

Movement for life! A physical literacy resource for early childhood caregivers

Nathan Hall^a & Melanie J. Gregg^b

^a Brock University, Canada, corresponding author, e-mail: nhall@brocku.ca,
<https://orcid.org/0000-0003-3795-7570>

^b The University of Winnipeg, Canada, <https://orcid.org/0000-0003-4317-8768>

ABSTRACT: Early childhood education settings play a critical role in offering opportunities for children to develop physical literacy. The purpose of the present study was to investigate if Movement for Life! (M4L), a physical literacy education program for adult caregivers of children ages 0-6, translated to change in the provision, knowledge, and understanding of physical literacy by early childhood educators (ECEs). Using a pre and post-test design 84 ECEs completed two measures: the Physical Literacy Environmental Assessment (PLEA; Caldwell et al., 2020), and a survey regarding personal behaviours for providing physical literacy development opportunities. In addition, six childcare centre directors completed the Physical Activity Self-Assessment for Childcare (Ward et al., 2008). The results demonstrate that the participation in the M4L program has a positive impact on the physical literacy environment of early childhood care centres. Additionally, ECEs believed it was important to provide physical literacy development activities. They reported increased confidence to provide effective physical literacy development activities from pre-test to post-test and reported significantly decreased difficulty providing effective physical literacy development activities from pre-test to post-test, although some barriers were suggested to still exist. The results indicate the M4L program was effective and successfully implemented with ECEs.

Keywords: *physical activity, education, early childcare, early childhood educators*

Introduction

Physical literacy is a physical behaviour construct developed in an effort to address the question: what is the range of physical capacities that would enable individual persons to make the most of their existence (Whitehead, 2001). For the purposes of the present study, we adopted Whitehead's 2010 definition of physical literacy as the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities throughout the life course. Becoming physically literate is a journey that begins at birth. Very young children (ages 0–6) start on the path to becoming physically literate largely through unstructured learning opportunities; namely play. To truly foster physical literacy development across the entire lifespan, there must be support for such development right from the earliest stages of the life course. Especially when we consider that early childhood physical activity experiences can influence attitudes towards physical activity across the rest of an individual's life (Stodden et al., 2008), and have been identified as a determinant of activity levels in future years (Reillo et al., 2010). Physical literacy is an integral part of the holistic development of the child (see Stodden et al., 2021). Therefore, providing support for physical literacy development in the early years should be considered of significant importance. Yet not all caregivers of young children may recognize the importance of physical literacy. Maude (2010) suggests that children are limited by their experiences, so knowledgeable adults need to promote physical literacy by nurturing physical competencies through modelling and providing opportunities for development.

Over half (54%) of Canadian parents use child care for children aged four and under (Sinha, 2014) and in 2021, 74% of the children in care were enrolled in centre-based child care (Statistics Canada, 2021) making early childhood educators (ECEs) one of the largest groups of adults providing early years care in the country. Unfortunately, this population has been found to overestimate the amount of physical activity that young children engage in (House & Palin, 2009). This is partly due to educators, as well as parents, believing that young children are naturally physically active (Clark, 2014; Timmons et al., 2007). Additionally, Whitehead (2010) and Clark (2014) suggest that ECEs may not recognize the importance or give attention to developing movement skills in young children, as they tend to focus on language, numeracy, social, and emotional skills development. Yet, ECEs can play a critical role in offering opportunities for children to develop physical literacy. Education programs for ECEs that specifically focus on the importance of physical literacy development could help address some of the aforementioned issues, but to date little is known about the effectiveness of such programs. Therefore, this study will explore the influence of just such a program, specifically the Movement for Life (M4L) program.

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Early childhood development & Physical activity patterns

A holistic perspective on child development gives consideration to all domains of development working in conjunction to further the growth of the child. Every child must be provided with opportunities to explore across multiple domains and environmental contexts; adults can facilitate this exploration by providing support and feedback (Stodden et al., 2021). When a child, for example, feels good about their motor skills (physical domain) they will feel good about themselves (emotional domain) and therefore feel more confident to be physically active. The more developed children's motor proficiency is, the more motivated they will be to be physically active (Gagen et al., 2009). As Stodden et al. (2008) highlight: "young children demonstrate various levels of motor skill competence primarily because of differences in experience" (p. 294). Contextual factors, such as caregiver support and encouragement, however, will affect a child's opportunity to be active.

Timmons and colleagues (2007) state that levels of physical activity in early childhood are greatly dependent upon the child. Some children can be very active, whereas others much less so. This is crucial because activity patterns established between birth and 6 years of age are an indicator of levels of physical activity for the next five years and beyond (Jones et al., 2013). Taylor et al. (2009) suggests that activity levels in young children can start to decrease at age 3. As such, regardless of the environment, supporting young children to engage in physical activity in their early years is important. Adults need to understand the significance of early childhood physical activity patterns and the value of building physical literacy in the early years, to support young children in developing a love of being physically active (Newport, 2013). Supporting all early childhood caregivers (e.g., parents; ECEs; other guardians) who organize, provide, and supervise opportunities for physical activity to young children will help develop the disposition of kids to be physically literate for life.

