

# A real world feasibility trial of the PLAYshop: an intervention to facilitate parent engagement in developing their child's physical literacy

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## Research

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# Abstract

## Background

Development of physical literacy, defined as *“the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life”*, can support children’s physically active behaviors and consequent health benefits. Little research exploring interventions to improve children’s physical literacy exist, although substantive evidence shows parents play a key role in children’s physically active behaviors and development of fundamental movement skills. The purpose of this study is to explore a novel, physical literacy intervention designed to assist parents to engage with their child in purposeful play; play that facilitates the development of physical literacy.

## Methods

The PLAYshop was a 75-minute workshop to build parents’ self-efficacy to support their child’s physical literacy through interactive activities and educational messages as well as educational resources focused on core physical literacy concepts. We collected quantitative pre- and post-workshop surveys of parents’ satisfaction, knowledge, confidence and intention to adopt practices as well as qualitative follow-up implementation focused interviews from both parents and facilitators. We used paired t-tests to examine changes in parents’ self-reported physical literacy knowledge and confidence and thematic analysis of interviews to explore workshop feasibility.

## Results

Six workshops were delivered to 33 parents of young children (3–8 years of age). 23 parents completed both pre- and post-workshop surveys. Follow-up interviews were completed with 11 parents and four workshop facilitators. Parents’ self-reported knowledge and confidence to support their child’s physical literacy development significantly increased after PLAYshop participation. Further, the majority of parents were satisfied with the workshop and motivated to apply workshop learnings at-home with their child. Workshop facilitators identified seven workshop strengths (e.g., workshop champions and skilled facilitators) and four challenges (e.g., recruitment and unfavorable spaces).

## Conclusions

The PLAYshop was perceived positively by parents and facilitators and appeared to improve parent self-efficacy and intention to promote physical literacy with their child. Recruitment and attendance were key implementation challenges. The findings from this real world trial address an important evidence gap,

highlighting areas for adaptations to improve the intervention and recruitment and suggesting that the PLAYshop is ready for efficacy testing in a more rigorous randomized controlled trial.

## Background

Physical activity is critically important to the development of young children as it improves cognitive and motor skill development, psychosocial health, social connectedness, and cardio metabolic health as well as reduces adiposity (Carson et al., 2017; Tremblay et al., 2012) and risk of chronic disease in adulthood (Craigie, Lake, Kelly, Adamson, & Mathers, 2011). Physical inactivity has emerged as a public health pandemic (Kohl 3rd et al., 2012) and internationally the prevalence of children participating in sufficient levels of physical activity remains low (Aubert et al., 2018). In response, researchers have developed and tested the effectiveness of numerous childhood physical activity interventions (Messing et al., 2019). Amidst some success, their impact has been limited (Longmuir & Tremblay, 2016; Love, Adams, & van Sluijs, 2019) and several research gaps remain.

Physical literacy offers a relatively new and promising approach for childhood physical activity interventions (Cairney, Dudley, Kwan, Bulten, & Kriellaars, 2019). It is defined by the International Physical Literacy Association as *“the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life”* (IPLA, 2017). Physical literacy is an antecedent to improve and maintain physical activity participation and consequent health benefits (Cairney et al., 2019; Edwards, Bryant, Keegan, Morgan, & Jones, 2017) – which makes it particularly important to begin to develop early in the life course. To date, little research has explored the feasibility of interventions designed to improve children’s physical literacy, leading to little understanding of *“what physical literacy-supportive programs look like in practice”* (Jurbala, 2015).

Evidence from systematic reviews indicate that parents play a key role in children’s physical activity related behaviors. In a 2016 systematic review of family-based physical activity interventions, 31 of the 47 included studies demonstrated a significant positive effect on children’s physical activity levels (Brown et al., 2016). A systematic review of the determinants of physical activity in children aged 0–6 years found that parent monitoring was the only factor consistently associated with children’s physical activity (Hesketh et al., 2017). More recently, a synthesis of results from 39 high-quality reviews (Messing et al., 2019) provided strong evidence that parents play a key role in promoting child physical activity across various community settings.

