This is the author's version of a work that was accepted for publication after peer review. This is known as the post-print.

Citation for author's accepted version


Citation for publisher's version


Notice: The publisher’s version of this work can be found at:
http://www.academia.edu/8699419/Exploring_physical_activity_opportunities_to...
Exploring physical activity opportunities to complement the Health and Physical Education curriculum

Dr. Brendon Hyndman (Charles Darwin University, Northern Territory), Dr. Amanda C. Benson (RMIT University, Victoria) & A/Prof. Amanda Telford (RMIT University, Victoria)

Curricular Physical Activity Opportunities for Children

School Health and Physical Education (HPE) programs (including Sport Education) are the major ‘curricular’ and ‘structured’ avenues for teachers to develop children’s physical skills and physical activity levels (Trost & Van der Mars, 2010). With growing parental safety concerns (Telford, Finch, Barnett, Abbott & Salmon, 2012) and economic pressures on parents beyond the school setting (Paxson, Donahue, Orleans, & Grissors, 2006), having curricular opportunities for children to develop physically is important. The HPE curriculum provides a unique opportunity for teachers to develop children’s physical activity, healthy lifestyle skills and knowledge within a safe and supportive learning environment (Trost & Van der Mars, 2010). Fundamental motor skills developed via curricular programs provide essential building blocks to equip children with the skills to participate in structured, competitive sports as they get older (Barnett, Van Beurden, Morgan, Brooks, & Beard, 2009).

Without fundamental motor skill proficiency, children may avoid or drop out of sporting experiences with their peers as they get older and subsequently decrease their opportunities for vital social experiences (Lubans, Morgan, Cliff, Barnett, & Okely, 2010). Curricular classes providing children with an opportunity to be physically active play an important part in children’s physical, cognitive and social development (Trost & Van der Mars, 2010). In addition to the inclusion of HPE (and Sport Education), there are a range of non-curricular strategies that can also promote children’s physical activity within the school setting.

Non-Curricular Physical Activity Opportunities for Children

With the demanding nature of the daily roles and responsibilities of school teachers (Jenkinson & Benson, 2010), it is important to consider other strategies within schools to promote children’s physical activity that can complement the work of HPE teachers. Rather than relying on organisational input from teachers, international evidence has highlighted that non-curricular
initiatives can enhance children’s physical activity opportunities (Ridgers, Stratton, & McKenzie, 2010). Non-curricular opportunities within the school setting to develop children’s physical activity mainly include active transport to and from school, before and after school programs and school break periods.

Active Transport to and from School

Active transport includes modes of travel such as walking, cycling and skating and is considered an important source of physical activity for children (Pont, Ziviani, Wadley, Bennett, & Abbott, 2009). Several reviews of literature have identified that children who engage in active transport to and from school tend to be more physically active (Sirard & Slater, 2008) and engage in more social interaction (Panter, Jones, van Sluijs, & Griffin, 2010). Initiative programs such as Safe Routes to School, the Walking School Bus, or the Walk to School programs have been implemented to increase children's walking and bicycling to school with some success (Davison, Werder, & Lawson, 2008). However, active transport is often reliant on safe routes to school (Davison et al., 2008) and the presence of walking or bicycle paths (Sirard & Slater, 2008). As active transport to school is more common in low income and minority groups, active transport programs targeting low socioeconomic status (SES) areas could be worthwhile (McDonald, 2008).

In the last 40 years, there have been major decreases in active travel to school among Australian children and adolescents (Van der Ploeg, Merom, Corpuz & Bauman, 2008). Therefore, rather than being a major source of children’s physical activity, the physical activity benefits of active transport to and from school could be used to complement other physical activity opportunities throughout the school day. Heavy traffic, long distances to travel and ‘stranger danger’ can be barriers to primary school-aged children actively commuting to and from school (Booth, 2000). Parents are also concerned about air pollution for children participating in active transport in some countries (Garrard, 2009). Given the perceived and real barriers associated with active transport, encouraging a range of non-curricular physical activity opportunities is warranted.