Role of early childhood educators (ECEs) in physical literacy development

ECEs play a critical role in offering opportunities for children to develop physical literacy, as they work with children during one of the most critical periods of development. Though brain development has a long trajectory the most rapid phase of development in brain synapses and neurochemistry occurs during the early years (Shonkoff & Phillips, 2000). Physical literacy programming during the early years helps children to develop these neurological structures and learn emotional responses that will shape a lifetime of physical activity (Clark, 2020). However, as mentioned before, many ECEs may not provide enough opportunity for young children to develop physical literacy due to a perceived need to focus more on other areas of development (Clark, 2014; Whitehead, 2010) and a belief that young children will be physically active naturally (Timmons et al.,

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2007). The literature (e.g., House & Palin, 2009; Salamon & Harrison, 2015) supports this idea of a lack of physical literacy development opportunities being provided by ECEs. Specifically, House and Palin (2009) reported that ECEs felt confident and comfortable in their skills and knowledge to provide physical activity, however, young children in childcare centres were not being afforded sufficient opportunities to be physically active. This assumption was further supported among caregivers for children in the youngest of age groups by Salamon and Harrison (2015), who found that educators consider infants capable of directing their own physical and cognitive development but less so their own emotional and social development. So, how can these behaviours be changed and the value of providing physical development opportunities for young children be impressed on ECEs?

Government has the potential to influence the opportunities for children to be physically active in licensed childcare facilities, by creating requirements for time to be spent outdoors where they are more physically active (Perry, 2001). Some jurisdictions require licensed child care facilities to provide outdoor play every day, weather permitting (e.g., Healthy Child Manitoba, 2017). If children are unable to venture outside due to the weather, then educators provide gross motor experiences indoors. The daily routine at child care centres should include activities that build children's cognitive, language, social, and muscle development (Healthy Child Manitoba, 2017). However, for the greatest impact, Gordon et al. (2013) explained that ideal physical activity interventions for preschoolers not only include environmental modifications, but involve outdoor play, unstructured activity, and most notably, a need to be organized and supervised by educated ECEs.

ECE's education related to childhood physical development

Researchers and policy makers alike, agree that the quality of early childhood education experiences depend on having competent staff (Peeters et al., 2016). With respect to providing physical development opportunities, a positive correlation has been found between the number of ECEs with a college education employed by an early childhood care centre and the amount of time children there spend being physically active (Dowda et al., 2004). Buckler and Bredin (2021) showed a need for training ECEs in physical literacy including understanding the concept as well as providing age-appropriate activities and practical ideas for implementation. There are vast differences in the education and professional development of ECEs (e.g., Manitoba Family Services Early Learning and Child Care, 2014; Zaslow et al., 2010). There is no one course that all individuals must complete to satisfy this requirement, but instead many options for including, but not exclusive to, courses offered by post-secondary institutions. Because of this ambiguity to satisfy educational requirements, it is possible for ECEs in some jurisdictions to receive little to no pre-service education specifically related to childhood

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physical literacy development. Additionally, there may not be requirements for ECEs to complete any continuing professional development even though research has consistently supported this development for ECEs (Sakr & Bonetti, 2021). Consequently, it appears that for children in the care of ECEs, the quality of their physical activity experiences and the support they receive for physical literacy development might be greatly enhanced if ECEs were provided specific education related to these issues.

Study purpose

The presented literature has demonstrated that ECEs can play an important part in early childhood physical literacy development, yet research in the area of physical literacy with young children is limited, with authors repeatedly highlighting that this is an area in need of further study (e.g., Van Cappelle et al., 2017). Furthermore, the literature demonstrates the potential need for providing ECEs with additional education related to physical literacy development and the impacts of such education. Therefore, the overall purpose of this study was to investigate the effectiveness of providing an education program to ECEs and care centre directors. The specific research questions being:

1. Does the delivery of physical literacy education to ECEs and early childhood care centre directors translate to perceived changes in environment regarding physical literacy opportunities and support being provided at early childhood care centres?
2. Does the delivery of physical literacy education to ECEs and early childhood care centre directors translate to reported changes in behaviours and values related to physical literacy development within early childhood care centre settings?
3. What barriers exist for ECEs with regards to offering physical literacy opportunities?

Methods

Although this study focused on program evaluation, it has been argued that program evaluation is deemed to be research when the purpose is to test a new or previously untested program (in this case the Movement for Life! program) to establish if it is successful at achieving its proposed outcomes (Monsen, 2018). Specifically, the intent of program evaluation research is to contribute to the knowledge base on a topic while examining the effectiveness of a program. Program evaluation helps to establish if the program design and model is effective and could potentially be applied to other programs or populations. For this specific program evaluation study a quasi-experimental single group pre-post test design was utilized (Norman et al., 2012).

