



'On-the ground' strategy matrix for fostering quality participation experiences among persons with disabilities in community-based exercise programs

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ARTICLE INFO

Keywords:

Quality participation
Disability
Community-based exercise program
Knowledge mobilization

ABSTRACT

Objective: The purposes of this paper are to (1) document the generation and refinement of a quality participation strategy list to ensure resonance and applicability within community-based exercise programs (CBEPs) for persons with physical and intellectual disabilities, and (2) identify theoretical links between strategies and the quality participation constructs.

Methods: To address purpose one, a list of strategies to foster quality participation among members was extracted from qualitative interviews with providers from nine CBEPs serving persons with physical disabilities. Next, providers from CBEPs serving persons with physical ($n = 9$) and intellectual disabilities ($n = 6$) were asked to identify the strategies used, and examples of their implementation, within their programs. Additional strategies noted by providers and in recent published syntheses were added to the preliminary list. A re-categorization and revision process was conducted. To address purpose two, 22 researchers with expertise in physical and/or intellectual disability, physical activity, participation and/or health behaviour change theory completed a closed-sort task to theoretically link each strategy to the constructs of quality participation.

Results: The final list of 85 strategies is presented in a matrix. Each strategy has explicit examples and proposed theoretical links to the constructs of quality participation.

Conclusions: The strategy matrix offers a theoretically-meaningful representation of how quality participation-enhancing strategies can be practically implemented "on-the-ground" in CBEPs for persons with disabilities.

Community-based exercise programs (CBEPs) are a means to enhance participation in physical activity among persons with disabilities (Adam & Morgan, 2018; Crawford et al., 2008; Sweet et al., 2021). These programs typically provide community-dwelling individuals with an opportunity to engage in leisure-focused (i.e., rather than rehabilitation-focused) exercise (Crawford et al., 2008). Programs include accessible exercise equipment and knowledgeable exercise professionals, both of which contribute to developing an exercise routine tailored to the needs of each participant (Crawford et al., 2008). Unfortunately, relatively few CBEPs tailored for persons with a disability exist (D'Urzo et al., 2019) considering that upwards of 22% of the population has a disability (Morris et al., 2018). In addition, little guidance exists for how to optimize participation among persons with

disabilities in such programs. Methods for optimizing participation are warranted given programs often operate on limited budgets or are associated with not-for-profit organizations (Merali et al., 2016). A knowledge tool that mobilizes evidence-informed best practices for fostering participation within CBEPs for persons with disabilities is needed.

The United Nations' Convention on the Rights of Persons with Disabilities (United Nations, 2006) enshrines full and effective participation in all aspects of society as a human right, including physical activity pursuits. Full and effective participation encompasses both quantity and quality of participation. Quantity of participation is conceptualized as the frequency or intensity of participation (Imms & Granlund, 2014). Quality participation is conceptualized as a feeling state derived when

Abbreviations: AC₂, Gwet Agreement Coefficient; CBEPs, Community-Based Exercise Programs.

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<https://doi.org/10.1016/j.psychsport.2023.102469>

Received 27 January 2023; Received in revised form 25 May 2023; Accepted 26 May 2023

Available online 27 May 2023

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participants appraise their participation experiences as satisfying at least one of the following values and needs: autonomy (i.e., perceiving choice, control and independence), belonging (i.e., feeling a sense of connection and acceptance by group or larger community), challenge (i.e., feeling appropriately tested), engagement (i.e., feeling focused, in-the-moment, absorbed, fascinated), mastery (i.e., experiencing competence, self-efficacy, and a sense of accomplishment), and meaning (i.e., feeling responsible to others or contributing to a personally or socially meaningful goal; Evans et al., 2018; Martin Ginis et al., 2017).

A configurative review (i.e., a synthesis method that seeks, interprets, and arranges information to develop concepts; Gough et al. (2012)) identified these six outcomes as important aspects of participation experiences among people with physical disabilities (Martin Ginis et al., 2017). Importantly, these six outcomes align with constructs within theories and models used in exercise psychology (e.g., Self-Determination Theory (Ryan & Deci, 2017), Social Cognitive Theory (Bandura, 2004), PERMA¹ model (Seligman, 2011)) to link people's subjective experiences of exercise participation to behavioural, psychological and subjective well-being outcomes. For example, exercise psychology research using Self-Determination Theory has demonstrated the importance of experiences of autonomy, competence, and relatedness (conceptually similar to autonomy, mastery, and belongingness, respectively) to exercise-related improvements in psychological and subjective well-being (Ntoumanis et al., 2021).

Martin Ginis et al.'s (2017) conceptualization of participation for people with physical disabilities provided a basis for developing practical strategies to foster quality experiences within the context of disability sport. Developed through discussions with researchers and sport administrators, the Quality Parasport Participation Framework (Evans et al., 2018) identifies 25 actionable strategies for creating quality sport experiences. These strategies are arranged within three environments where the conditions for quality experiences can be shaped: (a) the physical environment - the physical and structural components of the immediate and surrounding setting; (b) the social environment - relationships formed within the setting, as well as societal attitudes towards the activity; and (c) the activity environment - the nature of the activity itself. Identifying these environments and corresponding strategies has been a critical step to translating the concept of quality participation into application in disability sport programming.