Although previous systematic reviews did not report on physical literacy, many studies included for review examined parent-focused interventions with an emphasis on fundamental movement skills (FMS) – a key domain of physical literacy ((Barnett et al., 2016; Zeng, Johnson, Boles, & Bellows, 2019). For example, the three month Healthy Dads Healthy Kids (HDHK) program adopted FMS as the exclusive focus for one of the four, 75-minute father/child practical sessions (Morgan, Lubans, Plotnikoff, et al., 2011). Similarly, the eight-week Dads and Daughters Exercising and Empowered (DADEE) program (Morgan et al., 2019) and the mother-daughter MADE4Life program (Barnes, Plotnikoff, Collins, & Morgan,

2015) each devoted at least one practical session to FMS. FMS was an explicit outcome measure within only one intervention trial: a 2018 randomized controlled trial (RCT) of DADEE that found significant improvements in daughters' FMS proficiency (Morgan et al., 2019). FMS competence was objectively assessed via scores of daughters' performance in six object control skills (kicking, catching, striking a stationary ball, stationary dribble, overhand throw, and underhand throw). Compared to controls, daughters in the intervention had significantly higher object control scores post-intervention ( $p < .001$ ) that were sustained at 9-month follow up ( $p \leq .002$ ).

Positive findings for physical activity-related outcomes were found in trials of all interventions: fathers in DADEE significantly improved in physical activity parenting practices compared to controls (Morgan et al., 2019); children in HDHK significantly increased in level of physical activity compared to controls (Morgan, Lubans, Callister, et al., 2011); and mothers in MADE4Life reported positive behavior change as a result of the program (Barnes et al., 2015). Further, all of these programs appeared feasible, with high attendance and ratings of program satisfaction made by fathers in HDHK (Morgan, Lubans, Callister, et al., 2011) and DADEE (Morgan et al., 2019), as well as high ratings of program quality and session content made by mothers in MADE4Life (Barnes et al., 2015). These parent-focused interventions inclusive of FMS appear to have a meaningful impact on children's physical activity.

Increasing parent knowledge, confidence and capacity to carry out activities that promote physical literacy may provide children with a foundation for development in this area. No research to-date has explored a parent-focused physical literacy program as an intervention option. This paper aims to address this evidence gap by assessing the feasibility of a novel parent-focused physical literacy intervention aimed at supporting parents to develop their child's physical literacy through play.

## **The PLAYshop program**

The PLAYshop is a theory-based program that builds parents' self-efficacy to assist their child to develop physical literacy and acquire physical activity. The specific objectives of the PLAYshop are:

- to enhance parents' understanding of physical activity and physical literacy and their role in facilitating it;
- to expose parents to a number of activities and resources that could help them support the development of a wide range of movement skills and increase physical activity; and
- to increase parents' confidence in facilitating playful activities by engaging them in the activities (experiential learning) and providing key messages that align with and promote the development of physical literacy (competence, motivation, confidence, and valuing physical activity).

The overall aim of the PLAYshop is to support parents to engage in play with their child that facilitates the development of physical literacy – that is, purposeful play. The program was designed using Bandura's social cognitive theory (Bandura, 1986) with a specific emphasis on parent's self-efficacy and related intervention change techniques described using the Behavior Change Wheel (BCW; a synthesis of 19 behavior change frameworks)(Michie, Van Stralen, & West, 2011). This process identified several

behavior change techniques to address factors (capabilities, opportunities and motivation) that might present as barriers and/or enablers to parent's purposeful play with their child. The resulting implementation strategies are detailed in Table 1.

Table 1- Description of strategies mapped to the relevant COM-B factors and behavior change techniques

Implementation strategy	Intervention function	Barriers and enablers addressed (COM-B)	Behaviour change technique employed	Detailed description
1. Conduct educational training	-Education -Training -Modelling - Enablement -Persuasion	Parent knowledge and confidence (psychological capability)	-information about physical literacy and positive outcomes for child -instruction on how to perform the behaviour(s)	A 75-minute workshop for parents, delivered in an accessible community site (e.g., school, sport club or recreation center) by a facilitator with a background in physical literacy. Parents are introduced to the core concepts of physical literacy (motivation, competence, confidence, valuing,) via education, group discussion, and active participation in FMS-based activities. Parents are provided with modifications to perform activities 'at home'.
		Parent perceived ability to implement change (physical capability)	-instruction on how to perform the behaviour(s) using common household items -demonstration of the behaviour(s)	
		Lack of available resources and/or time to engage in purposeful play with child (physical opportunity)	-practice of the behaviour(s) -problem solving -identification of self (parent) as role model to child -verbal persuasion about capability	
		Lack of prioritising child's physical literacy (reflective motivation)	-principles of and ideas for modifications to support the parent in meeting the child's needs in terms of current ability and motivations	
2. Distribute educational resources	-Education - Enablement	Parent knowledge and abilities (physical and psychological capability)	-information about physical literacy and positive outcomes for child -problem solving -messages about addressing multiple developmental goals through physical play like numeracy and literacy through singing and counting	Several resources are provided to parents at workshop conclusion: Canada's 24-hour movement guidelines for children and youth, cards with various activity ideas, and a one-page physical literacy information handout.
		Lack of available resources and/or time to engage in purposeful play with child (physical opportunity)		

# Methods

## Trial design

Six physical literacy workshops (the PLAYshop) were delivered at different times and at varying sites (schools, recreation facilities and sport clubs) within two Canadian jurisdictions. This non-randomized study used a one-arm, concurrent nested approach with quantitative data collected through pre- and post-workshop surveys and qualitative data collected through follow-up telephone interviews of parents and PLAYshop facilitators. Human research ethics approval for the study was obtained from the University of Victoria (#16-444) and University of Alberta (#00093764).

