Examining the knowledge base and level of confidence of early childhood educators in physical literacy and its application to practice

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Abstract

Early childhood is an opportune time to develop physical literacy, acquire movement skills, and promote physical activity. Little is known about early childhood educators' competence and confidence in physical literacy knowledge and its application to practice. The purpose of this research was to examine the competence and confidence of early childhood educators in physical literacy, and to determine whether exposure to information in this area influences their confidence level. A total of 85 participants completed an online survey. Physical activity knowledge was high; however, error detection and correction knowledge was lower, with high variability in responses. Mean confidence rating (out of 10) was lowest for locomotor skill error detection and correction (6.4±1.8) and highest for physical activity promotion (7.7±1.6). Confidence in movement skill development decreased significantly pre- to post-survey ($p<0.001$); highlighting a potential "topic exposure" effect. These findings demonstrate the need for physical literacy training for early childhood educators.

Keywords: gross motor development; professional development; physical domain; motor domain

Introduction

Early childhood (0-5 years of age) is a critical period for the development of physical literacy. Physical literacy is defined by Whitehead (2013, 28) as the "motivation, confidence, physical competence, knowledge, and understanding to value and take part in physical activities" for life, which may be the most accepted definition currently. There are wide-ranging uses and definitions of this term, many of which simplify physical literacy to the development of foundational gross motor skills or fundamental movement skills. However, physical literacy should be examined as a holistic lifelong concept, rather than a series of skills to be attained (Edwards et al. 2017; Jurbala 2015). This is particularly important, as the emphasis on fundamental movement skills may

limit focus to the middle to late childhood years as is found in many currently used assessments of physical literacy (Edwards et al. 2018). Participation in lifelong health promoting physical activity has wide-ranging health benefits (Janssen and LeBlanc 2010; Warburton, Nicol and Bredin 2006; Warburton et al. 2010). The early childhood period is also influential for the development of physical competence, particularly the acquisition of fundamental movement skills (LeGear et al. 2012; Robinson et al. 2015; Stodden et al. 2008). Children who have higher levels of fundamental movement skills are more likely to be physically active and fit as adolescents and adults (Barnett, van Beurden et al. 2008; Lubans et al. 2010; Wrotniak et al. 2006).

By the age of 6, children have the developmental capability to perform fundamental movement skills using a mature pattern, where individuals perform the skill efficiently in a coordinated manner (Gallahue and Ozmun 2006; Payne and Isaacs 2016). Fundamental movement skills include: locomotor skills, where participants move the body through space (e.g., skipping); object control skills, where individuals manipulate an object (e.g., ball) to propel or to trap it, and non-locomotor skills, where individuals stand stationary but move the trunk with control (e.g., twisting) (Pangrazi and Beighle 2013; Payne and Isaacs 2016).

It has also been suggested that children exhibit cognitive characteristics in the early childhood years, which are conducive to skill acquisition. At this age, children use persistence and effort as measures of success, rather than comparisons of themselves to others, and are therefore less likely to self-exclude from activities they have not mastered (Stodden et al. 2008). Recent research has provided support for this concept. For example, LeGear et al. (2012) showed perceptions of physical competence in kindergarten children were high despite exhibiting low levels of motor proficiency. This

characteristic of early childhood provides a “window of opportunity” (p. 4) for the promotion of skill acquisition (LeGear et al. 2012). Capitalizing on this window and providing many positive physical activity and skill development opportunities for children during this time period may have a powerful effect on long term engagement in physical activity, as young children may exhibit greater willingness to engage in a variety of activities and skills.

A contemporary reality in the early childhood years is the increasing prevalence of childcare. Many children attend childcare facilities, where the majority of their day is spent under the care of an early childhood educator (ECE). From 1992 to 2014 the number of regulated childcare spaces in Canada increased from 371,573 to 1,201,377, a 3.2 fold increase (Friendly et al. 2015). The reasons for increased enrolment in childcare arise from an increase in dual income households in Canada, with a particular increase in working mothers (Friendly et al. 2015). Similar trends are seen in other countries such as the United Kingdom (Office of National Statistics 2014) and the United States (Women’s Bureau 2016).

