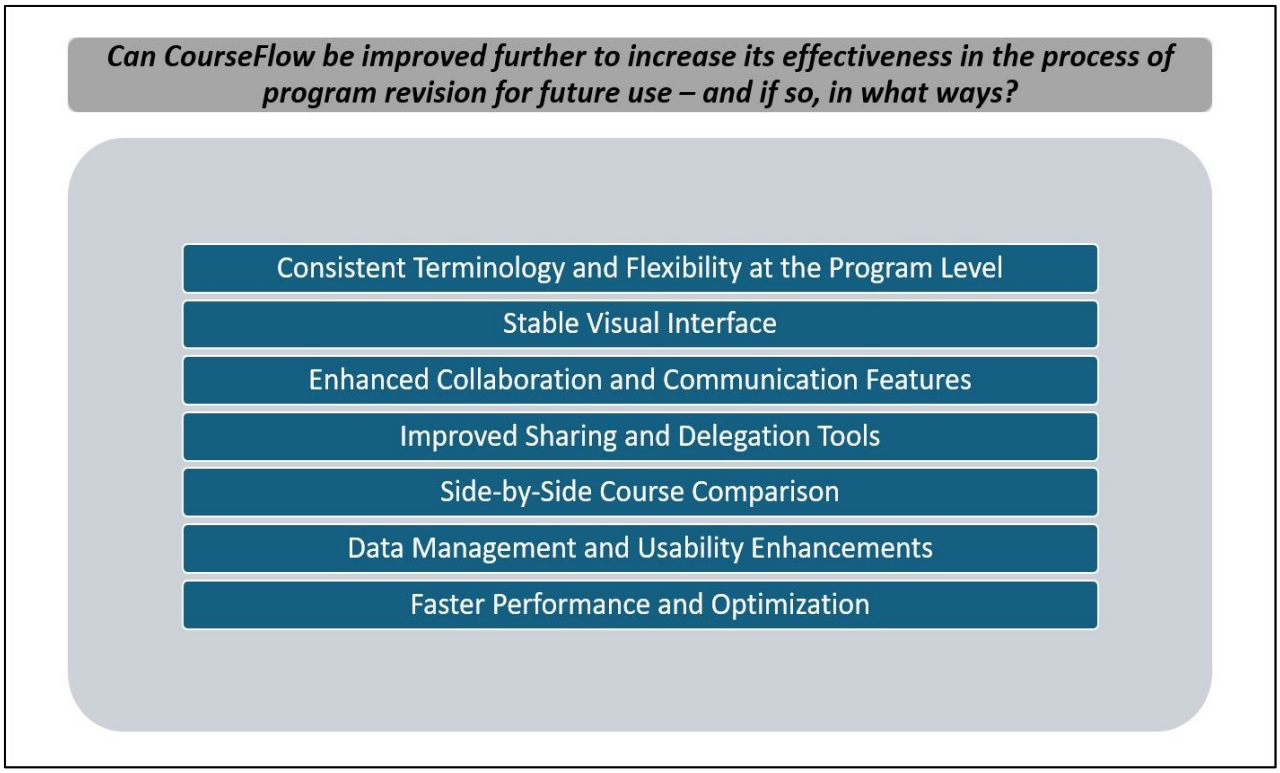
> We’ve noticed very slow load times in (…) the program, the number of outcomes created in a program, once you take into account competency, element of competency, and then they

> started creating that third level of performance indicators, [which] ended up being kind of too much. The load times are getting crazy. So, there's some optimization left to do there.

Lastly, addressing the third research question, "*Can CourseFlow be improved further to increase its effectiveness in the process of program revision for future use – and if so, in what ways?*" to increase its effectiveness, CourseFlow can be improved by ensuring consistent terminology and flexibility at the program level, establishing a stable visual interface, enhancing collaboration and communication features, improving sharing and delegation tools, enabling side-by-side course comparison, better managing data, and optimizing performance to reduce load times. These enhancements would help address current limitations and further solidify CourseFlow's utility in the program revision process. The following Figure 10 provides a visual overview of the results addressing this research question.

Figure 10

Visual Summary of the Findings to Address the Research Question "Can CourseFlow Be Improved Further to Increase Its Effectiveness in the Process of Program Revision for Future Use – and if so, in What Ways?"



The third research question was addressed with the help of the following examples of structural codes: “Planning process on the course level using CourseFlow”, “Good and bad sides of the planning process on the course level using CF and suggestions for future improvement”, “Affordances/constraints of CF at the course level and suggestions for future improvement”, “Planning process on the program level using CourseFlow”, “Good and bad sides of the planning process on the program level using CF and suggestions for future improvement”, and “Affordances/constraints of CF at the program level and suggestions for future improvement”.

Secondly, the exemplars of pertinent sub-themes stemming from descriptive coding are: “Tool_CourseFlow-advantages”, “Tool_CourseFlow-disadvantages”, “Tool_CourseFlow-to_improve”, “Tool_CourseFlow-planning_course_level”, and “Tool_CourseFlow-planning_program_level”. Lastly, on the focused coding level, relevant theme examples are:

“Tool_CourseFlow-affordances”, “Tool_CourseFlow-constraints”, and “Tool_CourseFlow-contribution_to_planning”.

Following the Analysis and Results, next is the Discussion chapter. This section of the paper delves into the insights and reflections that emerged through the process of conducting this research. While the analysis presented earlier sheds light on the core findings, the discussion here aims to explore the personal experiences, contextual factors, and broader implications of this study that influenced the research journey. By reflecting on these elements, the discussion will provide a comprehensive understanding of the challenges, opportunities, and considerations that shaped the study’s outcomes.

Discussion

This section of the thesis delves into the insights and reflections that emerged through the process of conducting this research. While the analysis presented earlier sheds light on the core findings in considerable detail, the discussion here starts with a brief overview of research findings and further aims to explore the personal experiences, contextual factors, and broader implications of this study that influenced the research journey. By reflecting on these elements, the discussion will provide a comprehensive understanding of the challenges, opportunities, and considerations that shaped the study’s outcomes.

Summary of the Research Outcomes

The primary aim of this research was to systematically investigate how CourseFlow supports practitioners, particularly within the Physiotherapy Technology program faculty at Dawson College in Montreal, who collectively adopted the tool for their program revision process. The study sought to identify areas where CourseFlow could be improved to enhance its utility and effectiveness, with

the broader goal of encouraging its adoption across various educational programs. The motivation for this research stemmed from a desire to understand the practical impact of CourseFlow on existing professional practices and to explore modifications that could make the tool more beneficial and accessible to a wider range of educators in the field.

The study's findings provided significant insights into the promise of the CourseFlow tool. Firstly, the results revealed that CourseFlow enhances the program revision process by facilitating more meaningful discussions, promoting intentional planning, and coordinating skill development across courses. It was found to improve orchestration, transparency, and collaboration among stakeholders, aligning course content with program competencies and fostering reflective practice, leading to a more coherent and effective curriculum. Secondly, CourseFlow distinguished itself through its strong alignment capabilities, intuitive visual interface, and support for continuous improvement and online collaboration, making it a valuable tool in curriculum design. However, the study also identified several challenges of using the tool, including limited editing and sharing capabilities, difficulties with content migration, non-intuitive terminology, visual clutter, and a steep learning curve for new users. Additionally, concerns were raised about the tool's long-term viability and support. Lastly, the areas of improvement of CourseFlow, as found by this study, include ensuring consistent terminology and greater flexibility at the program level, stabilizing the visual interface, improving collaboration and communication features, refining sharing and delegation tools, enabling side-by-side course comparison, better data management, and reducing load times to optimize performance. These improvements are expected to address existing limitations and further enhance CourseFlow's effectiveness in the program revision process.

This study addresses the literature gap, as discussed in the Introduction section of this paper, regarding the lack of scholarly literature and published research on instructional design tools

developed and implemented in the educational institutions in Canada. Moreover, the implications of this study are particularly promising. As highlighted in the Introduction, previous research has underscored a critical gap in the development of instructional design software that not only improves curriculum alignment but also supports interdisciplinary communication and collaboration of stakeholders in curriculum mapping and design processes (Melillán et al., 2023). CourseFlow, as analyzed in this study, shows significant potential to meet these needs. By presenting its numerous strengths and identifying key areas for improvement, this research contributes to the ongoing development of CourseFlow, potentially enabling it to become a more powerful tool for educational institutions. The insights gained from this study will hopefully lead to further refinements in both the tool itself and its implementation and use that will enhance its successful adoption and efficacy, ultimately benefiting a broader community of educators and learners alike.

Implications of the Research

To begin with, one intriguing point that emerged during the study is the prevalence of instructional design tools designed to aid the program revision process. As pointed out in the Introduction section of this study, there seems to be a saturation of such tools in the market, with a large number of educational institutions financing development and adopting one such tool of their own. This raises the question of why so many tools exist for the same purpose and how, despite of this, there still seems to exist a need for instructional design tools that successfully showcase the needs and relationships of curricular components within an educational program, as found by Melillán et al. (2023). One possible explanation is the diversity of needs and preferences among institutions but also lack of uniformity and consistency in language, structure, and organization of educational programs, which then drives the development of specialized tools tailored to specific contexts. Additionally, the competitive nature of the educational technology market encourages constant innovation, leading to a proliferation of options. However, this abundance of tools can also

be largely overwhelming, creating serious challenges for faculty who must navigate and master multiple systems, juggling this feat with their already abundant responsibilities and packed schedules.

Another significant observation relates to the need for institutional support in adopting tools for program revision. Securing such support is often a challenging process, as it requires aligning the interests and priorities of various stakeholders within the institution. Without strong institutional backing, the adoption of new tools can be fragmented, leading to inefficiencies and frustration among faculty. Some of the testimonies of this study participants spoke to the insecurity and uneasiness the practitioners feel to invest their effort and time transitioning to CourseFlow, not knowing how long the tool will be around and dreading losing materials, plans, and resources if the tool ceases to be relevant. When institutions commit to a specific tool, the result is a more focused and streamlined approach to professional development, with faculty dedicating their efforts to mastering the chosen system. This concentrated focus not only enhances motivation but also drives continuous improvement of the tool, ensuring it evolves to meet the needs of the educational institution more effectively. Research supports the notion that institutional commitment is crucial for the successful integration of educational technologies, as it provides the necessary resources and structural support (Bates, 2015; Martínez-Peláez et al., 2023; Mialkovska et al., 2023; Toukola & Ahola, 2022).