The purpose of the present project was to identify strategies for fostering quality participation in exercise programming for people with disabilities. Two research syntheses (Shirazipour et al., 2018; Williams et al., 2017) highlighted the relevance of the six participation aspects (Martin Ginis et al., 2017) and the three environments (Evans et al., 2018) for quality exercise experiences for people with disabilities (Andrusko et al., 2018; Jackson et al., 2019; Martin Ginis et al., 2017). An additional feature of participation in CBEPs for persons with physical disabilities is validation - feeling important, valued, supported and worthy of experiencing a high level of service in a physical activity program (Man et al., 2017). Thus, within this paper, we consider 10 quality participation "constructs" in total: the six aspects of participation (Martin Ginis et al., 2017), the three environments (Evans et al., 2018), and validation (Man et al., 2017). With these constructs now identified, we have the knowledge of *what* to target to optimize participation for persons with disabilities in CBEPs. However, program providers require additional guidance regarding *how* to foster quality experiences in practice. A comprehensive, empirically-derived and accessible list of strategies would enable program providers to enhance quality experiences in their programs. Further, similar to how exercise psychologists employ behaviour change techniques as actionable methods to alter theoretical constructs (Michie et al., 2008), a list of strategies would offer researchers methods or actions that describe how to foster quality

participation in exercise.

Insights into "how" to foster quality participation could be gleaned from various theories of human motivated behaviour. For example, Self-Determination Theory operationalizes the construct of "autonomy" as feeling a sense of choice about one's behaviour (Ryan & Deci, 2017). This definition of autonomy highlights how the construct may be fostered in an exercise setting - by offering choice for the type of exercise performed. While turning to psychological theory makes sense for exercise psychology researchers, it is problematic for practitioners given theoretical literature may be inaccessible and/or overwhelming for program providers to sift through and interpret (Grimshaw et al., 2012). Moreover, there is scant physical activity literature describing theory-based strategies for creating quality experiences among persons with a disability.

To date, two research syntheses have aimed to identify strategies that foster quality experiences among, and effective programs for, persons with disabilities in exercise settings (Shirazipour et al., 2018; Williams et al., 2017, respectively); however, both syntheses were limited by a lack of available evidence. Shirazipour et al.'s (2018) review included 30 studies and identified that group-based programming and guidance by knowledgeable providers are two strategies that foster quality participation constructs. Williams and colleagues' (2017) meta-synthesis included 10 studies and suggested that successful programs focus on providing social support and open communication, while structuring behavioural strategies to fit each participant's distinct needs and abilities. Although theory and existent research provide some indication of practical strategies for fostering quality experiences, a systematic approach that incorporates perspectives from program providers is required to generate a fulsome list of strategies useful for practitioners.

To begin to address this gap, our research group interviewed thirteen providers about how they foster quality experiences "on-the-ground" in their CBEPs for persons with physical disabilities (Man et al., 2017). Data were first inductively coded, then deductively mapped onto Martin Ginis et al.'s (2017) participation aspects. Program providers offered numerous ways they foster quality experiences, which mapped onto the six aspects of participation and validation. However, our findings were limited in several ways. First, the investigation included programs serving persons with physical disabilities only, so the applicability of findings to programs serving individuals with other disabilities (i.e., intellectual) is unknown. Exploring strategies used to foster quality experiences in exercise programs for persons with intellectual disabilities is warranted given applicability of the Quality Parasport Participation Framework in these settings (Andrusko et al., 2018). Second, the deductive thematic analysis identified the most likely quality participation construct that a given strategy would target; however, multiple constructs can be fostered by a particular strategy. For example, encouraging peer support and camaraderie within exercise sessions - a strategy to foster belongingness - could also foster both engagement and mastery (Jackson et al., 2019). Third, we did not consider the physical, social or activity environments required to foster quality experiences (Evans et al., 2018; Shirazipour et al., 2017; Williams et al., 2017); thus, organizing strategies to encompass all quality participation constructs would enhance the theoretical utility of findings. Finally, our initial findings led to general strategies to foster the six aspects of participation; explicit examples outlining what the strategies look like "on-the-ground" would enhance the practical utility of findings.

In summary, confirming the theoretical links between the quality participation constructs and strategies would further our understanding of *how* to promote quality experiences in CBEPs. Given the parallels between behaviour change techniques and the strategies in question, an approach similar to Michie and colleagues' (2008) process for linking theoretical behavioural determinants to behaviour change techniques could be used to map the 10 quality participation constructs to strategies for fostering quality participation. In addition, presenting the theoretical links alongside examples of the strategies would further our practical

¹ PERMA stands for Positive emotion, Engagement, positive Relationships, Meaning, and Accomplishments/Achievements.

understanding what quality experiences “look like” in CBEPs; drawing on the expertise of program providers would capture “on-the-ground” examples and ensure the strategies are relevant in practice. Accordingly, the purposes of this paper are to (1) document the generation and refinement of a quality participation strategy list to ensure resonance and applicability within CBEPs for persons with physical and intellectual disabilities, and (2) identify theoretical links between strategies and the quality participation constructs. Our aim is to contribute a theoretically-meaningful quality participation strategy tool that can be (a) practically implemented “on-the-ground” by providers who offer CBEPs to persons with disabilities and (b) used by exercise psychology researchers to manipulate the quality participation constructs in experiments to test the outcomes of improvements in quality participation. To fulfill this aim, we undertook a rigorous systematic, multi-step process subsequently described.

1. Methods

All steps of the study received approval from the institutional research ethics board.

1.1. Purpose 1: Generation and refinement of strategy list

The generation and refinement of an initial list of strategies and examples occurred in three steps, as follows.

1.1.1. Step 1: Generation of an initial list of quality participation strategies

First, we returned to our qualitative data with providers from nine CBEPs serving persons with physical disabilities (Man et al., 2017). Strategies that fostered each of the six aspects of participation (Martin Ginis et al., 2017) and validation were compiled into an initial list. Examples of how the strategies were operationalized were also extracted, where available.