Description of Movement for Life! program

The Movement for Life! program is a physical literacy education program that was developed based on current research literature to provide early childhood caregivers knowledge and skills related to supporting physical literacy development in the early years. It was created by the City of Winnipeg Community Services Department and by scholars at the University of Winnipeg. The version of the program being examined herein contained two parts. The first part was a knowledge and skill development workshop. This three hour workshop (workshop materials including facilitator manual, participant manual, and powerpoint slides in English and French language version and videos [English only] may be accessed here: www.winnipegmotion.ca/winnipeg_community_sport_policy.php), focuses on providing participants with information regarding what physical literacy is, the importance of physical literacy development in the early years, and the role that adult caregivers play in supporting the development of early childhood physical literacy. This information is delivered through a mix of slideshow presentation, group activities, and structured group discussion. Subsequent to the workshop, the second part of the program featured eight, one hour visits from a local organization that focuses on supporting physical activity in the early years (Fit Kids Healthy Kids). During these sessions study participants got to observe and assist trained educators in providing activities designed to support the development of physical literacy. These sessions were completed in both indoor and outdoor spaces at the child care centres, and included both structured and unstructured elements. Upon completion of these eight sessions the child care centres were provided with a bag of physical activity related equipment that can be used to continue providing the types of activities that were featured in the sessions. Please see Figure 1 for an outline of the study design.

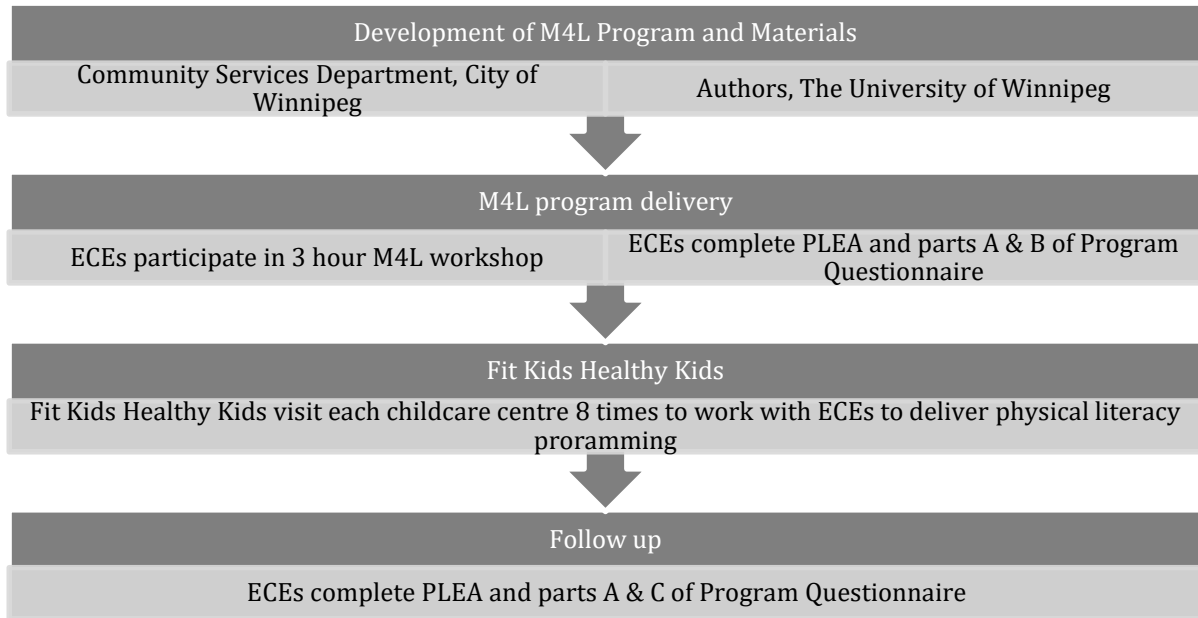


FIGURE 1 Study design

Participants

The participants in this study were from nine different urban child care centres in Winnipeg, Canada (a mid-size city) that had signed up to complete the Movement for Life! program being offered by the City of Winnipeg and its partner organization Fit Kids Healthy Kids in the months ranging from September 2018 – May 2019. A convenience sample of early childhood childcare staff participated ($n = 115$); removing participants with missing responses the complete data set included 6 childcare centre directors and 84 ECEs. The mean years of experience working in early childhood childcare was 11.54 years ($SD = 9.34$). Most participants were 40-49 ($n = 26$) or over 50 years old ($n = 22$). About half (47.8%) had previously received training or professional development related to encouraging physical literacy or movement activities for children.

Instruments

This study used multiple instruments to collect the data. The first of these instruments was the Physical Activity Self-Assessment for Child Care (Go NAP SACC; Ward et al., 2008, 2014). This 22-item questionnaire, completed on behalf of each childcare centre by the director, is a personal assessment designed to investigate caregiver's perceptions of the physical activity opportunities provided and child behaviours exhibited at their respective childcare facilities. It is comprised of all closed ended questions, each with four potential answers that participants must select from. This questionnaire has been found to be both reliable and valid in the early childcare setting (Benjamin et al., 2007; Ward et al., 2015).

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The second instrument utilized in this research was the Physical Literacy Environmental Assessment (PLEA; Caldwell et al., 2020). The PLEA is a 20-item environmental assessment tool designed to assess the degree that programming for children incorporates and supports physical literacy education and development across four domains (i.e., environment, programming, leaders and staff, values and goals). This tool functions more like a checklist, where participants check off items on the list that they believe apply or are true about the childcare centre where they presently work. The maximum overall score for the PLEA is 20 with the domain values varying; environment = 5, programming = 7, leaders and staff = 5, values and goals = 3. Existing research has supported the validity and reliability of the PLEA (Caldwell et al., 2020).