## Participants

We invited parents of young children (ideally 3-8 years of age) to participate in the PLAYshop using e-flyers distributed through the community networks of the schools, recreation centers, and local sports clubs. Siblings of any age were welcome to join and be involved in the workshop. All parents that showed up on the delivery day were invited to partake in the program, with data obtained only from parents and PLAYshop facilitators who signed a consent form.

## Data collection

*Quantitative data:* Pre- and post-workshop surveys of parents collected information about demographics, key study outcomes and parent satisfaction. Survey questions used 5 point Likert scale items to measure knowledge of physical literacy and its key components including FMS development and parent confidence in providing their child/children with activities that promote physical literacy. The post-workshop survey also included questions relating to parents' satisfaction with workshop delivery, whether the content was new to them, the usefulness of training, and their intent to implement activities. Facilitators distributed the pre-workshop survey for completion by parents on-site, immediately prior to workshop delivery. A member of the research team then emailed participants the post-workshop survey to complete one day following workshop delivery.

*Qualitative data:* A member of the research team conducted 10-15 minute semi-structured follow-up interviews of parents approximately two months after workshop delivery (follow-up). Interviews were composed of open-ended questions to assess the feasibility of the PLAYshop, including amenability with workshop teachings, applicability of workshop content, and the ease and/or barriers to implementing learnings with their child/children. A researcher independent of the PLAYshop then conducted 10-15 minute semi-structured interviews with facilitators to assess the enablers and barriers to workshop implementation, as well as explore possible modifications to enhance workshop efficacy and useful components that should remain unchanged.

## Data analysis

*Quantitative data:* We used SPSS Version 21.0 to analyze all quantitative data. Demographics and descriptive statistics described the population and baseline levels of knowledge, confidence and motivation. Changes in parents' physical literacy knowledge and confidence from baseline to follow-up were analyzed using paired t-tests. Statistical significance was defined as  $p < 0.05$ . Measures of frequency (expressed as valid percentages) were calculated to analyze parents' satisfaction with workshop content and delivery and post-workshop intent to participate in physical activities with their children.

*Qualitative data:* We analyzed qualitative data following principles of framework analysis. Two researchers generated themes for each of parent and facilitator interviews by (1) generating a preliminary coding framework, (2) assigning codes to categories, and (3) developing these into themes and sub-themes via negotiated consensus.

## Results

### Sample

We recruited 33 parents (mean age= 38.45 years; 24.2% male, 75.8% female) to participate in the PLAYshop. The full sample of parents completed the pre-workshop survey and 23 completed the post-workshop survey, 11 of which also completed the two-month follow-up telephone interview. The average number of children per household was 1.85. All four PLAYshop facilitators completed the facilitator interview.

### Parents' knowledge and confidence

Valid quantitative data for comparison were obtained from pre- and post-workshop surveys completed by 23 parents. Paired t-test analysis showed a significant increase across all measures of parents' self-reported knowledge from pre- to post-workshop ( $p \leq 0.027$ ). Figure 1 displays parents' mean self-reported level of knowledge pre- and post-intervention in regards to key physical literacy knowledge variables. Parents' mean level of knowledge significantly improved for physical literacy (1.25 [SD = 1.42],  $p = 0.011$ ); locomotor skills (1.14 [SD = 1.01],  $p = 0.000$ ); manipulative skills (e.g., catching, striking, kicking, hitting, throwing) (1.0 [SD = 1.21],  $p = 0.002$ ); balance and stability (0.95 [SD = 1.16],  $p = 0.001$ ); and facilitating physical activities (0.81 [1.47],  $p = 0.02$ ).

Paired t-test analysis also showed a significant increase across all measures of parents' self-reported level of confidence for initiating and implementing physical literacy activities with their children from pre-workshop to post-workshop ( $P < .05$ ). Significant improvements were found for parents' mean level of confidence to provide their child with opportunities for exploration and free play (0.55 [SD = 0.76],  $p = 0.004$ ); to adapt physical activities for different ages and abilities (1.0 [SD = 0.86],  $p = 0.000$ ); to create a home environment that encourages physical activity (0.71 [SD = 0.72],  $p = 0.000$ ); and to limit sedentary behaviors such as screen time and prolonged sitting (0.48 [SD = 0.75],  $p = 0.009$ ).