1.1.2. Step 2: Resonance and applicability of strategy list among providers of CBEPs

Participants. Providers from the nine CBEPs who contributed to Man and colleagues’ (2017) study were recontacted and invited to offer their perspective on the resonance and applicability of the strategies in CBEPs for persons with physical disability. In addition, six providers who administer CBEPs serving individuals with intellectual disabilities were invited to participate. The included programs were identified through separate systematic scoping reviews that aimed to identify CBEPs for persons with physical (D’Urzo et al., 2019) and intellectual disabilities (unpublished).

Protocol. Providers were invited to participate via email. Potential participants were assigned an identification number and provided a link to the online letter of information/consent form and Qualtrics survey.

Survey. Strategies and examples representing each of the six aspects of quality experience plus validation were presented on separate survey pages (7 pages total). At the top of each page, a definition of the six aspects (Martin Ginis et al., 2017) or validation (Man et al., 2017) was provided to orient the participant to the construct of interest. For each strategy on the page, the provider was asked to indicate whether the strategy is used in their program (yes/no). A comment box was provided for participants to offer feedback about the strategies, additional strategies (with specific examples) that were not yet represented in the list, and/or additional examples of how the strategies are operationalized in their specific context.

Analysis. Frequency counts and percentages were calculated for the number of programs that used each strategy. Additional strategies and examples were extracted from comment boxes and added to the strategy list. All comments were considered and integrated during Step 3.

1.1.3. Step 3: Addition, re-categorization, and revision of strategies

First, two recent research syntheses outlining program conditions

(Shirazipour et al., 2018) and participant perceptions (Williams et al., 2017) of positive experiences in physical activity settings for persons with physical disabilities were reviewed for strategies to supplement the preliminary strategy list. Next, the first, second and last authors – each with extensive familiarity with the quality participation framework, disability and exercise research, and hands-on experience administering a CBEP for persons with physical and intellectual disabilities - immersed themselves with the strategy list, then independently re-categorized the strategies with associated examples into one or more of the 10 quality participation constructs (i.e., six aspects, three environments, and validation). Discrepancies in re-categorization were addressed through discussion. During the re-categorization process, minor wording adjustments (i.e., rephrasing for consistency in tense and terms, specificity of strategies) were made and redundant strategies were removed. Additionally, all feedback received from the program providers in Step 2 was incorporated.

1.2. Purpose 2: Mapping strategies to quality participation constructs

1.2.1. Step 4: Expert consultation for theoretical links between strategies and constructs

Participants. The second author identified external researchers with expertise in physical and/or intellectual disability, physical activity, participation and/or health behaviour change theory/frameworks. The first and last authors then added to the list based on the contacts in their professional networks. Thirty-nine experts were invited to participate via email.

Protocol. A modified version of the closed sort task consensus process used by Michie et al. (2008) was developed to map the resulting strategy list from Purpose 1 to the 10 quality participation constructs. Interested experts were emailed a unique identification code along with the link to the letter of information/consent form and online Qualtrics survey.

Survey. The online survey began with detailed instructions for how to complete the sort task. Participants were then presented, and asked to become familiar with, the definitions of the 10 quality participation constructs. At the top of each subsequent survey page, the definitions of the 10 constructs were presented followed by one of the strategies and accompanying example(s). Experts were asked to indicate one or more of the 10 constructs that a given strategy targeted, or to respond ‘other’, whereby they could describe a new construct to which they believed the strategy would more appropriately fit. Experts were also able to provide comments for each strategy. Strategies were presented one-by-one to participants in a random order. There was no time limit for experts to complete the task. Participants were offered \$75 compensation upon survey completion.

Analysis. Frequency counts and percentages for each category that was selected for each strategy were tallied. These percentages were then divided into quartiles to establish high (75–100%), moderate (50–74%), low (25–49%) and no (<25%) agreement. The Gwet agreement coefficient (AC₂; Gwet, 2008) was calculated to assess inter-rater reliability (i.e., homogeneity in the yes/no ratings assigned by all survey participants; Gwet, 2014). The AC₂ coefficients are interpreted with the Landis and Koch (1977) inter-rater reliability scale due to the high number of raters, and the option to select from up to 10 constructs for each strategy, both of which decrease random chance, and thus accurately represent true inter-rater reliability (Gwet, 2008, 2014). Accordingly, a value of 0.20 was established as the cut-off point for calculated AC₂ values (Landis & Koch, 1977), and strategies with AC₂ values lower than 0.20 were removed from the final list.

1.2.2. Step 5: Integration of data into final matrix

Four authors (1, 2, 3, 6) participated in two meetings. At the first meeting, the authors compiled and discussed findings from Step 4. It was noted that examples had not been generated for 17 strategies. To ensure consistency in the final reporting of the strategies, the second and third

authors reviewed interview transcripts from the author team’s “Quality Participation Over Time” study (Man et al., 2019), which explored members’ experience of quality participation over their first year in a CBEP. The authors extracted examples of how persons with a disability described program providers’ implementation of the 17 strategies. During the second meeting, the final format for presenting the findings was discussed and agreed upon.

2. Results

2.1. Purpose 1: Generation and refinement of strategy list

2.1.1. Step 1: Generation of an initial list of quality participation strategies

Following a return to the data from Man et al. (2017), an initial list of 82 strategies spanning the six aspects of quality participation and validation was generated (see Supplementary Table A1).

2.1.2. Step 2: Resonance and applicability of strategy list among providers of CBEPs

Providers from 15 CBEPs for persons with physical ($n = 9$) and intellectual disabilities ($n = 6$) completed the online survey. All programs included opportunities for aerobic and resistance exercise, were offered in English to community-dwelling adults with disabilities ages 18 years and older, and located in Canada (see Table 1 for program characteristics).

Many strategies were commonly-used within programs serving both persons with physical and intellectual disabilities. Providers of programs for intellectual disabilities contributed an additional 12 strategies (total of 94 strategies after Step 2). Frequency counts and percentages for each of the strategies included in this step across CBEPs for persons with physical and intellectual disabilities are presented in Supplementary Table A1.