After School Activity Programs

Previous research has examined children’s physical activity during the after school period (Trost, Rosenkranz, & Dzewaltowski, 2008) with positive outcomes in relation to children’s engagement in physical activity (Flohr, Todd, & Tudor-Locke, 2006). Research has shown that children who report higher incidence of active play during the after school period are more active overall and active at a greater intensity than those who report fewer incidences of after school active play. Since national data revealed declining levels of children’s after school physical activity in 2004 (Australian Sports Commission, 2004), the Australian Government has promoted programs such as Australia’s Active After-school Communities Program (AASC) to increase children’s engagement in after school physical activity (Moodie, Carter, Swinburn & Haby, 2010). After school programs can provide children with both structured and unstructured physical activity opportunities and can extend children’s learning and development of physical skills beyond the daily school curriculum (Stanley, Boshoff & Dollman, 2013). Additionally, the rate of children attending after-school programs is likely to continue to increase due to a rise in parental employment and an emphasis on children’s academic performance (Vandell et al., 2005). However, like active transport, not all children engage in non-curricular after-school activity programs (Pate & O’Neill, 2009). Moreover, an increase in the number of parents working has limited primary school children from being picked up or delivered to after school physical activity and sports programs within non-school settings (Paxson et al., 2006). When children have limited opportunities to be sufficiently physically active during the school day, they do not compensate by increasing their after school physical activity levels (Dale, Corbin, & Dale, 2000). In light of some of the barriers associated with children engaging in active transport and after school physical activity programs, a key strategy to increase children’s physical activity levels is to target the non-curricular windows during school break periods (e.g. morning recess and lunchtime recess).
School breaks (e.g. morning recess, lunchtime recess) are key non-curricular windows that are supervised, safe and provide accessible play opportunities to all children (Hyndman, Benson, & Telford, 2014). Across the world many schools have reduced or eliminated HPE classes altogether, yet school breaks are consistently provided; usually over two hours per week and thus can constitute more time within a school week than structured curricular based HPE for children to be active (Lee, Burgeson, Fulton, & Spain, 2007). School break periods have been revealed as the principle source of children’s physical activity (Tudor-Locke, Lee, Morgan, Beighle, & Pangrazi, 2006), contributing up to 50% of daily physical activity recommendations (Tudor-Locke et al., 2006). Rather than continually burdening HPE teachers (Morgan & Bourke, 2005), enhancing play opportunities during school breaks places minimal burden on teachers. Children spend on average 30 hours per week attending school and accumulate up to 35% of school break time engaged in moderate to vigorous physical activity (MVPA) (Nettlefold et al., 2010). Developing greater knowledge of the influences on children’s play during school breaks is vital in order to tailor physical activity strategies within school break periods and provide sustainable health-related benefits.

Active play during school breaks has been acknowledged as a powerful developmental and learning tool (Ramstetter, Murray & Garner, 2010), leading to international policies to enhance school playground design features to encourage further school-based physical activity opportunities (Tranter & Malone, 2004). International governments (UK, Canada, USA, Sweden, Wales) have identified the value of children’s active play areas, such as outdoor teaching spaces, informing strategies to develop school grounds to boost the quality of children’s play (Tranter & Malone, 2004). Physical activity via active play during school breaks has been linked to improvements in classroom behaviour (Ridgers, Stratton, & Fairclough, 2006), cognitive performance (Pellegrini & Bohn, 2005) and the enhancement of social and physical skills (Pellegrini & Holmes, 2006).

