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# Impact of an Interprofessional Student-Led Concussion Clinic

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## Abstract

This article describes the impact on the learners and health care institution of the OnTRACK-Concussion program, an innovative student-led clinic at a children's rehabilitation hospital. The clinic, developed and operated by occupational therapists, serves the community full-time year-round. Interprofessional health care learners work together to provide education and intervention for youth with concussion and their families and to support research and community outreach initiatives. To determine the program's impact on student learning, a post-placement questionnaire was used to capture feedback about their clinical education experience. To determine the program impact more broadly, the most significant change method was used to analyze data from in-depth qualitative interviews with stakeholders across and beyond the organization. Three Program Impact Pathways were identified that support the program's success within and beyond the organization: 1) Having a clear message/vision of integration; 2) Enabling learners to work directly with patients; and 3) Enabling learners to work autonomously. Debriefing with peers and clinical supervisors was identified as an important learning experience by interprofessional learners. This student-led clinic, developed and operationalized by occupational therapists, supports the integration of patient care, research, and clinical education in pediatric concussion through clearly identified Program Impact Pathways.



## Keywords

Concussion, occupational therapy, clinical education, paediatrics





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## ABSTRACT

This article describes the impact on the learners and health care institution of the OnTRACK-Concussion program, an innovative student-led clinic at a children's rehabilitation hospital. The clinic, developed and operated by occupational therapists, serves the community full-time year-round. Interprofessional health care learners work together to provide education and intervention for youth with concussion and their families and to support research and community outreach initiatives. To determine the program's impact on student learning, a post-placement questionnaire was used to capture feedback about their clinical education experience. To determine the program impact more broadly, the most significant change method was used to analyze data from in-depth qualitative interviews with stakeholders across and beyond the organization. Three Program Impact Pathways were identified that support the program's success within and beyond the organization: 1) Having a clear message/vision of integration; 2) Enabling learners to work directly with patients; and 3) Enabling learners to work autonomously. Debriefing with peers and clinical supervisors was identified as an important learning experience by interprofessional learners. This student-led clinic, developed and operationalized by occupational therapists, supports the integration of patient care, research, and clinical education in pediatric concussion through clearly identified Program Impact Pathways.

## Introduction

Demands on today's health care systems are complex. Health care organizations are expected to provide high quality inter-professional evidence-based care, actively participate in research, and build capacity through the provision of exceptional clinical education experiences for health professional learners. Occupational therapists are uniquely positioned to provide leadership in developing initiatives to address these challenges including through the effective integration of care, research, and clinical education (Heard, 2014). Student-led clinics offer a potential solution; they can effectively implement inter-professional health care by bringing together learners from various health care professions in an integrated clinical environment to provide exceptional care to patients and assist with research initiatives as part of the student clinical education experience (Briggs & Fronek, 2020).

Traditionally, student-led clinics strategically address the unmet health care needs of a local population while also attending to student learning needs (Kent et al., 2016). They have also been identified as innovative settings for inter-professional education (Haggarty & Dalcin, 2014). Benefits of learning in an inter-professional student-led environment have been well documented (Tong et al., 2021). Learners have reported benefits such as learning about the scope of practice of other health professionals, realizing the value of working as part of an inter-professional team, and having a better understanding of the operational aspects of running a clinic (Holmqvist et al., 2012; Kent et al., 2014). Further, through participation in an inter-professional student-led clinic, learners describe developing a deeper sense of respect for colleagues through their shared responsibilities and collaboration (Wang & Bhakta, 2013). Participating in a student-led clinic has been reported to help learners with 'managing the gap' between the classroom and the 'real world' in a more authentic, yet supported way (Bostick & Hall, 2014; Patterson et al., 2017). While the benefits of training in a student led clinic have been documented, little is known about the broader impacts of student led clinics on the institution and the health system they serve.