One of the key phenomena explored in this research was the impact of CourseFlow on faculty collaboration. Interestingly, the exceptional collaboration observed by the author and reported by the study participants appeared to stem more from the inherent nature of the faculty within the Physiotherapy Technology program rather than the impact of the tool itself. This finding suggests that while the tool may have facilitated certain aspects of collaboration, the strong existing

relationships and collaborative culture among the faculty played a more significant role. Additionally, the effectiveness of a tool largely depends on its users' understanding of its affordances as well as their grasp of the necessary conceptual frameworks. In this study, one possible explanation for why users successfully engaged with the tool's affordances is their knowledge of competency-based education and instructional design principles. The users also displayed a willingness to learn the tool, demonstrating attitudes such as tolerance for ambiguity, which likely positively contributed to their ability to adopt the tool effectively. These insights highlight the importance of considering the broader context in which educational tools are implemented, as the success of such tools may be heavily influenced by pre-existing dynamics and skills within a program or institution.

A further point of interest is the discrepancy between what developers of instructional design tools know and what practitioners experience when using these tools. Despite the excellent, textbook-example collaborative efforts between these groups, such as those between the participants in this research, gaps in understanding can still occur, and developer and tool users might still have different standpoints and convictions on usefulness of the tool and real-life practices. This suggests that even more streamlined communication processes are needed to ensure that developers are fully attuned to the practical realities and needs of educators. By enhancing these communication channels, the potential for any miscommunication and unmet needs can be minimized, leading to tools that are even more effectively tailored to the requirements of educational environment.

Limitations of the Study

The data collection for this research was conducted during the COVID-19 pandemic, a factor that undoubtedly influenced the scope and depth of the data gathered. The pandemic restricted access to participants and limited the amount of data that could be collected, which in turn affected

the overall robustness of the study. Additionally, as discussed in the Analysis and Results section, the original direction of the research had to be adapted due to a significant number of participant withdrawals and instances where the collected data did not align with the research objectives. As mentioned in the Method section, this shift in focus compromised the methodological rigour of the study, particularly in terms of (a) confirmability, since the data collected from various sources was excluded from the results, as mentioned in the Method and Analysis and Results sections and (b) transferability, since almost all initially proposed participants withdrew from the study. The loss of participants and the need to adjust the research trajectory resulted in a study that, while still credible and dependable, may not fully meet the standards of rigour, "the Four-Dimensions Criteria" – FCE, as proposed by Lincoln and Guba (1986) initially envisioned.

Another limitation of this study is the aforementioned significant time gaps between the various stages of the research process. During these intervals, CourseFlow, the instructional design tool that is the main focus of this research, advanced considerably, incorporating many improvements in the directions that this study proposes. These advancements raise concerns about the potential obsolescence and relevance of the findings. While the research accurately reflects the state of the tool and its impact at the time the data was collected, the rapid and substantial evolution of the tool may render some of the insights less useful and applicable to its current iteration. This temporal disconnect underscores the challenge of conducting research in fast-moving technological fields, where the technological innovation and development can outpace the research process itself.

Author's Personal Limitations and Bias

The author's personal journey from the initial formulation of the research interests and aims to the completion of this thesis has been both lengthy and challenging, which the large gaps between tackling and completing different stages of this research hint at. This prolonged timeline was

significantly influenced by personal circumstances of the author, including pivotal events in her life that demanded attention and energy. The author acknowledges that this path was far from ideal, yet feels a profound sense of relief, gratitude, and satisfaction in having persevered to bring this research to fruition.

The author acknowledges a potential bias in this study stemming from her professional involvement with the instructional design tool that was the focal point of this research, CourseFlow. As a research assistant at SALTISE, the author was deeply engaged with the development and implementation of the tool, making it one of her primary responsibilities, as mentioned in the Introduction section of this study. This professional connection meant that she was not only familiar with the tool's affordances but also closely connected with many of the individuals involved in the project. Given her substantial investment in the tool's success and her collaborative relationships with key stakeholders, there is a risk that her perspective as a researcher may have been influenced by her positive perceptions and aspirations for the tool's impact and overall success. While every effort was made to maintain objectivity, the author recognizes that her dual role as both a researcher and a student-professional associated with the tool may have shaped the interpretation of the data and the overall conclusions of the study. This inherent bias is a limitation that readers should consider when evaluating the findings and their implications.

Future Directions

To begin with, one logical future direction for this study would be to conduct the research as originally proposed. With the COVID-19 pandemic now largely behind us and a return to usual, in-person activities, there is an opportunity to revisit the research with the original objectives and research questions in focus. Specifically, the study could revolve around the overarching objective to examine the alignment between courses and the progression of learning outcomes at the program

level, within the context of curriculum mapping and program revision. This research would directly address the research question that was removed from the new, adapted direction of this study: “How are practitioners operationalizing competencies and learning outcomes into their courses and then on the program level?” By exploring this alignment in a post-pandemic setting, the study could yield valuable insights into how practitioners and educational institutions are currently managing these processes, providing a more accurate reflection of planning, designing, implementing, and then reviewing educational programs in the present-day higher-education landscape.

Another potential avenue for future research would involve repeating this study while adhering strictly to maintaining methodological rigour criteria of FCE, which were compromised in the current study due to participant withdrawals and the need to shift the research focus, as mentioned earlier in this section. Ensuring triangulation by collecting data from diverse sources and enhancing transferability through purposefully sampled participants would strengthen the validity and reliability of the findings. Additionally, expanding the scope of the research to include multiple programs within a college, or even to span across several educational institutions which are using the same instructional design tool to aid in the program revision process, could provide a more comprehensive understanding of its impact on these processes as well as its affordances and challenges. This broader approach would allow for cross-institutional comparisons, which could uncover patterns and best practices applicable to a wider educational context.

Finally, there is a promise for conducting further research utilizing the data already collected for this study. A notable portion of the data remained unused by this study, as highlighted and explained earlier, offering a potentially rich source of information for future analysis. Investigating the themes and sub-themes that emerged from these data could lead to new insights and contribute to a deeper understanding of the issues at hand. By revisiting and reanalyzing this data, future

research could explore additional dimensions of CourseFlow's impact, including aspects that were not fully addressed in this study. Such approach would ensure that the collected data is fully leveraged, enhancing the contribution of this potential future research to the field.

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List of Appendices

Appendix A *Exit Profile at Physiotherapy Technology Program*

Exit Profile:

10 - Communicate effectively and professionally with diverse patient populations, their families, health care providers, and other partners to contribute to quality patient care.(copy)

19 - Develop and execute intervention plans for a variety of populations, through the analysis of patient data, within the legal limitations of the profession.

20 - Improve or maintain patients' health and function based on knowledge of anatomy, physiology, pathophysiology and biomechanics.

21 - Act with professional integrity in accordance with ethical and legal responsibilities of the profession, which include securing the proper prerequisites for intervention and interpretation of the law

22 - Adapt the therapeutic approach, using problem-solving and creativity, to address the needs of various individual populations, clinical situations, and work environments.

23 - Collaborate as part of a team (healthcare providers, patient, family) to provide ethical patient-centered care within the profession's legal limitations.

24 - Promote health and wellness and act as an advocate at the level of the individual, the community, and society as well as the profession.

25 - Ensure the protection of patients, co-workers, the public, and one's self by integrating safe work principles and procedures into practice.

26 - Engage in continuous self-reflection and professional development, as required by the professional order (OPPQ), to ensure competent and effective practice in evolving technological and professional c

27 - Communiquer de manière adéquate et efficace en français à l'oral et à l'écrit dans un contexte professionnel.

28 - Develop and manage their personal health and well-being.

Appendix B *Physiotherapy Technology Program Matrix Draft*

Objectives

Statements of the Competency

Program-Specific Component

02AD	Analyze the profession
02AE	Refer to the normal functioning of the human body
02AF	Prevent risks related to health, safety, hygiene and cleanliness
02AG	Locate the anatomical structures of the human body
02AH	Analyze the positions and movements of the human body
02AJ	Associate physiological mechanisms with physical rehabilitation needs
02AK	Correlate medical information with physical rehabilitation interventions
02AL	Interact in a professional context
02AM	Provide electrotherapy treatments
02AN	Intervene in cases involving pain and circulatory problems
02AP	Intervene in cases involving loss of mobility
02AQ	Intervene in cases involving muscle impairment
02AR	Intervene in cases involving functional loss
02AS	Adapt the therapeutic approach to various types of disability and handicap, as well as to different settings
02AT	Adapt their therapeutic approach to a geriatric clientele
02AU	Provide rehabilitation services to clients with orthopedic or rheumatological conditions

02AV Provide rehabilitation services for clients with neurological conditions

02AW Provide rehabilitation services for clients with cardiovascular, respiratory and lymphatic conditions

02AX Provide rehabilitation services for clients presenting with a loss of functional autonomy

02AY Conduct training, information, prevention and health promotion activities

General Education Component Common to All Programs and General Education Component Specific to the Program

16⅔ credits and 420 periods of instruction, 6 credits and 150 periods of instruction

English, Language of Instruction and Literature

4EA0 Analyze and produce various forms of discourse

4EA1 Apply an analytical approach to literary genres

4EA2 Apply an analytical approach to a literary theme

4EAP Communicate in the forms of discourse appropriate to one or more fields of study

Humanities

4HU0 Apply a logical analytical process to how knowledge is organized and used

4HU1 Apply a critical thought process to world views

4HUP Apply a critical thought process to ethical issues relevant to the field of study

French as a Second Language

One objective to be met from the following:

4SF0 Apply basic concepts for communicating in standard French
4SF1 Communicate in standard French with some ease
4SF2 Communicate with ease in standard French
4SF3 Explore a cultural and literary topic

One objective to be met from the following:

4SFP Apply basic concepts for communicating in French in relation to the student's field of study
4SFQ Communicate in French on topics related to the student's field of study
4SFR Communicate with ease in French on topics related to the student's field of study
4SFS Produce a text in French on a topic related to the student's field of study

Physical Education

4EP0 Analyze one's physical activity from the standpoint of a healthy lifestyle

4EP1 Improve one's effectiveness when practising a physical activity

4EP2 Demonstrate one's ability to assume responsibility for maintaining a healthy lifestyle through the continued practice of physical activity

Complementary General Education Component

4 credits, 90 periods of instruction

Two objectives to be met from the following, in subject areas outside the student's program of study:

000V Estimate the contribution of the social sciences to an understanding of contemporary issues
000W Analyze one of the major problems of our time using one or more social scientific approaches
000X Explain the general nature of science and technology and some of the major contemporary scientific or technological issues
000Y Resolve a simple problem by applying the basic scientific method
000Z Communicate with limited skill in a modern language
0010 Communicate on familiar topics in a modern language
0067 Communicate with relative ease in a modern language
0011 Recognize the role of mathematics or computer science in contemporary society
0012 Use various mathematical or computer science concepts, procedures and tools for common tasks
0013 Consider various forms of art produced according to aesthetic practices
0014 Produce a work of art
021L Consider contemporary issues from a transdisciplinary perspective
021M Explore a contemporary issue from a transdisciplinary perspective

Grid of Competencies

The grid of competencies provides an overview of a technical program. It brings together all of the components of a program and shows the relationship among the competencies.

The grid of competencies includes:

- the general competencies of the program-specific component, which deal with work-related activities common to various tasks or situations
- the specific competencies, which deal with tasks directly related to the practice of the trade or occupation

The grid of competencies shows the relationship between the general competencies on the horizontal axis and the specific competencies on the vertical axis. The symbol (○) indicates a correlation between a general and a specific competency.

The order in which the competencies are presented reflects the program's design; it does not dictate the course sequence. The grid of competencies is provided for information purposes only.

Program-Specific Component

Code: 02AD

Objective ***Standard***

Statement of the Competency	Achievement Context
Analyze the profession.	• By referring to the organization of the health and social services network • Based on current laws, regulations, standards and codes • Using information on the public and private institutions and businesses in the sector. • Using recent data on the profession • Using digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Relevant information gathered • Critical analysis of the information • Demonstration of interest in the profession

Elements of the Competency	Performance Criteria
1. Describe the organization of Québec's public and private health network.	• Accurate understanding of the organization of the health network • Accurate understanding of the different workplaces • Accurate understanding of the role of different health workers in relation to the profession
2. Examine the main characteristics of the profession.	• Clear and complete definition of physiotherapy and of the profession • Identification of the conditions that must be met in order to practice the profession, especially the program of study and its requirements • Recognition of the career prospects and the entrepreneurial potential in the sector • Proper differentiation of the different types of physiotherapy professionals in Canada • Understanding of the main trends in the field of physiotherapy

Elements of the Competency	Performance Criteria
3. Examine the laws and regulations governing the practice of physiotherapy.	• Full examination of the regulations of the professional order • Full examination of the medicolegal context surrounding the practice of physiotherapy in all types of settings • Full examination of the charters of human rights and freedoms
4. Examine the tasks and activities associated with the profession, their performance conditions and their requirements.	• Satisfactory examination of the tasks and their respective activities • Establishment of connections between the performance conditions and requirements associated with each task
5. Examine the skills and behaviours needed to practise the profession.	• Relevant connections established between the skills and behaviours related to the “care-giving” aspect of the profession • Relevant connections established between the skills and behaviours related to the technical aspect of the profession • Realistic comparison with their own skills and behaviours
6. Establish links between the profession and their career plans.	• Appropriate connections established between the profession and their career plan • Realistic assessment of their motivation to follow the pathway leading to professional practice

	Code: 02AE

Objective ***Standard***

Statement of the Competency	**Achievement Context**
Refer to the normal functioning of the human body.	• For all the human body's systems • Using anatomical diagrams and models • Using reference documents, digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with ethics and the professional code • Effective use of reference documents • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Develop a holistic view of the human body.	• Correct understanding of the structural organization of the human body, by system • Correct recognition of the organs and anatomical structures of the human body based on the reference system • Satisfactory visualisation of anatomical structures in space • Appropriate differentiation of individuals' characteristics (morphology, age, etc.).
2. Analyze the normal functioning of body systems.	• Accurate identification of the organs and anatomical structures that constitute each of the systems • Precise understanding of the physiological characteristics of systems (homeostasis) • Identification of functional links between the systems
3. Establish connections between normal anatomy and anatomical variants.	• Recognition of the influence of reproduction and genetic factors • Relevant identification of anatomical variants
4. Provide information on the normal functioning of the human body.	• Clear explanations for the intended audience • Basic advice on how to maintain or improve health

Code: 02AF

Objective *Standard*

Statement of the Competency	Achievement Context
Prevent risks related to health, safety, hygiene and cleanliness.	• In everyday situations that involve risks for the professional, other healthcare professionals, people receiving treatment and the general public • In therapeutic and residential settings • Based on current laws, regulations, standards, guidelines and codes • Based on directives, protocols, standardized operational procedures and emergency plans • Using personal and collective protective gear, furniture, lifts, equipment and materials, accessories and products • Using reference documents, safety data sheets (SDS), and digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics, professional code of ethics, protocols and procedures • Constant vigilance with respect to every aspect of health and safety • Appropriate reaction to specific situations • Informed decisions appropriate to the situation. • Professional behaviours • Consideration of contraindications and precautions required • Communication adapted to the persons being addressed

Elements of the Competency	Performance Criteria
1. Recognize the risks and dangers associated with the professional practice of physiotherapy.	• Accurate assessment of the following risks and dangers: ▪ chemical ▪ physical ▪ biological ▪ ergonomic ▪ psychosocial ▪ safety • Consideration of the potential consequences of failure to meet health and safety standards
2. Apply measures designed to prevent and control contagion, transmission of infection and contamination.	• Understanding of the process of infection and the risk of contamination • Effective application of the rules governing basic practices and additional precautions including: • the principles of aseptic technique ○ Handwashing ○ cleaning of the work area, surfaces and equipment (beds, parallel bars, exercise equipment, etc.) ○ donning of protective clothing and accessories ○ personal hygiene
3. Handle materials, equipment, electrical devices and products.	• Identification of the dangers associated with using electrical devices and radiation • Proper verification of the integrity of materials, equipment and electrical devices • Correct application of safety measures for the handling of materials, equipment, electrical devices and hazardous products
4. Apply ergonomic work principles and methods.	• Appropriate choice of work postures that limit the risk of injury and accidents • Proper organization of the work environment • Consistent application of comfortable positioning methods adapted to the client • Strict application of safe methods for moving clients, e.g. PDSB (Principes pour le déplacement sécuritaire des bénéficiaires / Principles for Moving Clients Safely) • Determination of intervention strategies that maximize the participation of the client

Elements of the Competency	Performance Criteria
5. Adapt to challenges associated with professional practice.	• Recognition of stress factors related to professional practice • Appropriate use of methods to manage one's stress • Identification of appropriate ways to prevent professional burnout • Recognition of one's own needs, limitations, and ability to meet the requirements of the profession • Use of specific safety measures when providing home care to clients • Use of preventive and intervention strategies to protect oneself in situations of violence, aggressivity, etc.
6. Provide emergency care.	• Knowledge of emergency protocols, evacuation plans and alert codes • Appropriate choice of interventions in the emergency situations most commonly encountered in physiotherapy • Proper application of technique for opening the respiratory tract • Proper use of cardiopulmonary resuscitation technique • Proper application of elastic compression bandages. • Effective collaboration with healthcare workers and other resource people

Code: 02AG

Objective ***Standard***

Statement of the Competency	**Achievement Context**
Locate the anatomical structures of the human body.	• For all types of client • For neurological, musculoskeletal and cardiovascular systems • Based on information available about the client prior to starting the treatment • Using anatomical charts and models • Using reference documents, digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with ethics and professional code of ethics • Proper application of ergonomic, comfort and safety measures • Proper application of required hygiene and infection control measures • Consideration of contraindications and precautions • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Delineate bone, joint and muscle structures.	• Locate and describe anatomical structures • Methodical application of procedures for locating anatomical structures • Precise identification and location of bone, joint and muscle structures using palpation
2. Locate nerves, peripheral vessels and ganglions.	• Proper application of a procedure for locating anatomical structures • Location through palpation and accurate schematic localization of the pathway of nerves, peripheral vessels and ganglions.
3. Provide information about anatomical structures.	• Clear explanations of the nature and location of structures in everyday language • Proper demonstration of the location of anatomical structures on the client's body.

