Optimizing Staff Training to Improve Adapted Physical Activity Service Provision for Two Community Organizations: Co-Construction and Implementation Evaluation

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Abstract

Community-based adapted physical activity programs, such as Adaptavie and Viomax, can benefit people with disabilities, however there is a lack of evidence-based tools to support kinesiologists' training in those programs. This study aimed to co-create and evaluate the implementation of physical activity training resources to meet the needs of Adaptavie and Viomax for improved staff training. The methodology comprised two phases. Phase 1 involved an integrated knowledge translation approach with a working group (n=8) consisting of staff, kinesiologists from Adaptavie and Viomax, and researchers. Four online meetings were conducted to discuss needs, co-create training modules, and assess usability. Phase 2 employed a pre-post quasi-experimental design to evaluate changes in capability, opportunity, and motivation of kinesiologists (n=14) after completing the training modules. Standardized mock client assessments and participant ratings of module feasibility were employed. The working group meetings generated 59 ideas, leading to the formation of 19 sub-content ideas from two main themes: training in motivational interviewing and behaviour change techniques, and optimizing adapted physical activity prescription. Nine online training modules were created using Articulate, Rise 360, and framed with Kolb's theory of experiential learning. Usability feedback confirmed that the modules were usable, acceptable, and met the expressed needs of kinesiologists. In Phase 2, medium to large effects were observed in participants' capability (Hedge’s g= 0.67-1.19) across 8/9 modules, opportunity (Hedge’s g= 0.77-1.38) across all modules, and motivation (Hedge’s g= 0.58-1.03) across 6/9 modules. All nine modules were rated as feasible. When opportunities presented themselves, 77.78% to 100 % of participants used the five behaviour change techniques in the mock client session. All participants had successful attempts to apply the action planning and problem solving behaviour change

techniques. Participants demonstrated good use of technical and relational motivational interviewing strategies, complex reflections, and favored adherent motivational interviewing language over non-adherent language. The findings indicate that training kinesiologists is feasible, effective, and has the potential to enhance adapted physical activity programs for individuals with disabilities.

Keywords: adapted physical activity, kinesiologists, training, community-based organizations, behaviour change, motivational interviewing.

Résumé

Les programmes d'activité physique adaptée en milieu communautaire, tels qu'Adaptavie et Viomax, peuvent bénéficier les personnes ayant un handicap. Cependant, il existe un manque d'outils basés sur des preuves pour soutenir la formation des kinésiologues dans ces programmes. Cette étude visait à co-créer et évaluer la mise en œuvre de modules de formation afin de répondre aux besoins d'Adaptavie et Viomax pour améliorer la formation du personnel. La méthodologie comprenait deux phases. La phase 1 a suivi une approche des principes directeurs de l'application des connaissances intégrée et comprenait un groupe de travail (n=8), composé de personnel, de kinésiologues d'Adaptavie/Viomax et de chercheurs. Quatre réunions en ligne ont été organisées pour discuter les besoins, co-créer et confirmer l'utilisabilité des modules. La phase 2 a suivi une conception quasi-expérimentale avant-après pour évaluer les changements dans la capacité, l'opportunité et la motivation des kinésiologues (n=14) après avoir terminé les modules de formation. Des évaluations standardisées avec un client fictif et des évaluations de la faisabilité des modules par les participants ont été utilisées. Les réunions du groupe de travail ont généré 59 idées, concernant les besoins des organisations, qui ont été regroupées en 19 idées de sous-contenus à partir de deux thèmes: la formation à l'entretien motivationnel et aux techniques de changement de comportement, et l'optimisation de la prescription d'activité physique adaptée. Neuf modules de formation en ligne ont été créés à l'aide d'Articulate, Rise 360, et encadrés par la théorie de l'apprentissage expérientiel de Kolb. Le processus de retour d'utilisabilité a révélé que les modules de formation étaient utilisables, acceptables et répondaient aux besoins exprimés pour la formation des kinésiologues. Dans la phase 2, des effets de taille moyenne à grande ont été observés dans la capacité des participants (Hedge's g = 0,67-1,19) pour 8/9 modules, l'opportunité (Hedge's g = 0,77-1,38) pour tous les modules et la motivation (Hedge's g = 0,58-

1,03) pour 6/9 modules. Les neuf modules ont été jugés réalisables. Lorsque des opportunités se sont présentées, de 77,78 % à 100 % des participants ont utilisé les cinq techniques de changement de comportement lors de la séance avec le client fictif. Tous les participants ont réussi à appliquer les techniques d'élaboration de plans d'action et de résolution de problèmes. Les participants ont fait preuve d'une bonne utilisation de stratégies techniques et relationnelles d'entretien motivationnel, de réflexions complexes et ont préféré utiliser un langage d'entretien motivationnel conforme plutôt qu'un langage non conforme. Les résultats indiquent que la formation des kinésiologues est réalisable, efficace et a le potentiel d'améliorer les programmes d'activité physique adaptée pour les personnes en situation de handicap.

Mots clés: Activité physique adaptée, kinésiologues, formation, organisations communautaires, changement de comportement, entretien motivationnel

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Contribution of Authors

N. Saadawi is the primary author of all chapters and carried out the data collection, data analyses, and writing of the thesis.

Dr. S.N. Sweet, Associate Professor, Department of Kinesiology and Physical Education, McGill University, and the candidate's supervisor, was actively involved in every step and decision made regarding the research study and the completion of all chapters of the thesis and was a co-principal investigator on the funding for this project.

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Chapter 1: Introduction

Worldwide, over one billion people live with a disability (WHO, 2011), from which 6.2 million are Canadians over the age of 15 (Morris et al., 2017). The International Classification of Functioning, Disability and Health defines disability as a person's difficulty in functioning due to the presence of one, or several of the following: impairment, activity limitation, and participation restriction. The most common disabilities in Canada are pain-related (14.5% of people with disabilities; i.e., chronic musculoskeletal and neuropathic pain), flexibility (10%; i.e., difficulty reaching in one or several directions), mobility (9.6%; i.e., difficulty walking or climbing stairs) and mental health-related (7.2%; i.e., anxiety and depression; (Morris et al., 2017).

The development of health conditions and chronic disease is prevalent among individuals with disabilities. In fact, the added stressors and limitations that accompany a disability are commonly associated with secondary complications such as depression (WHO, 2011). Adults with disabilities are also at higher risk of injury and the development of non-communicable chronic diseases when compared to the general population (Martin Ginis et al., 2021). Chronic disease and health complication among people with disabilities are often due to higher rates of health compromising behaviours, such as physical inactivity, and smoking (WHO, 2011). The behavioural risk factors are often a result of inequity experiences including low health-care accessibility and increased barriers to receiving disease prevention and health promotion services (WHO, 2011). In addition, the unmet societal, professional, and socio-environmental needs contribute to health inequities and lower access to services for people with disabilities, affecting their physical and mental health, which in turn reduces their quality of life (Mitchell et al., 2022). Indeed, the disadvantages that people with disabilities face are due to the social structures of

society that maintains inequity and in turn gives rise to unearned privilege to people without disabilities (Nixon, 2019).

Several inequities are present today that provide privileges to ambulatory individuals and disadvantages to people with disabilities (Nixon, 2019). However, there is an intensified need to address the inequities and limitations that people with disabilities experience and find solutions to reduce the accompanying health conditions (Martin Ginis et al., 2021). In fact, the United Nations aims to address these inequities by including people with disabilities in the Sustainable Development Goals (SDGs), which aim to protect the rights of people with disabilities by promoting well-being and healthy living for all (UN Department of Economic and Social Affairs, 2023). Addressing the inequities is especially important because non-communicable chronic conditions are the number one cause of death worldwide, and often require long-term treatment and care (Martin Ginis et al., 2021).

In addition, people with disabilities are limited in their participation in the community, due to reduced access to technologies, transportation, buildings, equipment, and programs (Bonnell et al., 2021). These limitations add to the burden that chronic disease already poses on this population (Bonnell et al., 2021). Programs that are especially inaccessible to this population are disease prevention and health promotion services, such as physical activity programs (Martin Ginis et al., 2021). Accessibility to physical activity programs is a result of the interactions between multiple systems, such as, physical activity opportunities, social interactions, infrastructure and policy and public services (Bonnell et al., 2021). Reduced accessibility to these types of programs is problematic considering the fact that promotion of well-being and health for people with disabilities can be achieved through physical activity (Martin Ginis et al., 2021). In fact, physical activity programs for people with physical disabilities can be delivered

by community-based organizations (Sweet et al., 2021). Community-based physical activity programs provide numerous benefits, including improved participation, engagement, and health for people with physical disabilities. Specifically, they have been found to increase social participation, maintain physical health, and increase self-esteem (Sweet et al., 2021). These programs are also more effective than standard care in prevention functional decline for people with chronic conditions (Desveaux et al., 2014). Community-based physical activity programs also provide people with disabilities access to professionals, such as kinesiologists, who have knowledge and have been trained to meet the needs of individuals with different disabilities. Despite the benefits of physical activity, physical activity participation among people with disabilities is low, with estimates suggesting that they are 16-62% less likely to meet physical activity recommendations than people without disabilities (Martin Ginis et al., 2021).

Physical activity participation for people with physical disabilities is influenced by a range of barriers and facilitators at different levels, including intrapersonal, interpersonal, institutional, community, and policy levels (Martin Ginis et al., 2016). Interventions have been developed to address interpersonal and intrapersonal barriers, such as social support and body functions (Dinwoodie et al., 2022). However, institutional barriers and the need of resources, such as a lack of disability-specific knowledge among professionals, and lack of involvement of end-users in intervention design (knowledge translation) often remain a challenge in these interventions. (Dinwoodie et al., 2022; Martin Ginis et al., 2016; Martin Ginis et al., 2021). People with physical disabilities have expressed the importance of improving professionals' knowledge and skills in addressing their individual needs, and effectively transfer physical activity information (Bonnell et al., 2021). Professionals' skills acquired through training interventions are at risk of long-term loss, emphasizing the need for additional workplace support

(Barwick et al., 2012; Tomasone et al., 2014). Implementation of standardized training programs in community-based organizations is crucial to promote physical activity among individuals with physical disabilities (Giouridis et al., 2021).

In line with the need for training professionals, especially kinesiologists, who are key staff at Adaptavie and Viomax, two community-based organizations offering adapted physical activity programs for people with disabilities noticed significant gaps in their programs. These gaps include a need to train their kinesiologists to provide their clients adapted physical activity prescription and knowledge in behaviour change techniques. In fact, a recent study among Adaptavie and Viomax concluded that kinesiologists need and want evidence-based information and training to perform their current roles (de Serres-Lafontaine et al., 2021; Herbison et al., 2023). Therefore, understanding the specific needs and behaviours of kinesiologists is required to enhance their professional practice in community-based organizations.

1.1 Purpose of the Study

The purpose of this study was to co-create and evaluate the implementation of physical activity training resources to meet the needs of Adaptavie and Viomax for improved staff training. This research is guided by the following research questions: What are the needs of staff at Adaptavie and Viomax, to inform the design and content of training modules? What is the effect of the training modules on staff's capability, opportunity, and motivation to promote physical activity among people with disabilities?

Chapter 2: Literature Review

Physical activity is defined as different types of bodily movements, produced by skeletal muscles, resulting in energy expenditure (Caspersen et al., 1985). Physical activity can be performed in various contexts including, but not limited to, leisure-time, transportation, household activities, sports, and planned exercise, which provide varying levels of health benefits (Caspersen et al., 1985). A subcategory of physical activity is exercise, which involves a structured set of movements done by an individual to improve or maintain their physical fitness (Caspersen et al., 1985).

As we adopt the ideology that having a disability is a natural variation in the human condition, people with disabilities have potential to achieve high levels of physical activity and quality of life (Nixon, 2019). To support the needs of people with disabilities and for them to achieve high levels of physical activity, certain adaptations must be made to conventional physical activity programs (Steadward et al., 2003). Adapted physical activity or APA is the term used to describe the adaptations made to physical activity to ensure equitable opportunities for people with disabilities. APA is broadly defined as a "cross disciplinary body of knowledge directed toward identification and solution of psychomotor problems throughout the lifespan" (Steadward et al., 2003 p. 19). The adaptations increase the choice and opportunities for physical activity practice as well as enjoyment for individuals who experience movement difficulty (i.e., physical disabilities). For example, a modification can be made to fitness tests, the selection and use of exercise equipment, or adjustment of goals and instruction (Steadward et al., 2003). APA is not only present in physical education and sports, but in many other disciplines such as recreation, creative arts, nutrition, medicine, and rehabilitation (Steadward et al., 2003).

The physical activity guidelines put out by the World Health Organization indicate that adults with disabilities should participate in at least 150-300 minutes of moderate-intensity aerobic physical activities throughout the week (WHO, 2011). These minutes can also be substituted with at least 75-150 minutes of vigorous-intensity aerobic physical activity, or a combination of both. Aerobic physical activity includes activities such as cycling, walking, and swimming. WHO also recommends the inclusion of muscle-strengthening activities, such as resistance training involving all major muscle groups at least 2 times per week. Strengthening muscle groups can include movements done with bodyweights, free-weights, or other types of activities like carrying objects, during one's occupation. The number of hours recommended by the physical activity guidelines can be increased to further reduce the effects of high levels of inactivity on the health of individuals with disabilities (WHO, 2011). Although these recommendations can be applied to all adults with disabilities, certain adjustments are needed to accommodate for specific health risks, limitation, exercise preference and capacity (Martin Ginis et al., 2018). In fact, the physical activity guidelines developed by WHO for people with disabilities are primarily based on data from individuals without disabilities (Martin Ginis et al., 2022). For instance, people with spinal cord injury face potential risks (i.e., skin breakdown and upper-body overuse injuries) that may not be considered in the recommended 150 min/week guideline. Thus, people with spinal cord injury benefit from physical activity levels that are below the WHO recommendations. People with disabilities may not receive the same benefits from physical activity due to their attenuated cardiometabolic responses (Martin Ginis et al., 2022; Martin Ginis et al., 2018). Similar differences in recommended physical activity frequency and duration are also found for other types of physical disabilities, such as with multiple sclerosis (Latimer-Cheung et al., 2013).

2.1 Physical Activity Levels of People with Disabilities

Many populations with disabilities are excluded from the epidemiological data of physical activity participation due to the low priority of physical activity measurements within current population-level datasets (Martin Ginis et al., 2021). However, from the available data in high-income countries, it is estimated that people living with a disability are 16-62% less likely to meet physical activity recommendations than people without disabilities (Martin Ginis et al., 2021). A study looking at people with spinal cord injury reported that only 12% were meeting combined aerobic and resistance SCI-specific physical activity guidelines. Approximately 74% and 44% of adults with spinal cord injury reported no minutes of resistance and aerobic physical activity, respectively (Rocchi et al., 2017). Of concern, the efforts of people with physical disabilities to become physically active and maintain an active lifestyle are often not sustainable, due to a high number of barriers that lead to dropout (Martin Ginis et al., 2016).

Physical inactivity causes up to 10% of the major non-communicable diseases worldwide, and 9% of premature mortality (Lee et al., 2012). Non-communicable diseases can be preventable with physical activity, however, when left unchecked these diseases often lead to other consequences and the need for long-term treatment and care. When compared to people without a disability, people living with a disability are at higher risk of developing health problems related to physical inactivity (Martin Ginis et al., 2021). In fact, individuals with disabilities report higher rates of chronic conditions than people without disabilities, averaging three conditions compared to one, respectively (McColl et al., 2010). Nonetheless, people with disabilities benefit from being physically active.

2.2 Physical Activity Benefits

Among people with disabilities, physical activity improves many aspects of physical health such as cardiorespiratory/muscular fitness, body mass/composition, bone health, and cognitive functions (Martin Ginis et al., 2021). Psychological and emotional benefits of physical activity are equally as important for people with disabilities (Martin Ginis et al., 2021). In fact, physical activity is associated with reductions in anxiety and depression severity over time in people with physical disabilities (Battalio et al., 2020). Moreover, people with disabilities who are physically active have reported improved sense of personal accomplishment (Anderson & Heyne, 2010). Maintaining an active lifestyle can also lead to social benefits for individuals with disabilities through friendships and creation of positive experiences (Anderson & Heyne, 2010). Overall, the positive effects of physical, psychological, and social benefits interplay to improve the quality of life of an individual (Keramat et al., 2022). Specifically, these authors utilized data from 2002 to 2020 from the nationally representative Household, Income and Labour Dynamics in Australia (HILDA) survey to measure changes in health-related quality of life. The health-related quality of life survey reported participants' disability status and physical activity levels, which were then analyzed with their health-related quality of life (Keramat et al., 2022). Although people with disabilities scored lower in their health-related quality of life than people without disabilities, results indicated that physical activity has a positive effect on health-related quality of life. Hence, people with disabilities who complete the recommended levels of physical activity have a much higher health-related quality of life than those who do not achieve the recommendations (Keramat et al., 2022). These findings indicate a heightened importance for people with disabilities to engage in physical activity for the improvement of their health-related quality of life (Keramat et al., 2022).