2.1.3. Step 3: Addition, re-categorization, and revision of strategies

The syntheses by Shirazipour et al. (2018) and Williams et al. (2017) identified three novel strategies not yet included in the list following Step 2. The re-categorization and revision processes in Step 2 yielded 86 strategies targeting the 10 quality participation constructs.

2.2. Purpose 2: Mapping strategies to quality participation constructs

2.2.1. Step 4: Expert consultation for theoretical links between strategies and constructs

Of the 39 experts who were invited to participate in the sort task, 22 completed the survey (56% response rate). Most expert participants were women (57%). Experts were from Canada ($n = 17$), United States ($n = 5$) and Australia ($n = 1$) with primary expertise in physical and/or intellectual disability ($n = 12$), physical activity ($n = 1$), participation ($n = 2$) and/or health behaviour change theory/frameworks ($n = 6$). On average, participants took 57 min ($SD = 28$; range 21–117) to complete the sort task. Experts selected from one to 10 of the 10 constructs for a given strategy. Following analysis, one strategy was eliminated (“Give opportunities for participants to raise concerns and discuss their personal goals”) due to poor inter-rater reliability.

2.2.2. Step 5: Integration of data into final matrix

Three critical decisions were made to finalize the presentation of the final list of 85 strategies:

1. Mapping of a given strategy on several constructs. As the data were compiled, it was clear that experts considered many strategies to foster multiple constructs. Given the overlap, we decided against assigning strategies to a singular, most agreed-upon construct. Rather, we designed a matrix to illustrate how a given strategy can be implemented to target several constructs of quality participation.

Table 1
Characteristics of programs represented by study participants.

Program ^a	Participants per session	Population served	Participant: staff ratio	Cost of program
Programs for Individuals with Physical Disabilities				
1	3–15	All physical disabilities	1:1	\$20 monthly
2	Varies	Multiple sclerosis, spinal cord injury and lower limb amputations	1:1	\$33–45 monthly
3	8–12	Limited mobility, multiple sclerosis, Parkinson’s disease, spinal cord injury and stroke	1:4	\$60 monthly
4	15–18	Limited mobility, multiple sclerosis, Parkinson’s disease, spinal cord injury and stroke	1:4	\$60 monthly
5	12	Aging, Brain injury, spinal cord injury and stroke	1:4	\$18–26 monthly
6	1	Cerebral palsy, limited mobility, multiple sclerosis, spinal cord injury and stroke	1:1	No cost
7	4	Acquired brain injury, limited mobility, spinal cord injury and stroke	1:1	\$85 hourly
8	8–35	Amputations, cerebral palsy, limited mobility, Parkinson’s disease, spina bifida, spinal cord injury and stroke	2:1	\$48 monthly
9	20–30	Spinal cord injury	2:1	\$75 monthly
Programs for Individuals with Intellectual Disabilities				
10	25	Autism spectrum disorder, down syndrome, global development delay	5:1	\$75 annually
11	10	Autism spectrum disorder	1:1	\$25 yearly
12	10	All intellectual disabilities	4:1	No cost
13	3–5	All intellectual disabilities	1:2	\$75 for 10 weeks
14	1-3 (private session) or 5–8 (group session)	Autism spectrum disorder, down syndrome, pervasive developmental disorder	1:3	No cost
15	3–15	All intellectual disabilities	1:3	\$20 monthly

Note.

^a Program names and locations have been removed to maintain anonymity of participating programs. Program characteristics presented at time of data collection; may not represent the current program.

2. Validation as a quality participation construct. Experts agreed that three strategies would likely foster validation in CBEPs. Like all other strategies in the list, the three identified strategies were considered to foster multiple constructs (i.e., they were not unique to validation). With no substantive evidence to disregard validation as a quality participation construct, it was retained in the final matrix.

3. Practically-useful format. The data were compiled in matrix format (Figure 1), mirroring the format used by Michie et al. (2008) in their initial behaviour change technique taxonomy. Frequency counts for each strategy range from high (75–100%) to low