Code: 02AH

Objective ***Standard***

Statement of the Competency	Achievement Context
Analyze the positions and movements of the human body.	• For all types of client • Within the legal framework for professional practice • Based on information available on the client prior to starting the treatment • Using anatomical charts and models • Using furniture, equipment, devices, technical aids, accessories, measuring instruments and materials • Using reference documents, digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with ethics and professional code • Proper application of ergonomic, comfort and safety measures • Proper application of required hygiene and infection control measures • Consideration of contraindications and precautions • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Analyze the mechanical forces and constraints exerted on anatomical structures in static positions and during movement.	• Recognition of the forces involved depending on the position or movement • Appropriate deduction of the constraints exerted on the structures of the human body • Realistic estimation of the effort needed to maintain equilibrium both in static postures and and during movement • Realistic estimation of the mechanical limits of human tissues • Recognition of the effect of using levers, pulleys and inclined planes on the forces involved

Elements of the Competency	Performance Criteria
2. Analyze how joint and muscle structures function to maintain static positions and to produce movement.	• Relevant connections made between the form and function of a structure and how it acts to maintain a position and to produce movement • Understanding of the relationships between forces exerted by inert structures and by muscles during various phases of a movement • Logical analysis of joint positions and movements produced during various phases of movement, including walking
3. Examine the respective positions of joint and muscle structures in static positions and in movement.	• Accurate location of inert structures and muscles in action during various phases of movement, including walking • Detailed examination of normal posture
4. Provide information on the postures and movements of the human body.	• Proper description of postures and movements of the human body in everyday language • Identification of impairments of posture and movement and ability to explain them to the client

Code: 02AJ

Objective *Standard*

Statement of the Competency	Achievement Context
Associate physiological mechanisms with physical rehabilitation needs.	• For all types of client • Based on information available on the client prior to starting the treatment • Using reference documents, digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with ethics and professional code of ethics • Proper application of ergonomic, comfort and safety measures • Proper application of required hygiene and infection control procedures • Consideration of contraindications and precautions • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Analyze the effect of muscle activity control mechanisms in physical rehabilitation applications.	• Identification of factors that have an influence on the effectiveness of muscular effort • Relevance of the connections established between the type of muscular effort and the energy source • Relevance of the connections established between the type of muscular effort and the contraction parameters • Relevance of the connections made between the neuromuscular and chemical control mechanisms and interventions aimed at facilitating or inhibiting muscle activity

Elements of the Competency	Performance Criteria
2. Analyze the effect of muscle activity on the human body.	• Recognition of the preventive and curative effects of muscle activities on all the systems of the human body • Relevant association between the damaging effects of inactivity and immobility and physical rehabilitation needs • Proper explanation of the effects of muscular activity and inactivity in everyday language
3. Associate the physiological changes related to aging with physical rehabilitation needs.	• Recognition of the effects of physical and cognitive changes associated with aging on functional autonomy • Proper explanation of the physiological changes related to aging in everyday language
4. Consider the physiological mechanisms of pain in a physical rehabilitation context.	• Establishment of connections between the physiological mechanisms of pain and the methods used to manage it • Proper explanation of the physiological mechanisms of pain in everyday language
5. Consider the physiological mechanisms of pregnancy in a physical rehabilitation context.	• Recognition of the effects of the physiological mechanisms of pregnancy on musculoskeletal problems • Proper explanation of the physiological changes related to pregnancy in everyday language

Code: 02AK

Objective *Standard*

Statement of the Competency	Achievement Context
Correlate medical information with physical rehabilitation interventions.	• For all types of client • For common pathological conditions • For the neurological, musculoskeletal and cardiorespiratory systems • Within the legal framework for professional practice • Using evidence-based information • Based on information available on the client prior to starting the treatment • Using the patient and physiotherapy charts • Using reference documents, medical imaging, and digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics and the professional code • Relevant search for evidence-based information • Efficient use of reference documents • Proper explanations of pathological conditions and clinical interventions in everyday language • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Associate the medical diagnosis with clinical features of pathological conditions.	• Identification of pertinent information about the pathological condition • Appropriate representation of the global clinical profile of the client
2. Make connections between common medical tests and the diagnosis.	• Recognition of the main medical tests that have an impact on physical rehabilitation • Connections made between the results of medical tests and the diagnoses

Elements of the Competency	Performance Criteria
3. Associate medical interventions with pathological conditions.	• Recognition of the most common medical interventions used for a given pathological condition. • Connections made between medical interventions and their implications for physical rehabilitation.
4. Identify the implications of the effects of medications for the physical rehabilitation intervention.	• Identification of relevant information about the medications • Connections made between the therapeutic effects and side effects of the medications and the physical rehabilitation intervention.
5. Associate rehabilitation interventions with pathological conditions.	• Identification of physical rehabilitation interventions using evidence-based information • Connections made between therapeutic interventions and rehabilitation goals
6. Identify information in the client chart that is relevant to physical rehabilitation.	• Accurate interpretation of the terminology and abbreviations used • Distinguish relevant from irrelevant information

Code: 02AL

Objective *Standard*

Statement of the Competency	Achievement Context
Interact in a professional context.	• For all types of client • Within the legal framework for professional practice • In collaboration with other physiotherapy professionals, healthcare professionals and other resource people • In a variety of professional situations such as interdisciplinary discussions, interdisciplinary and multidisciplinary meetings, training activities or information sessions, emergency situations, etc. • Following the policies and procedures of the therapeutic facilities and residential settings • Using the patient or physiotherapy chart, forms and other professional documents • Using digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics, and the professional code. • Respect for the role, responsibilities and competencies of other healthcare professionals • Appropriate use of information and communication technologies • Adaptation of communication to different people and contexts • Open-mindedness and respect for other points of view • Adoption of behaviours conducive to the establishment of harmonious relationships • Useful contribution to solving problems and making decisions • Appropriate solutions for defusing interpersonal conflicts • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Analyze evidence-based information.	• Accurate identification of reference sources and the ways to find them (keywords). • Correct identification of the parameters of a search protocol • Understanding of the ethical aspects of the research • Critical analysis of the information
2. Communicate with clients and caregivers.	• Understanding of the characteristics of different types of clients and related intervention strategies • Relevance and clarity of instructions addressed to the client or their caregivers • Appropriate understanding of the person's non-verbal language • Verification that the information given has been understood • Consideration of sociocultural variables • Consideration of difficult physical and psychological situations (e.g. functional disabilities, being off work, chronic pain, anxiety) • Appropriate application of intervention strategies that take into account the client's needs and the client's own ability to respond to those needs
3. Collaborate within a work team.	• Accurate distinction of the roles and competencies of each member of an intradisciplinary, interdisciplinary or multidisciplinary team • Careful exercise of their power to influence • Demonstration of attitudes and behaviours conducive to teamwork • Demonstration of leadership and solidarity concerning decisions made by the team
4. Adapt to difficult situations.	• Accurate assessment of the situation • Application of stress management techniques in specific situations (e.g. grief, palliative care, psychiatric disorders) • Recognition of their professional boundaries • Demonstration of emotional distancing appropriate to the situation • Appropriate adjustment of their interventions • Reaction within an acceptable delay • Application of strategies for resolving interpersonal conflicts

Code: 02AM

Objective ***Standard***

Statement of the Competency	**Achievement Context**
Provide electrotherapy treatments.	• For all types of clients • Within the legal framework for professional practice • For antalgic, trophic, tissue repair and client motor rehabilitation • Using evidence-based information • Based on information available on the client prior to starting the treatment • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using reference documents, protocols, and digital and technological tools.

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics and the professional code • Consideration of the various bio-psycho-social aspects of the client • Application of ergonomic, comfort and safety measures • Compliance with the rules governing health, safety, hygiene and aseptic technique • Consideration of indications, contraindications and precautions • Accurate understanding of the effects of techniques used on the human body • Adaptation or termination of the treatment based on the client's reactions • Satisfactory recognition of the signs and symptoms of a medical emergency • Adaptation of communication to the context and persons being addressed • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Organize the work.	• Careful preparation of the treatment area, materials, and equipment • Logical organization of the sequence of treatments • Methodical tidying and cleaning of the treatment area
2. Explain the principles underlying the use of electrotherapy devices.	• Appropriate explanation of the characteristics of currents and waves and their effects on structures of the human body in everyday language • Clear explanations about use of the devices and safety measures
3. Apply different types of electric currents.	• Choice of type of current, method and application parameters based on therapeutic goals, indications, contraindications and precautions • Effective application of the treatment
4. Apply electromechanical and electromagnetic waves.	• Choice of type of wave, method and application parameters based on therapeutic goals, indications, contraindications and precautions • Effective application of the treatment
5. Apply radiation.	• Choice of type of wave, method and application parameters based on therapeutic goals, indications, contraindications and precautions • Effective application of the treatment
6. Apply electrical stimulation and biofeedback.	• Choice of type of current, method and application parameters based on therapeutic goals, indications, contraindications and precautions • Instruction of client on the exercises they are expected to do • Effective application of the treatment
7. Record the information in the chart.	• Synthesis of relevant information • Use of a standardized charting method to enter information into the chart • Correct application of the rules of grammar and spelling

Code: 02AN

Objective ***Standard***

Statement of the Competency	**Achievement Context**
Intervene in cases involving pain and circulatory problems.	• For all types of client • Within the legal framework for professional practice • Using evidence-based information • Based on information available on the client prior to starting the treatment • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using reference documents, forms, and digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics and the professional code • Consideration of the client's bio-psycho-social profile • Application of ergonomic, comfort and safety measures • Compliance with the rules governing health, safety, hygiene and infection control • Consideration of indications, contraindications and precautions • Adaptation or termination of the treatment based on the client's reactions • Satisfactory recognition of the signs and symptoms of a medical emergency • Adaptation of communication to the context and persons being addressed • Continuous transmission of information on the treatment being given • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Organize the work.	• Careful preparation of area, materials and equipment • Logical organization of the sequence of treatments • Methodical tidying and cleaning of the treatment areas
2. Collect evaluative data.	• Collection of relevant and detailed subjective data • Detailed collection of objective data including any necessary standardized tests • Correct analysis of the data
3. Implement treatments for antalgic, trophic or compressive purposes.	• Choice of treatments and their application parameters based on therapeutic goals, indications, contraindications and precautions • Correct use of superficial thermal agents, hydrotherapy and pneumatic compression pumps for various problems, including wounds
4. Apply different massage techniques.	• Choice of massage techniques based on therapeutic goals, indications, contraindications and precautions • Correct performance of massage techniques for various conditions, including scars
5. Apply relaxation techniques.	• Choice of relaxation techniques based on therapeutic goals, indications, contraindications and precautions • Correct performance of relaxation techniques
6. Design exercise programs to reduce pain and improve circulation.	• Development of exercise programs adapted to the therapeutic goals and context • Clarity of written exercise program (handwritten or typed using a digital tool)