Improving the participation, engagement, and health of people with physical disabilities has been a significant outcome observed in physical activity programs within community-based organization (Sweet et al., 2021). For instance, a 4-month longitudinal study found that participants with physical disabilities reported engaging in more physical activity after joining the leisure-time physical activity program offered at their community-based organization (Sweet et al., 2021). Moreover, participation in activities relating to the aspects of the home, family, and maintenance of physical health as well as self-esteem all improved upon joining the program (Sweet et al., 2021). Other physical activity programs (e.g., wheelchair skills) have been administered for people with spinal cord injury (Best et al., 2017). Results of multiple randomized control trials examining the effectiveness of these programs demonstrate improved wheelchair self-efficacy, skills capacity, and participation in meaningful activities (Best et al., 2017). Outside of the disability population, a systematic review found that physical activity programs within the community significantly reduced cancer-related fatigue (Wagoner et al., 2021). In addition, community-based programs are more effective in prevention of functional decline than standard care for people with chronic conditions (Desveaux et al., 2014).

The promotion of physical activity within community-based organizations can be enhanced when elements of accessibility's interacting factors (i.e., social interactions, infrastructures, policy, and public services) are addressed (Bonnell et al., 2021). Although accessibility issues and barriers to physical activity opportunities remain a problem at different community-based organizations, several actionable solutions have been recently co-developed (Herbison et al., 2023). These solutions highlight the valued role that community-based organizations provide to the community of people with physical disabilities, staff and healthcare professionals working at those centers. However, the outcomes related to daily and social

activities as well as quality of life at community-based organizations are not commonly assessed in research contexts (Best et al., 2017).

2.3 Understanding Physical Activity Barriers and Facilitators

Although physical activity results in positive benefits, it is important to recognize that people with physical disabilities face and experience barriers and facilitators to physical activity participation (Martin Ginis et al., 2016). These barriers and facilitators can be at intrapersonal (i.e. psychological, body functions and structures), interpersonal (i.e. social support, attitudes, and social processes), institutional (i.e. disability specific knowledge of professionals within institutions/organizations, rehabilitation processes, building accessibility, and program factors), community (i.e. equipment, education, climate, and relationships among groups and organizations), and/or policy levels (i.e. funding for programs and transportation services; Martin Ginis et al., 2016). At the interpersonal level, psychological factors can influence one's behaviour and act as either a facilitator or a barrier to physical activity participation. Barriers in psychological factors include negative affect and emotions, attitudes/beliefs/perceived benefits, self-perceptions, personality characteristics and knowledge/use of behaviour change strategies (Martin Ginis et al., 2016).

At the community level, professionals can provide people with physical disabilities with more information to reduce physical activity barriers. For example, information regarding the transition from rehabilitation to community-based physical activity programs, which can be done by creating stronger relationships between rehabilitation facilitates and community-based physical activity programs (Martin Ginis et al., 2016). Other information that can be disseminated at the community level pertains to staying active during poor weather conditions. For individuals with physical disabilities, it's valuable to offer guidance on alternative forms of

physical activities that can be perused when the weather is unfavorable. Moreover, at the policy level, funding for programs and training, and transportation were the main barriers. For example, it would be important to create policies that enhance physical activity training programs and resources for professionals who support people with physical disabilities (Martin Ginis et al., 2016).

Aside from the importance of understanding the barriers to physical activity among people with physical disabilities, there has been a call to move research from describing (e.g., listing the barriers) to testing and implementing interventions that address those barriers (Martin Ginis et al., 2016). For instance, Dinwoodie et al. (2022) provide insight into the important areas to target when designing programs to diminish barriers to physical activity programs for people with physical disabilities (Dinwoodie et al., 2022). The authors examined the changes of physical activity barriers relating to the Social Ecological Model of adults with spinal cord injury following a physical activity counselling intervention (Dinwoodie et al., 2022). Dinwoodie et al. (2022) demonstrated that, as the intervention progressed, participants reported more institutional, community and policy level barriers when intrapersonal barriers were met. However, the intervention showed decreases in barriers at the intrapersonal level (i.e., lack of confidence and motivation, and feelings of pain or exhaustion). The decrease in intrapersonal barriers was found to be due to the use of behaviour change techniques (Dinwoodie et al., 2022).

Behaviour change techniques (BCTs) are defined as an “active ingredient” of an intervention aimed to change the mechanisms that control behaviours. They are skills that a person can learn to facilitate behaviour change (Michie et al., 2013) BCTs can be used in a variety of ways, individually or in combination. These techniques have been used in many contexts, such as interventions to help with healthy eating, support smoking cessation, changing

professional behaviour and increasing physical activity (Michie et al., 2013). Recently, 123 self-enactable BCTs (i.e., the adoption and engagement of BCTs by an individual) were identified (Hankonen, 2020; Knittle et al., 2020). Some common examples used in physical activity contexts include, self-monitoring, goal setting and action planning (Knittle et al., 2020). Studies have shown that physical activity levels increase when effective BCTs are present in an intervention (Michie et al., 2013).

A meta-analysis of interventions in people with physical disabilities tested the effectiveness of 24 studies while examining BCTs (Ma & Martin Ginis, 2018). The authors found that interventions had a small-to-medium effect size on physical activity behaviour immediately after and 6-months post interventions. Moreover, interventions that yielded a significantly larger effect size applied and tested theory (i.e., social cognitive theory, the transtheoretical model, theory of planned behaviour, health action process approach model, and the relapse prevention model) and BCTs into the intervention. Specifically, BCTs, such as self-monitoring, problem solving, monitoring by others with feedback, and instruction on how to perform the behaviour, were most often implemented into the reviewed physical activity interventions (Ma & Martin Ginis, 2018). For instance, interventions that used problem solving were found to have a larger effect size than ones that did not. Similarly, other BCTs such as, review behaviour goal(s), and information about health consequences, consistently show improvements in physical activity outcomes among people with physical disabilities (Tomasone, Flood, et al., 2018). Implementing problem solving and instructions on how to use a BCT is especially significant for the disability population who experience over 200 barriers to physical activity.

Moreover, using theory in interventions, can help researchers identify mechanisms of change that are unique to the challenges experienced by people with physical disabilities (Ma & Martin Ginis, 2018). The aforementioned studies highlight the importance of theory driven research for physical activity behaviour change. Researchers and other practitioners who provide direct support to people with physical disabilities may benefit from obtaining a comprehensive understanding of how to use BCTs tailored for people with physical disabilities. However, despite the importance of improving disability-specific knowledge for practitioners, many interventions, including the ones mentioned above, tend to primarily concentrate on overcoming intrapersonal and interpersonal barriers to promote physical activity participation among people with physical disabilities (Martin Ginis et al., 2016).

2.4 Institutional Barriers to Physical Activity

Eliminating institutional barriers (i.e., lack of disability-specific knowledge related to physical activity inclusivity within organization) is important for improving physical activity participation (Martin Ginis et al., 2016). For instance, a professional's understanding of their client's needs helps eliminate such barriers. Martin Ginis et al. (2016) described that, at the institutional level, the knowledge that health professionals and service providers hold is often a predictor of physical activity participation of people with physical disabilities. Professionals having disability-specific knowledge, plays a role in targeting the institutional level of the Social Ecological Model, in turn promoting physical activity (Herbison et al., 2023; Martin Ginis et al., 2016). Furthermore, inadequate training among staff often acts as a limiting factor for physical activity accessibility for people with physical disabilities (Bonnell et al., 2021). There remains a pressing need for programs to improve the skills, knowledge, and resources for clients with physical disabilities. This need arises from the minimal physical activity training that health care

professionals receive, as well as the lack of involvement of end-users in the design, testing, and implementation of interventions (Ma & Martin Ginis, 2018; Martin Ginis et al., 2016). Involving end-users in intervention design is important as it ensures proper knowledge translation (Martin Ginis et al., 2021).

Research partnerships, such as integrated knowledge translation (IKT), involve collaboration between researchers and research users, serving as a promising strategy for bridging the gap between research and practice. This approach ensures that research has practical implications and benefits for relevant individuals or organizations, as research users actively participate as partners throughout the entire research process (Gainforth et al., 2021). As disability communities advocate for more inclusion, the IKT approach is a strategy that supports and amplifies voices and promote participation in research. The IKT guiding principles were developed in collaboration with SCI researchers, research users, and funders to ensure meaningful research partnerships. The integration of IKT principles is critical in designing and implementing effective physical activity interventions for people with physical disabilities (Gainforth et al., 2021). Although researchers have made significant strides in identifying barriers and facilitators of physical activity and effective components of interventions, lack of end-user involvement remains a significant limitation. To ensure proper knowledge translation, end-users must be involved in intervention design, testing, and implementation. The IKT guiding principles offer a solution to bridge the gap between research theory and practice. The implementation of IKT principles has been shown to enhance research relevance by promoting engagement, shared decision-making, and direct links with people with physical disabilities (Gainforth et al., 2021). Therefore, this research will incorporate IKT principles to ensure that physical activity interventions for people with disabilities are more effective and better aligned

with end-user needs. IKT research has been shown to enhance the relevance of research findings (Cassidy et al., 2021). Specifically, by supporting partnerships' engagement and shared decision making in useable research.

The IKT principles are crucial in addressing the identified gap in knowledge translation and improving physical activity participation for individuals with physical disabilities (Giouridis et al., 2021). Researchers have made notable progress in identifying barriers, and facilitators of physical activity, and effective components of interventions, yet the absence of end-user involvement remains a limitation (Gainforth et al., 2021). One way to address this gap is to disseminate and implement those interventions to non-research settings which include but are not limited to, healthcare professionals, policymakers, recreation programs and community-based organizations (Giouridis et al., 2021). Community-based organizations are well positioned to provide programs and services to its members due to the connections to the groups that they serve. Community-based organizations can also have a role in strengthening the healthcare of the public by collaborating with health-system decision-makers and researchers that develop policies, programs, and services (Wilson et al., 2012). Several strategies have been identified for community programs to increase access to physical activity opportunities for people with disabilities. For example, fostering social support and increasing access to general and personalized professional support (i.e., social opportunities and staff impact) (Bonnell et al., 2021; Herbison et al., 2023). However, the lack of interventions and explorations in knowledge translation and the lack of professional's disability-specific knowledge related to physical activity (i.e., institutional barrier) sheds light on the need for training of staff delivering the physical activity programs in community-based organizations (Bonnell et al., 2021; Herbison et al., 2023).

2.5 Training Needs for Kinesiologists

Standardized training is beneficial for both the staff and the clientele of community-based programs for people with physical disabilities (Bonnell et al., 2021). People with physical disabilities expressed the importance of the staff's knowledge in APA and in addressing their person-centered needs when interacting at community-based organizations (Bonnell et al., 2021). Training staff ensures that information about services and external resources related to physical activity opportunities are up to date and properly transferred to members of community-based organizations (Herbison et al., 2023). Proper training may improve service use and, in turn, the physical activity engagement of people with physical disabilities (Herbison et al., 2023). Increasing communication among staff, people with physical disabilities and support organizations can lead to improved resources and physical activity opportunities (Herbison et al., 2023). However, there is a lack of APA training and educational tools for staff (i.e., kinesiologists) at community organizations (Bonnell et al., 2021; Herbison et al., 2023). Incorporating kinesiologist training is important as it increases the opportunity for improved skills and knowledge and can create welcoming physical activity environments for individuals with physical disabilities (Bonnell et al., 2021; Giouridis et al., 2021).

Kinesiologists are healthcare professionals that have undergone a university degree and are specialized in physical activity. They use their knowledge in physical activity for prevention, assessment, programming, treatment, and performance. Kinesiologists work with a range of individuals and health-related backgrounds, including those with/without a disability and/or chronic disease. Their competencies include identifying and evaluating their client's goals and needs, building a specific intervention plan, and critically maintaining its effectiveness and progression, while also knowing and respecting the ethical standards of the profession. In

Quebec, kinesiologists must pass a professional examination, and annually receive hours of continuing education to be accredited by the Quebec Kinesiology Federation (Fédération des Kinésiologues du Quebec - FKQ). Unlike in Ontario (College of Kinesiologists of Ontario; CKO), and Nova Scotia (College of Kinesiologists of Nova Scotia; CKNS), the FKQ is not regulated by a professional order, instead, it is an organization that represents kinesiologists in the province of Quebec. Kinesiologists are also known as exercise or physical activity professionals or trainers, and form part of the broader group of healthcare professionals responsible for promoting physical activity to improve health outcomes.

The research identifying kinesiologists who have training in behaviour change refer to university-level courses (Gagnon et al., 2018). In health promotion studies, there is more emphasis on improving the physical activity prescription skills of physicians, rather than training and strengthening the physical activity professional's skills (Zenko & Ekkekakis, 2015). This increased emphasis is due to the lack of physical activity curricula offered to other health professionals; however, the authors identify the importance of continued training for physical activity professionals (Zenko & Ekkekakis, 2015). Evidently, there is a distinct theory to practice gap for kinesiologists. Kinesiologists face this gap due to the lack of applied and interdisciplinary research (Knudson, 2005). Few schools and professional practices allow kinesiologists to have an integration of both experience and research, due to lack of access to reviews and latest research in professional settings (Knudson, 2005). Thus, implementing evidence-based training within professional settings, such as community-based organizations will allow for continued professional development among kinesiologists.

There remains a gap in both knowledge and inclusion of physical activity assessment and prescription in practice (Coombes et al., 2021). Zenko and Ekkekakis (2015) found that there is a

need for improvement in physical activity prescription knowledge, as scores on a survey assessing core components of physical activity guidelines were below 50%. These findings conclude that professionals require meaningful opportunities in continuing education to improve knowledge in physical activity prescription and its translation into practice (Zenko & Ekkekakis, 2015). Moreover, Giouridis et al. (2021) conducted a scoping review to identify strategies that health and physical activity professionals use to increase the physical activity behaviour of people with spinal cord injury. The authors also identified the barriers and facilitators of health and physical activity professionals' physical activity promotion to people with spinal cord injury at in-patient and community settings (Giouridis et al., 2021). Their most frequently cited strategies for increased physical activity outcomes included the implementation of promotional materials, motivational interviewing, physical activity counselling, tailoring programs and following up with clients according to their needs (Giouridis et al., 2021). Practical experience, obtaining formal training, access to workshop and to relevant resources were often cited in studies as physical activity promotion factors. However, training professionals frequently involves time and resources, which is one of the most common barriers identified. Other frequent barriers included, limited education, lack of training, difficulty navigating the healthcare system, and absence of relevant materials related to people with spinal cord injury. Clearly, further improvements are needed to limit the barriers in sustaining knowledge and training for health and physical activity professionals for the promotion of physical activity of people with spinal cord injury (Giouridis et al., 2021), to which this need can be assumed to be present among other disability groups.

2.6 Physical Activity Behaviour Change Counselling

Physical activity behaviour change is enhanced when kinesiologists are trained in and use behavioural counselling with their clients (Gagnon et al., 2018). Understanding the person's level of physical activity, their needs, their health background, and motivation is necessary for the professional to prescribe the right physical activity program (Swisher, 2010). A systematic review found that patients who have more interactions with health professionals that provide physical activity counselling have more significant increases in their moderate-level physical activity (approximately a 56 minute increase per week; Goryakin et al., 2018). Nevertheless, for BCTs to be properly received and acted upon by individuals seeking physical activity, it is important for health professionals to successfully deliver the techniques (Knittle et al., 2020). Kinesiologists can elicit the behaviour change process by using a person-centered approach such as motivational interviewing (Miller & Rollnick, 2013).

Motivational interviewing is defined as "a collaborative conversation style for strengthening a person's own motivation and commitment to change" (Miller & Rollnick, 2013, p. 12). Originally developed to assist individuals with substance abuse, motivational interviewing has since been applied to various health behaviours. This approach is client-centered and was created through clinical practice (Gagnon et al., 2018). Nonetheless, there is a lack of person-centered approach application such as motivational interviewing in physical activity programs, (Bonnell et al., 2021; Malone et al., 2012), which prevents an individual from understanding facilitators and limiting barriers to their physical activity level (Martin Ginis et al., 2016). There is evidently a need for improved health professionals' training in light of the lack of interventions targeting institutional barriers. Numerous attempts have been made to develop physical activity programs, and personalized research interventions. Nonetheless, the lack of

translation and inadequate training of kinesiologists limits the effective application of these programs.

In fact, there is a call to shift the focus from solely centring on intervention content to fostering an interpersonal style to promote behaviour change (Hagger & Hardcastle, 2014). Interpersonal style focuses on the way an intervention is presented to the target population and encompasses approaches such as the type of language used for delivering interventions, autonomy support and motivational interviewing (Hagger & Hardcastle, 2014). Motivational interviewing adopts several techniques that are identified in the BCT taxonomy (Hagger & Hardcastle, 2014). For example, Hardcastle et al. (2017) identified that almost half of motivational interviewing techniques overlap with BCTs. A total of 16 techniques overlaps, some examples include developing a change plan, review outcome goal, value explorations and identify past success and strengths. Given the overlap, BCTs and motivational interviewing can be combined by professionals to maximize effectiveness of behaviour change interventions (Hardcastle et al., 2017). Focusing on the individual-level (i.e., establishing a person-centered approach using motivational interviewing) may be more effective for changing health-related behaviours than passively interacting with participants (Hankonen, 2020; Knittle et al., 2020). One reason for its effectiveness is that individuals can identify and actively managing their behaviour change processes, rather than relying on external sources (Hankonen, 2020).