### Parent workshop experience

Of the 23 parents who completed post-workshop surveys, the majority reported that they were extremely satisfied with the workshop content (72.7%) and delivery (68.2%), with no parent reporting anything less than somewhat satisfied. Most parents also found the workshop training useful (59.1%). The workshop content was reported as “somewhat new” by 49% of parents and “very new” by 28.6%. Most parents (65.2%) were motivated to do physical activity with their children within two weeks of the workshop delivery, and 43.5% strongly disagreed that performing physical activities with their child/children within two weeks of the workshop would be difficult.

Thematic analysis of the follow-up semi-structured interviews of parents (n=11) identified five key themes in relation to implementing the physical literacy activities and concepts (table 1). Prominent facilitators were the ease of access/simplicity of activities introduced in the PLAYshop and the enthusiasm of children. A further prominent theme was life barriers getting in the way (i.e., time, routine, and motivation). Parents further suggested that having children of varying developmental stages and receding memories of workshop content over time may pose as an obstacle to using lessons from the PLAYshop.

*Table 1 - Parent feedback in relation to workshop experience and motivation*

Theme	Sub-Theme	Supporting Quotes
Simple to use	<ul style="list-style-type: none"> <li>o Simple props/supplies</li> <li>o Use what’s available</li> <li>o Accessible</li> </ul>	<ul style="list-style-type: none"> <li>-“Simple and straightforward”</li> <li>-“didn’t require a lot of equipment”</li> <li>-“access is so easy”</li> </ul>
Life gets in the way	<ul style="list-style-type: none"> <li>o Time</li> <li>o Motivation</li> <li>o Implementing a routine</li> </ul>	<ul style="list-style-type: none"> <li>-“Setting a side specific time. Scheduling is always hectic”</li> <li>-“Nothing other than my laziness”</li> <li>-“Time probably number 1”</li> </ul>
Kids are interested	<ul style="list-style-type: none"> <li>o Skills versus outcomes focused</li> </ul>	<ul style="list-style-type: none"> <li>-“Not make it about how far but the skills level of it”</li> <li>-“more about technique rather than distance”</li> <li>-“Interested, he wants to do it”</li> <li>-“See your excitement and get excited about it”</li> </ul>
Children differ	<ul style="list-style-type: none"> <li>o Sibling development stages</li> </ul>	<ul style="list-style-type: none"> <li>-“I usually have both kids at the same time. Difference between kids”</li> </ul>
We need reminding	<ul style="list-style-type: none"> <li>o Information fades</li> <li>o No reminders</li> </ul>	<ul style="list-style-type: none"> <li>-“Hard to recall everything. Maybe a follow-up booklet or an outline of theories for activities”</li> <li>-“forget activities”</li> </ul>

### ***Facilitator feedback***

Thematic analysis of the semi-structured interviews of workshop facilitators generated two major categories – one relating to strengths and successes (see Table 2) and one relating to challenges and areas for improvement (see Table 3). Each major category was divided into seven themes and four themes respectively, with some themes fitting within both. For instance, the presence of a champion assisted in the success of some workshops while the absence of an champion appeared as a key challenge for others. Similarly, children attending the workshops served as both a challenge (occasional

distraction) and strength (assisted with experiential learning and recruitment), and space for movement also served as either a challenge (inadequate space) or strength (ample space). Facilitator expertise, workshop content and parents' positive response to the workshop all emerged as workshop strengths while the need to support parents after the workshop emerged as an area for improvement.

*Table 3 - Workshop strengths and successes from the perspective of workshop facilitators*