In our pediatric rehabilitation hospital context, we theorized that an inter-professional student-led pediatric concussion clinic could address several converging health system priorities and gaps. These included: 1) the need for improved and timely access to evidence informed concussion management education and support for youth with concussion and their families (care); 2) the growing demand from academic institutions to provide exceptional clinical education for health professional learners (education); and 3) the lack of intervention research to guide practice in pediatric concussion and limited access to funds to conduct such research (research). Thus, we developed the *OnTRACK inter-professional student training and intervention research program* (herein referred to as OnTRACK-Concussion).

## Description

The program is a student-led clinic that fully integrates care, clinical training, and research within a pediatric concussion program at an urban pediatric rehabilitation academic teaching hospital. An interprofessional team, led by the authors, worked together to conceptualize the program. A synthesis of best evidence and practices

regarding inter-professional education, principles of knowledge translation and collaborative change leadership were integrated to develop and implement OnTRACK-Concussion (Lavis et al., 2006; Provvidenza & Johnston, 2009; Raelin, 2003; Whitney & Trosten-Bloom, 2010; World Health Organization, 2010).

The objectives of OnTRACK-Concussion are to: 1) promote pediatric concussion recovery by providing youth and their families with timely and free and immediate access to the best available evidence-based management information (care); 2) build capacity in pediatric concussion care through training of exceptional health care professionals from various fields (education); and 3) generate evidence for effective clinical interventions for youth with concussion (research). In this student-led clinic, inter-professional health care learners are trained to collaboratively lead '*Concussion & You,'* an evidence-informed education and support session (Hunt et al., 2016) and to support an active rehabilitation intervention research program for youth ages 10-18 years old who are diagnosed with concussion (Reed et al., 2015). Learners also facilitate a weekly interprofessional concussion journal club, assist with iterative program development and support external partnerships through community outreach activities and educational initiatives (e.g., presentations at sports clubs, schools).

OnTRACK-Concussion operates full-time year-round and is staffed by inter-professional learners from health professional graduate programs. Two to five learners are engaged in the program at any given time. Clinical supervision is provided by the full time OnTRACK-Concussion program manager, an occupational therapist with a research PhD and extensive clinical teaching expertise, with additional casual support from other professionals (physical therapy, kinesiology, social work). A part-time research (.75) coordinator, also an occupational therapist, provided guidance regarding the clinical intervention study.

We were interested in learning about the broader program impact. However, prior to doing so, we felt it was important to understand the experience of the learners to provide context and inform the program impact evaluation. Therefore, the purpose of this article is to describe the student experience in OnTRACK-Concussion and articulate the program's theory of impact that explains its value at the organization and individual levels.

## Assessment

A retrospective secondary analysis of previously collected post-placement student survey data was conducted to explore the clinical placement experiences of inter-professional students in OnTRACK-Concussion. Research ethics approval for this study was obtained from the institution's Research Ethics Board (REB #17-731). A mixed methods approach was undertaken to conduct the program impact evaluation which was undertaken in the context of a program evaluation. Given this context, the institutional ethics board indicated that REB review was not required for the program impact evaluation.

**Student Experience Impact**

A description of the student experience was completed using a program specific survey (see Table 1). All learners (N=24) who completed a placement in OnTRACK-Concussion during its first 18 months of operation (April 2018- November 2019) completed the survey after placement completion. Data from Likert-type questions were summarized using descriptive statistics (e.g., frequencies). Program data (i.e., number of patient/family attendees) were collected from program databases. Qualitative data were analyzed using conventional content analysis (Hshieh & Shannon, 2005). One member of the research team was responsible for coding all data and developing code descriptions (AH). A second member of the team reviewed the analysis to ensure that codes and descriptions were representative of the data (KP). Member checking was then completed to ensure that codes and code descriptions accurately described students' experiences.

**Table 1**

*Survey Questions*

**Demographic questions**

1. What is your profession?
2. What is your University?

**Open-ended questions**

1. The best huddle discussion was about:
2. One thing I learned about myself in this placement is:
3. One thing I learned about my profession is:
4. One thing I learned about another profession is:
5. What did you like best about your student experience in the On TRACK program?