2.7 Training of Trainers

Training health professionals on motivational interviewing skills has been shown to be feasible and effective to improve knowledge transfer into practice (Barwick et al., 2012; Madson et al., 2009). A review was conducted on the current focus, methods, length and outcomes of motivational interviewing training for various health professionals (Madson et al., 2009). From

the 28 studies identified, most of the trainings' length varied between 9 and 16 hours, and other studies included follow-up sessions for ongoing training. The methods of motivational interviewing training that were most frequently used were a combination of didactic instruction of material and experiential learning (i.e., role plays, standard patients, and modeling activities; Madson et al., 2009). The outcomes from the training revealed increases in participants' confidence, knowledge, interest, and intention in using motivational interviewing, as well as integration of this skill into practice (Madson et al., 2009). In addition 17 out of 22 studies identified by Barwick et al. (2012) revealed significant professional behaviour change relative to skills in motivational interviewing. Further, a meta-analysis examined the effects of motivational interviewing training for clinicians, and found that most practitioners who received training showed improvement in their motivational interviewing proficiency (De Roten et al., 2013). Compared to those who were not trained, the trained groups showed specific improvements in behaviours, adherence and empathy related to motivational interviewing skills (De Roten et al., 2013). In relation to health professionals in the field of physical activity and eating behaviour change, Edwards et al. (2015) evaluated if brief motivational interviewing training improved their participants' knowledge, skills, and confidence. The brief motivational interviewing intervention produced measurable gains for health professionals to counsel their patients in physical activity and eating behaviour change. In addition, improvements in knowledge and confidence were sustained 6-months post-training (Edwards et al., 2015). Finally, a study examined the feasibility of training peers in brief action planning amongst peers with spinal cord injury who were less confident in promoting physical activity to mentees (Gainforth et al., 2015). Results of this training revealed increases in listening and motivational interviewing skills, satisfaction, and perceived behavioural control, thus supporting its feasibility (Gainforth et al.,

2015). The abovementioned studies highlight that training in motivational interviewing and a person-centered approach can result in positive outcomes for health professionals, including disability settings.

In a study by Arbour-Nicitopoulos et al. (2014), experienced physical activity counsellors trained in behaviour change theory and motivational interviewing effectively increased their clients' intention to be physically active. The use of appropriate BCTs by counsellors further enhanced this intention. Additionally, evidence and theory-based phone counselling sessions were found to be important in promoting physical activity behaviour among adults with spinal cord injury (Tomasone, Arbour-Nicitopoulos, et al., 2018). The implementation of the Get in Motion program, which included teaching BCTs such as goal setting and planning, resulted in improved physical activity levels among adults with spinal cord injury, particularly in moderate-to-vigorous strength training and total leisure time physical activity (Tomasone, Arbour-Nicitopoulos, et al., 2018).

Additional studies have shown the utility of training health professionals for increasing discussions and prescription in physical activity. Tomasone et al. (2014) tested theory and evidence-based seminars for health professionals. The seminars were based on the “Changing Minds, Changing Lives” nationwide educational interventions offered by the Canadian Paralympic Committee. The seminars were 1-hour in length and were delivered by both a healthcare professional, and a person with physical disability who was physically active. The content of the seminars included evidence-based research and leisure-time physical activity participation statistics for people with and without disabilities. Additionally, curriculum on the importance of health professionals’ influence and strategies to promote physical activity were founded on the theory of planned behaviour. This training demonstrated increased health

professionals' attitudes, subjective norms, perceived behaviour control and intentions to discuss leisure time physical activity with patients with physical disabilities (Tomasone et al., 2014).

Developing evidence-based training resources for community-based physical activity programs for people with disabilities can increase the skills, behaviours, confidence of health professionals. Implementing behaviour change during routine interactions in the workplace with clients can lead to more sustainable impacts. This approach eliminates the need to recruit participants for more formal intervention programs (Lawrence et al., 2016). However, skills learned by professionals within training interventions may be at risk of long-term loss (Madson et al., 2009; Tomasone et al., 2014), which acknowledges a need for additional support in the workplace (Madson et al., 2009). To provide additional support, designing and delivering training to staff at community-based organizations in a standardized approach is important for the promotion of physical activity for people with physical disabilities (Giouridis et al., 2021). However, grounding staff training in educational theories are a helpful and essential tool for evidence-based educational practice (Mukhalalati & Taylor, 2019).

2.8 Educational Framework

Approaching training with an educational framework can facilitate the mode of delivery by the selection of instructional strategies, learning objectives, assessments and evaluations (Mukhalalati & Taylor, 2019). There are several adult learning theories offered in educational psychology. Adult learning theories or andragogy is distinct from pedagogy, as it involves constructing new knowledge on the bases of the learner's existing knowledge and experience (Mukhalalati & Taylor, 2019). Mukhalalati and Taylor (2019) literature review identified a summary of different adult learning theories, one of which focuses on the learner's individual experience, namely instrumental learning theory. Instrumental learning theory can be

subcategorized into behavioural theories, cognitivism, and Kolb's experiential learning theory (Mukhalalati & Taylor, 2019). Coming from an intellectual origin, Kolb's experiential learning emphasizes on the importance of experience during the learning process. Learning can also be viewed as a combination of experience, perception, cognition, and behaviour (Kolb, 1984). Kolb's theory of experiential learning considers learning as a process rather than an outcome, supporting the implication that ideas are not fixed, but can be formed and re-formed from experience. Learning is also seen as a holistic process of adaptation to the world (Kolb, 1984). Adaptations include transaction with the environment and between different people, which makes experiential learning not limited to books, teachers, and classroom. This transaction between objective conditions and subjective experience results in knowledge gain (Kolb, 1984).

Kolb's Four-Stage Learning Cycle

Kolb's theory is derived from Dewey, Lewin and Piaget's model of experiential learning and cognitive development (Kolb, 1984). This experiential learning theory is often implemented by researchers and practitioners due to its implication that learning and abstract concepts can be developed through new experiences (Stirling, 2013). Kolb represents learning as a four-stage learning cycle (Figure 1; Kolb, 1984). The four stages include concrete experience, reflective observation, abstract conceptualization, and active experimentation. *Concrete experience* is considered an action or "feeling" phase, as it involves the encounter or reinterpretation of a new or existing experience, and validation and testing of abstract concepts. *Concrete experience* situates knowledge at a place and time and involves reaching to real-world examples. *Reflective observation* is the observation or "watching" phase. It is an integration of experience and knowledge which relates past experiences to new experiences. Learners can intentionally reflect on their experience whether it is the environment, context, or outcomes. *Abstract*

conceptualization is an integration or "thinking" phase gives rise to new ideas and helps modify existing ideas by integrating the learner's experience, such as actions and results, with existing theory, resulting in new concepts that can be applied to future experiences. In this stage, logic and ideas are more often used than feeling and watching, as it relies on planning and developing new ideas to solve a problem. Finally, *active experimentation* is a hypothesizing and trial or "doing" phase as it encompasses the application of ideas to the surrounding environment. Learning in this stage is active, as adults are encouraged to try, change and influence new experiences through decision making and problem solving (Kolb, 1984).

Learning is effective when an individual progresses through the four stages, each stage complimenting the next. Moreover, Kolb's cycle can be entered from any stage and followed through its usual sequence (McLeod, 2022). Furthermore, different learning styles emerge in each stage, where one style can be preferred over other based on the individual (Kolb, 1984, McLeod, 2022). The learning styles are influenced by two pairs of variables that can be perceived as two lines of an axis through the four stages (Figure 1). The two lines of an axis are referred to as two continuums. The processing continuum (east to west) involves the way one approaches a task. The perception continuum involves how one thinks and feels about a task or emotional response to the task. The continuum places each learning stage in a dimension: feeling, watching, thinking, and doing. The continuums represent the idea that one cannot perform two variables on a single axis at the same time (e.g., doing and watching), rather, an individual's learning style is a product of the two. Thus, each learning style is a combination of two stages (Kolb, 1984; Kurt, 2020). Kolb's theory can be summarized by the following six tenets: *(1) Learning is a process, (2) Learning is grounded in experience, (3) Learning involves mastery of all four learning modes, (4) Learning is a holistic process of adaptation, (5) Learning*

involves transaction with the environment, and (6) Knowledge is created through learning (Stirling, 2013).

Kolb's Experiential Learning Theory's use in Training Professionals

Kolb's four-stage learning theory is frequently used by educational practitioners and researchers (Stirling, 2013). A study looking to improve the wheelchair skills training of occupational therapy students, assessed the effectiveness of a 4-hour bootcamp that integrates concrete learning strategies from Kolb's experiential learning theory (Giesbrecht et al., 2021). The strategies contextualize experiences and promote self-reflection for the application of the learned elements into clinical practice. Occupational therapy students improved their self-efficacy and skill capacity through the incorporation of experiential training. Participants explicitly reported experiential learning and time to practice as the most important factors to improve their self-efficacy (Giesbrecht et al., 2021). Furthermore, the application of this theory is seen in a professional development module aimed to teach coaches how to enhance the well-being of their athletes (Stirling, 2013). The module encompasses the six tenets of Kolb's experiential learning and integrates competencies in problem solving, valuing, critical thinking, leading, and interacting. For example, Kolb's tenet of "learning is grounded in experience" was integrated in the module by the addition of interactive case studies and role-playing exercises, and "learning involves transaction with the environment" were drawn upon through reflection exercises and interactive group-based exercises (Stirling, 2013). Integrating the modules with Kolb's tenets contribute to the improvement and effectiveness of coach education and coaching programs (Stirling, 2013).

More recently, Kolb's learning cycle was used and replicated into a medical education simulation to improve the confidence of health professionals. The intervention presented real-life

scenarios through simulation (concrete experience), and participants were invited to discuss and reflect on their performance during the simulation with experts (reflective observation). Then, a survey based on the simulation allowed participants to conceptualize the knowledge learnt (abstract conceptualization) and express the intent to apply this knowledge in future clinical practice (active experimentation). The four stages of learning were successfully implemented within the intervention and had a positive impact on the participants' personal and professional learning, especially from a practical point of view (Davitadze et al., 2022).

Furthermore, a study developing training for direct support professionals for individuals with intellectual disabilities used Kolb's learning cycle as the theoretical strategy of the mode of delivery of the program. They specifically implemented each stage of the four stages in the development of their training sessions (Overwijk et al., 2022). Because Kolb's theory is highly based on knowledge gain through experience, the development of the program was highly influenced by aspects such as learning in practice, knowledge exchange, and online modules. For example, their first training session involved providing a new experience to the participants through e-learning modules in topics about healthy nutrition and physical activity for people with intellectual disabilities. Reflecting was presented as group discussions, feedback assignments, and linking the new knowledge to their own experience (Overwijk et al., 2022). Therefore, each learning session was framed around Kolb's theoretical strategies: experience, reflection, thinking, acting, and maintenance (Overwijk et al., 2022). Davitadze et al. (2022) and Overwijk et al. (2022) provide concrete examples of Kolb's theory's use in training programs.

Despite Kolb's theory demonstrating its usefulness in training health professionals, it has not been employed in developing training modules specifically tailored for kinesiologists and to understand training outcomes. Therefore, this study aims to bridge this gap by enhancing our

understanding of the utilization of such frameworks in standardized kinesiologist training. Kolb's theory provides a strong framework for training delivery; however, it does not provide metrics for assessing kinesiologists' changes in psychosocial outcomes and their behavioural practices. A theory that provides a framework for understanding behaviour change is the Capability-Opportunity-Motivation Behavioural (COM-B) model (Michie et al., 2011).

2.9 COM-B Model

The COM-B model is derived from the Behaviour Change Wheel, which involves a set of mechanisms that allows for internal, and external change (Michie et al., 2011). *Capability* is defined as having the necessary knowledge and skills and involves two sub-components; psychological and physical capacities, which enable an individual to engage in a behaviour. *Psychological capacity* includes having understanding and knowledge to perform a task, while *physical capacity* pertains to ones' physical strength, skills, balance etc. *Motivation* involves the cognitive processes that provide energy and direction to behaviour, including goals, conscious and analytical decision-making, habitual processes, and emotional responding. The two accompanying sub-components include reflective and automatic motivation. *Reflective motivation* involves the conscious thoughts and processes of an individual to plan a behaviour, whereas *automatic motivation* relates to a person's habits, impulses, and emotions. Finally, *opportunity* is defined as external factors that have an influence on an individual and their planned behaviour. Physical and social opportunities are the associated sub-components, where *physical opportunity* is most frequently associated with time, material, and space, while *social opportunity* depends on the individuals surrounding a person , the culture and social norms (Michie et al., 2011).

Other than the COM-B model's use to understand behaviours, and needs of professionals, this model has also been used to train professionals. For example, the COM-B model was used to understand and inform the development of training on tobacco cessation for health workers (Warsi et al., 2019). The COM-B model is also used as a guideline to modify health professionals' actions with their patients, and helps researchers better understand behaviours (Crowley et al., 2020). The COM-B model can also be used to evaluate the impact of an intervention (Keyworth et al., 2020). Using the COM-B model to assess health professionals can be a tool to identify and assess change in outcomes of interventions, including training programs.

In fact, a recent study has integrated Kolb's Theory alongside the COM-B model. In line with the needs identified at the two community organizations, Overwijk et al., (2022) recognized several domains as support needs for professionals and developed appropriate training resources according to those needs. The content of their training program was based on the Theoretical Domains Framework (TDF; an integrative framework of theories of behaviour change), where the COM-B model is the central focus for behaviour change. In addition, the mode of delivery of their training was based on Kolb's theory. The COM-B model was implemented in their study to support the needs of direct support professionals for their interactions with people with intellectual disabilities. Specifically, the capability (knowledge and skills), opportunity (social and physical support), and motivation (intention) of the direct support professionals were the target for improvement, as they incorporate all necessary factors to change behaviours (Overwijk et al., 2022). The COM-B components, determinants, performance and change objectives and practical strategies for the training were all presented. The training placed a strong emphasis on the determinants and effectively facilitated participant learning by leveraging Kolb's theory, thereby offering evidence of the synergistic utilization of these two theories However, an

important element that sets our study apart is the assessment of the COM-B components for each specific BCTs, which was not conducted by Overwijk et al. (2022).

2.10 Training Needs Within the Adaptavie and Viomax Context

Two community-based organizations located in Quebec identified the need to train their staff to better deliver their programs, Adaptavie, (located in Quebec City) and Viomax (located in Montreal). Founded in 1980, Adaptavie is a community-based organization for adults and youth living with functional limitations (e.g., people with spinal cord injury and who experienced a cerebrovascular accident). Adaptavie's mission is prevention, maintenance, improvement, and promotion of physical/mental well-being and autonomy. Members receive benefits such as improving their overall health, increased socialization, and support to their loved ones. They offer a multitude of APA programs, sports, and social activities. The majority of their programming are targeted for people with physical disabilities; however, they offer physical activity programs for youth, older adults, and individuals with intellectual disabilities. Programs include but are not limited to group or individual consultations for social interventions and autonomy, para-cycling and rugby and walking sports clubs, and physical conditioning. Viomax is a community-based organization located in Montreal, Quebec, and founded in 1995, they aim to provide a positive environment, while improving health, autonomy, and social participation of people living with functional limitations (e.g., individuals who have experienced a cerebrovascular accident). This non-profit organization aims to improve accessibility to leisure and physical activity for all populations. Similar to Adaptavie, they offer various programs such as physical conditioning, mobility and psychosocial workshops for improved self-confidence and meditation. Given the critical role of these programs in supporting individuals with disabilities and the risk of professionals' skills long-term loss, there is a growing demand for training

(Madson et al., 2009; Tomasone et al., 2014). This need can be effectively met by offering standardized training to staff at community-based organizations, aimed at promoting physical activity for people with disabilities (Giouridis et al., 2021; Herbison et al., 2023).

In fact, Adaptavie and Viomax expressed the critical gap in their APA programs, which is to improve their staff's prescription of APA and use of behaviour change skills. They also identified the need for tools to support the training of staff. Viomax staff highlighted that more appropriate training would lead to more accessible physical activity for their clients (Bonnell et al., 2021). In addition, in a recent focus group, Adaptavie staff emphasized their lack of training and access to scientific information to appropriately perform their roles (de Serres-Lafontaine et al., 2021). At Adaptavie and Viomax, the staff needing training are kinesiologists. Thus, understanding the specific needs and behaviours of kinesiologists may be appropriate to enhance their professional practice in community-based organization, especially with standardized training that is framed and delivered using an educational theory. Training at Adaptavie and Viomax should ultimately be tailored to their organizations, the clientele they receive, and their available resources.

Chapter 3: Manuscript

Optimizing Staff Training to Improve Adapted Physical Activity Service Provision for Two Community Organizations: Co-Construction and Implementation Evaluation

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Introduction

Globally, there are more than one billion people living with a form of disability, with approximately 200 million experiencing significant limitations in functioning (WHO, 2011). The International Classification of Functioning, Disability, and Health defines disability as difficulty encountered in any of the following areas of functioning: impairment, activity limitation and participation restriction (WHO, 2011). This definition recognized that disability is not only limited to physical impairments but can encompass challenges faced in engaging in daily activities and participating in society. People with disabilities are at higher risk of injury and the development of non-communicable chronic diseases, which is often attributed to health compromising behaviours such as physical inactivity and smoking (WHO, 2011). Additionally, inequities in access to healthcare and disease prevention services further contribute to the health disparities faced by people with physical disabilities (Martin Ginis et al., 2016). When referring to physical disabilities, the focus is on limitations in bodily function or structure, distinct from intellectual disabilities (limitations in cognitive functioning and adaptive skills; WHO, 2011). People living with physical disabilities are less likely to meet recommended physical activity levels. However, regular physical activity can improve cardiorespiratory and muscular fitness, body composition, bone health, cognitive functions, and psychological well-being for individuals with disabilities (Martin Ginis et al., 2021).