The final data collection instrument used in this research was a questionnaire specifically designed for the study (Program Questionnaire; see Appendix 1). This questionnaire has three parts to it. Part A of the questionnaire features 8 closed-ended questions that focus on perceived importance of physical literacy in early years development, confidence and ability to provide effective physical literacy development experiences to young children, perceived support for providing such activities, as well as structure of physical activity opportunities currently provided at the participant's early childhood care centres. These 8 questions were rated on a 5 point scale with anchors of 1 = *not important at all*, 3 = *moderately important*, and 5 = *exceedingly important*. Part B of the questionnaire is a demographics section that collects data on participant's age, years of teaching experience, and age of children they presently care for at their centres. The final part of the questionnaire was only completed during the post-test and has a mixture of open and closed-ended questions. This part of the questionnaire focused on perceived behaviour and environmental changes related to physical literacy opportunities being provided at participant's childcare centres since completing the Movement for Life! program. This part also asked participants to identify the biggest challenges to implementing or including the concepts learned in the physical literacy education program.

Data collection procedures

After receiving university research ethics approval for the study, directors of early childhood care centres who had already registered with the City of Winnipeg to complete the Movement for Life! program were contacted, asked if they would be willing to participate in the study, and if they would allow the research team to also approach the childcare centre's ECEs about participating in the study. Formal letters of information were provided to all prospective participants and consent forms were completed prior to any component of the research being undertaken. Immediately prior to completing the knowledge-based Movement for Life! workshop directors and ECEs completed the PLEA (Caldwell et al., 2020) and the survey created for this study. In addition, the directors also

completed the Physical Activity Self-Assessment for childcare (Ward et al., 2014). Participants then completed all aspects of the Movement for Life! education program over the following 8 weeks. Upon finishing the Movement for Life! program participants once again completed the same questionnaires, with a few additional items added to the Program Questionnaire (See Appendix 1). Following completion of the post-test all data was entered into SPSS for data analysis and personal identifiers were removed.

Data analysis

Pre and post-test means and standard deviations were calculated for the four domains assessed by the PLEA, the overall scores on the PLEA, and questions from the Program Questionnaire that have a rating scale. Paired t-tests were used to assess changes in scores from pre to post participation in the Movement for Life! program.

Frequencies (%) of childcare centres meeting best practice recommendations are reported for the Go NAP SACC at pre and post participation in the M4L program.

Thematic analysis was used to group open-ended question responses by theme. Example responses are included throughout the results section to provide increased depth, detail, and context. Two researchers independently coded the data into themes and then met to compare, contrast, and discuss themes until consensus was reached. When quotes are provided the participants are differentiated by P followed by their participant number.

Results

Physical activity self-assessment for childcare

Directors completed the physical activity portion of the Go NAP SACC self-assessment instrument (Ward et al., 2014) to assess their program's strengths and areas for improvement. Six directors completed the assessment both prior to and following the M4L program. Frequencies of meeting the best practice recommendations are reported in Table 1. Few directors (n = 2) reported caring for infants, so the data related to infants were not included in the Table and only data related to children ages two and up are reported. Just over half (9/17) of the best practice recommendations showed improvement from before to after the M4L program, six remained consistent, and two moved farther from the target.

TABLE 1 Physical Activity Self-Assessment for Child Care frequencies (%) of childcare centres meeting best practice recommendations

<i>THEME</i>	<i>BEST PRACTICE</i>	<i>TIME 1</i>	<i>TIME 2</i>
Time Provided	120 minutes or more of indoor and outdoor daily physical activity	80%	80%
	60 minutes or more of adult-led daily physical activity	0%	0%
	Outside of nap and meal times, the longest the children are expected to remain seated at any one time is less than 15 minutes	80%	80%
Indoor Play Environment	The program offers 3-4 features of indoor play spaces	100%	80%
	The program has 5-6 types of portable play equipment available and in good condition for children to use indoors	80%	100%*
	Teachers offer portable play equipment to children during indoor free play time – at least a few items are always available to encourage physical activity	80%	60%
	The program's collection of posters, books, and other learning materials that promote physical literacy includes a large variety of materials with items added or rotated seasonally	0%	25%*
Teacher Practices	Teachers never take away time for physical activity or remove children from physical active playtime for longer than 5 minutes to manage challenging behaviors	80%	100%*
	Teachers supervise, verbally encourage, and often join in to increase children's physical activity	40%	60%*
	Each time they see an opportunity teachers incorporate physical activity into classroom routines, transitions, and planned activities	40%	40%
Education & Professional Development	1 time per week or more children participate in planned lessons focused on building gross motor skills	80%	80%
	Each time they see an opportunity teachers talk with children informally about the importance of physical activity	20%	40%*
	2 times per year or more teachers and staff receive professional development on children's physical activity	0%	20%*
	Professional development for current staff on children's physical activity has included 5-6 of the listed topics	0%	20%*
	2 times per year or more families are offered education on children's physical activity	0%	40%*
	Education for families on children's physical activity includes 4-5 of the listed topics	20%	20%
Policy	Written policy on physical activity included 7-8 of the listed topics	0%	20%*

* = positive change in best practices.