Beyond school breaks, children may have limited access to physical activity opportunities, therefore further awareness of the physical activity opportunities within school play spaces should be obtained (Kriemler et al., 2011). Whilst a well-designed school environment can enhance physical activity participation during school breaks, Australian studies reveal many schools have eliminated play spaces and equipment, experience crowded play spaces and enforce restrictive policies that act as barriers to the access and use of play spaces; resulting in fewer opportunities for children to experience active play (Chancellor, 2013). Providing engaging physical activity opportunities during school breaks is a key strategy to enhance children’s daily physical activity participation, therefore an increased understanding of how to create sustainable physical activity opportunities becomes an important consideration for teachers and school decision makers. Giving consideration to the children’s perspective of active play spaces when planning and designing school play spaces could provide valuable insight (Hyndman, Benson, & Telford, 2014). It is important to ensure school decision makers design school playgrounds in a manner that maximises children’s opportunities to move and experience the enjoyment of being active during school breaks (Hyndman, Benson, & Telford, 2014). An example of how physical activity can be facilitated during school break periods is the Lunchtime Enjoyment Activity and Play (LEAP) intervention that consisted of the provision of movable/recycled materials.

**The Lunchtime Enjoyment Activity and Play (LEAP) intervention**

The primary aim of the Lunchtime Enjoyment Activity and Play (LEAP) school playground intervention was to evaluate the effects of introducing movable/recycled materials on primary school children’s quality of life (QOL), enjoyment and participation in physical activity (PA). Movable/recycled materials with no fixed purpose were introduced to a grass field in a brand new Catholic primary school from the end of term 1 to the middle of term 2 until the end of term 2 during Autumn and Winter in 2010. As the school grounds were brand new, there was only one other play area, a car-park area which was commonly used during wet conditions or for those children not interested in playing on the field (Figure 1). There was no fixed play equipment in the school grounds.
during the intervention (e.g. climbing frames, monkey bars, slides).

**Figure 1:** The school playground prior the LEAP intervention being introduced

The movable/recycled materials introduced to the playground were items generally not considered to be typical play materials for children within schools, with the exception of play balls, hoops and skipping ropes. The materials included milk crates, swimming boards and noodles, buckets, cardboard boxes, tyre tubes, plastic pipes, vacuum/pool hoses, plastic walls and sheets, hessian bags, water/sand shells, tractor/motorbike and bicycle tyres, exercise mats, and hay bales. Five materials were introduced during the first week of the program, and each week thereafter a minimum of two additional types of materials were introduced during the intervention period (Figure 2). All items remained on the field after being added, except for the removal or replacement of items that were broken or if teachers perceived an item presented a safety issue.

**Figure 2:** The sequence of introducing movable/recycled materials into the school playground

In accordance with the requirements of the Australian/New Zealand Safety Standards, children were instructed not to stack more than two hay bales on top of each other (approximately waist height for the average primary aged student). Additionally, teachers instructed students that only the research team and teaching staff could move the tractor tyres to other parts of the grass field. Children were not permitted to strike each other with the swimming noodles and children had to return all equipment at the end of the week to the entrance of the grass field.
Children were in the playground for 30 minutes during the morning break and 30 minutes during the lunchtime period. All students (5-12-year-olds) had access to the playground simultaneously. The provision of small pieces of portable sports equipment was made available by the school such as footballs, bats and balls as per usual practice in primary schools. Two teachers were rostered on playground supervision (yard duty) during breaks as per usual practice, one teacher was allocated to supervise the grass field (Figure 1 and 3) and the other to supervise the bitumen car park area (Figure 1). The Principal briefed the teachers prior to students commencing the intervention, explaining that the items were to encourage children to create their own play and not to intervene unless children’s safety was at risk.

![Image of playground](image)

**Figure 3:** The school playground after the LEAP intervention was introduced

**Table 1:** Children’s use of the movable/recycled materials for physical activities during school break periods (recorded via field note observations)*