Elements of the Competency	Performance Criteria
7. Teach exercises designed to reduce pain and improve circulation.	• Teaching of exercises that promote circulation, pain reduction, and relaxation • Use of intervention strategies that promote client participation • Suggestion of measures complementary to the treatment, if applicable (sending back to the referring professional, referral to other professionals, advice on materials and equipment the client should obtain, etc.). • Relevant recommendations regarding maintenance and prevention • Advice to maintain or improve overall health.
8. Record the information in the chart.	• Synthesis of relevant information • Use of a standardized charting method to enter information into the chart • Correct application of the rules of grammar and spelling

Code: 02AP

Objective ***Standard***

Statement of the Competency	Achievement Context
Intervene in cases involving loss of mobility.	• For all types of client • Within the legal framework for professional practice • Using evidence-based information • Based on information available on the client prior to starting the treatment • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using reference documents, forms, and digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with the professional regulations and code of ethics

	• Consideration of the client's bio-psycho-social needs • Application of ergonomic, comfort and safety measures • Compliance with the rules governing health, safety, hygiene and infection control procedures • Consideration of indications, contraindications and precautions • Adaptation or termination of the treatment based on the client's reactions • Satisfactory recognition of the signs and symptoms of a medical emergency • Adaptation of communication to the context and persons being addressed • Continuous transmission of information on the treatment being given • Correct use of medical terminology

Elements of the Competency	**Performance Criteria**
1. Organize the work.	• Careful preparation of area, materials and equipment • Logical organization of the sequence of treatments • Methodical tidying and cleaning of the treatment areas
2. Collect evaluative data.	• Collection of relevant subjective data • Detailed collection of objective data including any necessary standardized tests • Correct analysis of the data

Elements of the Competency	Performance Criteria
3. Use mobilization exercises and techniques.	• Choice of treatments and their application parameters based on therapeutic goals, indications, contraindications and precautions • Correct and safe performance of mobilization exercises and techniques, including manual techniques • Careful selection of devices and accessories that help clients to regain mobility (pulleys, ball, etc.).
4. Use facilitation and stretching exercises.	• Choice of exercises, treatments and their application parameters based on therapeutic goals, indications, contraindications and precautions • Correct and safe performance of facilitation techniques
5. Design exercise programs to improve mobility.	• Development of exercise programs adapted to the therapeutic goals and context • Clearly written exercise program (handwritten or typed using a digital tool)
6. Teach exercises designed to improve mobility.	• Teaching of exercises that promote mobility and flexibility • Use of intervention strategies that promote client participation • Suggestion of measures complementary to the treatment, if applicable (returning to the referring professional, referral to other professionals, advice on materials and equipment the client should obtain, etc.). • Relevant recommendations regarding maintenance and prevention • Advice to maintain or improve overall health.
7. Record the information in the chart.	• Synthesis of relevant information • Use of a standardized charting method to enter information into the chart • Correct application of the rules of grammar and spelling

Code: 02AQ

Objective ***Standard***

Statement of the Competency	Achievement Context
Intervene in cases involving muscle impairment.	• For all types of client • Within the legal framework for professional practice • Using evidence-based information • Based on information available on the client prior to starting the treatment • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using reference documents, forms, and digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics, and the professional code. • Consideration of the client's bio-psycho-social profile • Application of ergonomic, comfort and safety measures • Compliance with the rules governing health, safety, hygiene and infection control • Consideration of indications, contraindications and precautions • Adaptation or termination of the treatment based on the client's reactions • Satisfactory recognition of the signs and symptoms of a medical emergency • Adaptation of communication to the context and persons being addressed • Continuous transmission of information on the treatment being given • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Organize the work.	• Careful preparation of area, materials and equipment • Logical organization of the sequence of treatments • Methodical tidying and cleaning of the treatment areas
2. Collect evaluative data.	• Collection of relevant subjective data • Detailed collection of objective data including any necessary standardized tests • Correct analysis of the data
3. Use techniques to recruit muscles and improve muscular strength.	• Choice of treatments and their application parameters based on therapeutic goals, indications, contraindications and precautions. • Correct stimulation of muscle contraction • Careful use of devices and accessories to facilitate muscle recruitment, stimulation or strengthening
4. Design exercise programs to improve muscular strength.	• Development of exercise program adapted to the therapeutic goals and context • Clearly written exercise program (handwritten or typed using a digital tool)
5. Teach exercises designed to improve muscular strength.	• Teaching of exercises that promote muscle strengthening • Use of intervention strategies that promote client participation • Suggestion of measures complementary to the treatment, if applicable (returning to the referring professional, referral to other professionals, advice on materials and equipment the client should obtain, etc.). • Relevant recommendations regarding maintenance and prevention • Advice to maintain or improve overall health.
6. Record the information in the chart.	• Synthesis of relevant information • Use of a standardized charting method to enter information into the chart • Correct application of the rules of grammar and spelling

Code: 02AR

Objective ***Standard***

Statement of the Competency	**Achievement Context**
Intervene in cases involving functional loss.	• For all types of client • Within the legal framework for professional practice • Using evidence-based information • Based on information available on the client prior to starting the treatment • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using reference documents, forms, and digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics, and the professional code. • Consideration of the client's bio-psycho-social profile • Application of ergonomic, comfort and safety measures • Compliance with the rules governing health, safety, hygiene and infection control • Consideration of indications, contraindications and precautions • Adaptation or termination of the treatment based on the client's reactions • Satisfactory recognition of the signs and symptoms of a medical emergency • Adaptation of communication to the context and persons being addressed • Continuous transmission of information on the treatment being given • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Organize the work.	• Careful preparation of area, materials and equipment • Logical organization of the sequence of treatments • Methodical tidying and cleaning of the treatment areas
2. Collect evaluative data.	• Collection of relevant subjective data • Detailed collection of objective data including any necessary standardized tests • Correct analysis of the data
3. Correct postural impairments.	• Choice of treatments and their application parameters based on therapeutic goals, indications, contraindications and precautions • Correct performance of techniques to reduce postural impairments • Judicious use of accessories that facilitate postural awareness
4. Perform interventions to improve or maintain transfers and ambulation.	• Choice of treatments and their application parameters based on therapeutic goals, indications, contraindications and precautions • Correct and safe performance of interventions as well as transfer and ambulation training • Appropriate adjustment and teaching of the use of technical aids
5. Perform interventions to improve or maintain balance, proprioception and coordination.	• Choice of treatments and their application parameters based on therapeutic goals, indications, contraindications and precautions. • Correct and safe performance of techniques and exercises that promote balance, proprioception and coordination
6. Perform interventions to improve or maintain gait.	• Choice of treatments and their application parameters based on therapeutic goals, indications, contraindications and precautions • Correct and safe performance of gait training and techniques to improve awareness of gait faults • Appropriate adjustments and teaching of the use of technical aids

Elements of the Competency	Performance Criteria
7. Design exercise programs to improve or maintain locomotor function.	• Development of exercise programs adapted to the therapeutic goals and context • Clearly written exercise program (handwritten or typed using a digital tool).
8. Teach exercises designed to improve locomotor function.	• Teaching of exercises designed to improve locomotor function • Use of intervention strategies that promote client participation • Suggestion of measures complementary to the treatment, if applicable (returning to the referring professional, referral to other professionals, advice on materials and equipment the client should obtain, etc.). • Relevant recommendations regarding maintenance and prevention • Advice to maintain or improve overall health.
9. Record the information in the chart.	• Synthesis of relevant information • Use of a standardized charting method to enter information into the chart • Correct application of the rules of grammar and spelling.

Code: 02AS

Objective	*Standard*

Statement of the Competency	**Achievement Context**
Adapt the therapeutic approach to specific physical disabilities and mental losses, in different settings.	• For all types of client • In therapeutic and rehabilitation settings • For situations involving physical or psychological disability, handicap, or loss, • Within the legal framework for professional practice • Using evidence-based information • In collaboration with other healthcare professionals and resource people • With the goal of optimizing rehabilitation • Based on information available on the client prior to starting the treatment • Based on the policies and procedures of the therapeutic setting or living environment • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using reference documents, digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics, and the professional code. • Consideration of the client's bio-psycho-social profile • Strict application of the required health, safety, hygiene and infection control rules • Strict application of client comfort and safety measures • Consideration of indications, contraindications and precautions • Use of intervention strategies that promote participation by the client, their entourage or resource people • Adaptation or termination of the treatment in accordance with the client's reactions • Satisfactory recognition of the signs and symptoms of a medical emergency • Adaptation of communication to different people and contexts • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Identify signs of adaptation or maladaptation.	• Close observation of the client's reactions • Relevant connections made between the signs exhibited by the client and the coping mechanisms • Recognition of signs of maladaptation (grief, depression, psychological distress, chronic pain and others)
2. Adapt the clinical approach to the type of physical disability and its severity.	• Consideration of the impact of a disability on the client's emotional and social life • Relevance of the connections made between the type and severity of the disability and the client's needs during the rehabilitation process
3. Adapt the clinical approach in the case of psychosocial, cognitive or psychiatric conditions.	• Consideration of the effects of psychosocial, cognitive or psychiatric conditions on the client's emotional and social life • Recognition of the effect of psychosocial, cognitive and psychiatric conditions on the rehabilitation process
4. Adapt their approach based on the therapeutic setting or living environment.	• Consideration of the effect of the type of therapeutic setting or living environment on the rehabilitation process • Intervention strategies adapted to the setting • Adaptation of the therapeutic setting or living environment so as to enhance the client's orientation and autonomy

	Code: 02AT
Objective	***Standard***

Statement of the Competency	**Achievement Context**
Adapt their therapeutic approach to a geriatric clientele.	• For losses pertaining to functional autonomy • Within the legal framework for professional practice • Using evidence-based information • In collaboration with other healthcare professionals and resource people • For the maintenance or optimization of functional autonomy • Using current evaluation and treatment techniques • Based on information available on the client prior to starting the treatment • Based on the policies and procedures of the therapeutic setting or living environment • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using reference documents, digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics, and the professional code. • Consideration of the client's bio-psycho-social profile • Strict application of the required health, safety, hygiene and infection control procedures • Strict application of client comfort and safety measures. • Consideration of indications, contraindications and precautions • Adaptation or termination of the treatment based on the client's reactions • Satisfactory recognition of the signs and symptoms of a medical emergency • Adaptation of communication to the persons being addressed • Correct use of medical terminology