**Likert-type questions (responses: never, sometimes, usually, always)**

1. Learning with other students/ professionals has increased my confidence as a member of a health care team.
2. I felt the education I delivered was optimized for clients & families by working with other professionals.
3. I have a better understanding of how other professionals contribute to the care of kids with concussion.
4. My communication skills improved during this placement.
5. I found it a waste of time learning with other health care professionals from other disciplines.
6. I am unclear as to what my professional role is when learning with other health care professionals.
7. I felt my time at the On TRACK program made me more prepared for working as a regulated health care professional.
8. I was able to ask questions and learn from my peers.
9. I feel more confident working on an inter-professional team and aware of my contributions to that team.
10. I feel I was given the opportunity to problem solve for different clinical cases and clinic operation issues.
11. Overall, rate your experience in the On TRACK program from 1-10 (with one being a waste of time, 10 being the best experience ever): 1 2 3 4 5 6 7 8 9 10.

### Program Impact

To identify the program's impact, a mixed methodology approach was used and was completed in three stages. The first stage used the Most Significant Change (MSC) process (Dart & Davies, 2003; Davies & Dart, 2005) during which data was collected via in-depth interviews with 17 stakeholders' to capture their stories about the changes they noticed following participation in OnTRACK-Concussion. Stakeholders represented were learners, patients and their parents, health care providers (e.g., physicians, occupational therapists, physical therapists, nurses), professional practice leaders, hospital administrators and managers, and university education coordinators. Participants were asked to identify the most significant change as a result of their work with OnTRACK and describe what enabled that change to occur. Changes were identified in the data and grouped by type of change (organizational, individual). In stage 2, additional qualitative and quantitative data were collected *retrospectively* from existing sources (e.g., program evaluation data, student experience questionnaire data) to validate and elucidate changes identified in stage 1. The final stage (stage 3) used a collaborative participatory approach to create a theory of impact of the OnTRACK-Concussion program. The program impact theory elucidates not only the ways in which the OnTRACK Concussion program is impacting the various components of the system but also seeks to understand the underlying mechanisms of why and how the program is achieving the impact that it is having. A program's theory of impact "consists of a set of statements that describe a particular program, explain why, how, and under what conditions the program effects occur, predict the outcomes of the program, and specify the requirements necessary to bring about the desired program effects" (Sidani & Sechrest, 1999). This involved engaging system stakeholders in the interpretation of quantitative, qualitative, and existing relevant documentation to generate and validate the theory of impact. One author (KP) reviewed data from the student experience evaluation, changes emerging from the analysis and MSC process and developed the first draft of the On TRACK-Concussion Program Impact Pathways (PIPs). To ensure the rigor of the analysis, PIPs were shared with key stakeholders within and beyond the organization (i.e., students, clinicians, hospital managers, university clinical education leaders) to determine how the identified PIPs resonated for them. The PIPs were then communicated to relevant stakeholders (i.e., hospital and university leaders) for the purposes of informing the activities of the OnTRACK-Concussion program and telling the value story of the program. The final version of the program theory of impact is presented below in the results section.

## Results

### Student Experience Impact (Survey Results)

Respondents from the student experience survey were 24 learners representing four different health professions [occupational therapy (n=10), physical therapy (n=12), social work (n=1) and kinesiology (n=1)]. During the evaluation period 357 individuals (children and their families) received care and support through the program. Survey results are presented in Table 2. When asked to rate their overall experience of the placement, learners gave an average rating of 9/10 (range=5-10/10; median =9; mode=10) with 10 'being the best experience ever' and '0' being 'a waste of time'.