Construct	Strategy	Example	Constructs of Quality Participation																	
			A	B	C	E	M	Me	V	PE	SE	AE								
Autonomy	Invite participants to give their input on the development of their exercise routine	Allow participants to have input in determining the frequency, intensity, duration, and type of exercise; Participants have the option to select from a variety of structured physical activity options																		
	Allow participants to determine their own exercise goals in collaboration with a qualified trainer	In a preliminary meeting, the participant identifies their personal goals and the trainer provides feedback, subsequently helping to build a program to achieve these goals																		
	Provide participants with the option to fundraise for their own membership fees	Participants collect pledges for the program's special events in order to subsidize their own participation fees																		
	Transfer physical activity knowledge pertaining to exercise methods and skills, so that participants can exercise independently outside of the exercise program	Provide online links and videos for at home workouts; Provide participants with their programs so they can perform them individually																		
	*Provide continued exercise opportunities to participants after they have graduated from or completed the program	Offer another exercise program that helps transition participants to mainstream gyms																		
	Provide opportunities for participant to engage in physical activity outside of the program session	Include a voluntary option to drop-in to the gym outside of program session time																		
	Allow participants to set their own goals for changes they would like to see in their daily lives	When performing exercises, try to relate movements to functional activities so participants can identify goals for their daily lives																		
	Support participants' mastery perceptions by demonstrating an understanding and acceptance of all participant abilities	Respect participants' personal preferences and decisions for how they want to exercise																		
Belongingness	Engage in communication with the program participants outside of the program hours/sessions	Circulate monthly newsletters about the program community, upcoming events, etc.																		
	Include activities where participants may work together (for group-based exercise program)	Partner ball tosses, battle ropes, etc.																		
	Provide opportunities for participants to socialize	Provide opportunities for participant socialization during exercises, between exercises, and outside of program times																		
	Group together participants with similar abilities and needs (for group-based exercise program)	For circuit-based exercise, divide participants into groups based on similar mobility impairments, so the exercises can be tailored and adapted to the participants' abilities																		
	Encourage participants to provide peer-based motivation for one another.	Volunteer provides positive reinforcement when participants motivate one another																		
Belongingness	Allow participants to continually re-enroll in the program, after they have graduated from or completed the program.	Structure the program to be on-going; do not limit enrolment to only new participants																		
	Orient the participant when they first join the program	Introduce them to program leaders, staff members, and volunteers, as well as any other individuals they will be working with directly																		
	Create opportunities to get to know the participants beyond their identity in the program as an exerciser	Ask participants about their lifestyle and interests; Host social sessions after weekly exercise sessions to get to know participants																		
	Have program characteristics that promote acceptance and inclusion from the general public	Advertise the facility as an all-inclusive, safe space for persons with and without mobility impairment																		
Challenge	Create individualized exercise programs to suit the current needs of the participant	Integrate add-ons or variations to exercises to increase difficulty at a participant's discretion (for group-based exercise program)																		
	Provide cues or reminders to ensure that participants are working hard to complete their exercises	Providers counts participant's repetitions out loud; visually indicates movement start and end points																		
	Create voluntary friendly competition between participants on a voluntary basis.	Plan monthly 'challenges' such as throwing competitions, obstacle courses, etc.; Recognize individuals who succeed in program competitions																		
	Prescribe exercises that push participants to their comfortable limit	Be willing to respectfully challenge the participant to improve, instead of being complacent about improvements regarding exercise																		
	Intermittently conduct a formal reassessment and update a participant's exercise program	Create and monitor a timeline for all participants to be re-assessed every 6 months																		
	**Ensure staff members/ volunteers are knowledgeable about making appropriate exercise adaptations	Recruit staff members/ volunteers who have a health sciences, exercise, and disability, etc. background; Educate staff members/ volunteers on contraindications for exercise and safety in the gym																		
Engagement	Provide participants with educational opportunities relevant to physical activity	Provide informal education regarding the benefits of exercise during the exercise session; Provide the opportunity for participants to learn more about the benefits of exercise specific to their condition(s)																		
	*Be willing to make new times and dates available for program sessions to offer variety in scheduling and accommodate participants	If a program session is full, open up a new session time to take in more participants; Offer program sessions at multiple time points in the day to accommodate different participant preferences																		
Mastery	Gradually provide less direct support for the participant, when appropriate (for individual-based exercise program)	As participants gain confidence and improve at their exercises, provide hands-off support or support only when it is needed																		

Figure 1. “On-the-ground” strategy matrix for fostering quality participation in community-based exercise programs for persons with physical and intellectual disabilities.

*Strategy was agreed upon to best foster two or more aspects of quality participation. **Strategy only exhibited low agreement

Constructs of quality participation: A, Autonomy; B, Belonging; C, Challenge; E, Engagement; M, Mastery; Me, Meaning; V, Validation; PE, Physical Environment; SE, Social Environment; AE, Activity Environment.

			A	B	C	E	M	Me	V	PE	SE	AE
Mastery	Provide cues or reminders to ensure that participants maintain proper technique when exercising.	Count sets and repetitions with the participant; Place hands at the start and end points of movements, etc.										
	Encourage participants to report back their action plans and progress to staff members/ volunteers	Volunteers ask participants if they have noticed changes in their strength and endurance.										
	*Use a stepped approach to increase the complexity of a participant's exercises	Start with a basic, simplistic exercise and slowly introduce components to add difficulty such as weights, therabands, added movements, etc.										
	Provide clear instructions with adequate detail for performing exercises	Use straight forward language, demonstrate exercises, and identify range of motion of movements before the participant tries the exercise										
	Demonstrate the proper technique for exercises	Model the exercise before instructing the participants to follow; Allow participants to observe other members completing a task										
	Provide constructive feedback to participants.	Correct a participant's technique if they are performing the exercise incorrectly										
	Use verbal persuasion to increase a participant's confidence in their ability to perform the activity	Provide the participant with feedback on their performance, and emphasize what they're doing correctly										
	Record or log exercises performed	Have participants or staff members/ volunteers write down the amount of time, weight, sets and repetitions of exercises that are completed										
	Show participants their progressions between assessments using quantitative analysis	Use machines that can display/ show percentages of improvement in range of motion, weight, etc. to participants										
	Have health professionals (physiotherapist, trainer, etc.) provide advice and guidance to participants during the session	A physiotherapist is on site, trains staff members/ volunteers, or works directly with a participant at each session										
Meaning	**Encourage participants to voluntarily get involved in physical activity research studies.	If the program has received flyers or information about research studies, the staff members/ volunteers will mention them to participants and post the information in the facility										
	**Post research findings of site-specific studies in the facility	Communicate study results through word of mouth of staff members/ volunteers; Put up posters of study results in the facility										
	Encourage participant self-reflection, and examination of personal goals and how exercise is making them feel	Have participants fill out a short journal entry each session										
Validation	Follow up with participants after they graduate out of the program	Follow up with participants at 3 months post program completion via a phone call or personal meeting										
	Set up feedback opportunities on an ongoing basis for participants to offer personal suggestions and input on the program	Use a comment box so participants can voice their opinions; Create a participant representative role on the organizing board										
	**Provide adequate training to staff members/ volunteers to ensure a high level of service in the program	Ensure that staff members/ volunteers have specific training in physical activity for the population										
Physical Environment	Ensure that the exercise setting is reserved during each session for program members only	Book a space in a gym or exercise facility that can only be accessed with membership to the program										
	Incorporate the latest evidence-based training techniques and exercise machines.	Tapping muscles, using electric stimulation, use of mirrors; ZeroG treadmills, functional electric stimulation bicycles										
	Offer the program out of an inclusive and safe facility such as a community centre or private facility	Ensure the space has accessible doorways and elevators, or ramps; that the equipment is accessible and set up to allow for the use of mobility aids.										
	Acquire intuitive, easy-to-use exercise equipment	Use a Nu-Step machine, which guides stepping movement and is easily accessible with a swivel seat										
	Monitor facility temperature to ensure participants are exercising in the optimal environment	Always make sure that the facility temperature is the same, and check it around 30 minutes prior to participants arriving										
	Have accessible washrooms on site	The stalls have enough room for a wheelchair and service dog (in some cases both), as well as handles near the toilet. Accessible showers are also recommended										
	Provide access to clean drinking water for program participants	Have an accessible water fountain inside the gym										
	Arrange equipment within space to optimize ease of movement for participants	Adopt an open gym concept; Ensure there is enough space for movement between areas with assistive devices										
	Provide close parking in reserved spots for program participants	Provide parking passes to participants who drive themselves, and ensure accessible parking is on-site or in a nearby accessible location										
	Limit enrolment in sessions to ensure equal access to equipment	Avoid accepting new participants into sessions where current participants are often waiting to use the equipment										
Increase financial accessibility to the program	Create new and different payment schedules or offer membership subsidies											