Physical literacy environmental assessment

Means and standard deviations for the four subscales of the PLEA and the overall scores are reported in Table 2. The ECEs reported significantly better use of the environment (e.g., Space, facility and equipment are available, maintained and used for structured and free play) at time 2; $t(89) = -2.951, p = .004, d = .30$. They also indicated more supports in place for leaders and staff (e.g., Program leaders are encouraged and supported to continuously improve and update their knowledge, training and expertise) at time 2; $t(85) = -2.959, p = .004, d = .31$ and that physical literacy was better reflected in the values and goals (e.g., Physical literacy education, including its importance and benefits, is provided to leaders, participants and/or parents) of their childcare centres after participating in M4L; $t(85) = -2.641, p = .010, d = .28$. There were no significant changes in programming (e.g., Participants have some Physical Literacy or related assessment to monitor strengths, improvements or areas of weakness) at time 2; $t(89) = -1.108, p = .271, d = .12$. Overall scores indicated positive changes in the physical literacy environment [$t(89) = -2.554, p = .012, d = .26$].

TABLE 2 Means and standard deviations of PLEA

<i>DOMAIN</i>	<i>TIME 1 M (SD)</i>	<i>TIME 2 M (SD)</i>
Environment	3.76 (1.26)	4.18 (.92)
Programming	4.07 (2.05)	4.33 (1.92)
Leaders and Staff	2.71 (1.74)	3.28 (1.68)
Values and Goals	1.67 (1.16)	2.02 (1.01)
Overall score	12.20 (4.92)	13.58 (4.66)

Physical literacy education program of early childhood educators: Program questionnaire

The importance of providing activities that support the development of movement skills and physical literacy was rated highly at both time points with importance being slightly higher for children 2-5 years old [$t(88) = .615, p = .540, d = .07$] compared to children under age 2 [$t(87) = .220, p = .827, d = .02$]. The ECEs reported significantly increased confidence to provide effective physical literacy development activities from pre-test to post-test; $t(88) = -2.64, p = .010, d = .27$. They also reported significantly decreased difficulty providing effective physical literacy development activities from pre-test to post-test; $t(87) = 3.423, p = .001, d = .34$ (note that a lower value on this item means less difficulty). There were no significant differences from pre to post test for administrative support [$t(87) = -1.118, p = .266, d = .12$], parental support [$t(87) = 1.081, p = .283, d = .12$], or how structured the physical activity opportunities were [$t(87) = .882, p = .380, d = .09$]. Generally, ECEs reported moderate or higher administrative support, moderate or

low parental support, and moderate structure. Means and standard deviations of the program questionnaire are presented in Table 3.

Following the program 81.4% of the ECEs reported their participation in M4L prompted them or the centre they work at to increase the frequency of activities provided related to physical literacy and 88.2% reported an increase in the number/variety of those activities. Some example activities the ECEs noted were: “try to do more movement activities with kids throughout the day in between transitions, e.g., head and shoulders, hokey pokey” (P24); “more outdoor play, include loose parts, nature walks, unstructured play” (P26); “try to encourage more active story times and art activities” (P27); “playing a silly game either at beginning or end of session to make sure all children have had enough movement. Also set up some equipment to focus on a child’s development.” (P30); even “Pushing furniture aside in the colder months and bringing outdoor equipment in.” (P9).

TABLE 3 Means and standard deviations of Program Questionnaire

<i>ITEM</i>	<i>TIME 1 M (SD)</i>	<i>TIME 2 M (SD)</i>
Importance under age 2	4.25 (.85)	4.24 (.88)
Importance ages 2-5	4.69 (.60)	4.64 (.61)
Confidence	3.69 (.95)	3.94 (.80)
Difficulty	2.67 (1.06)	2.18 (1.01)
Administrative support	3.95 (.99)	4.08 (.95)
Parental support	3.02 (1.20)	2.88 (1.14)
Structure	3.39 (1.06)	3.30 (.87)

These activities were partially supported by the equipment provided by FKHK ($M = 3.26$; $SD = 1.27$). Notably “for gross motor activities like jumping, rolling, dancing, catching and the like” (P28), some use it during “free play time in the gym” (P31), while others “usually use it for outdoor play” (P1).

The children responded somewhat positively to very positively to the increase and variety of activities ($M = 3.45$; $SD = .53$) and most ECEs (73.3%) indicated changes in the children’s physical activity patterns. Positive behavioural changes in the children were noted by many of the ECEs, for example: “Some children have developed better social skills and cooperation skills” (P107); “More active, more interactive, more engaged and more playful” (P77); “More focused and eager to participate” (P79); “They’re happy, active, like to be outside most of the time” (P85); “With more physical activity the children eat and sleep better” (P90); “More cooperation, more frequent calm play” (P59); “More imaginative play while outdoors” (P58); and “More energetic, less behavioural challenges” (P17).