Early childhood educators within Canada and the US use a holistic model for childcare, aimed at supporting the development of the whole child, including development of the social, emotional, physical, language, and cognitive domains (Barnett 2008; Craig 2012). The physical domain of childhood development includes the acquisition of fine motor skills (such as utilizing a pen or buttoning a button) and gross motor skills (such as running, kicking, or throwing) (Payne and Isaacs 2016). Early childhood educators play an important role in the developmental process and are likely instrumental in supporting a positive physical literacy journey in the children they work with, given their role in promoting physical activity in the early childhood years

(Lu and Montague 2016). Lu and Montague's (2016) review provides a call to action to prioritise physical activity in early years programming, considering the multitude of health, social, and cognitive benefits that activity in this time period provides.

Despite the important role ECEs may play in a positive physical literacy journey, there is little training provided in this area for ECEs. Previous research has demonstrated that children under the care of ECEs with more education (e.g., a college degree) are more likely to participate in physical activity (Dowda et al. 2004). There is some evidence that suggests that ECEs may not have the background training to implement effective movement skills curricula (Breslin, Morton, and Rudisill 2008); however, greater understanding of the training needs and wants of ECEs in the area of physical literacy is needed.

In preparation of this work, an online search was conducted to review the educational curriculum of all recognised institutions in British Columbia, Canada offering training in early childhood education. While online course descriptions of teaching syllabi indicated that physical activity or gross motor development were subtopics within one or two courses per program, the scan showed that no institutions offered courses with a standalone focus on physical literacy, physical activity, or motor development as a part of their early childhood education certificate or diploma program. Without physical literacy skills training, the potential for an ECE to enhance opportunities for the development of physical literacy in the child care setting is limited.

Given the growing emphasis on increasing instructional capacity in physical literacy in the childhood years (Government of British Columbia 2015), research is needed in the area of ECE training and physical literacy to inform effective pre-service training and ongoing professional development. To date, little is known about the level

of knowledge competence and confidence that ECEs possess in the area of physical literacy. This investigation employed a survey and was exploratory in nature. The purpose of the work was to generate information on the competence and confidence of a sample of ECEs in three theme areas: physical activity concepts, fundamental movement skill patterns, and the capability to detect and correct movement errors. The primary objective was to generate information to better inform the development of effective training programs that meet the needs of ECEs. Given the limited pre-service training in physical literacy, we postulated that ECEs' existing knowledge in the area would be low. In addition, we hypothesised that confidence would be moderate, but may actually decrease from the start to finish of the survey. We predicted a decrease in confidence because exposure to questions requiring a knowledge base in which the respondent lacks training, may bring to realization what one lacks, thereby decreasing one's level of confidence.

Material and Methods

The link to a web-based survey designed specifically for this investigation was distributed to all student and employed early childhood educators in the region via professional organizations in 2015. This project employed a cross-sectional survey design employing mixed methods. The investigation received approval from and was executed in exact accordance with the ethical guidelines set forth by the University of British Columbia's Behavioural Research Ethics Board for research involving human participants. Participants were never tracked via IP address and no information that could personally identify a participant was collected.

Participant data

Descriptive data of participants was collected to understand the demographics, experience, and training of respondents. Demographic variables included age and sex. Experience was determined from years of experience, ECE licensure, type of workplace, and age of children attending workplace. Information regarding training included type of pre-service training (e.g., eight-month training program, diploma, bachelor's degree), and if pre-service training included physical activity, motor skill development, or motor skill acquisition curricula. The survey did not undergo a validation process, as the purpose was to gain insight into the current knowledge and views of ECEs in BC to inform the development of an ECE training module.

Survey

The purpose of the survey was to examine the physical literacy confidence and competence of ECEs in application to practice using likert scale, multiple choice, and open-ended questions. Key topic areas were selected for inclusion within the survey to ensure the survey was sufficiently broad to encompass the topic, and also reasonable in length to encourage participation.

Knowledge and competence

Questions (total = 15) were categorised into four major sections: physical activity knowledge (7 questions, e.g., knowledge of public messages of recommended amount of physical activity and classification of physical activity intensity), age of skill acquisition (4 questions, e.g., knowledge of anticipated age of motor milestone achievement for rudimentary or mature movement skill patterns), error detection (2 questions, e.g., the capability to identify the source of a child's movement error during performance), and error correction (2 questions, e.g., the capability to recommend activities to improve an identified movement error). None of the categories were