Figure 1. (continued).

			A	B	C	E	M	Me	V	PE	SE	AE
Social Environment	Recruit staff members/ volunteers with diverse personalities.	Recruit volunteers of various ages, personality traits, and educational backgrounds										
	Facilitate interaction between participants, individuals who are involved in different programs, and other staff at the facility	Begin the exercise session with a group meeting; Include activities where participants may work together (for group-based exercise program)										
	Have staff members/ volunteers provide one-on-one social support for the participants (for individual-based exercise program)	Engage in conversation with the participant; Have staff members/ volunteers show interest in participants and their lives (i.e. ask about how they have been since they last came to the program)										
	Keep the same staff members/ volunteers working with the same participant during exercise sessions (for individual-based exercise program)	Designate a specific volunteer to introduce the participant to the exercise facility upon entry to the program, and ensure the same volunteer/staff member is consistently working with that participant										
	Welcome a family member or caregiver to be present (but not participate) at the program	Family members can join other community exercise programs at the facility										
	Have staff members/ volunteers float or circulate constantly	Monitor participants to ensure that they are performing their exercises; Provide positive feedback to individuals who are struggling or have negative attitudes										
	Have staff members/ volunteers provide encouragement and motivation	Verbal persuasion to continue with the exercise, and comments such as "You can do it!"										
	Practice problem solving together with the participant.	Provider works with the participant to adapt exercises based on participants' concerns about an exercise.										
	Model/ demonstrate persistence in exercise through group taught sessions, pamphlets, stories, and workshops, etc.	Invite a graduate of the program to speak about their exercise journey and the challenges they overcame while being a part of the program										
	Utilize social media to facilitate the sharing of program participants' successes	Tag participants in posts where they achieve their goals; Send videos and photos to participants so they can share them with their own followers										
	Allow past program participants to return, volunteer at the program, and act as role models to current participants	Graduates come back to socialize, interact, and speak with current participants; Graduates from the program volunteer to hold discussions/ focus groups on relevant topics										
	Practice active listening to help the participants to feel supported and heard	Instruct staff members/ volunteers to validate the concerns of the participant; Instruct staff members/ volunteers to listen instead of providing advice to the participant										
	Practice individualized consideration, where staff members/ volunteers address unique participant needs with compassion and empathy	Treat all participants as individuals; Ask participants about the way that they would most like to be supported										
Social Environment	Provide access to experts and services who can give the necessary emotional, tangible, and informational support for participants	Refer participants to online regional platforms to find personal resources; have contact information of relevant experts and services										
	Practice open and continuous communication with the participant	Ask questions to see how the participant is doing; Have staff members/ volunteers be genuine, friendly, and warm when interacting with participants so they feel comfortable										
	Have program leaders engage in community outreach to spread awareness of opportunities for persons with disability	Program leaders continually seek out partnerships with relevant stakeholders; Program leaders take part in community events and fundraisers										
	Encourage the staff members/ volunteers to be eager and have positive attitudes while at the program	Instruct staff members/ volunteers to be friendly and welcome each member when they enter the gym										
	Train staff members/ volunteers to be sensitive to the social, accessibility, and physical activity needs of the population participating in the program	Make suggestions for participant progression, rather than dictating or pushing progression on the participant; Ask a participant if they require assistance with mobility and ambulation										
	Enforce a zero tolerance rule for inappropriate behaviour	Gently remind participants to minimize disruptions during group exercise; Privately speak to participants who behave inappropriately and communicate the consequences of continued behaviour										
	Ensure staff members/ volunteers are knowledgeable about the specific impairments or symptoms of the participants (in a confidential way)	Only provide non-identifying, relevant information about a participant's contraindications to exercise so that the staff member/ volunteer can properly support the participant										
	Create an open, honest and supportive environment where differences are accepted rather than frowned upon	Inform volunteers from the beginning (their orientation session) that the welcoming atmosphere is one of the most important parts of the program										
	Have staff members/ volunteers encourage participants to build and utilize their own support networks	Encourage participants to create/initiate or join common-interest groups together that are outside of the exercise program										
	Practice caring attitudes and be non-judgmental and empathetic during interactions with participants	Focus on participants' interests and their participation in the exercise program, rather than their impairment										
	Expand the inclusion criteria for the population eligible to sign up for the program	A program that normally works with individuals with cerebral palsy could expand it's network to work with stroke victims										
	Ensure that the program leaders are present at the program	Have the program leaders and directors drop in to the program sessions from time to time to meet and interact with participants										

Figure 1. (continued).