Elements of the Competency	Performance Criteria
1. Describe the resources available in Québec for a geriatric clientele.	• Proper differentiation of the various types of living environments • Proper identification of different programs designed for seniors • Determination of the advantages and limitations of providing care for seniors continuing to live at home • Consideration of end-of-life characteristics
2. Analyze the client's bio-psycho-social profile.	• Consideration of the client's social history • Analysis of the risk factors associated with taking multiple medications • Analysis of the risk factors associated with fragility • Analysis of the effect of geriatric diseases • Recognition of possible personality changes and communication difficulties • Use of intervention strategies adapted to the client's cognitive and physical abilities • Identification of the various means of restraint and other options
3. Implement interventions with a geriatric clientele.	• Evaluation of functional capacities adapted to the bio-psycho-social profile • Realistic evaluation of the risk of falls • Correct execution of vital sign measurement • Correct recognition of tolerance to effort • Correct analysis of the client's functional profile • Determination of realistic therapeutic goals to promote autonomy • Adaptation of interventions according to the global profile • Use of intervention strategies that promote participation by the client, their entourage or resource people

Code: 02AU

Objective *Standard*

Statement of the Competency	Achievement Context
Provide rehabilitation services to clients with orthopedic or rheumatological conditions.	• For people of all ages • For cases involving amputations, pregnancy-related musculoskeletal problems, and orthopedic or rheumatological conditions accompanied or unaccompanied by neurological symptoms • Within the legal framework for professional practice • Using evidence-based information • In collaboration with other healthcare professionals and resource people • With the goal of achieving optimal functional performance • Using current evaluation and treatment techniques • Based on information available on the client prior to starting the treatment • Based on a medical requisition or the physiotherapist's assessment • Based on the client's chart • Based on the policies and procedures of the therapeutic or residential setting • Using protocols and reference documents • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics, and the professional code. • Strict application of the required health, safety, hygiene and infection control procedures • Strict application of client comfort and safety measures. • Respect for privacy and confidentiality • Adaptation of communication to the context and persons being addressed • Continuous transmission of information on the treatment being given

	• Procurement of consent prior to starting interventions • Critical analysis of evidence-based information • Consideration of indications, contraindications and precautions • Consideration of the client's bio-psycho-social profile • Demonstration of a strong sense of initiative, creativity and resourcefulness • Tangible contribution to the smooth operation of the work setting • Demonstration of manual dexterity • Adaptation or termination of the treatment based on the client's reactions • Recognition of the signs and symptoms of a medical emergency • Correct use of medical terminology

Elements of the Competency	**Performance Criteria**
1. Organize the work.	• Efficient preparation of area, materials and equipment • Efficient organization of the sequence of treatments • Procurement of all relevant information • Ongoing consideration of new information added to the client's chart • Accurate determination of the patient category
2. Document the problems.	• Detailed analysis of all relevant information • Methodical planning of the subjective and objective data collections • Pertinent questions about signs and symptoms • Meticulous execution of measurements and objective tests
3. Analyze all the subjective and objective data.	• Accurate interpretation of all data obtained • Elaboration of a prioritized list of problems or therapeutic goals in order of priority • Consideration of the client's expectations
4. Determine the treatment plan.	• Pertinent choice of treatment techniques and parameters • Participation in creating a global or interdisciplinary intervention plan, if applicable

Elements of the Competency	Performance Criteria
5. Implement the treatment plan.	• Meticulous application of treatment methods and techniques • Proper use of mechanical and manual traction • Constant monitoring for subjective and objective changes in the client's condition • Explanations of the exercises and advice adapted to the client • Appropriate engouragement of the client to take charge of their rehabilitation • Suggestion of measures complementary to the treatment, if applicable (returning to the referring professional, referral to other professionals, advice on materials and equipment the client should obtain, etc.)
6. Complete a re-evaluation.	• Methodical planning of the subjective and objective re-evaluation • Pertinent questions about evolution of the client's condition • Detailed analysis of the data collected in comparison with the initial evaluation • Correct adaptation of therapeutic goals and the treatment plan • Proper explanation of the changes made to the treatment plan in everyday language
7. Implement a discharge plan.	• Proper explanation of the reasons for stopping treatments in everyday language • Relevant recommendations regarding maintenance and prevention • Recommendations for other professionals to be consulted if applicable • Judicious planning of a follow-up, if needed
8. Record the information in the chart.	• Synthesis of relevant information • Use of a standardized charting method to enter information into the chart • Correct application of the rules of grammar and spelling

Code: 02AV

Objective *Standard*

Statement of the Competency	Achievement Context
Provide rehabilitation services for clients with neurological conditions.	• For people of all ages • For cases involving neurological conditions • Within the legal framework for professional practice • Using evidence-based information • In collaboration with other healthcare professionals and resource people • With the goal of achieving optimal functional performance • Using current evaluation and treatment techniques • Based on information available on the client prior to starting the treatment • Based on a medical requisition or the physiotherapist's assessment • Based on the client's chart • Based on the policies and procedures of the therapeutic or residential setting • Using protocols and reference documents • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics, and the professional code. • Strict application of the required health, safety, hygiene and infection control procedures • Strict application of client comfort and safety measures. • Respect for privacy and confidentiality • Adaptation of communication to the context and persons being addressed • Continuous transmission of information on the treatment being given • Procurement of consent prior to starting interventions • Critical analysis of evidence-based information

	• Consideration of indications, contraindications and precautions • Consideration of the client's bio-psycho-social profile • Demonstration of a strong sense of initiative, creativity and resourcefulness • Tangible contribution to the smooth operation of the work setting • Demonstration of manual dexterity • Adaptation or termination of the intervention based on the client's reactions • Recognition of the signs and symptoms of a medical emergency • Correct use of medical terminology

Elements of the Competency	**Performance Criteria**
1. Organize the work.	• Efficient preparation of area, materials and equipment • Efficient organization of the sequence of treatments • Procurement of of all relevant information • Ongoing consideration of new information added to the client's chart • Accurate determination of the patient category
2. Document the problems.	• Detailed analysis of all relevant information • Methodical planning of the subjective and objective evaluations • Pertinent questions about signs and symptoms • Meticulous execution of measurements and objective tests
3. Analyze all the subjective and objective data.	• Accurate interpretation of all data obtained • Elaboration of a prioritized list of problems or therapeutic objectives • Consideration of the client's expectations
4. Determine the treatment plan.	• Pertinent choice of treatment techniques and parameters • Participation in creating a global or interdisciplinary intervention plan if applicable

Elements of the Competency	Performance Criteria
5. Implement the treatment plan.	• Meticulous application of treatment methods and techniques • Constant monitoring for subjective and objective changes in the client's condition • Explanations of the exercises and advice adapted to the client • Appropriate engouragement of the client to take charge of their rehabilitation • Suggestion of measures complementary to the treatment, if applicable (returning to the referring professional, referral to other professionals, advice on materials and equipment the client should obtain, etc.).
6. Complete a re-evaluation.	• Methodical planning of the subjective and objective re-evaluation • Pertinent question about changes in the client's condition • Detailed analysis of the data collected in comparison with the initial evaluation • Correct adaptation of therapeutic goals and the treatment plan • Proper explanation of the changes made to the treatment plan in everyday language
7. Implement a discharge plan.	• Proper explanation of the reasons for stopping treatments in everyday language • Relevant recommendations regarding maintenance and prevention • Recommendations adapted for other professionals to be consulted, if applicable • Careful planning of a follow-up, if needed
8. Record the information in the chart.	• Synthesis of relevant information • Use of a standardized charting method to enter information into the chart • Correct application of the rules of grammar and spelling

Code: 02AW

Objective *Standard*

Statement of the Competency	Achievement Context
Provide rehabilitation services for clients with cardiovascular, respiratory and lymphatic conditions.	• For people of all ages • For cases involving cardiovascular, respiratory and lymphatic conditions • Within the legal framework for professional practice • Using evidence-based information • In collaboration with other healthcare professionals and resource people • With the goal of achieving optimal functional performance • Using current evaluation and treatment techniques • Based on information available on the client prior to starting the treatment • Based on a medical requisition or the physiotherapist's assessment • Based on the client's chart • Based on the policies and procedures of the therapeutic or residential setting • Using protocols and reference documents • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics, and the professional code. • Strict application of the required health, safety, hygiene and infection control procedures • Strict application of client comfort and safety measures. • Respect for privacy and confidentiality • Adaptation of communication to the context and persons being addressed • Procurement of consent prior to starting interventions • Critical analysis of evidence-based information • Consideration of indications, contraindications and precautions

	• Consideration of the client's bio-psycho-social profile • Demonstration of a strong sense of initiative, creativity, and resourcefulness • Tangible contribution to the smooth operation of the work setting • Demonstration of manual dexterity • Adaptation or termination of the intervention based on the client's reactions • Recognition of the signs and symptoms of a medical emergency • Correct use of medical terminology

Elements of the Competency	**Performance Criteria**
1. Organize the work.	• Efficient preparation of area, materials, and equipment • Efficient organization of the sequence of treatments • Procurement of all relevant information • Ongoing consideration of new information added to the client's chart • Accurate determination of the patient category
2. Document the problems.	• Detailed analysis of all relevant information • Methodical planning of the subjective and objective evaluations • Pertinent questions about signs and symptoms • Meticulous execution of measurements and objective tests
3. Analyze all subjective and objective data.	• Accurate interpretation of all data obtained • Creation of the list of problems or therapeutic goals in order of priority • Consideration of the client's expectations
4. Determine the treatment plan.	• Pertinent choice of treatment techniques and application parameters • Participation in creating a global or interdisciplinary intervention plan, if applicable