exhaustive in nature; rather, each category focused on a few key concepts. Multiple choice questions were administered to examine knowledge of physical activity, age of acquisition, and error detection and correction. For example, 'playing tag would be considered what type of physical activity: (a) light physical activity, (b) moderate physical activity, (c) vigorous physical activity, or (d) sedentary activity?' Open-ended questions were administered to examine knowledge of age of acquisition and error detection and correction. For example: two questions were asked for error detection and correction relating to running (a locomotor skill) and catching (an object control skill), respectively. These included: '(1) (a) Imagine you are working with a child who is having difficulty generating a flight phase when running (the point in time when both feet are off the ground). What is most likely causing this? (b) Describe an activity that could be done to improve this'; and '(2) (a) The children you are working with are 3 years of age. They are unable to effectively catch a ball tossed in an arc. Is this a cause of concern? (b) Describe an activity that could be done to improve this'. For open-ended questions, there was no single correct answer, but open-ended questions were included to gain a better understanding of the capacity of respondents to think critically when faced with movement challenges they may see within their day to day work. Open-ended questions were also included to gain insight into the perceptions of ECEs surrounding physical literacy and its application to ECE practice (e.g., 'What does the term physical literacy mean to you in relation to your ECE practice?') and to collect specific opinions or perceptions of the content areas from respondents (e.g., 'Identify any areas that you would like further professional development or educational opportunities in regarding physical literacy and fundamental motor skill development in an early childhood education setting'). No major terms (e.g., physical activity, exercise, physical literacy) were defined for participants in order to gain each participant's unique

understanding of these terms.

Confidence measures

The survey also examined confidence in physical literacy knowledge using Likert-scale questions, where ECE's were asked to provide a confidence rating for each question on a scale from 1 (not at all confident) to 10 (highly confident) in the following areas: physical activity promotion, movement skill development, locomotor skill development, error detection and correction for locomotor skills, object control skill development, error detection and correction for object control skills, non-locomotor skill development, and error detection and correction for non-locomotor skills.

Survey structure

The structure of the survey was such that respondents were first asked to provide demographic and training information, then to rate their confidence in physical activity knowledge and early childhood movement skill development, followed by multiple choice and open ended questions, and finally to rate their confidence in all other areas of physical literacy, as well as a re-assessment of movement skill development confidence at the conclusion of the survey.

Data analysis

A descriptive analysis of confidence ratings was conducted to determine means and standard deviations. Multiple choice questions were analyzed for accuracy, a percentage correct for each participant was assigned, and descriptive statistics were then calculated. Open ended responses were analyzed and coded by hand using a deductive approach to determine patterns and similarities amongst respondents. These coded responses were then grouped to determine common themes in responses. Pre- and post-survey

confidence ratings of overall movement skill development knowledge were calculated, and compared using a paired t-test. This was conducted to determine whether or not exposure to the survey topics had an effect on participants' level of confidence.

Results

A total of 301 respondents opened and began the survey and 85 completed surveys were received (77 F, 1 M, 7 no response), with a 28% response rate. Only completed surveys were used in the data analysis. Most participants were more than 10 years into their career, had post-basic ECE training, worked at a centre providing full day care, and provided care for children aged 3-5, or 0-5 years of age. Most of the participants were currently employed (n=82), and only three participants were students. Table 1 provides participant characteristics (participant age, experience, and level of certification) of the ECEs completing the survey. Level of certification was categorised as a 1 year (or initial certificate), or a 5-year certificate (received after completing a 500 hours of work as an ECE in BC, is valid for 5 years, and is held by all ECEs following their initial 1 year certificate). A 5-year certificate can be categorised further as a basic ECE certificate, or a post-basic certificate, specializing in children with special needs, infants and toddlers, or both.

Insert Table 1 Here

ECEs reported having taken one full semester course (21%), a half-semester course (9%), or two or more full semester courses (8%) in the areas of physical activity, motor skill development, or motor skill acquisition during their pre-service training. While 50% of ECEs reported taking no specific courses in the area, ECEs did report discussing the topics frequently (39%) or at least a few times (21%) in other courses.

Only 1% of respondents reported no time spent on these topics. For post-service training in physical activity, motor skill development, and motor skill acquisition, many ECEs indicated that they had completed no continuing education courses in these areas (39%); however, 22% had completed one course, 18% had completed two courses, and 22% had completed three or more courses. Participants were asked to indicate whether they believed they had adequate training to promote physical activity and fundamental movement skill development in the children they work with and 39% responded yes in both areas, 18% responded yes in one area, 41% responded somewhat, and only 2% responded no.

Knowledge competency

Mean percentage on the multiple choice assessment of knowledge competency was 62.5% ±16.6 (mean ± standard deviation). While general physical activity knowledge questions were answered consistently correctly, respondents demonstrated difficulty in identifying public messaging for physical activity recommendations in the early childhood years (only 14% of respondents responded accurately). Respondents identified correctly age of skill acquisition for locomotor skills (76%); however, only 20% of participants correctly identified age of acquisition for object control skills.