			A	B	C	E	M	Me	V	PE	SE	AE								
Social Environment	Have an experienced staff member/volunteer present to provide support to junior staff members/ volunteers	Internship students or older volunteers self-identify at the beginning of the session, and can answer the questions of new volunteers																		
	Offer modifications for exercises	Have extra equipment (such as different weights, therabands, bosu balls, etc.) close by for adaptations to the chosen exercise																		
Activity Environment	Provide variation in the modality of exercise instruction, according to the needs of the participant	Instructors demonstrate exercises themselves, explain the exercise verbally, physically provide start and end points for movements, help participants move their bodies with the correct form, etc.																		
	Ensure that the ratio of staff members/volunteers to participants is low	Book appointments for exercise sessions for adequate support and personnel to help during a participant's attendance; For Individual-based exercise: 1:1; For group-based exercise, 1:4																		
	Perform prescribed exercises in an alternative format, if the machine or equipment that is needed is being used	Suggest using a theraband for a chest press; Rotate the order of exercises in the participant's routine to use a free machine																		
	Separate a participant's exercises by providing the option for intermittent breaks	Indicate in a participant's exercise routine when breaks should be taken																		
KEY:																				
<table border="1"> <tr> <td style="background-color: #d3d3d3;"></td> <td>High Agreement (75-100%)</td> </tr> <tr> <td style="background-color: #a9a9a9;"></td> <td>Moderate Agreement (50-74%)</td> </tr> <tr> <td style="background-color: #808080;"></td> <td>Low Agreement (25-49%)</td> </tr> <tr> <td style="background-color: #404040;"></td> <td>No Agreement (0-24%)</td> </tr> </table>				High Agreement (75-100%)		Moderate Agreement (50-74%)		Low Agreement (25-49%)		No Agreement (0-24%)										
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	No Agreement (0-24%)																			

Figure 1. (continued).

agreement (0–24%), with the percentages representing the proportion of experts that believed the strategy fostered a given element or condition. Strategies were placed in the matrix according to the construct that had highest level of expert agreement. Alongside every strategy is a corresponding example, to provide clarity when implementing the strategy.

3. Discussion

The purposes of this paper were to (1) document the generation and refinement of a quality participation strategy list to ensure resonance and applicability within community-based exercise programs (CBEPs) for persons with physical and intellectual disabilities, and (2) identify theoretical links between strategies and the quality participation constructs. By using a systematic, multistep process modelled from the closed sort consensus method used by Michie et al. (2008) to generate a behaviour change technique taxonomy, we have created a strategy matrix that offers a theoretically-meaningful representation of how strategies can be practically implemented “on-the-ground” by CBEP providers who want to offer quality participation experiences to persons with disabilities.

The strategy matrix has a broad scope as it includes strategies that can be applied in programs tailored for either (or both) persons with physical and intellectual disabilities, with practical examples of how to operationalize each strategy within such programs. The strategy matrix was developed by incorporating the perspectives of multiple end users who may apply and/or benefit from its use (i.e., program providers, program members, and experts in health behaviour change theory, disability, physical activity, and participation). The matrix shows that one strategy can target multiple quality participation constructs (as speculated by Evans et al., 2018), with the agreed-upon theoretical links clearly laid out in a table format, ensuring theory is accessible to exercise program providers. In addition, as many of the quality participation constructs are conceptually similar to constructs from theories used in exercise psychology (e.g., mastery from Social Cognitive Theory (Bandura, 1997); autonomy, belonging and relatedness from Self-Determination Theory (Deci & Ryan, 2012)), the strategies can also be applied in future theory-driven exercise psychology research. Finally, the matrix encompasses conditions within the physical, social and

activity environment which are a required foundation for offering a quality experiences (Evans et al., 2018).

While a strength of the matrix is the theoretical links between strategies and quality participation constructs, there is complexity in its interpretation. Some strategies have theoretical links with several quality participation constructs. For example, experts had high agreement that the strategy “Intermittently conduct a formal reassessment and update a participant’s exercise program” fostered challenge and mastery, and moderately agreed that it fostered an optimal activity environment. The potential overlap in the quality participation constructs has been noted at both conceptual (Martin Ginis et al., 2017) and practical levels (Jackson et al., 2019). A similar phenomenon is reported in the exercise psychology domain wherein behaviour change techniques are conceptually linked to multiple theoretical constructs of human motivation (Carey et al., 2019; Johnston et al., 2021). While there are several strategies with links to more than one construct, there are also several strategies where experts did not have high agreement for which constructs were targeted; for example, strategies initially thought to target validation only reached low and moderate agreement by experts. Experimental designs testing the efficacy of individual strategies on program members’ quality participation constructs is warranted. In the meantime, providers aiming to foster quality experiences in exercise programs may opt to implement strategies that have theoretical links to one or more constructs.

The temporality in how interlinked quality participation constructs are experienced is still unclear, as some constructs may be a defining characteristic of a quality experience in some instances, but an outcome in other instances. For example, the experience of challenge is required before one can experience mastery, yet mastery may also be a precursor to future experiences of challenge. Future research exploring how quality experiences change over time is necessary to unpack the relationship between quality participation conditions, elements and outcomes.

Ultimately, the utility of the matrix is that it offers a “menu of strategies” for how quality experiences may be fostered in CBEPs for persons with disabilities. Given the contexts of these programs are variable (Hebert et al., 2016), a one-size-fits-all approach to strategy implementation is impossible. Although lengthy, the matrix’s “menu” provides a complete picture of what could be possible in CBEPs for persons

with disabilities, allowing providers to apply strategies that are most applicable and feasible within their context (Brehaut & Eva, 2012; Michie et al., 2005).