**Table 2**

*Frequencies of Interprofessional Student Responses to Quantitative Survey Questions*

| Question | Responses % (N) | | | |
|---|---|---|---|---|
| | Never | Sometimes | Usually | Always |
| 1. Learning with other students/ professionals has increased my confidence as a member of a health care team. | | 8.3 (2) | 16.6 (4) | 75.0 (18) |
| 2. I felt the education I delivered was optimized for clients & families by working with other professionals*. | | 8.3 (2) | 16.6(4) | 70.8 (17) |
| 3. I have a better understanding of how other professionals contribute to the care of kids with concussion. | | 12.5(3) | 33.3 (8) | 54.1 (13) |
| 4. My communication skills improved during this placement. | | | 25.0 (6) | 75.0 (18) |
| 5. I found it a waste of time learning with other health care professionals from other disciplines. | 95.8 (23) | 4.1 (1) | | |
| 6. I am unclear as to what my professional role is when learning with other health care professionals. | 79.2 (19) | 16.6 (4) | 4.1 (1) | |
| 7. I felt my time at the On TRACK program made me more prepared for working as a regulated health care professional. | | 12.5 (3) | 16.6 (4) | 70.8 (17) |

| | | | |
|---|---|---|---|
| 8. I was able to ask questions and learn from my peers. | 4.1 (1) | 4.1 (1) | 91.7 (22) |
| 9. I feel more confident working on an inter-professional team and aware of my contributions to that team. | 4.1 (1) | 12.5 (3) | 83.3 (20) |
| 10. I feel I was given the opportunity to problem solve for different clinical cases and clinic operation issues. | 12.5 (3) | 16.6 (4) | 70.8 (17) |
| 11. I feel I was given the opportunity to collaborate and learn from my peers. | 4.1 (1) | 12.5 (3) | 83.3 (20) |
| 12. I feel confident advising youth and families about concussion management. | | 12.5 (3) | 87.5 (21) |
| 13. I felt supported by the supervisors throughout the placement. | | | 100.0(24) |

Content analysis of open-ended questions revealed that learners appreciated learning in the open, supported learning environment with their inter-professional peers. They identified that debriefing with their inter-professional peers and supervisors in daily huddles was important to their learning. Learners recognized discussions about patient cases, working through emotions, conflicts, career planning, shared theory application, and generalizing learnings to other settings as the most important debrief discussion topics. Learners reported that the placement helped them learn about their own profession's scope of practice, as well as an appreciation of the breadth of the scope of practice and training of other professions. For example, a physical therapy student stated, [*I learned about] the breadth of OT in concussion care, even with assigning exercise (which is more PT) and how much compassion and rapport changes client care.* They indicated they developed self-confidence and a view of oneself as a capable professional (*[I developed] increased self-confidence and independence and knowing I can and am ready to enter the real world!).* Learning in an open, supported environment and collaborating with inter-professional peers were revealed as the best parts of learning in the program by all learners. "*I liked that it was a student-led program. This gave us a lot of independence and allowed us to learn and grow on our own; however,*

*instructors were always within arm's reach in case we needed help. I enjoyed working with other students from different professions. I believe we all learned a lot from the experience, but also from each other."* They noted that the shared space made collaboration with peers easy to do and facilitated quick access to supervisors.

**Program Impact**

According to the MSC interview data analysis, three changes and how these changes were enabled in the On-TRACK concussion program were revealed. Each change and relevant enablers are described using a Program Impact Pathway (PIP). All three PIPs are described in Figure 1. The value of the OnTrack-Concussion program can be described at both the organization and individual level. The first impact pathway (PIP #1a) describes how early efforts in positioning OnTrack-Concussion as an integrated program impacted the organization's ability to deliver integrated programming (education, research, care) as a learning organization. Analysis of interviews with OnTrack-Concussion leadership as well as members of the hospital's senior management team indicated that presenting a clear vision of integrating education, research, and care to build an innovative clinical education experience for learners was important to articulate at the beginning of the program and emphasize throughout the running of OnTrack-Concussion (1a).