Elements of the Competency	Performance Criteria
5. Implement the treatment plan.	• Meticulous application of treatment methods and techniques • Proper application of treatment methods for wounds • Constant monitoring for subjective and objective changes in the client's condition • Explanations of the exercises and advice adapted to the client • Proper teaching of strategies for reducing energy expenditure and managing effort • Appropriate engouragement of the client to take charge of their rehabilitation • Suggestion of measures complementary to the treatment, if applicable (returning to the referring professional, referral to other professionals, advice on materials and equipment the client should obtain, etc.).
6. Complete a re-evaluation.	• Methodical planning of the subjective and objective re-evaluation • Pertinent question about changes in the client's condition • Detailed analysis of the data collected in comparison with the initial evaluation • Correct adaptation of therapeutic goals and the treatment plan • Proper explanation of the changes made to the treatment plan in everyday language
7. Implement a discharge plan.	• Proper explanation of the reasons for stopping treatments in everyday language • Relevant recommendations regarding maintenance and prevention • Recommendations adapted for other professionals to be consulted, if applicable • Careful planning of a follow-up, if needed
8. Record the information in the chart.	• Synthesis of relevant information • Use of a standardized charting method to enter information into the chart • Correct application of the rules of grammar and spelling

Code: 02AX

Objective *Standard*

Statement of the Competency	Achievement Context
Provide rehabilitation services for clients with losses of functional autonomy.	• For people of all ages • For cases involving a loss of autonomy or the effects of a known and controlled condition • For the maintenance or optimization of functional autonomy • Within the legal framework for professional practice • Using evidence-based information • In collaboration with other healthcare professionals and resource people • Using current evaluation and treatment techniques • Based on information available prior to taking charge of the client • Based on a medical requisition or the physiotherapist's assessment • Based on the client's chart • Based on the policies and procedures of the therapeutic or residential setting • Using protocols and reference documents • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics, and the professional code. • Strict application of the required health, safety, hygiene and infection control procedures • Strict application of client comfort and safety measures. • Respect for privacy and confidentiality • Adaptation of communication to the context and persons being addressed • Procurement of consent prior to starting interventions • Critical analysis of evidence-based information • Consideration of indications, contraindications and precautions

	• Consideration of the client's bio-psycho-social profile • Demonstration of a strong sense of initiative, creativity and resourcefulness • Tangible contribution to the smooth operation of the work setting • Demonstration of manual dexterity • Adaptation or termination of the intervention based on the client's reactions • Recognition of the signs and symptoms of a medical emergency • Correct use of medical terminology

Elements of the Competency	**Performance Criteria**
1. Organize the work.	• Efficient preparation of area, materials and equipment • Efficient organization of the sequence of treatments • Procurement of all relevant information • Ongoing consideration of new information added to the client's chart. • Accurate determination of the patient category.
2. Collect evaluative data.	• Detailed analysis of all relevant information • Methodical planning of the subjective and objective evaluations • Pertinent questions about functional impairments • Accurate verification of difficulties and functional limitations • Meticulous execution of measurements and objective tests
3. Analyze all the subjective and objective data.	• Correct analysis of the client's functional profile • Elaboration of the list of problems • Establishment of realistic therapeutic goals adapted to the client's needs • Consideration of the client's expectations
4. Determine the treatment plan.	• Pertinent choice of treatment techniques and parameters • Participation in creating a global or interdisciplinary intervention plan, if applicable

Elements of the Competency	Performance Criteria
5. Implement the treatment plan.	• Organization of treatment based on the client's abilities and limitations • Meticulous application of treatment methods and techniques • Appropriate use and adjustment of technical aids • Constant monitoring for subjective and objective changes in the client's condition • Explanations of the exercises and advice adapted to the client • Appropriate engouragement of the client to take charge of their rehabilitation • Suggestion of measures complementary to the treatment, if applicable (returning to the referring professional, referral to other professionals, advice on materials and equipment the client should obtain, etc.).
6. Complete a re-evaluation.	• Methodical planning of the subjective and objective re-evaluation • Pertinent question about changes in the client's condition • Detailed analysis of the data collected in comparison with the initial evaluation • Correct adaptation of therapeutic goals and the treatment plan • Proper explanation of the changes made to the treatment plan in everyday language
7. Implement a discharge plan.	• Proper explanation of the reasons for stopping treatments in everyday language • Relevant recommendations regarding maintenance and prevention • Recommendations adapted for other professionals to be consulted, if applicable • Careful planning of a follow-up, if needed
8. Record the information in the chart.	• Synthesis of relevant information • Use of a standardized charting method to enter information into the chart • Correct application of the rules of grammar and spelling

Code: 02AY

Objective *Standard*

Statement of the Competency	Achievement Context
Perform training, information, prevention and health promotion activities.	• For all types of clients, health professionals and the general public • Within the legal framework for professional practice • Using evidence-based information • In collaboration with other healthcare workers and resource people • Based on the policies and procedures of the therapeutic setting or living environment • Using protocols and reference documents • Using furniture, products, equipment, devices, technical aids, accessories, measuring instruments and materials • Using digital and technological tools

	Performance Criteria for the Competency as a Whole
	• Compliance with regulations, ethics, and professional code • Strict application of the required health, safety, hygiene and infection control procedures • Critical analysis of evidence-based information • Adaptation of communication to the context and persons being addressed • Demonstration of a strong sense of initiative, creativity and resourcefulness • Use of intervention strategies that promote participation by the client or the group

Elements of the Competency	Performance Criteria
1. Plan the activities.	• Relevant determination of the goals of the activity • Meticulous planning of the program for the activity according to the type of participants • Appropriate preparation of the equipment and the space

Elements of the Competency	Performance Criteria
2. Develop activities.	• Consideration of the needs of the setting and specific clienteles • Careful design of information, prevention and health promotion activities for different clienteles • Careful design of information, training and prevention activities for other healthcare workers • Preparation of relevant documents in accordance with the targeted goals
3. Conduct exercise classes as well as training and information sessions.	• Choice of exercises according to the characteristics of the clientele or healthcare workers • Correct teaching of exercises • Appropriate presentation of the information in everyday language • Adaptation in accordance with the participants' reactions • Consideration of group feedback • Correct recording of the activities carried out and the participants' reactions

Appendix C *Call for Participants*

Take part in the research on using CourseFlow to aid curriculum alignment

Fall 2021 / Winter 2022

About the research:

The research is conducted by Bojana Krsmanovic, MA student at the Department of Education, Concordia University, supervised by Dr. Richard Schmid.

This research examines the alignment between the courses and the progression of competencies and learning outcomes at the program level in the context of curriculum mapping using CourseFlow, an interactive and dynamic instructional design tool. Specifically, the research looks at how you as the Program Revision team (i.e., Program faculty and instructional designers, hereafter referred to as 'practitioners') conduct the work involved in Program Revision, including development of learning outcomes and learning activities for your courses, verifying alignment of competencies at the program level. The project will also address the question whether or not this tool supports the process of curriculum mapping, promoting conversations that lead to better coordination between practitioners, audit, reflection, and a more aligned curriculum.

Throughout the late Fall 2021 and Winter 2022 terms, I will be observing the process of implementation of CourseFlow into the curriculum mapping in your Program at Dawson College (i.e., working meetings of the practitioners) and reporting on the processes involved, including the development of practices and protocols. Over the course of this study, the only time requested will be a single, half-hour interview at the conclusion of your team's work. All aspects of the study will be carried out remotely (via Zoom or email). Parts of the study and the interviews (with your permission) will be audio and/or video recorded. Your identity will never be revealed in any reports.

I will forward the necessary consent documents that include a letter of consent which outlines the procedure and protocols for informed participation. If you are interested in participating in this research, you will need to sign and return the consent letter to me by email. If you need any further information, I will email you a Doodle link where you can indicate your available time for our first Zoom meeting during which we can discuss the consent form and any questions that you might have about the research.

Please note that participation in this study is completely voluntary and your information will remain confidential. If you would like to participate, or if you have any questions about the study, please contact me at bojana.krsmanovic@mail.concordia.ca.

Appendix D *Information and Consent Form*

INFORMATION AND CONSENT FORM

Study Title: Toward a More Effective Curriculum Alignment Process

Researcher: Bojana Krsmanovic

Researcher's Contact Information: bojana.krsmanovic@mail.concordia.ca

Faculty Supervisor: Dr. Richard Schmid

Faculty Supervisor's Contact Information: richard.schmid@concordia.ca

Source of funding for the study: N/A

You are being invited to participate in the research study mentioned above. This form provides information about what participating would mean. Please read it carefully before deciding if you want to participate or not. If there is anything you do not understand, or if you want more information, please ask the researcher.

A. PURPOSE

The purpose of the research is to examine the alignment between the courses and the progression of learning outcomes on the program level in the context of curriculum mapping and, specifically, how practitioners operationalize competencies and learning outcomes into their courses and then on the program level through the affordances of CourseFlow, an interactive and dynamic instructional design tool. The project will also address the question if this tool makes the process of curriculum mapping effective, allowing for better conversations, audit, reflection, and a more aligned curriculum.

B. PROCEDURES

If you participate, you will be interviewed and observed in the meetings so that the author of the study will gain a better understanding of whether CourseFlow provides for an effective approach to the curriculum mapping/alignment process from various standpoints, and if yes, what aspects of the tool contribute to it and how, and if not, what the reasons for this are. Page 2 of 3

In total, participating in this study will take an hour of active involvement (being interviewed) and a couple of months of passive involvement (being observed in the program meetings around curriculum alignment).

C. RISKS AND BENEFITS

You will not be exposed to risk that is greater than minimal by participating in this research. Note that greater than minimal risk means that the probability and magnitude of possible harms and risks implied by participation in the research are greater than those encountered in aspects of your everyday life that relate to the research.

Potential benefits of participation in this research include boosting engagement and collaboration among administrative and teaching staff involved in the process, thus improving your own courses and teaching as well as the responsiveness of the curriculum to addressing graduate attributes.