When identifying what error may be causing difficulties in the flight phase of the running pattern, responses were highly varied, with over 12 categories of responses emerging from the sample (Table 2). Moreover, 11% of respondents answered by stating that they did not know. A large percentage (55%) of respondents identified physical constraints as limiting movement capabilities (e.g., strength, balance, coordination); however, no single response was identified consistently and some of the responses did not identify constraints that could be addressed through instruction in a

learning environment (e.g., age is not a variable that can be manipulated via instructional feedback).

Insert Table 2 Here

When identifying error correction activities for running performance, activities to overcome physical limitations or constraints were commonly suggested (e.g., activities to improve balance (10%) or activities to increase posture/core strength (5%) and leg strength (5%)). Activities specific to other locomotor skills, such as hopping, jumping, or leaping, were most commonly identified as activities that should be implemented to improve the flight phase of running (31%). A total of 8% of participants responded that they did not know (Table 3). Adaptive activities (e.g., vary the size of the ball) were commonly suggested to improve catching performance (34%), as well as the introduction of progressive skill activities such as rolling (20%) and bouncing (10%). A total of 6% of respondents did not know (Table 4). A large percentage of participants (27% for running, 19% for catching) identified that continual performance of the skill itself, with no adaptation or change to instruction and/or the learning environment, should be sufficient to improve the motor problem emerging within the performance of the skill.

Insert Table 3 Here

Insert Table 4 Here

Confidence ratings

Pre-survey confidence measures ranged from 6.4 ± 1.7 in locomotor skill error detection and correction to 7.7 ± 1.6 in physical activity promotion out of a total score of 10. Confidence rankings across physical literacy topics are presented in Figure 1. Statistical differences were found between some variables, and reported in Figure 1. Confidence in

movement development decreased significantly from pre-survey (7.3 ± 1.7) to post-survey (6.4 ± 2.0) (p=0.00) (see Figure 2).

Insert Figure 1 Here

Insert Figure 2 Here

Application to practice

In response to what exercise meant in relation to ECE practice, the most common responses were categorised qualitatively as (1) physical activity, any form, or (2) games, fun, and play. This was further defined into four subcategories: (1) time outside; (2) unstructured or free movement experiences; (3) learning and practice of movement skills; and (4) activities to increase heart rate (e.g., for health).

In response to what physical literacy meant in relation to their ECE practice, two major knowledge areas were identified: (1) ECE knowledge of motor development and physical activity; and (2) the physical competence of the children ECEs work with. ECEs identified that they needed the knowledge to promote physical literacy, and it was their responsibility to ensure the children they work with were developing physical literacy. Fitness or health, physical activity or movement, and learning or developing movement skills, were identified as other areas where physical literacy could be related to ECE practice. A portion of respondents (13%) were unfamiliar with the term physical literacy.

The ECEs identified that there was a need for increased training opportunities in physical literacy in the field and a desire for increased knowledge of activities and ideas to promote physical literacy. In the open-ended responses ECEs also identified and reported that they experienced a decrease in their confidence in the area of physical

literacy at the completion of the survey.

Discussion

The sample of ECE survey respondents was consistent with the demographic portfolio of employed early childhood educators in Canada (Flanagan, Beach and Varmuza 2013). The employed ECE population is made up predominantly of more mature workers (almost 30% of ECEs across Canada are over the age of 45) and predominantly female (Flanagan, Beach and Varmuza 2013). ECEs across Canada demonstrate an average of 12 years of experience, with a median of 10 years, and 25% of Canadian ECEs have worked in child care for 18 years or more (Flanagan, Beach and Varmuza 2013). Coupled with the low unemployment rates, 4.2% in 2015 (Work BC), statistics suggests a high turnover rate of early career ECEs, but following a specified time period, the retention rate increases considerably. The training experiences of this sample were similar to those identified in Martyniuk and Tucker's (2014) survey of ECE students, which found that the majority of participants had not taken any physical activity specific courses.

Our findings showed that general knowledge of physical activity was high amongst respondents. This finding is consistent with current evidence, which demonstrates that many people have a basic knowledge and understanding of the importance of physical activity; however, this does not necessarily translate into engagement in physical activity (Trost et al. 2003). Research has shown that education style interventions at the population level have translated into increased knowledge, but do not increase physical activity behaviour (Young et al. 1996). While many of the survey respondents possessed a basic working knowledge of physical activity concepts, it remains unknown whether this knowledge is reflected in the physical activity levels of

the children under their care. That is, are physical activity levels in the child care setting higher in those children whose ECE scored higher on the section for general knowledge of physical activity compared to those whose ECE scored lower? This is particularly important given previous research demonstrating low levels of physical activity in child care settings (Reilly, 2010).