Despite positive changes to the physical literacy environment and associated positive outcomes the ECEs reported challenges to implementing or including the concepts learned from the Movement for Life! program. Some reported challenges making physical literacy a priority and finding sufficient time e.g., “the biggest challenges have just been to remember, because our days get so hectic with kids under two” (P21). Some ECEs highlighted safety concerns including equipment set up time “Getting equipment out while watching children” (P55); “Make sure area is safe for the number of kids” (P57); and the need to “[Have] time to set up the games ahead of time.” (P10). Indoor space limitations in relation to poor weather, as interpreted by the ECEs, were often noted as a barrier to introducing more physical literacy opportunities e.g., “lack of space/time to make available space especially when cold weather keeps us inside” (P2). As well as prioritizing resources “Everything needs to be accounted for in a budget. When money is available, resources will be added.” (P52). The availability of outdoor space varied across childcare sites, some had dedicated outdoor space that they could outfit with age appropriate play equipment, others had to transport equipment and store it each time they moved between the indoor and outdoor environments.

Motivation of children to participate in the physical literacy focused activities was identified as another barrier. Statements such as, “Making the children who don’t like physical activity get engaged in the program” (P8) and “Motivation (among the children) in the beginning was one of the challenges and to keep them focused” (P80) demonstrate these types of concerns.

Some ECEs indicated personal factors as barriers. For example, personal levels of physical activity engagement “The biggest challenge for me is to keep myself more active throughout the day. As teachers are the role models for the children.” (P26). Shifting perspective to value movement was a change for some e.g., “Changing one’s own mindset to certain ways of doing things. E.g., allowing children to do table top activities while standing rather than prompting to sit.” (P30).

Discussion

Because the overall purpose of this study was to investigate the effectiveness of providing a physical literacy focused education program to ECEs and early childhood care centre directors, the discussion for this paper will focus on responding to the three identified research questions for this study.

Does providing physical literacy education translate to perceived changes in the care centre environment?

Whether physical, social, or policy related the influence of environmental factors on young children's physical literacy development can be considerable. For example, research on early childhood care facilities has demonstrated that factors such as availability of play space and play equipment (Bower et al., 2008, Cardon et al., 2008), as well as policies around outdoor play time (Hinkley et al., 2008) or adult led active play (Dooley et al., 2020) influence children's physical activity levels. The results from the present study demonstrated that providing physical literacy education to the ECEs and the early childcare centre directors had a positive influence on several, but not all, environmental factors examined. Most notably, based on the fact that the overall scores on the PLEA significantly improved from pre to post participation in the M4L program, and this tool is specifically designed to assess the degree with which an environment incorporates and supports physical literacy education and development, it would appear that providing this type of physical literacy education to ECEs and care centre directors can have an overall positive impact on the physical literacy environment of their childcare facilities. Interestingly, the only subscale on the PLEA where no significant change was found was on the “programming” subscale. However, as can be seen in Table 2, this subscale had a relatively high mean score initially during the pre-test (4.07 out of 7) which means it had less room for improvement. The high scores related to programming could potentially be attributed to the care centres following aspects of Manitoba's early learning and child care (ELCC) framework (Government of Manitoba, 2014) that are required for a centre to be licensed. The PLEA uses a yes (i.e., meeting indicator) versus no (i.e., not meeting indicator) type of format and several of the 7 programming indicators, such as “programming includes both structured and free play”, are aspects that are covered in the Manitoba ELCC framework. Future research should examine which of the four domains from the PLEA are most salient for physical literacy development in early childcare facilities, this can help create targeted interventions.

Only the directors completed the overall centre assessment tool (i.e., Go NAP SACC) as part of this study, yet the findings related to the environment changes reported are worth noting. In the five themes the Go NAP SACC identifies as best practices for childcare centres in regard to physical activity only one of these (i.e., Time Provided) did not show any positive changes from pre to post. This finding is encouraging but needs to be considered in more depth. First, it is valuable to consider why “time provided” was the only theme to not see any positive changes. This lack of change may best be explained by two factors, importance of consistent routines and timing when the study was conducted. The importance of developing and maintaining consistent routines to help optimize development in the early years has been well documented (La Paro & Gloeckler, 2016).

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Because of this value placed on consistent routines, early childcare settings are very unlikely to change their daily schedules especially once children have become accustomed to a routine. The centres that participated in this study did so at least a quarter of the way through their programming year. Consequently, all centres had well established daily and weekly schedules that included dedicated outdoor and/or active play times before they participated in the M4L program. Therefore, it was not likely that they would change their schedules to provide more time. However, returning to these centres to see if they increased time provided at the start of the next year may be worthwhile.

Considering that the M4L program is identified as an education program, it should come as little surprise that directors perceived positive changes with respect to the Go NAP SACC theme of “education and professional development” at their centres. Whereas, the positive changes seen under the themes of “policy” and “teacher practices” are of more interest. The fact that an education program such as M4L can positively influence an early childhood care centre’s policies related to physical literacy development is important because research has demonstrated that having policies in place can positively impact overall physical activity opportunities being provided (Dooley et al., 2020). Finally, the fact that the directors perceived positive changes in teacher practices was likely because the ECEs’ behaviours related to supporting physical literacy development changed, which will be discussed in greater detail later in this article.

Does providing physical literacy education translate to changes in reported behaviours and values within early childhood care centre settings?