Workshop Strengths and Successes	
Theme	Quotes
Having a Parent or Teacher Champion	F1: The 2 schools where we had the most effective recruitment, we had a super engaged parent that did all the recruiting for us.
	F2: So when people- so for one school that we did [the workshop] in we had a parent advocate in that school who wanted to bring it in and so that really helped because then the turn out for that [workshop] was much better ...
	F4: So things that helped a lot was the principal became engaged for us to hold- to use the school as a hosting site and same with one of the teachers- one of the teachers at the school. So for marketing to parents having that inside source I think that got the higher number of participants so... I would say like executive support and in-school support for that particular setting.
Children Attending Workshops	F4: I think it's important to keep- to have at least part of [the workshop] with their kids. Like get [parents] involved with their own kids right off the bat .... that eliminates big barriers too...then parents don't have to worry about getting child care or anything like that.
	F1: because we got feedback from parents in one of the schools where they weren't sure if they could bring their children ....They felt [not including kids] reduced attendance .....
	F2: Umm, so we did allow people to bring their kids. which was good because we had enough facilitators there to break off into 2 groups... and then we would come back as a big group. So I think that was ... helpful and then we could see how parents are actually interacting with the kids and they can try things right then and there.
Skilled Workshop Facilitators	F1: Well, we had highly skilled staff.
	F1: So, you need to be able to riff- on the day you need to be able to riff a bit. Oh and here's an extension, because sometimes a family comes and they actually have a 8 year old there and a 5 year old, and the activity for the 5 year old and the 8 year old are different. And you need to be able to demonstrate those quick revisions on the fly for the parent.
	F3: And I thought that obviously [Facilitator 1] is great at adjusting... [and] in the moment going like "This isn't working, we should do something else", so I think that was great. So I think not sticking to the plan too well was really what made the PLAYshop work when we did it.
	F4: ... also one of the things I witnessed when I sat in on other [workshops] was the kind of optimism and enthusiasm and energy from a facilitator. So, that really has an impact on how engaged the parents become themselves. and how enthusiastic and energetic they are.
Separating Parents and Children	F1: So, reflection and discussion is an important piece of the adult education experience and so that also needs the kids pulled away
	F1: oh- the other thing that really works- the reason why two [facilitators], if you have children you use two [facilitators] because one- sometimes you have to message to the parents, sometimes you can do activities that show the parents but there's a little bit messaging before doing that needs to go on and if you have kids involved you need to have them doing [something else] while the parents are getting talked to. So that's why that exists
	F2: Umm, so we did allow people to bring their kids. Um, which was good because then we had enough kinda facilitators there to break off into 2 groups. So when we needed to speak to the parents by themselves we could, and then someone would play games with the kids and then we would come back as a big group.
	F4: ..... so if you had 2 people always delivering- 2 facilitators, 1 could be doing physical literacy type games with the kids, they're focused on engaging the children while the other facilitator umm focused on the parents and then it gives the parents a bit of a break. The parents can focus. You can do that kinda education piece and then bring it all in together potentially at the end.
Conducive Spaces	F1: We always had enough gym space. You need enough space. You don't need a huge space. ....As long as you have a multipurpose room, you're okay for size
	F3: We did [the workshop]- the ones that I helped out with- we did in 2 elementary school gyms and that's like the perfect amount of space.
	F4: ... just really making sure that [the space] is a setting conducive to movement and to physical literacy type game[s] and play.
Parent Response and Engagement	F1: So, the parents were really enthusiastic. They really loved the workshops and they really felt supported in what they learned. They asked questions. .... they were very engaged.
	F4: The parents seemed to receive [the workshop] well. We did have some parents with their kids there and the kids [also] seemed to really be engaged and it was a positive atmosphere.
	F2: The parents seemed to really like it and took home the ideas. The ideas I think they liked the best was the fact that they could do physical activities at home without much equipment. Like they didn't need to buy a bunch of stuff
Workshop Content	F1: I think the content. The content works. The content works- there's little things like if you have a bit longer you can add additional messaging...
	F2: I think the actual content of [the workshop] was good, parents seemed to like that. So I wouldn't change necessarily that aspect.
	F4: ... and then those key messages... watching some of the other workshops that were facilitated primarily by [Facilitator 1] really the emphasis on those key messages about being playful and fun but also [using the play] in order to develop those skills and the importance behind that.

F4: oh I just think it's so important that we do start-start targeting parents now for the next kind of wave of physical literacy and fundamental movement skills development.

Table 4 - Workshop challenges and areas for improvement from the perspective of workshop facilitators