Community-based physical activity programs have shown to be instrumental in improving participation and well-being of people with physical disabilities (Sweet et al., 2021). When physical activity programs are promoted within community-based organizations, they provide tailored opportunities for people with physical disabilities. However, the effectiveness of such programs can be further enhanced by addressing elements of accessibility's interacting

factors, including social interactions, infrastructures, policy, and public services (Bonnell et al., 2021). Creating inclusive environments that consider these factors can lead to the effective support of people with physical disabilities at community-based organizations. Nevertheless, barriers persist at various levels, including intrapersonal, interpersonal, institutional, community, and policy levels, which influence the participation in physical activity for people with disabilities (Martin Ginis et al., 2016). Community level barriers, include lack of disseminated information to people with physical disabilities regarding transitions from rehabilitation to community settings, and alternative options for physical activity during poor weather conditions (Martin Ginis et al., 2016). Institutional barriers, such as a lack of disability-specific knowledge and minimal physical activity training among professionals often hinder the effectiveness of interventions aimed at improving physical activity for people with physical disabilities (Dinwoodie et al., 2022; Martin Ginis et al., 2016; Ma & Martin Ginis, 2018).

People with physical disabilities have expressed the importance of staffs' knowledge in adapted physical activity and their ability to address their specific needs within community-based organizations (Bonnell et al., 2021). To create inclusive physical activity environments for people with physical disabilities, it is crucial to address these institutional barriers by enhancing the training of trainers, including kinesiologists (Herbison et al., 2023). However, there is a recognized gap in the training of kinesiologists, highlighting the importance to improve their skills and knowledge to meet the needs of people with physical disabilities (Bonnell et al., 2021; Giouridis et al., 2021).

Behaviour change techniques (BCTs) have been shown to be effective in promoting physical activity among people with disabilities (Tomasone, Flood, et al., 2018). These techniques, such as reviewing behaviour goals, problem solving, and providing information

about health consequences, consistently lead to positive outcomes in physical activity. Therefore, it is important for kinesiologists and other professionals, who provide direct support to people with physical disabilities, to have a comprehensive understanding of how to tailor BCTs for this population (Knittle et al., 2020). However, barriers such as limited education, lack of training, difficulty navigating the healthcare system, and the absence of relevant materials specifically related to people with physical disabilities still exist, underscoring the need for further improvement (Giouridis et al., 2021). Moreover, motivational interviewing, a person-centered communication approach, enhances the effectiveness of physical activity interventions and can contribute to the behaviour change process (Knittle et al., 2020; Miller & Rollnick, 2013). Kinesiologists equipped with training in motivational interviewing can effectively guide individuals with disabilities, helping them overcome barriers and achieve their physical activity goals (Edwards et al., 2015; Knittle et al., 2020). However, there is a need for training and education in motivational interviewing for kinesiologists, along with the provision of adequate resources and materials (Giouridis et al., 2021).

Adaptavie and Viomax, two community-based organizations, have identified a critical gap in their adapted physical activity programs, particularly in improving their staff's utilization of BCTs and improving person-centered communication to enhance physical activity prescription (Bonnell et al., 2021). For example, Viomax staff emphasized that more appropriate training would lead to increased accessibility of physical activity for their clients, while Adaptavie staff highlighted their lack of training and access to scientific information to perform their roles effectively (de Serres-Lafontaine et al., 2021; Herbison et al., 2023). At Adaptavie and Viomax, training involves new employee onboarding where available organizational resources and information on how to work and train people with disabilities are presented. The

organizational resources encompass documents on specific chronic conditions, and disabilities. Specialized training sessions are also occasionally offered to current employees (e.g., wheelchair skills training). As kinesiologists form a significant portion of the staff at Adaptavie and Viomax, it becomes crucial to understand their specific needs and behaviours to enhance and standardize their professional practice within their organizations. Thus, the training programs at Adaptavie and Viomax should be tailored to the unique requirements of their organizations, the clientele they serve, and the available resources.

Several studies have demonstrated the efficacy of training interventions in enhancing professional's behaviour change and motivational interviewing skills (Tomasone, Arbour-Nicitopoulos, et al., 2018; Madson et al., 2009). Despite the existing research, there is a noticeable gap between theory and practice for kinesiologists (Knudson, 2005). There is a lack of recent studies focused on investigating changes in behaviours of kinesiologists related to training, furthered by issue that the skills acquired during training interventions may be at risk of long-term loss (Madson et al., 2009; Tomasone et al., 2014). This gap highlights the necessity for additional workplace support (Barwick et al., 2012). It is crucial to implement standardized training programs in community-based organizations, as this plays a significant role in promoting physical activity among people with physical disabilities (Giouridis et al., 2021).

One theoretical framework that can help understand behaviours of professionals, is the COM-B model. The COM-B model identifies capability (i.e., psychological, and physical capability such as, knowledge and skills), opportunity (i.e., physical, and social external factors that influence planned behaviour), and motivation (i.e., process that energize and direct behaviour such as, goals, habits, emotions) as the three key components that influence behaviour change (Michie et al., 2011). The COM-B model has been applied to evaluate behaviours, train

professionals, develop training interventions (Crowley et al., 2020; Overwijk et al., 2022; Warsi et al., 2019). Overwijk et al. (2022) used the COM-B model to evaluate knowledge, skills, attitudes of professionals after training and their findings highlighted increased levels of capability and motivation. By applying the COM-B model, we can gain a comprehensive understanding of the capability, opportunity, and motivation factors that impact the training of kinesiologists and their ability to promote behaviour change effectively.

The purpose of this study was to co-create and evaluate the implementation of physical activity training resources to meet the needs of Adaptavie and Viomax for improved staff training. This research is guided by the following research questions: What are the needs of staff at Adaptavie and Viomax, to inform the design and content of training? What is the effect of the training modules on staff's capability, opportunity, and motivation to promote physical activity among people with disabilities?

Methods

An Integrated Knowledge Translation Approach

To build a strong and meaningful partnership with Adaptavie and Viomax, a working group was formed, comprising administrative staff (operational managers and program coordinators), kinesiologists from both organizations, as well as graduate students and researchers from McGill University and Laval University. The working group met four times, facilitating shared decision-making with partners across all aspects of the study. The integrated knowledge translation principles (IKT) were followed to ensure co-creation. Co-creation involved revisiting the principles, soliciting feedback, and conducting brainstorming activities to ensure equal representation of ideas from all members during and prior to meetings. The strategies employed by the working group and their alignment with each IKT principle are

illustrated in Figure 2. Due to the co-creation and evaluation nature of this project the study methodology occurred in two phases. Phase 1 aimed to co-create the training resources by integration of IKT principles and encompassed working group meetings 1 and 2. Phase 2 aimed to evaluate the changes in capability, opportunity, and motivation of Adaptavie and Viomax kinesiologists and assess their physical activity motivational interviewing and BCTs with a mock client after completing the training modules. Phase 2 encompassed working group meetings 3 and 4.

Phase 1

Design

The nominal group technique (NGT) was used to provide structure in the first two meetings with Adaptavie and Viomax. NGT allows group members to generate a high number of ideas, discuss ideas equally among members, and rank ideas attentively (Gallagher et al., 1993). NGT aims to provide an equal chance for participation in discussion and involvement in decision making, thus increasing the quality of the discussion outcomes (Gallagher et al., 1993).

Participants

Participants of the first phase consisted of the working group (n=8). Participants from the working group were conveniently and purposively selected to align with the IKT nature of this study. The inclusion of Adaptavie and Viomax members is essential for identifying their needs and collaborating in the creation of the training modules, as they will be the main knowledge users. Purposeful sampling of operational managers from Adaptavie and Viomax, along with program coordinators who are practicing kinesiologists, ensured comprehensive organizational representation. The program coordinators also engage directly with other kinesiologists who

work with clients, exposing them to daily feedback and concerns. Kinesiologists not included in the working group were pivotal participants in phase 2 of the project.

Procedures

A total of four, 3-hour working group meetings were held on an online meeting platform to understand partners' needs and co-create the modules. The working group meetings occurred using an online shareable whiteboard as a visual platform for all members to have access to. The shareable whiteboard has features that allow members to use multiple slides and share their ideas using textboxes, and notes. The working group meetings were facilitated by NS with a planned meeting agenda which was sent out to all members the day prior to the meeting. All working group meetings were recorded.

Module Planning. The first working group meeting's goal was to identify the general needs of the staff and kinesiologists at Adaptavie and Viomax, such as the content and general themes of the training modules. To identify the needs and adhere to IKT principles, the NGT procedures in Figure 3 were integrated into the first working group meeting. NGT allows for a clear identification of agreements and disagreements among members. The quick recognition of results allows for more detailed summaries, and further feedback and discussion among members (Gallagher et al., 1993).

The second working group meeting aimed to categorize the themes and needs generated from the first meeting into sub-content ideas. In addition, the optimal modality, delivery format, and length of training were discussed. NGT was used to guide the second working group meeting specifically in generating ideas and discussion of ideas. However, ranking ideas and voting for a priority list was not included given the purpose of the meeting (i.e., categorizing existing ideas into general themes).

Module Development. Based on the working groups 1 and 2 and to fulfill Adaptavie and Viomax's training requirements, nine online modules were developed on Rise 360—an interactive module creation platform by Articulate. The modules include text, photos, audio, knowledge questions (multiple choice and written reflections), learning activities and case studies. Appendix A presents screenshot of the modules that include the mentioned elements. Five researchers from McGill University and Université Laval were involved in the creation of the modules. The researchers have varying experiences in topics related to exercise psychology, kinesiology, adapted physical activity prescription, and motivational interviewing.

The general topics of the modules were motivational interviewing, BCTs and adapted physical activity prescription. Examples of motivational interviewing techniques include open-ended questions, reflective listening, and choice provision (Miller & Rollnick, 2013). The training in BCTs involved teaching kinesiologists the meaning of the skills and how to apply them with people with disabilities in a physical activity context. Figure 4 describes how each stage of Kolb's theory (concrete experience, reflective observation, abstract conceptualization, and active experimentation) was implemented within each module (Kolb, 1984). Features such as modality, and mode of delivery were in line with the training research that have used Kolb's theory as an educational framework (Davitadze et al., 2022; Overwijk et al., 2022). The modules' specific contents are described in the results section of this paper.

Module Refinement. The third working group meeting aimed to obtain usability feedback and edits from the members and refine the first two training modules created. Each member individually reviewed the first module created and noted any comments on the shared whiteboard link. As participants completed the module, they also answered the following questions: "*To what extent is this module feasible and useful for your kinesiologists? What do*

you think of the structure and format of the module? (Interactivity, clarity, aesthetics, level of difficulty)". The second module was then reviewed as a group, where participants shared their comments as the module was presented on the shareable whiteboard.

The fourth working group meeting aimed to finalize changes on the remaining seven created modules, and to discuss the delivery of modules to participants in phase 2. Prior to the fourth meeting, participants of the working group were sent a new module on a weekly basis as they were completed. Along with the modules, they received a shareable whiteboard link where they provided usability comments and feedback using the same questions discussed during the third working group meeting. The creation of each new subsequent module was informed and enhanced based on the usability comments from the first two modules, leading to the need for only one round of revisions from the working group. The comments were reviewed during the fourth meeting and any necessary changes were made to the modules. All usability comments were applied to make changes and enhance the modules.

Data Analysis

The first and second working group meeting results were presented through a descriptive analysis. The results from each member's 10-item list generated in the first working group meeting were analyzed by the group organizer. The group was asked to identify the top 10 ideas and rank them in order of priority. Each idea was scored according to their rank, with 10 points given to the 1st item and 1 point for the 10th item. The importance that a person gives to each item was revealed and compared between group members. The ideas addressed in the first working group meeting resulted with votes from each participant, leading to a collective vote of the final 10 ideas. The group collectively categorized the 10 ideas into two distinct themes. During the second working group meeting, the two themes were further sub-categorized into

ideas for potential training modules. All members reached a collective agreement on the specific content to be included in the modules for each theme. The comments received on the sub-content ideas for each theme were extracted, summarized, and visually presented through tables and figures. The comments retrieved from the third and fourth working group meetings regarding module usability were grouped into four distinct categories. These categories were then used to make final edits and changes to each module.

Phase 2

Design

A pre-post quasi-experimental design (Miller et al., 2020) was used to evaluate the changes in capability, opportunity, and motivation as well physical activity behaviour change counselling of kinesiologists after completing the training modules. A quasi-experimental design was chosen because a randomized design is not practically relevant for this context. Specifically, we cannot only train a sub-set of kinesiologists at Adaptavie and Viomax. This design is also commonly used by implementation researchers, policymakers, and administrators (Miller et al., 2020). With this design, the ecological validity is increased due to the mirroring of real-world settings (Thomas et al., 2011) while meeting the need of our community partners to train their current kinesiologists.

Participants

For the evaluation of the training modules, eligible participants (n=14) were enrolled through non-probability convenience sampling technique. Convenience sampling was chosen due to the partnership nature of the research with community-based organization, and because one of the research questions of the study was to identify the needs of Adaptavie and Viomax. Participants were selected based on availability and interest. A list of participants names and

emails were sent by two Adaptavie and Viomax working group members, which was used for recruitment. Eligibility requirements include being a kinesiologist, currently employed at Adaptavie or Viomax, and aged 18 years or older. Due to the co-development and implementation nature of this research, members of the working group were excluded.

Procedures

After receiving ethics approval from McGill University ethics board, participants were asked to read and electronically sign a consent form through a personalized Limesurvey link. Once informed consent was obtained, participants were able to proceed to complete the demographic survey. In addition, the COM-B questionnaire (see measures section), was completed before and after the training. Once the participants completed the baseline questionnaire, they were sent a new Limesurvey link to complete the training modules. The Limsurvey contains links to all modules, and participants were redirected to a feasibility questionnaire after completing each module. Participants had access to the training modules' Limesurvey link for a period of two weeks, the period was extended if needed upon participant request.

Once participants completed the training, they were tested on a standardized mock client which determined their ability to apply the concepts from the modules, as well as the quality of skills used. The mock client is a person who lives with a spinal cord injury. The mock client created an informal script to guide them through the session, with certain adjustments made through practice and training. The mock client sessions lasted 15 minutes online for each participant. The interaction was video recorded which allowed researchers to code and analyze the mock client sessions. The use of simulation-based evaluation is often used and valued in adult training research (Barwick et al., 2012; Fortune et al., 2019). To assess the kinesiologists'

use of motivational interviewing skills, an evaluation coding manual was created using the Motivational Interviewing Treatment Integrity (MITI 4.2.1) scoring tool, known for its validity and reliability (Barwick et al., 2012; Forsberg et al., 2008; Fortune et al., 2021). In addition, the BCTs' use, and quality of use were rated for each participant, following similar format as the MITI.

Measures

Demographic information. Participants reported their age, gender, marital status, ethnicity, income, years length of employment, years of experience as a kinesiologist, number of professional education series conducted, certifications, and presence of additional training specific to APA or behaviour change.

COM-B. A COM-B questionnaire assessed participants' capability (physical and psychological, i.e., knowledge and skills), opportunity (physical and social, i.e., social, and physical support), and motivation (reflective and automatic, i.e., intention) to work in physical activity among people with disabilities. The questionnaire consists of 6 items, one item for each component of capability, opportunity, and motivation, which are applied to the following counselling behaviours: motivational interviewing, BCTs and APA prescription (Appendix B). Each item is assessed on a 7-point Likert scale, ranging from 1 (*strongly disagree),* to 7 *(strongly agree).* An example of a capability item is: *"I have the necessary knowledge to use motivational interviewing to promote physical activity among people with disabilities";* an opportunity item: *"I have the support from others to use an action plan to promote physical activity for people with disabilities";* and a motivation item: *"I have the willingness to prescribe adapted physical activity in order to promote physical activity for people with disabilities".* The COM-B

questionnaire was a modified based on recommendations and a previously used brief COM-B questionnaire (Michie et al., 2014; Sweet et al., 2019).

Module Feasibility Questionnaire. After each module, participants completed a feasibility questionnaire, adapted from Gainforth et al. (2021), to assess the module's *appeal, relevance, appropriate use of language, specificity/unambiguity, acceptability, and potential for unintended adverse effects* on a 7-point Likert scale, ranging from 1 (*strongly disagree),* to 7 *(strongly agree;* Appendix C).

Mock Client Coding Sheet. The coding sheet based on the MITI 4.2.1 was developed to code for the following motivational interviewing behaviour counts: *questions, simple and complex reflections, seeking collaboration, emphasizing autonomy, affirmation, giving information, persuade with and without permission, and confronting.* Each behaviour count was coded into the following five outcomes: total MI adherent (seeking collaboration, emphasizing autonomy and affirmations), total MI non adherent (persuade and confront), percentage of complex reflections (complex reflections divided by total reflections), reflection to question ratio (total reflections divided by total questions), and open-ended questions. In addition, overall scores were calculated on a 5-point Likert scale for *cultivating change talk and softening sustain talk (technical global scores), and partnership, and empathy (relational global scores)*. BCTs coding was used to determine if there was an opportunity to use the BCT, if yes, the extent of its use was rated on a 5-point Likert scale, where 1 is coded for *(vaguely used or unsuccessfully used the BCT),* and 5 coded for (*successfully delivered the BCT and guides the client to implement it).* Zero was also used to code for (*not used despite the opportunity;* Appendix D).