The ECEs reported increased confidence in delivering activities and found it easier to implement physical literacy development activities following the program (these findings are consistent with previous research such as the Active for Life research group, 2020). These outcomes seem to be associated with providing more frequent physical literacy opportunities for the children with greater variety. For the most part the children responded favourably to these changes and this is not surprising, given the links between providing variety and appropriate challenges to children’s physical literacy motivation, confidence, and self-esteem (Durdan-Myers et al., 2018).

Administrative support was perceived to be high to begin with and their willingness to participate in the M4L program could be taken as additional evidence that they support physical literacy development. This support of the M4L program by administration may have played a role in the high levels of importance placed on physical literacy and movement skills across both time points. In particular the ECEs valued physical literacy and movement skill development for children ages 2–5 compared to younger children, this is reflected in previous literature that highlights that early childhood caregivers frequently believe children will naturally participate in movement and physical

development will occur without intervention (Clark, 2014; Timmons et al., 2007, Whitehead, 2010).

Parental support for physical literacy development was relatively low from time 1 to time 2. Though the parents were not directly exposed to the M4L program they were informed that the ECEs at their child's centre were participating in the program and were invited to a Town Hall where the study results were shared. These actions were not sufficient to change parental support. As children often spend more time with their parents than they do in a child care centre it is critical to engage parents and support them to provide physical literacy opportunities so their children experience the associated benefits of physical literacy development. Lane et al. (2022) found parents' understanding of physical literacy and confidence regarding physical literacy increased following a targeted physical literacy workshop. The parents were able to successfully implement several workshop aspects into their home environment. More interventions targeting parents and their role in physical literacy development are needed as well as purposely making links to the childcare setting and how parents can support physical literacy development in that setting (e.g., sending child to care with appropriate outdoor clothing; inquiring about their child's participation in motor skills).

What barriers exist for ECEs with regards to offering physical literacy opportunities?

Although, as already discussed, ECEs suggested difficulty in providing physical literacy focused activities was lessened thanks to participation in the M4L program, that did not mean that barriers to supporting physical literacy development in their early childhood care centres were rendered non-existent. The qualitative findings from the study suggest that even after completing the education program barriers related to time and space requirements, motivation issues, and changing traditional mindsets were still an issue for the ECEs and need further consideration.

The perceived barriers of time, weather and space would all be considered environmental influences on providing physical literacy opportunities. When it comes to time, this again is likely to do with the fact that sticking to a schedule and maintaining consistent routines are considered so important in the early childhood care setting (La Paro & Gloeckler, 2016) and thereby make it seem difficult to find additional time for activities focusing on physical literacy development. This issue might be solved by clarifying that additional dedicated time does not need to be "found" for physical literacy development activities, but instead activities that support physical literacy development just need to be better integrated into the already existing schedule. However, participants in this study did not just suggest issues finding additional time but also suggested that the time requirements to set up activities indoors or transition the indoor environment to accommodate physical

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literacy focused activities can be problematic, and these comments are directly connected to the other identified environmental barriers of space and weather. Inclement weather, common in Manitoba, often forces early childhood care centres to keep the children indoors and consequently reduces the available space to conduct physical literacy development activities. These perceived barriers are not entirely surprising considering that Van Zandvoort and colleagues (2010) reported similar barriers in their research that focused on childcare centre's challenges to providing physical activity opportunities, and reduced space at early childhood care centres has been consistently found to have a negative influence on physical activity levels of children (Finn et al., 2002; Hinkley et al., 2008). Therefore, it would appear that ensuring access to adequate indoor space dedicated to physical activity might be the best way to address ECEs perceptions around these environmental barriers to providing physical literacy development activities.

The main barrier related to motivation that study participants identified was that they found a lack of motivation among some children in their care, with respect to participating in physical literacy supporting activities. This research and the M4L program focused on the educators and not the children in their care. Therefore, changing children's motivation to participate in physical activities was not something that should be expected from the results. However, this does not negate the fact that a lack of motivation from a child to participate in the physical literacy development activities would be a barrier to an ECE trying to deliver such activities. Existing literature suggests that there can be many factors that influence a child's motivation to participate in physical activities (Brustad, 2012) including an environment that provides physical activity opportunities and social supports for those physical activities. However, one finding specific to the early childhood population and motivation to be physically active is that, providing a mastery-oriented climate is positively associated with children's physical activity (Wadsworth et al., 2017). Therefore, it might be possible that providing mastery focused physical literacy development activities could help reduce the lack of motivation that ECEs perceived in this study. Further research on this would be valuable.

The final perceived barrier to be considered was the troubles suggested with respect to changing traditional mindsets about being physically active in a childcare centre. Research has demonstrated that high amounts of sedentary behavior among children in early childhood care settings is common (Pate et al., 2015), but it has been argued that part of the reason for this is that children traditionally have been encouraged to be sedentary in these settings because they are perceived to be safer and easier to manage when seated. Therefore, the finding that participants in the present study found it difficult to change their mindset to encourage less sedentary time and specifically encourage engagement in physical literacy focused activities both indoors and outdoors at the childcare setting was not surprising. The results from this study demonstrate that education can help to increase awareness and change those mindsets, but it may be that

a more sustained education program and additional support for physical literacy focused activities in early childcare settings will be needed to help break away from traditional ways of thinking.