Workshop Challenges and Areas for Improvement	
Theme	Quotes
Workshop Recruitment and Attendance	F1: Recruitment. It is so difficult getting the parents [to the workshop]. It is very random. So typically when you're recruiting in all these settings you're going through a third party, like the parent advisory committee person, inviting the parents through their network or the school principal or the sport club technical director. So, you have to rely on somebody to send out the notices to the list. So that broke down in some cases, but not all.
	F3: I think participation was the biggest one... it's easy enough to put it out there and say this is gonna happen and I think in theory like people want to know this sort of stuff and want to be able to do and offer and like be able to help their kids stay more physically active at home and doing all this sort of stuff, but like when it comes time to actually deliver the programs a lot of those like "maybes, ya sortas" turn into no-shows.
	F3: ... it's easy enough for us to adapt to be able to deliver something differently to those [smaller] groups and be able to say like "okay we were going to do this, we'll do this instead because it works better with that group". But at the same time like they maybe don't get the same out of it that a group of 10 parents would because you just- you can't explain the same sort of things.
Unfavorable Spaces	F1:...outside space is problematic I would suggest that the workshop should be done indoors and mostly because we use a lot of balloons and light things and they blow away. The second thing is the ability to bound your space. It's a bit chaos-y. You need an ability to bound your space
	F4: ... ya the classroom was a little broken [up] because of all the chairs and the tables and I remember thinking that it would be better had I pushed like the stuff aside and just created a more open inviting atmosphere.
Children as a Distraction	F1: We had some of the kids answering the questions because they sat with the parents at the time, so that was harder. And then of course you know kids they- there is always one or two that are precocious, trying to take the lime light in a group situation. So you need to navigate that a bit.
	F3: I think we tried to do it all together and when you're- it's like 7 o'clock after school and kids are expecting to be like playing games and you're trying to explain things to the parents while the kids are just standing there and watching you do it, you lose a lot of that attention because the parents are now worried about what the kids are doing instead of what you're explaining to them about.
	F4: ..... when the parents that had small children with them, I think it was harder, it was more difficult for them to (pause) focus and really get the most out of the workshop. ....
Supporting Parents after the Workshop	F1: ... I would do a let's make activity and they would leave with the piece of equipment .....We did do a [simple] handout, .... but a more professional handout and a web resource where they could go to find some simple ideas probably would help.
	F1: And then I think a follow up phone call, discussion [on] how it's going and maybe some email activities coming to them. I think it needs to be more interactive after the day.
	F4: [The workshop] is engaging and parents get motivated but then once they leave- what are the chances that it's sustained that kind of you know learning and positive energy. ... so I think some sort of- follow-up, some sort of sustainability type strategy just to prompt that continued behaviour.

## Discussion

We conducted a small, real world uncontrolled study to assess the feasibility of a brief, parent-focused intervention aimed at enhancing the knowledge, confidence, skills and resources necessary to support them in developing their child's physical literacy through play. According to our results, the majority of parents who partook in the PLAYshop were highly satisfied with both workshop delivery and content. It also appeared to have a positive impact on parents' knowledge, confidence, and engagement in purposeful play with their child/children. Compared to pre-workshop measures, post-workshop surveys of parents showed significantly higher levels of knowledge in key physical literacy variables and confidence in undertaking physical-literacy promoting activities with their child/children. Further, the majority of

parents were highly motivated to apply learnings from the PLAYshop and undertake physical literacy activities with their child/children.

Consistent with findings of prior research (Barnes et al., 2015; Morgan, Lubans, Callister, et al., 2011; Morgan et al., 2019), our results suggest that a brief training workshop may positively influence parenting practices in regards to physical literacy. What is more, research has shown that the home environment impacts a child's motor skill development (Barnett, Hnatiuk, Salmon, & Hesketh, 2019; Zeng et al., 2019) and RCTs have further linked parent-focused interventions with improvements in child's FMS (Morgan et al., 2019) and physical activity (Morgan, Lubans, Callister, et al., 2011; Morgan et al., 2019). This has important implications seeing as physical literacy is a lifelong journey that impacts numerous health outcomes (Cairney et al., 2019). Educating parents may provide a viable means of influencing the physical literacy journey early in the life course. A more rigorous assessment of the PLAYshop via a RCT is needed to determine its efficacy.

Parents and workshop facilitators reported numerous strengths of the PLAYshop content and delivery, including its usefulness, convenience, and ability to elicit enthusiasm from both parents and children. Further, the workshop brevity, ease to deliver, and low supplies required makes it a realistic public health intervention in an era where resources are often scarce. However, despite these strengths, several implementation barriers were noted (e.g., distracting children, difficulty recruiting parents, and unfavorable delivery spaces). Fortunately, these challenges were exposed in this study and may be mitigated by modifications. For example, an additional facilitator to engage children during parental learning might lessen the distraction – a method successfully employed for the HDHK father-child practical sessions (Morgan, Lubans, Callister, et al., 2011).

This study has numerous limitations including the small number of participants and lack of a control group. However, this is common of feasibility studies whose primary purpose is to determine whether future definitive trials of an intervention should take place and if so, what this trial should like (Blatch-Jones, Pek, Kirkpatrick, & Ashton-Key, 2018). Strengths of the study included the workshop delivery with real world partners in the context in which potential scale-up would occur.

## Conclusion

The PLAYshop appeared feasible and improved parent self-efficacy to promote physical literacy with their child/children, although recruitment was challenging. Based on these positive results, the planning of a future full-scale RCT is currently underway and outcomes from this study will be used to inform modifications to improve workshop implementation and impact.