Indeed, we have received some preliminary feedback from our research team's community partners who offer CBEPs, suggesting several ways to use the matrix. The matrix could be applied in the development of new exercise programs that foster quality participation. First, providers would identify which quality participation construct they want to foster within their program, then scroll down that construct's column to identify the "menu of strategies" where there is agreed-upon theoretical alignment for that construct. The providers would then assess feasibility within their context before tailoring the strategy to their program. A second practical application of the matrix is to assess where and how existing programming may be altered to further promote quality experiences. Providers said they would use the matrix as a checklist to identify which quality participation constructs are primarily targeted by the strategies they currently implement in the program, and whether additional constructs need to be targeted to ensure a fulsome quality experience for all members. A third practical application of the matrix envisioned by our partners is to use the strategies for training new program staff or volunteers. Specifically, the strategies can be used to offer novice providers guidance about how to foster positive exercise experiences for persons with disability, and to justify why certain features of the program exist. The research team collaborated with program providers to produce a knowledge tool that guides providers through the content in the matrix and how to apply findings "on-the-ground" in CBEPs for persons with disabilities. The knowledge tool can be found in [Supplementary Material B and C](#).

Of note, there are several epistemologies that could frame the development of, and thus dictate the methods used for, a list of strategies for fostering quality participation constructs. We approached our study from an epistemology that values consensus-building using an established and systematic process. There is debate in the literature regarding the knowledge generated from consensus-based approaches (for a summary of critiques and counterarguments, see Innes, 2004). Several strengths of the process undertaken in the current study are the inclusion of experts with diverse but relevant experience, the opportunity for participants to indicate disagreement or alternative constructs that align with strategies, and the presentation of percentage agreement to highlight where there is disagreement and/or uncertainty among participants (Shrier, 2021). However, our approach was limited given there was no discussion among expert participants (Shrier, 2021) nor between the research team and experts, minimising insight into participants' opinions on the (mis)alignment of strategies with constructs (c.f., Monforte et al., 2022). We encourage readers to be considerate of the knowledge generated in consensus-based evidence and view our study as a starting point for researchers/providers who aim to target the quality participation constructs in their interventions/programs.

Several limitations of this study and the strategy matrix should be noted. First, during the closed sort task (Step 4), as expert participants continued in the survey, they started to sort strategies into fewer and fewer constructs. While this may be due to increased familiarity with the task, it may also be due to participant fatigue given the number of strategies included or to increasing uncertainty in how to link strategies with constructs. Following up on the survey with qualitative methods, similar to the approach used by Monforte et al. (2022), may have offered additional insight into participants' thoughts about the alignment between constructs and strategies. Second, during analysis of the sort task results, agreement among experts was classified into quartiles (high, moderate, low, and no agreement). The limitations of choosing cut points is documented (Andersen et al., 2007; Jacobs, 2018); however, quartile cut points offered a meaningful way to communicate expert opinion to providers, which was a central goal of this project. Third, while the matrix broadens the scope of strategies for CBEPs serving

persons with physical and intellectual disabilities, the strategies presented are specific to segregated programs (e.g., wherein persons with disabilities participate alongside persons with disabilities only). End users should acknowledge that not all strategies will directly translate to inclusive programs (e.g., where participants exercise together regardless of ability). For example, the strategy "Group together participants with similar abilities and needs (group-based exercise)" is phrased specifically for segregated exercise programs. Further refinement of the matrix is necessary to explore whether different and/or additional strategies serve to enhance quality experiences in inclusive programs. Fourth, the matrix was developed based on in-person offerings of CBEPs. The COVID-19 pandemic required exercise programs to adapt to virtual programming, or offer a mix of in-person and virtual programming. While many of the strategies in the matrix may apply in, or be adapted for a virtual context, further research is warranted to explore how to foster quality experiences among exercisers with disability in virtual exercise programs. Finally, the perspectives of persons with disability were not sought to provide feedback on the strategies included in the matrix; however, in using transcripts from participants to supplement the generation of examples (Step 5), the matrix includes the views of persons with disabilities. Future research exploring the resonance of the strategy matrix among persons with disabilities is required.

4. Conclusions

Our study provides a theoretically-informed "menu of strategies" that may be adopted by providers of new or established CBEPs who want to foster quality participation among individuals with a disability or by exercise psychology researchers who want to manipulate the quality participation constructs in experiments testing outcomes of improvements in quality participation. The final matrix synthesized insights from research and practice for use "on-the-ground" in CBEPs for persons with physical and intellectual disabilities. Further research is warranted to determine the impact of the matrix on providers' ability to foster quality experiences among program participants.

Funding

This work was supported by a Partnership Grant from the Social Sciences and Humanities Research Council of Canada (SSHRC PG 895-2013-1021) awarded to KMG for the Canadian Disability Participation Project (CDPP).

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: JRT and AELC are Co-Directors of a CBEP that participated in the study. KEM, JDS and KEA were volunteers at the same CBEP during the study period. KAMG has no conflicts to report. This work was supported by a Partnership Grant from the Social Sciences and Humanities Research Council of Canada (SSHRC PG 895-2013-1021) awarded to KMG for the Canadian Disability Participation Project (CDPP).

Data availability

Data will be made available on request.

Acknowledgements

This work was made possible by the valuable contributions of the program providers and experts who participated. We would like to acknowledge our partners across Canada who offered insight into how the matrix could be applied "on-the-ground" in their CBEPs for persons

with disabilities: Stephanie Corras, Kelsey Ford, Kelly Kasper, Clayton Rolston, Paige Wozny, and Milly Zaletelj.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.psychsport.2023.102469>.

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