*"We did not have a program where lots of students and trainees partnered with clinicians, in a way where the students weren't the face in the program...It is the idea that students are the leads, that students are bringing the level of expertise, practice and the experience of being a learner and a teacher, all in the same breath, as part of who we are as an academic organization."* – Hospital Senior Management Team member

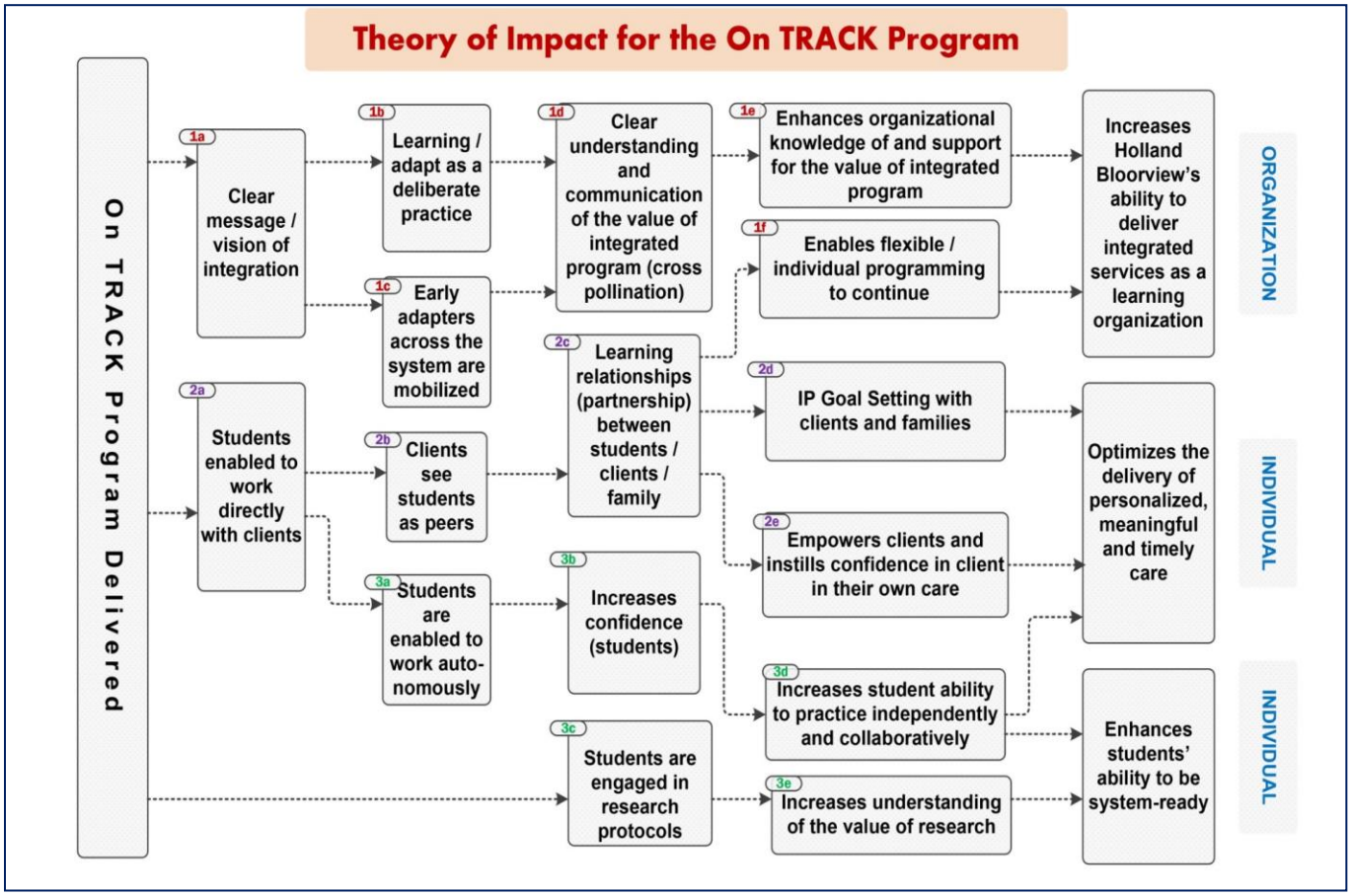
A key component of the vision for the program was to embed opportunities for learning (i.e., education) and program modification (1b) as led by learners. Clarity of vision also enabled the mobilization of key champions for the work, according to the organization's leadership (1c). Organization leadership also indicated that regular communications from students and program leaders about how the program was evolving was important in understanding program value within and beyond the organization.