When summarizing the responses for the open-ended questions, respondents generally viewed exercise as any type of physical movement. For example: "any physical movement that children are engaged in – walking, hiking, running, tag, Mr. Wolf" or as, "getting up and getting moving – could be dancing, going for a nice walk in the neighbourhood, playing at a park, kicking a ball, running and playing tag, swinging on a rope swing,…". These statements support the messaging that every little bit of physical activity counts (see Warburton and Bredin 2016). Physical activity and exercise were used interchangeably in survey responses. While these terms are not interchangeable in a research setting, these responses may indicate that the terms may be perceived as more interchangeable in a play-based environment.

The ECEs responded consistently that the amount of time children should engage in physical activity per day was 60 minutes. The message of 60 minutes per day of moderate to vigorous physical activity (Tremblay et al. 2016) has been promoted with concerted effort both provincially, nationally, and globally by various organizations. However, this messaging has been promoted in physical activity guidelines and policy documents (Government of British Columbia 2015) for children 5-17 years of age. In contrast, in the early years (0-4 years), the messaging has been to promote 180 min/day of any intensity physical activity, with a progression toward a minimum of 60 min/day of "energetic play", accepted as moderate to vigorous physical

activity (Tremblay et al. 2012). While the accuracy of messaging in the translation of the evidence is in debate (see Warburton and Bredin, 2016), this finding does reveal that the influx of promotional materials designed for older children has influenced ECEs, which may ultimately affect physical activity programming within the childcare setting.

Respondents demonstrated difficulty in identifying the source of an error, and when an error had been identified prescribing a corrective activity that was congruent with the identified error. For example, participants were asked to provide a reason for a child being unable to generate a flight phase (point in time when both feet are off the ground) when running. Lack of leg strength was identified as a potential cause by only 18% of respondents and only 4% of respondents recommended a leg strengthening activity as a corrective activity. Rather, many participants prescribed jumping, hopping, or leaping activities to overcome a child's inability to generate a proficient flight phase when running. For children with insufficient leg strength, these activities may not be facilitative, as children who lack the strength to lift their body off the ground when running are likely to experience similar difficulty when engaging in jumping, hopping, or leaping activities.

Participants demonstrated the greatest difficulty in response for an object-control skill when asked to identify an activity to prepare for catching a tossed ball in an arc (for children 3 years of age). The capability to catch a ball tossed in an arc develops later in childhood (identified by 64% of participants), which is consistent with the development of the perceptual motor system. Visual tracking allows for the development of coincident anticipation timing (the capability to time (produce) a response that coincides with the arrival of a moving stimulus). Coincident anticipation timing continues to mature throughout childhood, reaching maturation at approximately

12 years of age, and requires practice and task exposure for optimal development in childhood (Payne and Isaacs 2016). However, there are multiple activities that can be presented to learners to lay the foundation for and promote the future acquisition of catching a ball tossed in an arc (Pangrazi and Beighle 2013; Payne and Isaacs 2016). Over 50% of ECEs provided catching activities with modifications to the object (e.g., use a slow-moving object such as a scarf, or use textured or various sized balls) or the task itself (e.g., convert the task to a rolling activity). However, 19% of ECEs provided non-adaptive catching activities (e.g., "just keep practicing").

For both running and catching a significant portion of respondents suggested continual practice of the skill as a correction activity. However, research indicates that fundamental movement skills do not arise without instruction (Clark 1995) and children who do not receive sufficient instruction may not achieve proficiency in these skills (Goodway and Branta 2003). Previous research has indicated that children who spend more time in moderate to vigorous physical activity are more likely to have stronger locomotor movement skills, but no difference is seen in object control skills (Williams et al. 2008); therefore, continued practice of running may be more beneficial than continued practice of catching, without additional intervention or instruction. The area of error detection and correction is an important area to focus on and address in pre- and in-service training of ECEs. Greater exposure and opportunities to develop error detection and correction capabilities are important for the effective design of the learning environment in the childcare setting.