Data Analysis

All analyses were conducted using SPSS version 27. Descriptive analysis was used to present sociodemographic information and module feasibility. Paired-samples t-tests were conducted to evaluate the impact of each training module on kinesiologists' capability, opportunity, and motivation to promote physical activity for people with disabilities. A Hedge's correction effect size was calculated with the paired-sample t-test option offered by SPSS (Lenhard & Lenhard, 2016). Wilcoxon signed-rank test was conducted as a non-parametric test given the small sample size. Two independent coders (NS & MK) used the MITI coding manual to rate the extent to which the kinesiologists followed the training protocol during the 15-minute mock client evaluation. A practice coding session was conducted where each coder coded each session independently. Reliability between the two coders for motivational interviewing (behaviour counts and overall scores) and BCTs (scale) were compared using intraclass correlation (ICC2) estimates based on a single-measures, consistency, two-way mixed-effects model. BCTs (opportunity to use) were compared with interrater reliability (Cohen's Kappa coefficient). After initial reliability analysis, the coder met to review their codes for one participant and address discrepancies and recode mock client sessions independently. The interrater reliability and intraclass correlations were conducted a second time.

Results

Phase 1

Needs of Adaptavie and Viomax

The first working group meeting generated 59 ideas regarding the needs of the organizations on the shareable whiteboard. The nominal group technique voting process facilitated the final selection of 10 ideas, resulting two distinct themes: *Theme 1* focused on

training in BCTs and motivational interviewing, while *Theme 2* revolved around optimizing adapted physical activity prescription. The second working group meeting resulted in a total of 19 sub-content ideas for the two themes generated in working group meeting 1. Theme 1 generated 16 ideas related to motivational interviewing and BCTs to improve and maintain physical activity levels of the clients at Adaptavie and Viomax. Theme 2 generated three ideas related to optimizing an existing adapted physical activity toolkit for prescription, including creating an introduction to the toolkit, how to navigate the toolkit, and an interactive module based on the toolkit. The 19 ideas were used to inform the creation of the modules. Figure 5 illustrates the sequential steps taken – from needs assessment to module creation. In addition, when discussing modality of training, the meeting concluded with a consensus to use programmed instruction with interactive case studies, learning activities, and questions.

Training Modules

The first three training modules were based on motivational interviewing, including *Module 1: Introduction to Motivational Interviewing*, *Module 2: The Spirit of Motivational Interviewing* and *Module 3: The Process of Motivational Interviewing*. The next four modules were based on specific BCTs, including *Module 4: Self-monitoring, Module 5: Goal Setting, Module 6: Action Planning and Problem Solving* and *Module 7: Social Support*. Module 8 was based on optimizing adapted physical activity prescription with the use of a physical activity prescription toolkit, and Module 9 consisted of a comprehensive case study that incorporated activities, questions, and reflections based on the information covered in all preceding modules.

Module Usability Assessment

The four categories regarding the usability of the modules were: 1) Structure, clarity, and wording (40 comments), 2) Positive feedback (27 comments), 3) Complexity and diversity of

case studies (17 comments) and 4) Role of kinesiologists (8 comments). All comments are presented in Appendix E. Based on the feedback regarding the complexity and diversity of case studies, several modifications were made to the modules. These changes primarily involved incorporating specific case studies that closely reflect real-life situations that kinesiologists at Adaptavie and Viomax encounter. Additionally, adjustments were made to highlight the role of kinesiologists by including sidenotes in each module offering helpful tips explaining what falls within the scope of practice of a kinesiologist.

Phase 2

Sociodemographic Characteristics

Of the 15 enrolled participants, 14 completed the study, including all nine modules. One participant withdrew before completing the baseline questionnaire for unknown reasons. Sociodemographic survey data is presented in Table 1.

Capability, Opportunity, and Motivation

Pre-post COM-B questionnaire means, and standard deviations are reported in Table 2 and 3. Participants self-reported spending, on average, 32 minutes per module (range: 10 to 120 minutes), representing an average of 285 minutes to complete all nine modules.

Motivational Interviewing. Comparing pre-post scores, participants reported large increases for motivational interviewing capability (Hedge's g = 0.92, 95% CI [1.53, 0.29]), medium-to-large increases for opportunity (Hedge's g = 0.73, 95% CI [1.30, 0.14]), and medium increases for motivation (Hedge's g = 0.58, 95% CI [1.12, 0.16]).

Self-monitoring. Comparing pre-post scores, participants reported large increases for self-monitoring capability (Hedge's g = 1.09, 95% CI [1.73, 0.42]), opportunity (Hedge's g = 1.38, 95% CI [2.10, 0.64]), and motivation (Hedge's g = 1.03, 95% CI [1.66, 0.37]).

Goal Setting. Comparing pre-post scores, participants reported medium-to-large increases for goal setting opportunity (Hedge's g = 0.77, 95% CI [1.34, 0.17]). Participants reported non-significant small increases for goal setting capability (Hedge's g = 0.27, 95% CI [-0.78, 0.26]), and motivation (Hedge's g = 0.29, 95% CI [-0.80, 0.24]).

Action Planning. Comparing pre-post scores, participants reported medium-to-large increases for action planning capability (Hedge's g = 0.71, 95% CI [1.27, 0.12]), large increases for opportunity (Hedge's g = 1.09, 95% CI [1.73, 0.42]), and medium increases for motivation (Hedge's g = 0.62, 95% CI [1.17, 0.49]).

Problem Solving. Comparing pre-post scores, participants reported medium increases for problem solving capability (Hedge's g = 0.67, 95% CI [1.23, 0.93]), and large increases for opportunity (Hedge's g = 1.04, 95% CI [1.68, 0.39]). Participants reported non-significant small-to-medium increases for motivation (Hedge's g = 0.48, 95% CI [-1.01, 0.72]).

Social Support. Comparing pre-post scores, participants reported large increases for social support capability (Hedge's g = 1.19, 95% CI [1.86, 0.50]), large increases for opportunity (Hedge's g = 1.18, 95% CI [1.84, 0.49]), and medium-to-large increases for motivation (Hedge's g = 0.76, 95% CI [1.33, 0.16]).

Adapted Physical Activity Prescription. Comparing pre-post scores, participants reported medium increases for adapted physical activity prescription capability (Hedge's g = 0.67, 95% CI [1.23, 0.95], large increases for opportunity (Hedge's g = 0.92, 95% CI [1.53, 0.29]). Participant reported non-significant small-to-medium increases for motivation (Hedge's g = 0.48, 95% CI [-1.01, 0.07]).

The Wilcoxon Signed Rank Test supported all the results of the paired samples t-test, except for motivation for motivational interviewing, where it approached significance at $p = .051$.

Module Feasibility

Across all 9 modules, feasibility indicator means ranged from 6.23 to 6.66 (out of 7) which indicates that participants agree to strongly agree to module feasibility (Tables 4 to 6). Similarly, there were no perceived unintended adverse effects with low scores ranging from 1.46 to 1.92 (out of 7; Table 7). Self-monitoring was perceived as slightly less appealing than other BCTs, although it still fell within the range of overall appeal with a rating of 5.79 (out of 7).

Mock Client Evaluation

A total of 9 mock client sessions were recorded with a total of 309 utterances. The sessions ranged between 12 to 17 minutes (M = 15:53) with the full session time being coded. Across all mock client sessions, NS and MK had moderate to excellent reliability (0.73-0.95) for motivational interviewing overall scores and behaviour counts (0.73-0.94; Table 8). Across all modules, coders had excellent reliability for BCTs opportunity (Table 10), and good to excellent reliability for BCTs scale (0.76-0.95), except for self-monitoring, which did not have enough data to conduct proper analysis (Table 10).

As per the good competence and proficiency thresholds of 4 suggested in the MITI 4.2.1, participants demonstrated good use (4 out of 5) of motivational interviewing technical global scores (cultivating change talk and softening sustain talk) and good use (4.11 out of 5) relational global scores (partnership and empathy). Participants had good percentage (53.6%) of complex reflections when compared to the MITI 4.2.1 good competence and proficiency thresholds of 50%. However, participants reflection to question ratio was low, and 35% of participants' questions were open-ended. Participants used adherent motivational interviewing language three times more than non-adherent motivational interviewing language (Table 8). On average, within 15 minutes, participants used 2 utterances of seeking collaboration, 2 of emphasizing autonomy

and 4 affirmations (adherent language). Participants used more persuade with permission utterances than persuade utterances and did not use any confrontation (Table 9).

All nine of participants had an opportunity to use goal setting, problem solving and social support, eight participants had an opportunity to use action planning, and three participants had an opportunity to use self-monitoring during the mock client sessions. When opportunities presented themselves, 100% of participants used self-monitoring, action planning and problem solving, 89% of participants used goal setting and 78% of participants used social support. Based on the 1 to 5 scale for quality of BCT use, most participants had moderate to high quality ratings (3+ out of 5) for action planning (62.5%), problem solving (77.8%), and social support (57.1%), while low ratings were coded for most participants on self-monitoring (66.7%) and goal setting (87.5%). Means, medians, and standard deviations of the quality of ratings per BCT are also reported in Table 10.

Discussion

The purpose of this study was to co-create and evaluate training resources for kinesiologists at Adaptavie and Viomax. Specifically, the training aimed to improve staff capability, opportunity, and motivation in using motivational interviewing, BCTs, and adapted physical activity prescription with their clients. Phase 1 needs assessment results with the working group highlighted the need for BCTs and motivational interviewing training, as well as optimizing adapted physical activity prescription. The modules created were found to be usable, acceptable, and aligned with the training needs of kinesiologists at Adaptavie and Viomax. Phase 2 evaluations demonstrated the modules as being feasible alongside significant improvements in participants' capability, opportunity, and motivation across multiple modules, indicating substantial positive effects. In the mock client sessions, participants demonstrated proficiency in

motivational interviewing strategies and, when opportunities presented themselves, most participants used the five BCTs, with successful application of action planning and problem solving. Our results address the existing gap in evidence-based tools for training kinesiologists by emphasizing co-creation with community partners and combining two theoretical frameworks. Additionally, the findings provide valuable practical insights for enhancing staff training, improving program effectiveness and sustainability, and enhancing accessibility to adapted physical activity programs.

The success of phase 1 can be largely attributed to the partnership forged between researchers and community-based organizations' staff. By implementing the integrated knowledge translation principles (Gainforth et al., 2021), this partnership ensured the formation of a working group and the use of methods that fit these principles. Notably, the inclusion of techniques like nominal group technique and the use of a shareable whiteboard facilitated the effective collaboration and shared decision-making. Furthermore, involving Adaptavie and Viomax as end-users in the decision-making process addresses limitations observed in other online behaviour change interventions (Chisholm et al., 2020). This involvement ensures alignment with kinesiologists' daily practice and roles while minimizing overlap with existing training. This co-creation process resulted in highly relevant training modules that meet end-users’ needs and likely explained the participants’ high feasibility ratings of the modules. By adhering to the integrated knowledge translation principles, the co-development and assessment of the community partners’ needs was successfully accomplished.

The needs outlined by the working group, specifically the lack of motivation among their clientele and the insufficient training of their kinesiologists in motivational interviewing and BCTs, align well with recent studies that highlight the need for this training (Herbison et al.,

2023; Bonnell et al., 2021; Virtanen et al., 2021). The identified needs support the significance of addressing institutional barriers, such as lack of disability-specific knowledge among professionals (Dinwoodie et al., 2022). Addressing these institutional barriers, underscores the practical relevance of our study by addressing the training of professionals in BCTs and motivational interviewing. As a result, this study makes a noteworthy contribution to the field given the existing gap in evidence-based training resources. In addition, given the existing resources at Adaptavie and Viomax do not involve training in motivational interviewing and BCTs, the training modules created provide novel, standardize resources for kinesiologists at these community organizations.

Combining motivational interviewing and BCTs is particularly important to enhance the practice of kinesiologists for physical activity behaviour change (Giouridis et al., 2021; Edwards et al., 2015). The limited application of BCTs and motivational interviewing in fitness centres can be attributed to the predominant emphasis on physical activity prescription in kinesiology curriculum (Chisholm et al., 2020; Wilson et al., 2019). Our approach of incorporating motivational interviewing throughout all modules effectively addresses this gap, and may partly explain why capability, opportunity, and motivation increased across most modules. By considering not only physical activity prescription guidelines but also motivation, client knowledge, and the role of kinesiologists (Wilson et al., 2019; Gagnon et al., 2018), our approach fills the curriculum's lack of content and yields positive outcomes.

Value of Adult Learning Theory: Kolb’s Theory

The use of Kolb's adult learning theory serves as a highly applicable framework, as it helped to effectively standardize module delivery, address structural needs, and enhance the learning and knowledge of participants. The usability feedback highlighting the importance of

complex case studies and kinesiologists' role in ambiguous situations, align with Kolb's emphasis on hands-on learning and active experimentation. Moreover, the adjustments based on usability assessments prioritize process-oriented learning rather than outcome learning for client interactions. By creating a context for experiences and encouraging self-reflection, the strategies supported the practical application of learned topics. The high feasibility ratings, positive changes in capability, opportunity, and motivation of participants and high motivational interviewing usage may validate the significance of incorporating Kolb's theory into kinesiologists' training and its potential impact on their professional development. Although scarce, previous interventions that utilized Kolb's theory align with our study's outcomes, as they effectively engaged participants in the learning process, accommodated their needs, and yielded positive impacts on their professional and personal development (Davitadze et al., 2022; Overwijk et al., 2022). However, the evaluation of this educational framework was not conducted, accentuating the need to evaluate the implementation of each stage and the overall learning experience of participants accordingly.

Capability, Opportunity, Motivation, and Behaviours for Physical Activity Promotion

Several studies have utilized the COM-B model to investigate barriers, facilitators, and develop training programs for behaviour change (Deom Tardif et al., 2022; Spillane et al., 2021). However, a distinguishing feature of our study is its focus on evaluating professionals' capability, opportunity, and motivation both before and after training. This unique approach has enabled us to assess the proficiency level of kinesiologists in these specific training areas. The modules' effectiveness is demonstrated by improvements in participants' capability, opportunity, and motivation, particularly the modules focusing on motivational interviewing. These results are consistent with previous research that demonstrates increased knowledge, skills, confidence,

competence, interest, and intention after training professionals – all of which are subcomponents of the COM-B model (Barwick et al., 2012; Bull et al., 2017; Edwards et al., 2015).

The findings of our study align with Overwijk et al. (2022), who applied the COM-B model to assess the effects of training in BCTs and professional roles on the knowledge, skills, and attitudes of nutrition and physical activity professionals. Their research demonstrated increases in capability and motivation, which are consistent with the outcomes observed in our study. However, they did not assess capability, opportunity, and motivation for specific BCTs. The uniqueness of our study was the evaluation of each motivational interviewing, BCTs, and adapted physical activity module, enabling us to examine specific topics. For instance, the module on social support showed the highest increase in capability, while opportunity was the COM-B component with the highest increase across modules, and increases in motivation were observed for motivational interviewing, action planning, social support, and self-monitoring.

The consistent increases in social support across COM-B constructs may be because it is a new BCT concept for kinesiologists. In fact, other studies did not explicitly train professionals in social support, however, they observed improvements in BCTs that have similarities to social support, such as providing information about health consequences and instructions on how to perform behaviours (Overwijk et al., 2022; Bull et al., 2021). Further, the increase in opportunity across modules may be attributed to our partners' efforts in addressing opportunity barriers. For instance, they allowed staff to complete the training modules during work hours and emphasized the organizational benefits of completing the modules. These strategies are crucial because professionals often face financial constraints, time limitations, and training restrictions, leading to limited opportunities for change (Giouridis et al., 2021; Crowley et al., 2018). These results

also showcase the value and potential for increase efficacy when resources and interventions are co-created with end-uses, rendering meaningful outcomes for all members of the partnership.

The small change observed in capability and motivation for goal setting and motivation for problem solving and adapted physical activity prescription may be due to participants' pre-existing high level of proficiency, potentially influenced by their perceived skill levels (Bootsma et al., 2022; Swann et al., 2023). The inherent practice of kinesiologists to prescribe physical activity and offer solutions to client barriers may explain their previous motivation in adapted physical activity prescription and problem-solving (Ma & Martin Ginis, 2018). Nonetheless, we found increases in motivation in self-monitoring, action planning and social support, which supports the need to assess motivation. In fact, previous studies have primarily focused on enhancing professionals' capability while neglecting or inadequately addressing motivation, despite its crucial role (Virtanen et al., 2021).

From a behavioural perspective, the mock client's results in motivational interviewing align with the established cut-offs of behaviour counts and global scores found in the MITI 4.2.1. A study evaluating fidelity of motivational interviewing in clinical practice also reported positive outcomes associated with using motivational interviewing adherent language, cultivating change talk, redirecting sustain talk, fostering partnership, and conveying empathy (Leske et al., 2021). Similarly, the low ratio of reflections to questions observed in our study aligns with findings from previous research and can be attributed to the evaluative nature of kinesiologists' sessions (Leske et al., 2021). Given participants had 15 minutes with the mock client, they asked numerous questions about the client's activities, goals, and general health, which contributed to the high frequency of questions being coded. It is important to note that achieving proficiency in motivational interviewing skills requires practice and tend to decay over time (Leske et al., 2021;

Løchting et al., 2021). However, while the modules served as an effective introduction to motivational interviewing, we recommend prioritizing ongoing training and feedback to maintain proficiency in motivational interviewing (Fortune et al., 2019).