*"It's helpful to get regular updates on how this is evolving and to see the value of this program and how it is changing over time."* – Senior Management Team member

The program's output and learner, client/family outcomes painted a clear understanding of the value of an integrated program (1d) which, in turn, enhanced the organization's knowledge of and support for integrated programming (1e). This impact pathway was later validated by program stakeholders.

**Figure 1**

*Theory of Impact*




The second PIP (2a) articulated how the program worked to optimize the delivery of personalized, meaningful, and timely care for patients and families living with concussion by students as part of their clinical education program. The underlying mechanisms for this program impact can be traced to the program's emphasis on enabling learners to work directly with clients in a leadership capacity (2a). As a result, the young clients interviewed describe their relationship with learners as peers (2b) which fostered a reciprocal learning relationship that was identified also by learners (2c).

*"Because I am in grade twelve, it was beneficial for me because I was able to connect with the students and talk about university and they told me all these stories. So there was a connection that I may not have developed and a comfortability I may not have had if it was just with the doctors."* – OnTrack client

This, in turn, enabled interprofessional goal setting with the patient (2d) and empowered clients to direct their own care with confidence (2e) thus contributing to meaningful and timely care for clients and families.

*"I would say the most significant impact [from the On TRACK program] would probably be the tools that helped my son which were the visualization tools and the confirmation that he was doing everything he needed to do*." – OnTrack parent

Furthermore, the impact of this reciprocal learning relationship enabled flexible/individual programming to continue which enhanced the organization's performance as a learning organization (Senge, 1990).

The third PIP (PIP #3a) describes how the program worked to enable learners to view themselves as being better prepared to work in the health care system. Supported by information in both interviews and learner experience surveys, students' ability to work directly with patients in an autonomous (3a) and yet collaborative way improved their confidence (3b) to enter the workforce as an independent practitioner who can work collaboratively with both patients and peers (3d).

*I'm very shy and I used to observe in a lot of placements, and just sit on the sideline and watch my preceptors do the work. I had a rapport with the supervisors here. They trusted me and that trust that I could go out and know what I'm doing helped me gain that confidence*. – OnTrack student

Learners also indicated that their ability to work collaboratively contributed to meaningful care to the clients of OnTrack-Concussion (PIP#2). The other activity that contributed to their feeling more "system ready" was their engagement with the clients who participated in research protocols (3c). The learners described that they had an increased appreciation for the role of research in client care (3e) which they felt would be valuable as practicing health professionals.

*"I feel like they (clients and families) got a lot of access to care and information, monitoring, careful progression, which is something that they may not have been used to. It's a very nice thing to see how they were positively surprised with how we addressed their problems. I think it was nice to see how helpful the information was so it was easy from my perspective, knowing that the content I was giving to them was research-backed and very practical."* – OnTrack student

## Discussion

To our knowledge, this is the first inter-professional student-led clinic program that incorporates clinical education with intervention research, the first to work with a pediatric concussion population within an academic rehabilitation hospital setting and the first to articulate a program impact theory that includes impacts on individuals (students, clients/families) and the organization. Three PIPs were identified that articulate the program's theory of impact: 1) Clear message of vision/integration; 2) Enabling students to work directly with clients and 3) Enabling students to work autonomously. In this discussion, we offer our perspectives about factors that contribute to the program impact pathways, and our thoughts about supervision in interprofessional student led clinics.

From an organizational perspective, it is clear from the theory of impact that establishing a clear message and vision was important to senior leaders within the organization (PIP 1a). Clear communication about this vision and program outputs enabled senior leaders to understand the value of the program within and beyond the organization. Engaging multiple voices within the system, as underpinned by collaborative change leadership, was important as a means of enabling this program pathway (Raelin, 2003). Occupational therapy leadership was key in facilitating this process by ensuring clear messaging was clearly and collaboratively designed and communicated to senior leaders by involving students and clients as much as possible in this process.