This study addresses an important research gap and is a valuable preliminary step in the development, testing and delivery of an intervention to promote childhood physical literacy. It contributes to the broader physical literacy movement that strives for children to have *“the motivation, confidence, knowledge, skills, and fitness necessary to enjoy a physically active lifestyle”* (Longmuir & Tremblay, 2016).

## Abbreviations

IPLA: International Physical Literacy Association; HDHK: Healthy Dads Healthy Kids; DADEE: Dads and Daughters Exercising and Empowered; FMS: Fundamental movement skills; RCT: Randomized controlled trial; BCW: Behavior Change Wheel

## Declarations

**Ethics approval and consent to participate:** This study received human research ethics approval from the University of Victoria approval (#16-444) and University of Alberta (#00093764).

**Consent for publication:** Not applicable.

**Availability of data and materials:** The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Competing interests:** The authors declare that they have no competing interests.

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**Authors' contributions:** CL drafted the manuscript. PJN and CW conceived and developed the intervention concept. PJN guided the design and piloting of the intervention. CW, CL, PJN, KR implemented the intervention, PJN and VC oversaw the evaluation and data collection. CL, KR, KM and MP collected and analysed the data. PJN and VC interpreted the data. All authors contributed to reviewing, editing and approving the final version of the paper.

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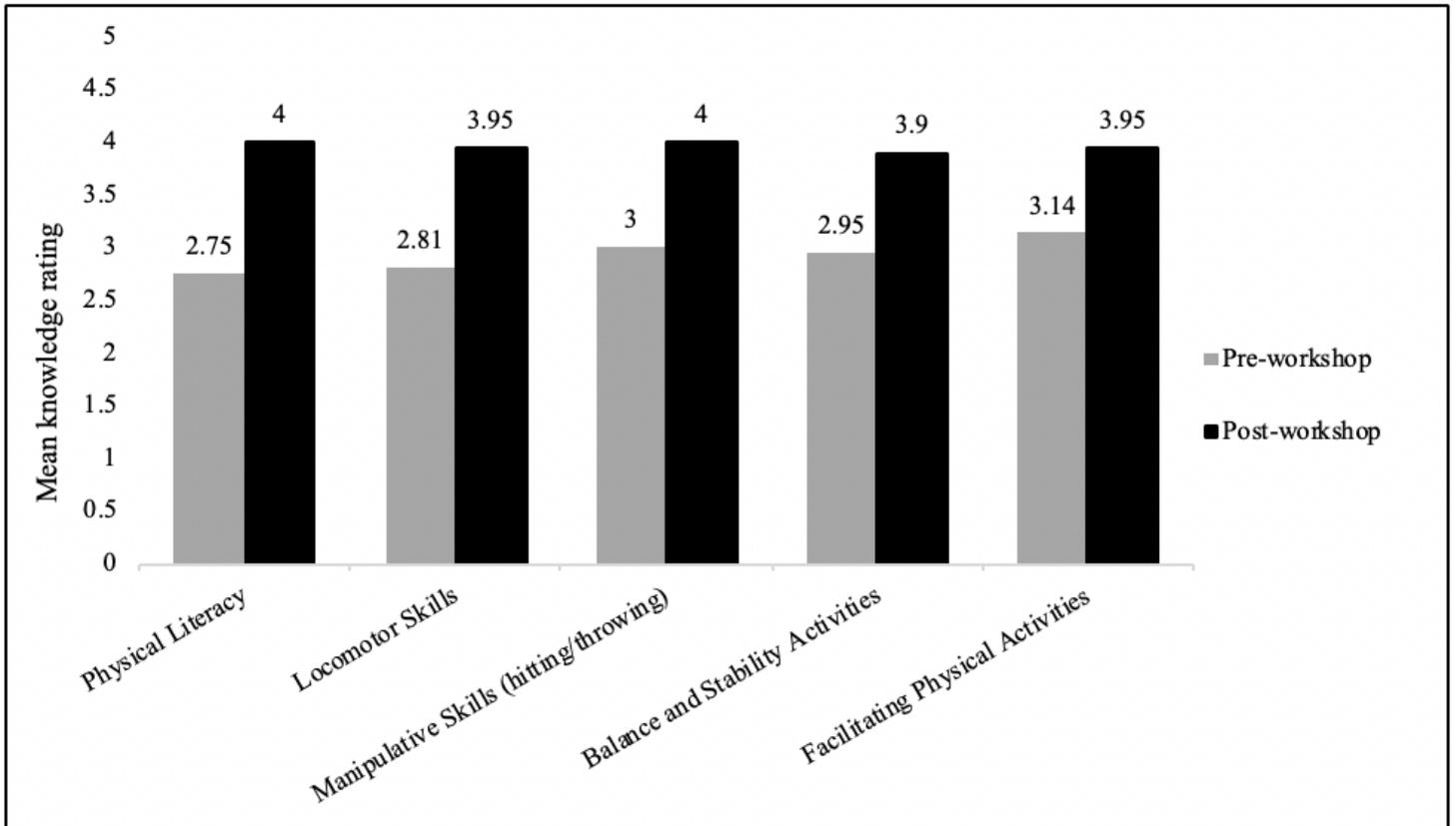
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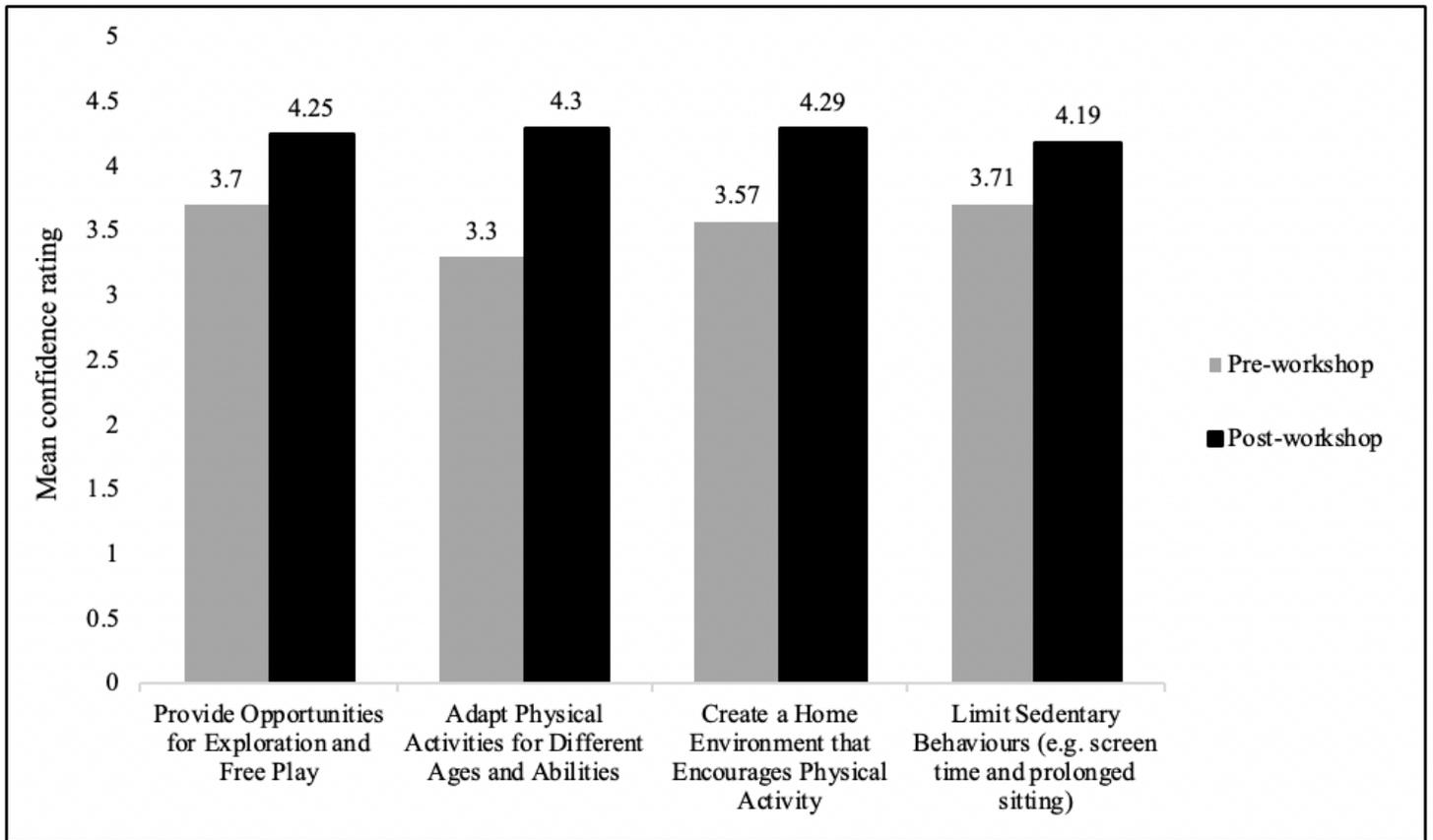
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## Figures



**Figure 1**

Parents' self-reported level of physical literacy knowledge pre- and post-workshop



**Figure 2**

Parents' self-reported level of confidence to carry out key PLAYshop teachings pre- and post-workshop

## Supplementary Files

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- [PLAYshopMinimumStandardsofReportingChecklist.docx](#)