Participants had an opportunity to use every BCT within the mock client session, except for self-monitoring. The conversation veered away from self-monitoring towards goal setting, action planning, problem-solving, and social support due to the nature of the mock client's script. This shift is significant because it highlights the adaptability and responsiveness of the kinesiologists in adjusting their approach based on the client's needs and concerns (i.e., guiding client using motivational interviewing). Although training may have improved kinesiologists taking the opportunity to use BCTs, more time may be required to enhance the quality of their use. In practice, kinesiologists have longer evaluation sessions, follow-ups, and one-on-one support, providing more time for implementing BCTs.

Limitations and Future Research

One limitation of this study is the small sample size, attributed to the limited kinesiologists working at Adaptavie and Viomax. Despite the sample size, we found medium to large effects with statistical significance indicating that sample size was adequate. In addition, the absence of a control or comparison group was inevitable due to the co-creation nature of the project, making it unfeasible to establish such a group. In addition, convenience sampling could lead to sampling bias and potentially influence social desirability in participant responses to the questionnaires. Regarding the COM-B questionnaire, only two items were used for each sub-component of the COM-B model to make it more feasible to assess each component of the modules (Motivational Interviewing, BCTs, and Adapted Physical Activity). This decision was influenced by the applied setting in which the modules were delivered, where a longer

questionnaire would have increased participant burden (Allen et al., 2022). While it was not feasible for this study, conducting follow-up measurements of kinesiologists' COM-B after a few months would have been beneficial to observe potential changes in their practice as they may not have had sufficient time to implement the acquired training skills with their clients. Future studies could also examine the implementation of these modules within organizations to understand adoption, use, and long-term impact of the modules. With such an implementation study, future research could investigate the modules' impact on the actual behaviours of the kinesiologists and the potential influence of the training on Adaptavie and Viomax members' physical activity levels and use of BCTs.

Conclusion

This study successfully co-created and evaluated training resources for kinesiologists at Adaptavie and Viomax, enhancing their capability, opportunity, and motivation in utilizing motivational interviewing, BCTs, and adapted physical activity prescription. Our process bridged an important theory-to-practice gap highlighted in the literature (Kudson, 2005). The study's theoretical framework utilized Kolb's theory to guide kinesiologist training, while the COM-B model and mock client session tested the effectiveness of the training and its impact on practice. The incorporation of two theories within a co-creation process highlights the conceptual and knowledge-based strengths of this study while addressing the existing gap and need for evidence-based tools. The resulting effects of this study are feasible, usable, and effective training resources that will become sustainable resources for Adaptavie and Viomax, thus meeting the ultimate goal of partnered research.

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Table 1

Sociodemographic Characteristics.

Variables	n (*n*=14)
Age	
20-25	8
> 25	4
Language	
French	14
English	4
Arabic	1
Gender	
Male	5
Female	9
Ethnicity	
Arab	1
Southeast Asian	1
White	12
Education	
High School Diploma	1
College/cegep/university, no diploma or degree	4
College/cegep diploma or certificate	4
Bachelor's degree	7
Master's degree	2
Income	
< 20000	5
20000-34999	3
>75000	5
Role	
Kinesiologist	9
Intern or student	5
Administrative staff	2
Year Since Certification	
<1 year	1
1 year	1
>1 year	3
Not reported	4
Establishment Diploma Received	
University	14
Year Since at Adaptavie/Viomax	
< 1 year	6
1-6	5
>7 years	3
Received Additional Training	

Yes	8
No	6
Training Type (if yes to above)	
University course training	3
Organizational training	5

Table 2

Pre-Post COM-B of Motivational Interviewing and Adapted Physical Activity Prescription

Metrics	COM-B	Pre		Post		t (13)	p
		Mean	SD	Mean	SD		
Motivational Interviewing	Capability	5.39	1.11	6.18	0.54	-3.56	.003
	Opportunity	5.00	1.21	5.96	0.80	-2.82	.014
	Motivation	5.57	1.11	6.14	0.60	-2.23	.044
Adapted Physical Activity Prescription	Capability	5.79	0.83	6.32	0.67	-2.60	.022
	Opportunity	5.68	0.70	6.46	0.60	-3.56	.003
	Motivation	6.18	0.67	6.46	0.46	-1.85	.088

Note. Negative t values indicate higher means for post data compared to pre.

Table 3

Pre-Post COM-B of Behaviour Change Techniques

Metrics	COM-B	Pre		Post		t (13)	p
		Mean	SD	Mean	SD		
Self-monitoring	Capability	4.07	1.74	6.21	0.61	-4.19	.001
	Opportunity	4.04	1.15	5.93	0.55	-5.31	.000
	Motivation	4.71	1.48	6.11	0.68	-3.95	.002
Goal Setting	Capability	6.04	0.66	6.25	0.64	-1.03	.321
	Opportunity	5.18	1.15	6.07	0.55	-2.96	.011
	Motivation	6.18	0.61	6.36	0.69	-1.10	.292
Action Planning	Capability	5.57	0.96	6.25	0.47	-2.72	.017
	Opportunity	4.96	0.91	6.04	0.57	-4.19	.001
	Motivation	5.68	1.01	6.25	0.33	-2.39	.033
Problem Solving	Capability	5.54	1.01	6.18	0.42	-2.59	.022
	Opportunity	5.00	1.07	6.07	0.65	-4.02	.001
	Motivation	6.00	0.56	6.25	0.55	-1.84	.089
Social Support	Capability	5.00	1.13	5.93	0.68	-4.60	.001
	Opportunity	4.75	1.31	6.00	0.48	-4.53	.001
	Motivation	5.71	0.85	6.14	0.50	-2.92	.012

Note. Negative t values indicate higher means for post data compared to pre.

Table 4

Feasibility of Motivational Interviewing Modules

Module	Overall Mean (SD)	Appealing Mean (SD)	Relevance Mean (SD)	Appropriate use of language Mean (SD)	Specificity/ unambiguity Mean (SD)	Acceptability Mean (SD)
Introduction to MI	6.56 (0.17)	6.43 (0.51)	6.36 (1.08)	6.57 (0.65)	6.79 (0.65)	6.64 (0.50)
The Spirit of MI	6.43 (0.24)	6.07 (0.73)	6.43 (0.76)	6.64 (0.50)	6.64 (0.50)	6.36 (0.75)
The Process of MI	6.37 (0.17)	6.29 (0.61)	6.36 (0.63)	6.14 (0.86)	6.50 (0.52)	6.57 (0.51)

Table 5

Feasibility of Behaviour Change Technique Modules

Module	Overall Mean (SD)	Appealing Mean (SD)	Relevance Mean (SD)	Appropriate use of language Mean (SD)	Specificity/ unambiguity Mean (SD)	Acceptability Mean (SD)
Self-monitoring	6.23(0.26)	5.79 (1.25)	6.29 (0.73)	6.36 (0.84)	6.29 (0.73)	6.43 (0.76)
Goal setting	6.54 (0.22)	6.21 (0.98)	6.64 (0.63)	6.79 (0.43)	6.64 (0.50)	6.43 (0.94)
Action Planning / Problem Solving	6.41(0.22)	6.21 (0.70)	6.36 (0.63)	6.71 (0.47)	6.21 (1.12)	6.57 (0.65)
Social Support	6.50 (0.16)	6.29 (0.47)	6.57 (0.65)	6.71 (0.47)	6.50 (0.65)	6.43 (0.65)

Table 6

Feasibility of Adapted Physical Activity Prescription and Case Study Modules

Module	Overall Mean (SD)	Appealing Mean (SD)	Relevance Mean (SD)	Appropriate use of language Mean (SD)	Specificity/ unambiguity Mean (SD)	Acceptability Mean (SD)
Adapted Physical Activity Prescription	6.66 (0.19)	6.64 (0.50)	6.87 (0.36)	6.71 (0.47)	6.36 (0.75)	6.71 (0.61)
Case Study	6.56 (0.20)	6.21 (0.70)	6.71 (0.47)	6.57 (0.51)	6.64 (0.50)	6.64 (0.63)

Table 7

Modules' Potential for Unintended Adverse Effects

Module	Mean (SD)
Introduction to MI	1.46 (0.52)
The Spirit of MI	1.62 (0.87)
The Process of MI	1.62 (0.87)
Self-monitoring	1.92 (1.50)
Goal setting	1.54 (0.88)
Action Planning/Problem Solving	1.54 (0.88)
Social Support	1.46 (0.88)
Adapted Physical Activity Prescription	1.62 (0.96)
Case Study	1.46 (0.88)

Table 8

Motivational Interviewing Overall Scores: Mock Client Sessions

Overall Scores	Mean	SD	Minimum	Maximum	ICC
Technical Global	4.00	0.56	3	4.5	0.73
Relational Global	4.11	0.99	2	5	0.88
%CR*	53.6%	25.4%	0.00%	90.0%	0.91
R to Q Ratio*	0.53	0.26	0.20	1.11	0.94
% Open-ended Q*	35.0%	18.0%	0.00%	61.5%	-
Total MI Adherent	5.11	1.36	3	7	0.92
Total MI non-Adherent	1.67	1.73	0	5	0.85

Note. *%CR is the complex reflection percentage, R to Q Ratio denotes the reflection to question ratio, %Open-ended Q is open-ended questions. n = 9.

Table 9

Motivational Interviewing Behaviour Counts: Mock Client Sessions

Behaviour Counts	Mean	SD	Minimum	Maximum
Total Utterances	34.33	3.91	31	44
Giving Information	5.00	2.60	2	10
Total Questions	14.78	5.33	4	21
Open-ended Questions	5.56	2.88	0	9
Simple Reflections	2.56	1.42	1	5
Complex Reflections	3.78	2.54	0	9
Seeking Collaboration	2.00	1.41	0	4
Emphasizing Autonomy	2.00	1.41	0	5
Affirming	1.11	1.17	0	4
Persuade with Permission	3.11	1.69	0	5
Persuade	1.67	1.73	0	5

Note. n = 9.

Table 10

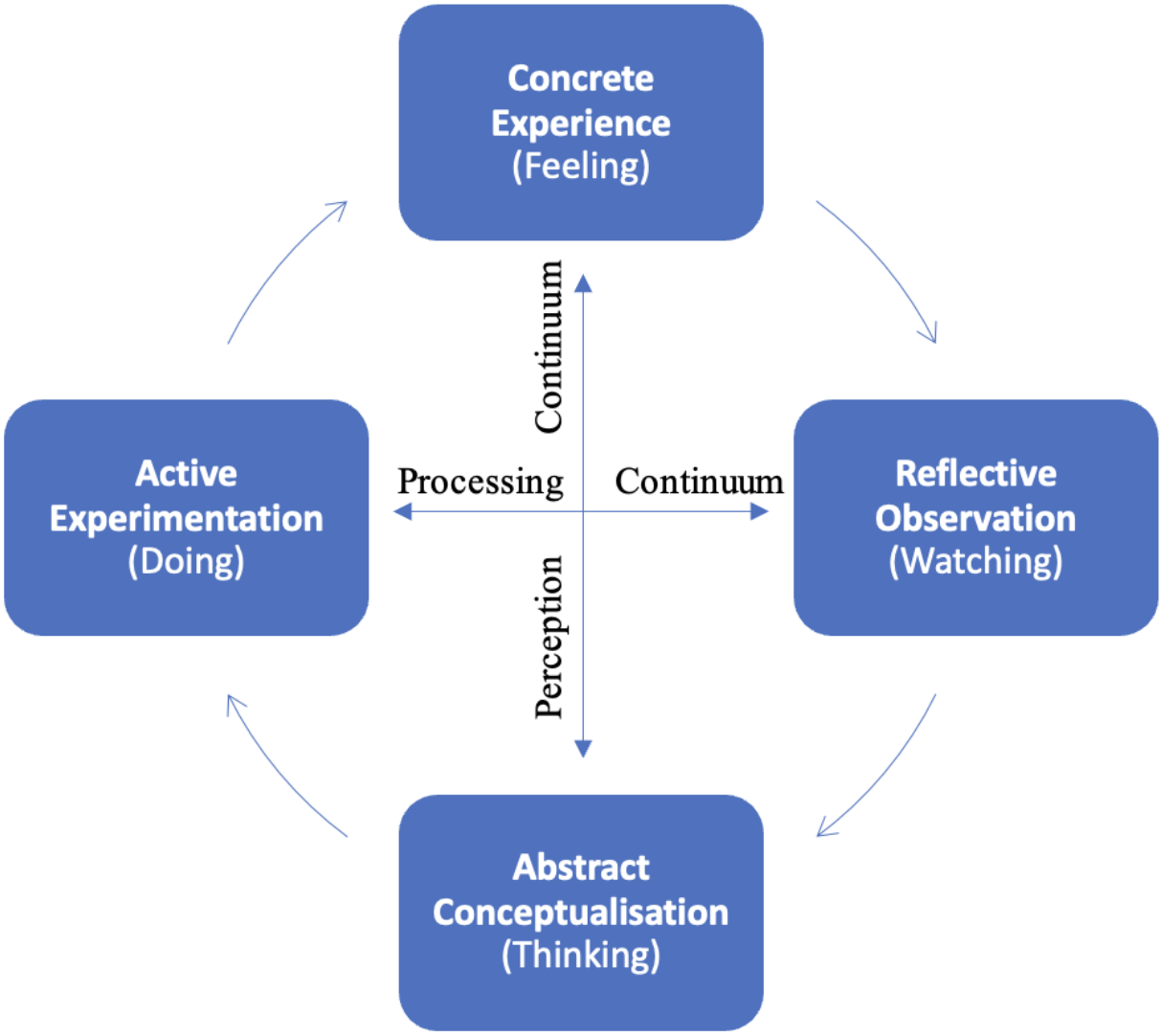
Behaviour Change Techniques Use and Quality: Mock Client Sessions

BCT	n	n (Used*)	Mean (SD)	Median	Minimum	Maximum	Kappa	ICC
Self-monitoring	3	3	2.33 (1.53)	2.00	1	4	1	-
Goal Setting	9	8	2.00 (0.54)	2.00	1	3	1	0.76
Action Planning	8	8	3.25 (1.17)	3.50	2	5	-	0.88
Problem Solving	9	9	3.11 (1.05)	3.00	1	4	1	0.94
Social Support	9	7	2.43 (0.79)	3.00	1	3	1	0.95

Note. *Participants who used the BCT when opportunity was presented. Action Planning Kappa, and Self-monitoring ICC cannot be analyzed due to constant values and small sample size.

Figure 1

Kolb's Four-Stage Cycle



Note. Kolb's Four-Stage Cycle informed from Kurt (2020), and Kolb (1984).