D. CONFIDENTIALITY

We will gather the following information as part of this research: 1) Observation notes and 2) your responses to interview questions.

We will not allow anyone to access the information, except people directly involved in conducting the research. We will only use the information for the purposes of the research described in this form.

The information gathered will be confidential. That means that your identity will never be revealed in any analyses, results, or reports.

We will protect the information by keeping it password-protected on a laptop and thus not accessible to anyone other than the researcher and supervisor. Any secondary storage (backup) will be located on the supervisor's University account, thus fully protected.

We intend to publish the results of the research. However, it will not be possible to identify you in the published results.

We will destroy the information five years after the end of the study. Page 3 of 3

E. CONDITIONS OF PARTICIPATION

You do not have to participate in this research. It is purely your decision. If you do participate, you can stop at any time. You can also ask that the information you provided not be used, and your choice will be respected. If you decide that you don't want us to use your information, you must tell the researcher before the end of the Winter 2022 term.

There are no negative consequences for not participating, stopping in the middle, or asking us not to use your information.

F. PARTICIPANT'S DECLARATION

I have read and understood this form. I have had the chance to ask questions and any questions have been answered. I agree to participate in this research under the conditions described.

NAME (please print)_____

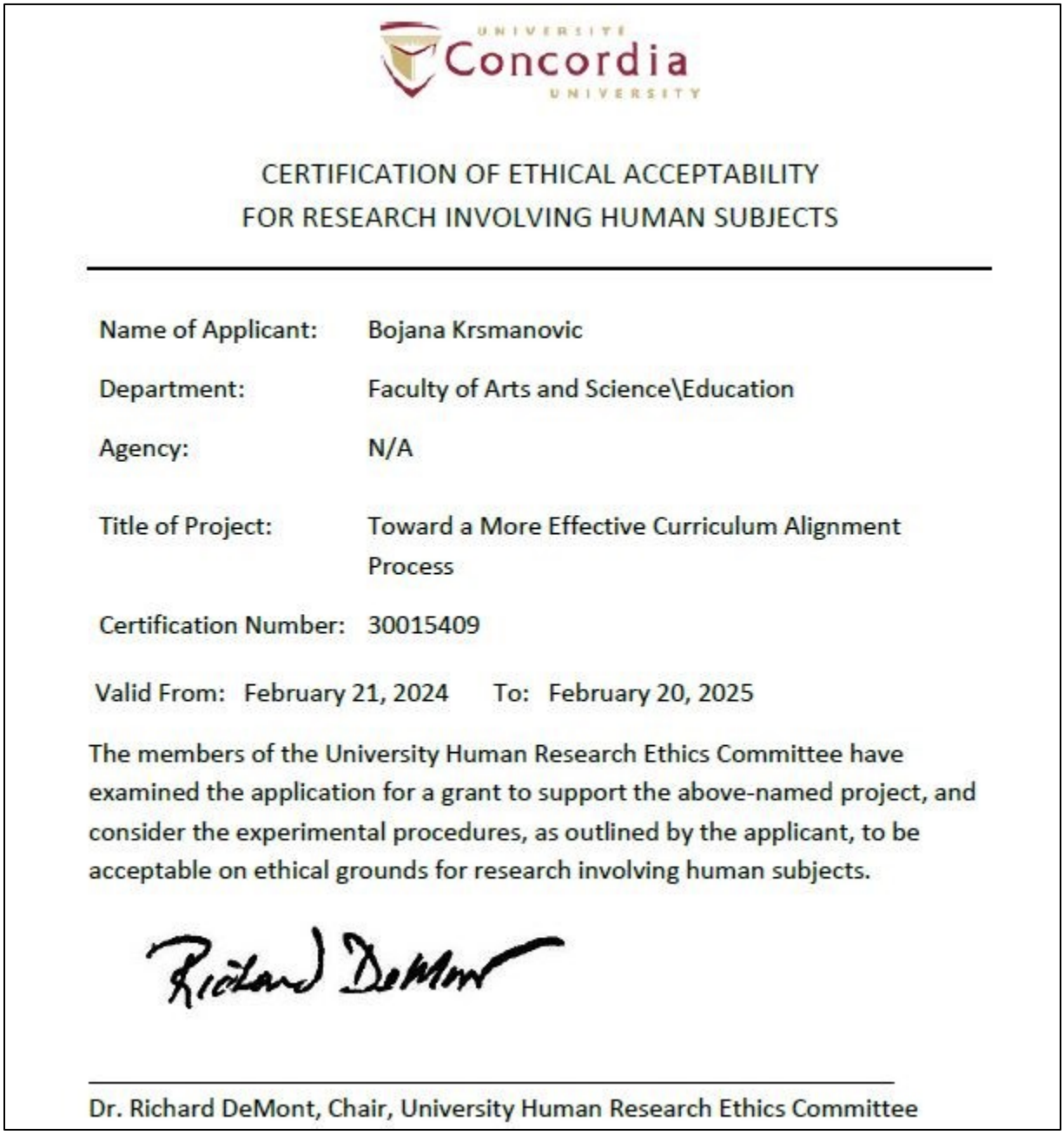
SIGNATURE _____

DATE _____

If you have questions about the scientific or scholarly aspects of this research, please contact the researcher. Her contact information is on page 1. You may also contact her faculty supervisor.

If you have concerns about ethical issues in this research, please contact the Manager, Research Ethics, Concordia University, 514.848.2424 ex. 7481 or oor.ethics@concordia.ca.

Appendix E *Ethics Certification from Concordia University*



UNIVERSITÉ Concordia UNIVERSITY

CERTIFICATION OF ETHICAL ACCEPTABILITY
FOR RESEARCH INVOLVING HUMAN SUBJECTS

Name of Applicant:	Bojana Krsmanovic
Department:	Faculty of Arts and Science\Education
Agency:	N/A
Title of Project:	Toward a More Effective Curriculum Alignment Process
Certification Number:	30015409

Valid From: February 21, 2024 To: February 20, 2025

The members of the University Human Research Ethics Committee have examined the application for a grant to support the above-named project, and consider the experimental procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

Richard DeMont

Dr. Richard DeMont, Chair, University Human Research Ethics Committee

Appendix F *Ethics Certification from Dawson College*

Dear Bojana Krsmanovic,

Thank you for submitting an ethics renewal request for "Toward a More Effective Curriculum Alignment Process", REB ID: KRSMB2122190.

Your request has been approved and this e-mail serves as an extension to the certificate of ethical acceptability issued on November 11, 2021. Your **next annual reporting date is February 20, 2025.**

REMINDER
During the course of this investigation, any deviations from the approved protocol and/or unanticipated developments should immediately be brought to the attention of the REB. The REB must approve any modifications to the approved protocol prior to implementation.

Once the study has been completed or terminated, a Research Study Closure Form must be submitted within one month of the study's completion or termination date. All forms are located on the Dawson College REB webpage.

Kind regards,
Felicia Solomon

Research Ethics Coordinator
Research Ethics Board (REB)
Comité d'éthique de la recherche
514. 931. 8731 x 1416 | rebapply@dawsoncollege.qc.ca

Appendix G *List of Interview Questions*

Extended sample of interview questions:

CourseFlow for Physiotherapy Technology

1. **Prior – what participants bring to the table**
    a. Previous experiences
        - How many years have you been working at your position?
        - How much experience have you had with course design and curriculum program design development?
        - In your experience, what are the processes (steps) used in each of these? Describe.
        - What tools have you used for curriculum creation and mapping?
            - How effective have these tools been?
            - What are the constraints/limitations of these tools?
        - What are the strengths/affordances of these tools?
    b. Skillsets
        - What skills and knowledge do you believe are required for curriculum mapping/ program revision process?
        - What experience/background do you bring to this task?
        - How do you overcome the gap between what is required and the skills you bring to the table?
    c. Understandings and reflections
        - What are your views on the curriculum mapping process – what should it ideally look like?
        - What are your experiences using the CourseFlow tool?
            - Was it easy or hard to use?
        - How long did your adjustment to the new software take?
        - Do you prefer this tool to the one previously used for the process?
        - Taking a look at CourseFlow, what are its strengths in addressing your needs?
            - What would CourseFlow need to address any limitation/challenges you came across during your work with this tool?

2. **During – how participants perceive the process**
    a. Collaboration and negotiation
        - Who else is involved in the task of course design/program revision?
            - If other people are involved, what are the roles? Which role do you take up?
        - Do you collaborate? Do you coordinate? Is there any negotiation in the process?
            - Does CF encourage using these skillsets (i.e., collaboration, negotiation) ?
        - Describe the process of collaboration and negotiation among yourself and the teaching staff at the Physiotherapy Technology Program around the curriculum planning process using CourseFlow.
            - How could it have been improved, if at all?
        - Describe the process of introducing CourseFlow to your colleagues.
    b. Views on the planning process on course level
        - Describe the planning process on the course level using CourseFlow.
        - What were the good and bad sides of the process? What would you improve for the future?
        - What were the affordances/constraints of the tool? What would you improve for the future?
    c. Views on the planning process on program level
        - Describe the planning process on the program level using CourseFlow.
        - What were the good and bad sides of the process? What would you improve for the future?
        - What were the affordances/constraints of the tool? What would you improve for the future?

3. **After – how participants are affected by the process**
    a. Refining of own skillsets/professional practices
        - Describe how the curriculum mapping/program revision process using CourseFlow helped you reflect on your own skillsets.
            - Which skills (i.e., collaboration, negotiation) do you feel you improved on most during the process? Which ones you feel you need to further improve on?

- Describe how the curriculum mapping/program revision process using CourseFlow helped you reflect on your own professional practices.
    - Did it help you improve professionally? In what ways?

b. Aligning instruction with student learning
    - Do you think that the curriculum mapping process using CourseFlow helps better alignment of teachers' instruction with student learning?
        - If yes, how?
        - If not, what would you change about the tool so that it helps teachers' instruction be better aligned with student learning?