Respondents demonstrated moderately high levels of self-reported confidence in the area of physical literacy. Confidence levels for physical activity (7.65) reported in this study are similar to that found in a survey of pre-service ECE students (Martyniuk and Tucker 2014), which also utilised a 10 point scale, and found that the cohort on

average rated themselves at 7.37 in their confidence to facilitate physical activities. This suggests some generalizability of the current findings to a larger ECE population. Participants were significantly more confident in their ability to facilitate physical activity then any movement skill. In our findings, statistically significant differences in confidence to facilitate some movement skills emerged as seen in Figure 1; however, these are unlikely to represent functionally meaningful differences as the values are similar (e.g. 6.38 vs. 6.53).

A shift in self-reported confidence was shown when pre- and post-survey movement skill confidence was assessed. Through exposure to the on-line assessment questions on physical literacy, the ECEs' general confidence in their capability to improve movement skill proficiency in children under their care decreased. These findings indicate that participating in the process of answering the knowledge-based questions increased the ECEs' awareness of content materials in which they may need further professional development. As such, their level of confidence in the content material decreased at the completion of the survey. Moreover, in the open-ended questions some ECEs demonstrated a self-awareness of their shift in confidence level, and identified in written form their decrease in confidence with the subject material. For example, it was stated that involvement in the survey "definitely made [me] more aware of the lack of in depth information we [ECEs] have regarding children's typical physical development". This finding identifies an important knowledge translation opportunity; wherein following the assessment of one's content knowledge, evidence-based tools should be disseminated to participants (e.g., fact sheets, infographics) and/or participants should be directed to complementary resources for professional support (e.g., on-line training modules, webinars, telehealth services such as the Physical Activity Services at HealthLink BC).

The ECEs were asked to identify areas for further professional development opportunities and/or educational training as it relates to physical literacy and fundamental motor skill development in an early childhood education setting. Findings showed that ECEs consistently expressed a need for increased training opportunities and a desire for increased accessibility to resources in physical literacy specific to the early childhood setting. For example, a participant stated, "[I] have never heard of credit courses in Physical Activity for ECEs". While this statement exemplifies the gap in pre- and in-service training, it also identifies an area of need in professional development. Developing training opportunities, which are supported by continuing education credits, may facilitate an ECE's development in physical literacy. As well, participants felt they needed activities that were "age-appropriate" and resources that they could "add to [their] tool-kit". Professional development in physical literacy should first ensure that all ECEs are capable of providing sufficient quality physical activity opportunities for the children they work with, particularly given recent evidence that suggests highly active preschoolers have more proficient movement skills (Barnett, Salmon and Hesketh 2016). Continued professional development should focus on enhanced knowledge about age and acquisition of movement skills and practical advice on supporting development, error detection and correction. A particular focus should be on object control skills given that evidence suggests that these skills are less developed in children and there remains a discrepancy in performance between boys and girls (Foulkes et al. 2015; Hardy et al. 2010; LeGear et al. 2012).

We acknowledge that there are several limitations to our project including the relatively small sample size and the response rate which may limit the generalizability of our results. The respondents may be particularly interested in physical literacy and physical activity. For example, this could mean that the enthusiasm for professional

development in the general ECE population might not be as large as in this sample.; This should not, however, diminish the demonstrated need for training in physical literacy. As this was a preliminary investigation to gain knowledge of the potential training needs of ECEs in physical literacy, physical activity, and fundamental movement skills, these limitations should not detract from the demonstrated areas of training need. This is particularly salient as a less enthusiastic population may have even greater need for training in this area.

Given the importance of physical literacy promotion for the health and optimal development of boys and girls in early childhood, continued research in this area is warranted. The results of this investigation provide strong support for this need, and are consistent with current literature (Breslin, Morton and Rudisill 2008; Lu and Montague 2016; Robinson et al. 2012). This has also been highlighted in the BC Physical Activity Strategy, indicating a need to improve the physical literacy environment in general, but also specifically in childcare settings (Government of BC 2015). A focus on the development and assessment of contemporary pre- and in-service training programs for ECEs in physical literacy is one potential direction of research that is supported by the government's physical activity strategy (Government of BC 2015). Survey responses showed a need to advocate for policies to increase physical literacy training at the pre-service level in order to facilitate the training of ECEs with a strong knowledge base and practitioner competencies in physical literacy. As well, there is a need to improve access to professional development programs in physical literacy for ECEs. Based on the current findings, a focus on skills instruction and on how to adapt these instructions to address identified errors should be a primary focus of this work. Through these steps, improving the physical literacy instruction skills of ECEs could provide potential lifelong health benefits for the children who attend early childhood educational centres.

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