Figure 2

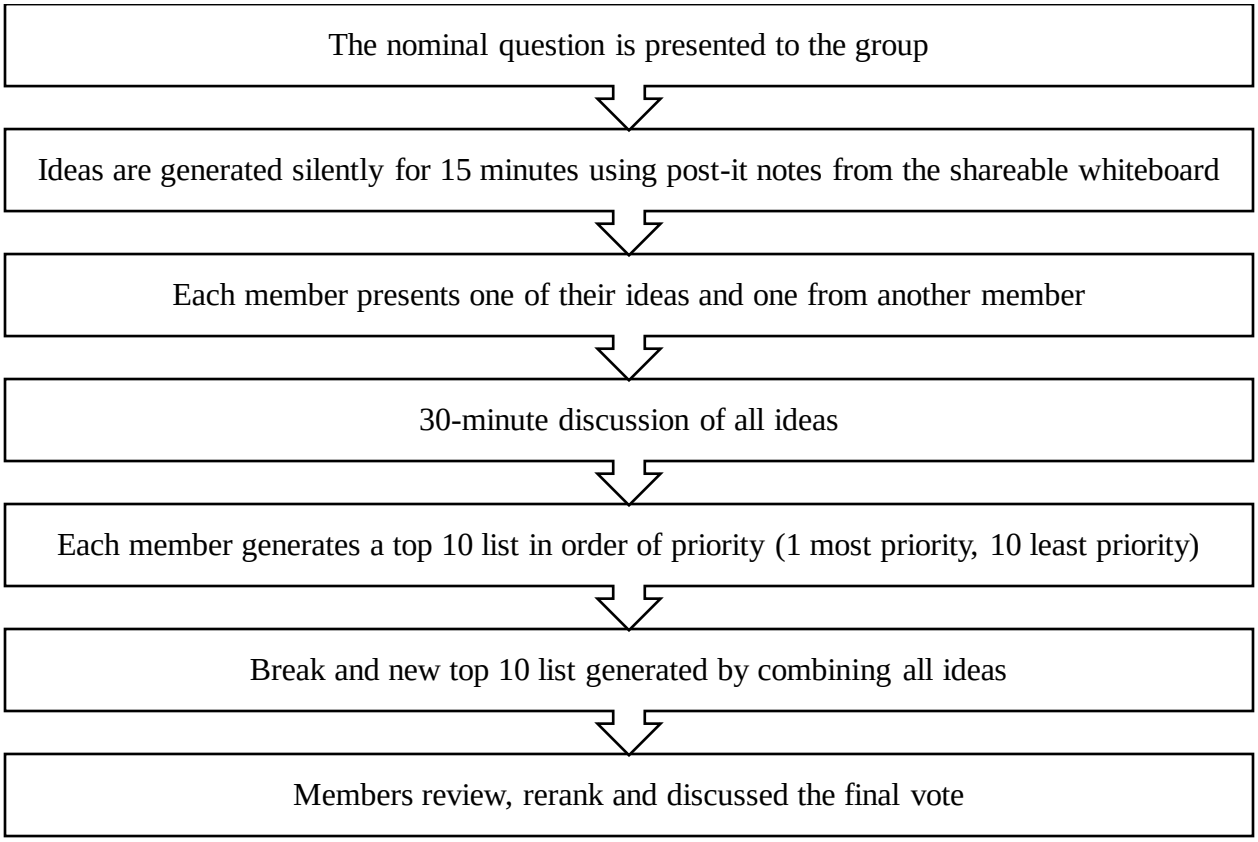
Employed Strategies Ensuring Adherence to IKT Guiding Principles

Strategies Used	IKT Guiding Principles
Creation of working group	1: Partners develop and maintain relationships based on trust, respect, dignity, and transparency. 7: Partners address ethical considerations 8: Partners respect the practical considerations and financial constraints of all partners.
Working group meeting 1 and 2 discussing the needs of the Adaptavie and Viomax and the steps for creation of modules (including NGT, shareable whiteboard)	2: Partners share in decision-making. 3: Partners foster open, honest, and responsive communication. 4: Partners recognize, value, and share their diverse expertise and knowledge. 5: Partners are flexible and receptive in tailoring the research approach to match the aims and context of the project.
Working group meeting 3 and 4: editing the modules and discussing the contents of modules (including NGT, shareable whiteboard)	2: Partners share in decision-making 3: Partners foster open, honest, and responsive communication. 4: Partners recognize, value, and share their diverse expertise and knowledge. 5: Partners are flexible and receptive in tailoring the research approach to match the aims and context of the project.
Sharing the IKT principles during each working group meeting	1: Partners develop and maintain relationships based on trust, respect, dignity, and transparency. 3: Partners foster open, honest, and responsive communication.
Email communications for updates, steps to be taken, and shared decision-making.	3: Partners foster open, honest, and responsive communication.
Evaluating the modules for kinesiologists employed at Adaptavie and Viomax	6: Partners can meaningfully benefit by participating in the partnership. 7: Partners address ethical considerations. 8: Partners respect the practical considerations and financial constraints of all partners.

Note. The integrated knowledge translation guiding principles for conducting research in partnership informed from Gainforth et al., (2021).

Figure 3

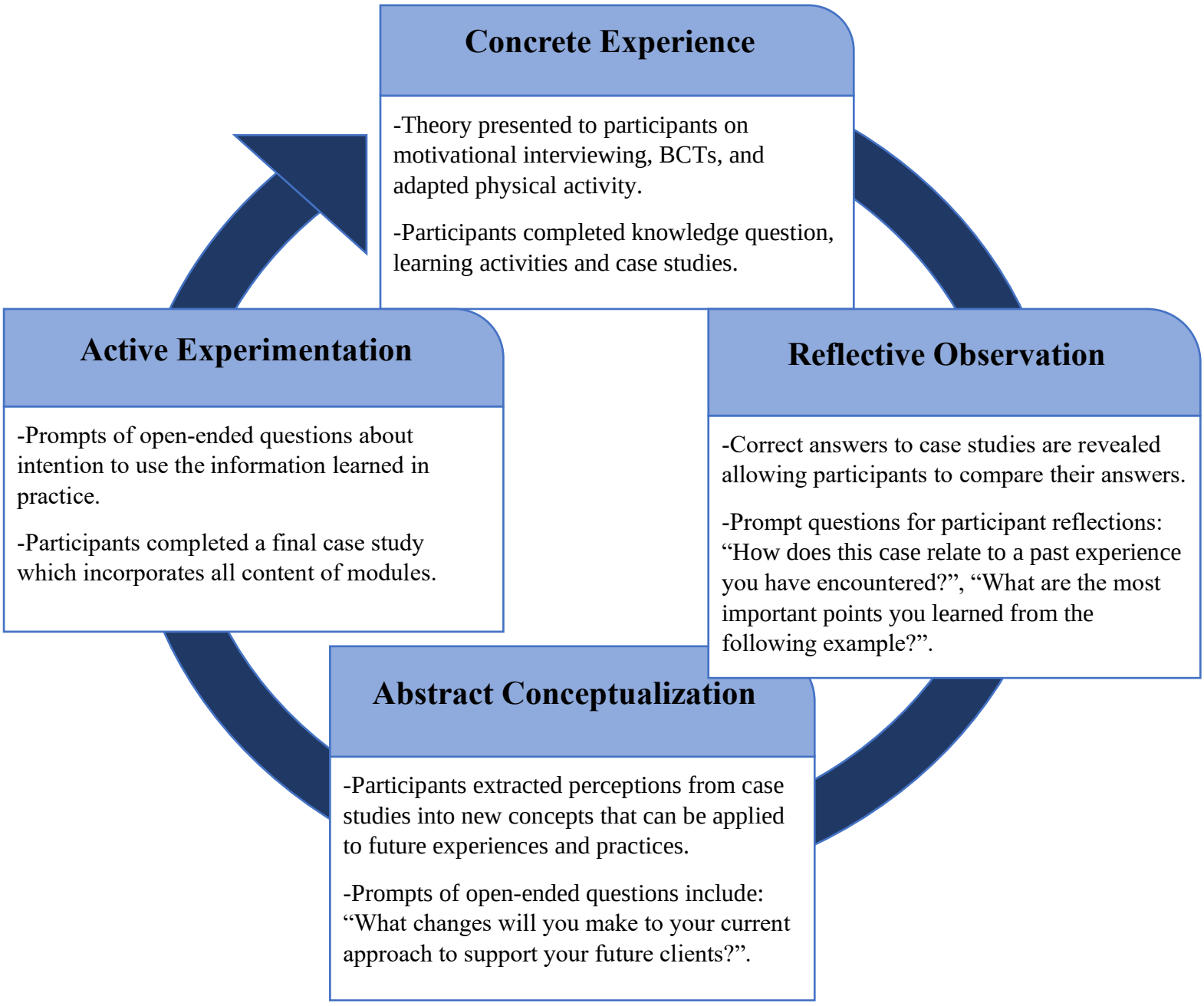
Nominal Group Technique Procedures



Note. Adapted from Gallagher et al. (1993).

Figure 4

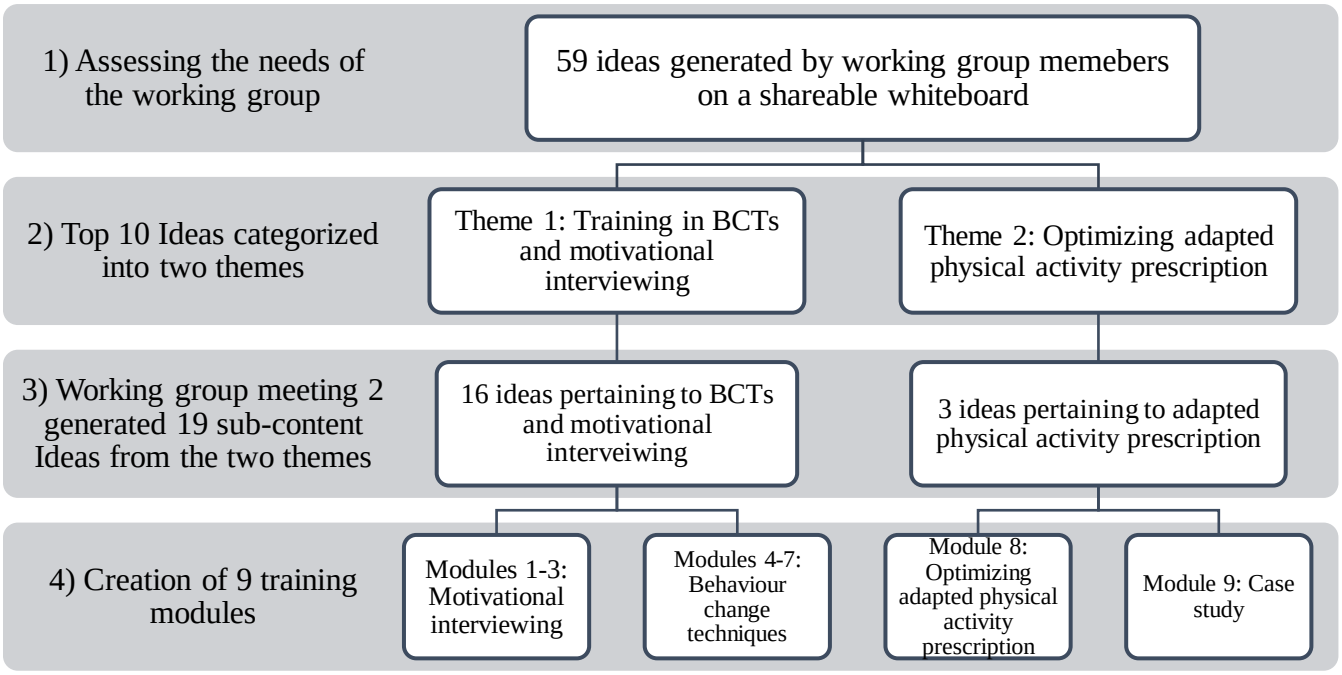
Modules Framed by Kolb's Four-Stage Cycle



Note. Adapted from Kolb, (1984).

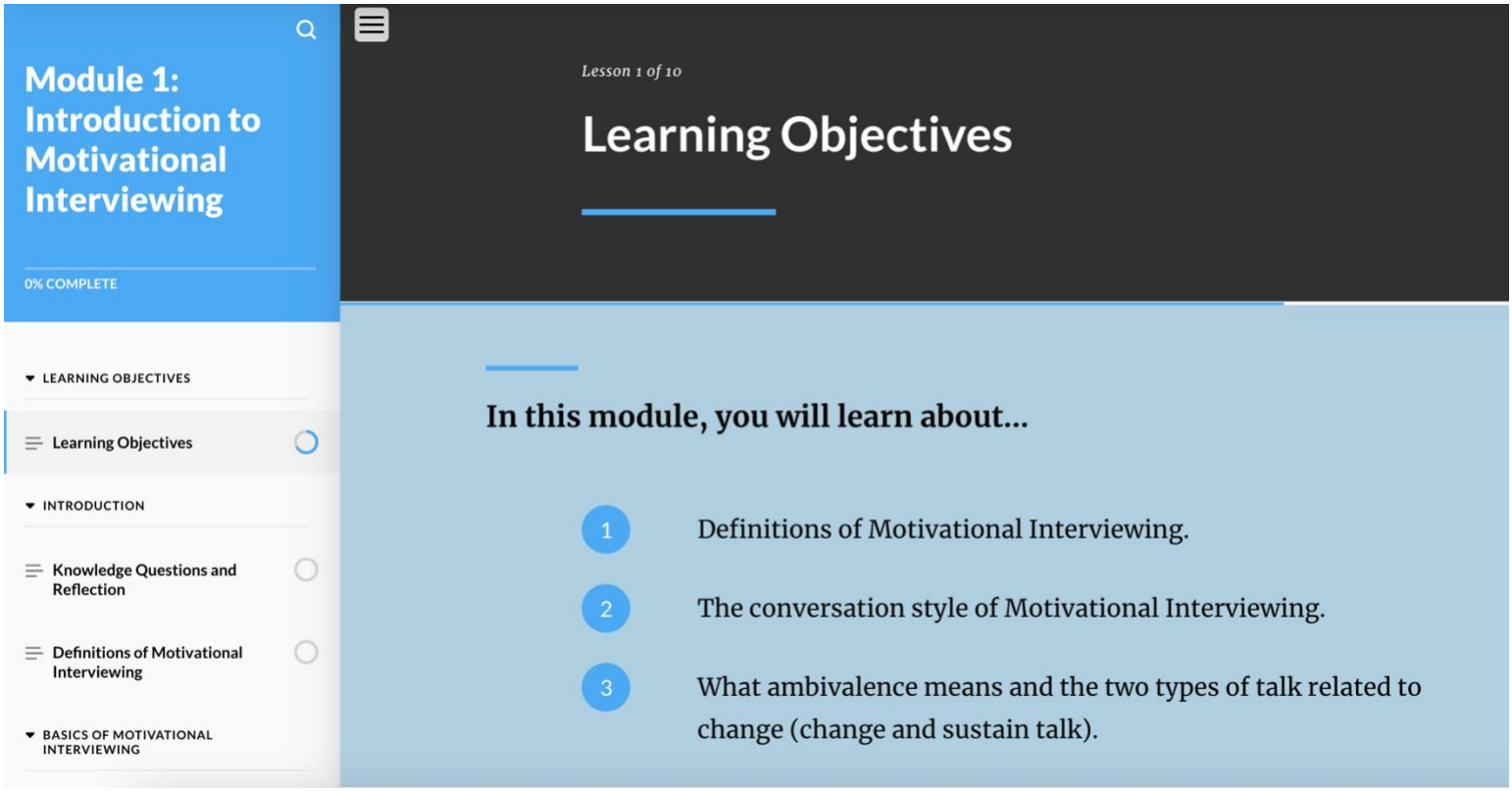
Figure 5

Assessing the Needs of the Working Group for Module Creation

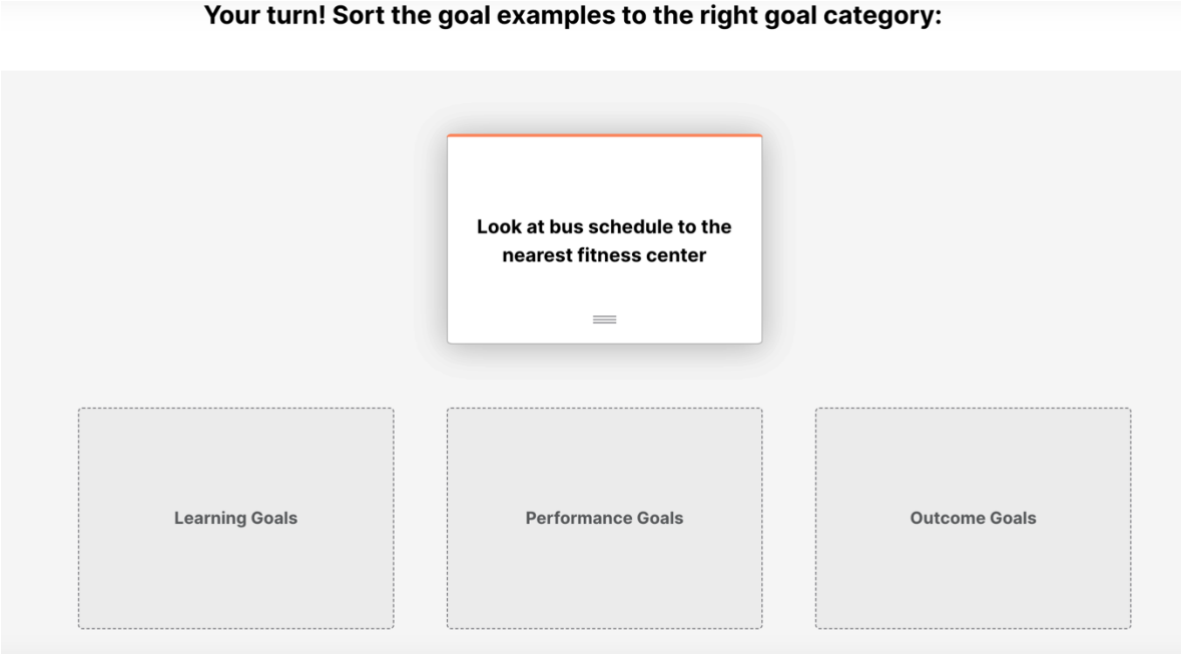


Appendix A

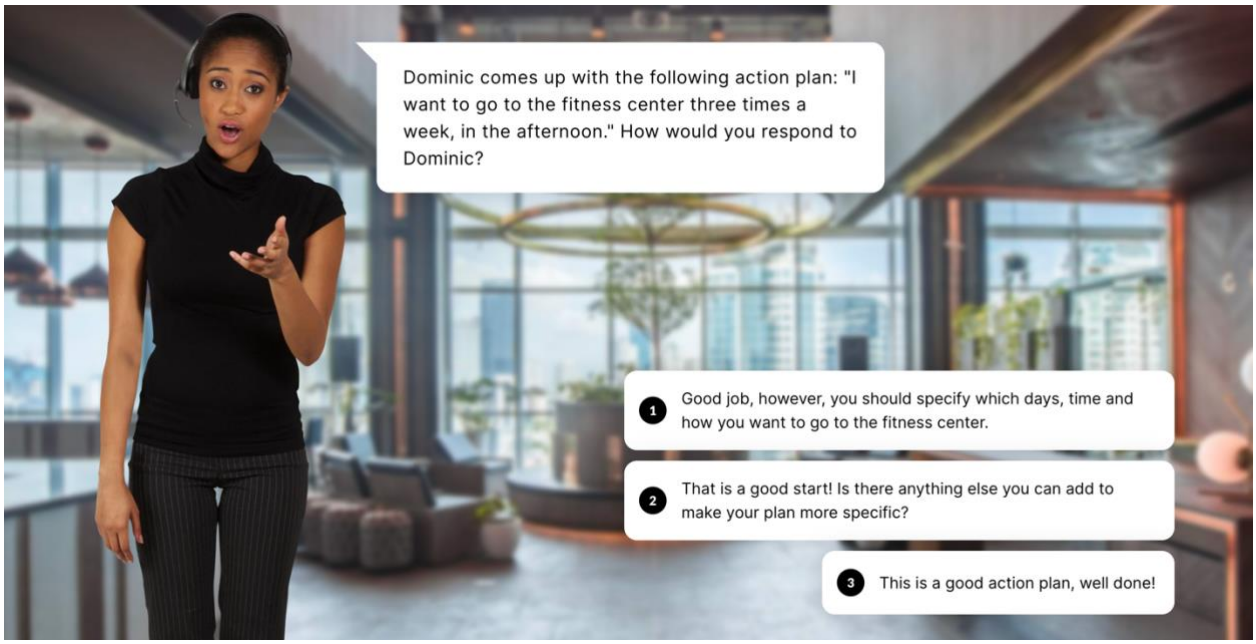
Screenshots of Modules from Articulate – Rise 360