The second PIP, enabling students to work directly with clients, is in line with other reports of the student experience in student-led clinics (e.g., Kent et al., 2016; Haggarty & Dalcin, 2014). However, our findings extend the understanding of the importance of enabling students to work directly with clients in this type of program by elucidating the development of a special therapeutic relationship between the students and the young clients they serve. Students felt empowered by being able to provide direct care to their clients, while clients felt empowered by the students to be more active participants in their care. This mutual empowerment may be an important feature of student-led clinics that underscores their value and success at the individual level.

Enabling students to work autonomously is the third PIP identified in this study. Student autonomy has been identified as a key theme in supporting student learning in student-led clinics (Ahern & O'Donnell, 2022). Supporting students to work autonomously was inherent in the program design and students were engaged in intentional experiences to enable students to work independently. First, learning with and from other interprofessional students in shared, authentic experiences is a deliberate program design. Learners reported that care was optimized by working with other health professional students, that they felt more confident working as part of an inter-professional team and that learning from other students was worthwhile. Joint education has been identified as an essential enabler for integrated delivery of services (Best, 2017) and offers opportunities for development of improved working relationships, optimal management of challenging situations and recognizing the expertise of professions. As reported by Gilkey and Earp (2006) successful interdisciplinary training requires attention to the environment, collaborative experiences, networking, and reflection. Shared office space, daily huddles to plan and debrief, shared patient assessment and intervention planning are important components of the OnTRACK-Concussion program that promoted successful autonomous learning.

Our results imply that learners felt well supported in the OnTRACK-Concussion program. This is notable as the program supervision style is a significant departure from traditional models of clinical supervision in rehabilitation professions that typically consist of one-to-one learner to preceptor, or two-learners to one preceptor supervision models (Markowski et al., 2021; Rodger et al., 2008). This response is also significant given that OnTRACK-Concussion learners' primary supervisor was an occupational therapist and often not from a shared professional background. This suggests that aspects of clinical education may be facilitated by supervisors that do not have the

same professional background as learners and that inter-professional supervision models may be considered in clinical health professions education. This is an important finding from our work as there is limited literature that describes the role inter-professional supervisors can have in facilitating clinical learning in student-led environments.

Our findings are limited to the organization where the OnTRACK program is situated. How they translate to other student-led clinics or environments in other settings or contexts is not known. While we aimed to explore the views of a wide variety of stakeholders, it is possible that we missed some stakeholders with differing views due to recruitment bias. The broader impact of this program including, the impact outside the organization, and more specific educational outcomes for learners was not captured in this work and would be an area for future study.

**Implications for Occupational Therapy Education**

Occupational therapy leadership contributed to the broad system impact of this program and occupational therapists are well-situated to lead the development and operation of similar clinical education programs. Occupational therapy educators should consider that clinical education in interprofessional student-led clinics can be an important part of fieldwork education for occupational therapy learners through offering experiential learning that promotes leadership and role-emerging opportunities, self-reflection and generalizing knowledge to novel and variable situations, thus preparing system-ready clinicians. The program theory of impact is in alignment with Kolb's (1984) experiential learning theory as it describes the experience of 'doing' and offers flexibility for learners with different learning styles and characteristics. The theory of impact also relates to Bloom's Taxonomy of Learning given the multitude of learning opportunities that can take place (Bloom et al., 1956). Learners are supported to find 'just right' challenges for their individual and collective learning needs through experiences with direct client care, program planning and administration at multiple levels within the organization. Finally, occupational therapists are well positioned to provide supervision to interprofessional students in student-led clinics. Other health professionals may also be able to provide interprofessional supervision if this is within their scope of practice.

## Conclusion

The OnTRACK-Concussion program provided learners with meaningful clinical education and had important impacts on individuals (students, staff, clients, and families) as well as the organization. Students collaborated with their peers within a 'real-life' work setting which fostered the development of professional confidence, leadership and viewing oneself as a capable, valued member of a team. Student-led clinics provide opportunities for clinical education that are valued by learners and have important impacts more broadly on the organization in which they are situated and the individuals they serve.

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