Strengths and limitations

The study included participants from multiple child care centres and a relatively large sample size, making the results generalizable across the region the data were collected from. However, because all data were collected in one region of one country the information from the M4L program may already be provided to ECEs in other regions and countries. The M4L resources are available online and free to use so anyone can access the tools.

Future research should go beyond the pre and post-test design to assess retention over several months or years. In addition, an experimental design would allow for the comparison of child care centres whose ECEs have participated in the M4L program with centres who did not participate to see if there are differences in the physical literacy environment following the program. It would also be useful to assess whether the M4L program is effective on its own without the hands-on training provided by Fit Kids Healthy Kids. Observing how ECEs interact with children when facilitating physical literacy opportunities, noting what is available in the physical environment and how it is used, and observing changes in children's physical literacy would all provide additional evidence of the effectiveness of ECE training programs. This method will help to determine if the M4L or similar education programs result in observable behavioural changes.

Conclusions

ECEs are providing education to children during one of the most critical periods of development (Shonkoff & Phillips, 2000) and the quality of these early childhood education experiences depend greatly on the capabilities of the ECEs (Peeters et al., 2016). When it comes to ECEs supporting children's physical literacy development, the present study demonstrated that providing ECEs with specific education focused on physical literacy can positively influence the physical literacy environment at early childhood care centres, as well as positively impact many of the ECEs' behaviours and perceptions related to physical literacy support at their centre. Consequently, it would be valuable for ECEs to receive education dedicated to physical literacy development either as part of their preservice training or as a continuing professional development requirement. Programs

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such as M4L are not the only way to provide such education, but they do offer one possible method for improving caregiver support for physical literacy development in the early years and future research should investigate the effectiveness of providing such programs to early childhood caregivers other than ECEs (e.g., parents).

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Appendix 1

Physical Literacy Education Program for Early Childhood Educators: Program Questionnaire

Physical literacy is defined as the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities for life.

Part A:

(Please circle the appropriate answer)

1. How important do you believe it is to provide the children under the age of 2 with activities that support the development of movement skills and physical literacy?
 - 1 – *not important at all*
 - 2
 - 3 – *moderately important*
 - 4
 - 5 – *exceedingly important*

2. How important do you believe it is to provide children ages 2 – 5 with activities that support the development of movement skills and physical literacy?
 - 1 – *not important at all*
 - 2
 - 3 – *moderately important*
 - 4
 - 5 – *exceedingly important*

3. At the present point how confident are you in your abilities to provide effective physical literacy development activities/learning situations for the children in your care?
 - 1 – *not confident at all*
 - 2
 - 3 – *moderately confident*
 - 4
 - 5 – *exceedingly confident*

4. Have you ever received/attended additional training or professional development related to encouraging physical literacy or providing movement related activities for children?
 - Yes
 - No

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5. At the present point how difficult do you find it to provide effective physical literacy development activities/learning situations for the children in your care?

1 - *not difficult at all*

2

3 - *moderately difficult*

4

5 - *exceedingly difficult*

6. In your present position, how much support do you feel the administration at your childcare center have provided in regards to providing physical literacy development activities/learning situations for the children in your care?

1 - *provide no support at all*

2

3 - *provide moderate support*

4

5 - *provide full support*

7. In your present position, how much support do you feel the parents at your childcare center have provided in regards to providing physical literacy development activities/learning situations for the children in your care?

1 - *provide no support at all*

2

3 - *provide moderate support*

4

5 - *provide full support*

8. At the present point, how structured do you feel the physical activity opportunities are that are provided at your center?

1 - *completely unstructured*

2

3 - *moderately structured*

4

5 - *completely structured*

Part B: Demographics**(Please fill in the blank or circle the appropriate answer)**

1. Age: Under 20, 20 – 29, 30 – 39, 40 – 49, 50 +
2. How many years of experience do you have working in the Early Childhood childcare profession? _____
3. What age of children do you care for in your present position? (circle all that apply)
Under 2, 2-3, 4-5

Part C: (only to be completed following the program)

1. Did your participation in the physical literacy education program prompt you or the center you work at to increase the **frequency** of activities provided related to physical literacy?

Yes
No
2. Did your participation in the physical literacy education program prompt you or the center you work at to increase the **number/variety** of activities provided related to physical literacy?

Yes
No
3. Only answer the following if you answered “Yes” to either of the previous two questions.
 - a) How do you feel the children have responded to these changes?

1 = *very negatively*
2 = *somewhat negatively*
3 = *somewhat positively*
4 = *very positively*
 - b) Have the children’s overall physical activity patterns changed?

Yes
No
 - c) What behavioural changes, if any, have you noticed among the children?

4. What have been the biggest challenges to implementing or including the concepts learned in the physical literacy education program?
5. Can you list any specific new activities related to physical literacy development that you/your center have added since completing the physical literacy education program?
6. How often are you using the equipment provided by Fit Kids Healthy Kids?
 - 1 – *never*
 - 2
 - 3 – *sometimes*
 - 4
 - 5 – *constantly*
7. In what ways, if any, are you using the equipment provided by Fit Kids Healthy Kids?