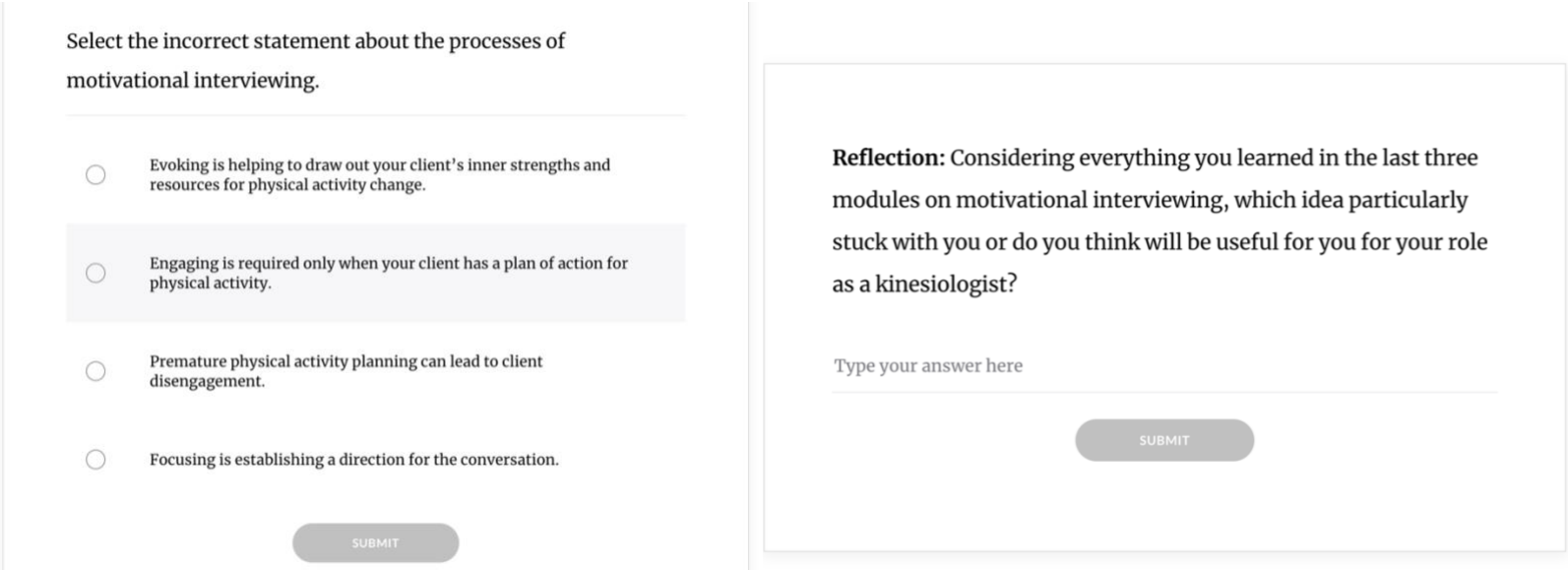
Note. General overview of the Introduction to Motivational Interviewing module.



Note. Example of sorting learning activity from the Goal Setting module.



Note. Example of case study activity from the Action Planning and Problem Solving Module.



Note. Example of knowledge and reflection questions from Motivational Interviewing modules.

Appendix B

The COM-B Questionnaire

The following questions relate to the idea of understanding the capability, opportunity, and motivation of professionals working in the area of physical activity among people with disabilities.

Strongly Disagree	*Disagree*	*Somewhat Disagree*	*Neither Agree Nor Disagree*	*Somewhat Agree*	*Agree*	*Strongly Agree*
1	2	3	4	5	6	7

For the scale above, please respond to each statement as honestly as possible. There are no right or wrong answers.

Motivational Interviewing:

**The first questions pertain to motivational interviewing. Motivational interviewing is a way of communicating that helps professionals motivate their clients to adopt healthier behaviours.

	1	2	3	4	5	6	7
I have the knowledge to use motivational interviewing to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the skills to use motivational interviewing to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the resources (e.g., time and money) to use motivational interviewing to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have support from others to use motivational interviewing to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am confident that I can use motivational interviewing to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am willing to use motivational interviewing to promote physical activity among people with disabilities.	○	○	○	○	○	○	○

Self-monitoring:

**The next questions pertain to self-monitoring. Self-monitoring is a behaviour change technique that involves recording a behaviour, or a feeling/thought. This tool can be used to track and compare to norms.

I have the knowledge to use self-monitoring to promote physical activity among people with disabilities.	○	○	○	○	○	○	○

I have the skills to use self-monitoring to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the resources (e.g., time and money) to use self-monitoring to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have support from others to use self-monitoring to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am confident that I can use self-monitoring to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am willing to use self-monitoring to promote physical activity among people with disabilities.	○	○	○	○	○	○	○

Goal Setting:

**The next questions pertain to goal setting. Goal setting is a behaviour change technique defined by what a person is trying to accomplish; it's the object or goal of an action.

I have the knowledge to use goal setting to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the skills to use goal setting to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the resources (e.g., time and money) to use goal setting to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have support from others to use goal setting to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am confident that I can use goal setting to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am willing to use goal setting to promote physical activity among people with disabilities.	○	○	○	○	○	○	○

Action Planning:

**The next questions pertain to action planning. Action planning is a behaviour change technique based on a detailed description of where, when and how a goal is implemented.

I have the knowledge to use action planning to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the skills to use action planning to promote physical activity among people with disabilities.	○	○	○	○	○	○	○

I have the resources (e.g., time and money) to use action planning to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have support from others to use action planning to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am confident that I can use action planning to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am willing to use action planning to promote physical activity among people with disabilities.	○	○	○	○	○	○	○

Problem Solving:

**The next questions pertain to problem-solving. Problem solving is a behaviour change technique that involves analyzing the barriers to target behaviours and identifying ways of overcoming them.

I have the knowledge to use problem solving to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the skills to use problem solving to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the resources (e.g., time and money) to use problem solving to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have support from others to use problem solving to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am confident that I can use problem solving to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am willing to use problem solving to promote physical activity among people with disabilities.	○	○	○	○	○	○	○

Social Support:

**The next questions pertain to social support. Social support is a behaviour change technique that refers to the nature and quality of a person's social interactions. It is the perception of the help or comfort one receives.

I have the knowledge to use social support to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the skills to use social support to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the resources (e.g., time and money) to use social support to promote physical activity among people with disabilities.	○	○	○	○	○	○	○

I have support from others to use social support to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am confident that I can use social support to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am willing to use social support to promote physical activity among people with disabilities.	○	○	○	○	○	○	○

Adapted Physical Activity Prescription:

**The next questions pertain to the prescription of adapted physical activity.

I have the knowledge to prescribe adapted physical activity to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the skills to prescribe adapted physical activity to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have the resources (e.g., time and money) to prescribe adapted physical activity to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I have support from others to prescribe adapted physical activity to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am confident that I can prescribe adapted physical activity to promote physical activity among people with disabilities.	○	○	○	○	○	○	○
I am willing to prescribe adapted physical activity to promote physical activity among people with disabilities.	○	○	○	○	○	○	○

Appendix C

Module Feasibility Questionnaire

You are asked to rate each module in terms of relevance, appropriate language use, specificity/unambiguity, acceptability, and potential for unintended adverse effects. Please read through each item carefully and rate the items on the scale below:

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Completely agree

The module is appealing to me.

1 2 3 4 5 6 7

The module is relevant for a kinesiologist working among people with disabilities.

1 2 3 4 5 6 7

The module uses language that is appropriate for a kinesiologist working among people with disabilities.

1 2 3 4 5 6 7

The module is easy to use.

1 2 3 4 5 6 7

The module could be used to enhance training of kinesiologists within Adaptavie or Viomax.

1 2 3 4 5 6 7

The module could lead to <u>unintended adverse effects or negative feelings/emotions</u> in respondents.

1 2 3 4 5 6 7

Appendix D

Mock Client Coding Sheet

	A	B	C	D	E	F	G
1	Recording d	Interviewee ini	Interviewer	Coder'(s) initials	Recording du	Coded se	Target behaviour
2							
3							
4	Interviewer's Utterance (paraphrased)					Time	Code
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							

Code:		Definition:
Q	Question	Question to retrieve information about the client, their history, their needs (open, closed, evocative, fact-finding, etc.)
SR	Simple reflection	Summaries and convey understanding or facilitate client–clinician exchanges. These reflections add little or no meaning (or emphasis) to what clients have said.
CR	Complex Reflection	Directional in nature, add substantial meaning and deeper emphasis to what the client has said.
Seek	Seeking collaboration	Asking a question that requires the agreement of the client in order to continue, for example "how can I help you with this" "would you be okay to chat about this topic?"
EA	Emphasizing Autonomy	Leaving the decision up to the client throught statements like "It is your decision, I cant do anything" "I wonder what you will decide to do"
A	Affirmation	To accentuate the positive, recognize and acknowledge that which is good including the individual's inherent worth as a fellow human being. To affirm is also to support and encourage.
GI	Giving Information	**Neutral** Educates, provides feedback, or expresses a professional opinion without persuading, advising, or warning.
PWP	Persuade with Permission	If client asks, or if clinician asks if its ok and wants to provide advice with an emphasis on collaboration or autonomy support while persuading
P	Persuade	Attempts to change the client's opinions, attitudes, or behavior using tools such as logic, compelling arguments, self-disclosure, or facts
Con	Confront	Telling the client that what they are doing is wrong, or risky, or bad for their health.
NC	Not coded	

Note. Excel sheet for coding utterances and definition of each code referred to, derived from MITI 4.2.1.

TOTALS

Measure	Result
Total Mi Adherent = Seeking Collaboration + Affirm + Emphasizing Autonomy	0
Total MI Non-Adherent = Confront + Persuade	0
# Simple Reflections (SR)	0
# Complex Reflections (CR)	0
# Questions (Q)	0
# of Rreflections (CR + SR)	0

Global Ratings (scale of 1-5)

Measure	Result
Cultivating Change Talk (CCT)	
Softening Sustain Talk (SST)	
Partnership	
Empathy	

Points to Improve (for the interviewer)

1. To improve

Technical global	CCT+SST/2
Relational global	Partnership +Empathy/2
%CR	CR/SR+CR
Reflection to Q ratio	Total R / Total Q
Total MI adherent	Seek collab + affirm + emphaisze autonomy
Total MI nonadherent	Confront + persuade

Note. Sum of codes for behaviour counts and global scores of motivational interviewing, derived from MITI 4.2.1.

Cultivating Change Talk				
Low				High
1	2	3	4	5
Clinician shows no explicit attention to, or preference for, the client's language in favor of changing	Clinician sporadically attends to client language in favor of change – frequently misses opportunities to encourage change talk	Clinician often attends to the client's language in favor of change, but misses some opportunities to encourage change talk	Clinician consistently attends to the client's language about change and makes efforts to encourage it	Clinician shows a marked and consistent effort to increase the depth, strength, or momentum of the client's language in favor of change

Softening Sustain Talk				
Low				High
1	2	3	4	5
Clinician consistently responds to the client's language in a manner that facilitates the frequency or depth of arguments in favor of the status quo.	Clinician usually chooses to explore, focus on, or respond to the client's language in favor of the status quo.	Clinician gives preference to the client's language in favor of the status quo, but may show some instances of shifting the focus away from sustain talk.	Clinician typically avoids an emphasis on client language favoring the status quo.	Clinician shows a marked and consistent effort to decrease the depth, strength, or momentum of the clients language in favor of the status quo.

Partnership				
Low				High
1	2	3	4	5
Clinician actively assumes the expert role for the majority of the interaction with the client. Collaboration or partnership is absent.	Clinician superficially responds to opportunities to collaborate.	Clinician incorporates client's contributions but does so in a lukewarm or erratic fashion.	Clinician fosters collaboration and power sharing so that client's contributions impact the session in ways that they otherwise would not.	Clinician actively fosters and encourages power sharing in the interaction in such a way that client's contributions substantially influence the nature of the session.

Empathy				
Low				High
1	2	3	4	5
Clinician gives little or no attention to the client's perspective.	Clinician makes sporadic efforts to explore the client's perspective. Clinician's understanding may be inaccurate or may detract from the client's true meaning.	Clinician is actively trying to understand the client's perspective, with modest success.	Clinician makes active and repeated efforts to understand the client's point of view. Shows evidence of accurate understanding of the client's worldview, although mostly limited to explicit content.	Clinician shows evidence of deep understanding of client's point of view, not just for what has been explicitly stated but what the client means but has not yet said.

Note. Technical and relational global scales for motivational interviewing retrieved from MITI 4.2.1.

Behaviour Change Technique Coding						
1) Was there an opportunity to use the BCT- Yes/No						
2) If yes, rate the usage with 0 = did not use the BCT despite the opportunity						
3) 1 to 5 from scale below						

Behavior Change Techniques				
Low				High
1	2	3	4	5
The interviewer vaguely uses the BCT or has unsuccessful attempts to use it	The interviewer mentions the BCT but often misses the chance to guide the client to implement it for behaviour change	The interviewer partially uses the BCT but has few successful attempts at guiding the client to implement it for behaviour change	The interviewer uses the BCT but has frequent successful attempts at guiding the client to implement it for behaviour change.	The interviewer successfully delivers the BCTs and guides the client to implement it for behaviour change

Self-monitoring						
1) Was there an opportunity to use self-monitoring	Yes	No				
2) If yes, rate usage 0-5	0	1	2	3	4	5
Goal Setting						
1) Was there an opportunity to use goal setting	Yes	No				
2) If yes, rate usage 0-5	0	1	2	3	4	5
Action Planning						
1) Was there an opportunity to use action planning	Yes	No				
2) If yes, rate usage 0-5	0	1	2	3	4	5
Problem Solving						
1) Was there an opportunity to use problem solving	Yes	No				
2) If yes, rate usage 0-5	0	1	2	3	4	5
Social Support						
1) Was there an opportunity to use social support	Yes	No				
2) If yes, rate usage 0-5	0	1	2	3	4	5

Note. Behaviour change techniques coding sheet and quality scale for mock client sessions.

Appendix E

Usability Comments

Complexity and Diversity of Cases
Add a counterexample (e.g., someone who has not finished processing/grieving their situation and has a wrong/impossible goal
More complex cases, especially for people who don't want to change.
Resistance to change
Resistance to PA, strategies to change client's perspective, unblock the block between the kin and the client (how to navigate blockage)
How to deal with cases that don't go well
How to do follow-ups about the use of BCTs
Structure, Clarity and Wording
Remove abbreviations
Remove serif style writing
Change the background image in the case study to make the client fit in better
Redundant answer summaries of activities
Remove choice to restart activity if possible
Have a consistent length of content for each lesson
20-25 minutes realistic time
White on white text difficult to read
Not many questions in the beginning
After the question, it says 'Start over'... not clear, you must scroll to get the second question.
Make the feedback after activity shorter
Clarify the fact that not all modalities of self-monitoring must be used, but these are some examples of the many BCTs to use
After comparing answer with mona answer to validate the answer (re-evaluate answer, to integrate their answer in some way) (How will Mona's case study help you make changes to your approach?)
Role of Kinesiologists
What am I? am I a guider, director… to know myself as a professional
List of words for every style of MI (add a word list for each type of communication with a personal reflection)
Add a question to elicit the interviewer's introspection, what kind of communicator am I?
Have examples of when is a good time to "direct" because some people do not know their limits
Types of personality, every client and kinesiologist are different, not enough on types of personality. Have these situations as examples of case studies, makes kin reflect more, might be a little easy
Clarify in the beginning the potential that BCTs bring to kins in their practice

Positive Feedback
Liked advice to be a good guide and ambivalence
Their clientele needs the MI portion
The link between the content of the different lessons
Questions to validate our knowledge before the training
Frequent feedback/motivation
Example of client quote
Meaningful images (e.g., follow, guide, lead)
I like the activity summary!
Explanation of how to navigate through the software
Good summary at the end of the module
Very feasible module
The aesthetics is perfect with the help of time
Aesthetic is good, easy to manipulate
Its precise enough so it feels like you are learning