<table>
<thead>
<tr>
<th>Movable/recycled materials</th>
<th>Children’s use of the movable/recycled materials during the school break periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>All movable/recycled materials</td>
<td>Obstacle courses, imaginative play, building, activity stations</td>
</tr>
<tr>
<td>Bicycle tyres</td>
<td>Rolling, stacking</td>
</tr>
<tr>
<td>Broom sticks</td>
<td>Riding, sweeping activity stations</td>
</tr>
<tr>
<td>Buckets</td>
<td>Filling with materials, driving cars</td>
</tr>
<tr>
<td>Cardboard boxes</td>
<td>Hiding, clothing, sliding, stacking</td>
</tr>
<tr>
<td>Hay bales</td>
<td>Jumping, landings, building, cubby houses</td>
</tr>
<tr>
<td>Hula hoops</td>
<td>Rolling, hula hooping around waist</td>
</tr>
<tr>
<td>Mats</td>
<td>Toboggan/sleigh seats, hay bale cover</td>
</tr>
<tr>
<td>Milk crates</td>
<td>Building houses, space ships, cars, castles, rockets, tunnels &amp; boats, climbing, jumping, soccer goals, landings</td>
</tr>
<tr>
<td>Netting</td>
<td>Dresses, capes, house roofs, sails</td>
</tr>
<tr>
<td>Plastic cones</td>
<td>Activity station borders, hats, goals</td>
</tr>
<tr>
<td>Plastic cylinders</td>
<td>Telescopes, rockets, cannons</td>
</tr>
<tr>
<td>Plastic sand/swimming shells</td>
<td>Tobogganing, sand play, walls</td>
</tr>
<tr>
<td>Plastic walls</td>
<td>Cubby house roofing/walls, climbing</td>
</tr>
<tr>
<td>Play balls</td>
<td>Cannon balls, rolling, groceries</td>
</tr>
</tbody>
</table>
Swimming kick boards | Sleigh seat, dragging, building
---|---
Swimming noodles | Riding pretend horses, fencing, tug of war
Tarpaulins | Cubby house roofs/walls, boat sails
Tyre tubes | Jumping, stacking, rolling
Vacuum tubes | Instruments, phone call centre
Wooden planks | Balancing beams, house walls

*Adapted from Hyndman, Benson and Telford (2014)*

**Key findings from the Lunchtime Enjoyment Activity and Play (LEAP) intervention**
(Hyndman, Benson & Telford, 2014)

- The Lunchtime Enjoyment Activity and Play (LEAP) intervention had significant effects on children’s steps and distance covered (both assessed using pedometry) in comparison to children in a matched primary school after both the 7-week and 8-month time points.
- Short-term (7-weeks) effects from the LEAP intervention were evident for children’s physical health scale of quality of life, enjoyment of physical activity and enjoyment of individual-level play activities.
- Direct observation using the System of Observing Play and Leisure in Youth (SOPLAY) revealed that the LEAP intervention school children spent significantly higher proportions within specified playground areas in more vigorous physical activity intensities than the matched primary school children after both the 7-week and 8-month time points.
- Direct observation used in the school playground throughout the school year revealed that the predominant physical activity type observed amongst the students in the intervention school changed from imaginative play with the movable/recycled materials after 7-weeks (Figure 4) to building and construction after 8-months (Figure 5).
- A process evaluation of the reach, effectiveness, adoption, implementation and maintenance (RE-AIM) of the LEAP intervention revealed that movable/recycled materials could be feasibly implemented and maintained for at least a two and a half year period in a primary school (Figure 5).
- The cost-effectiveness, sustainability and diversity of the movable/recycled materials were seen as major factors contributing to the success of the LEAP intervention.
- The multiple intra-personal (e.g. creativity, problem solving) and inter-personal (e.g. teamwork, negotiation) level influences and engagement of the children (especially non-competitive type children & females) reported by teachers at the LEAP intervention school suggests the LEAP intervention would be a useful strategy to complement the HPE curriculum and be replicated in other school settings.
Figure 4: The proportion of predominant activity types measured by direct observation within each specified playground area at baseline and post-test (7 weeks)*

Figure 5: The proportion of predominant activity types measured by direct observation within each specified playground area at 8 months and 2 ½ years*
Implications of the LEAP intervention for HPE teachers

Combining active play and learning can be difficult to integrate conceptually and in practice (Pui-Wah & Stimpson, 2004). The findings from the LEAP intervention could be used to improve teachers’ understanding of the benefits of the ‘informal HPE curriculum’ during school break periods and to consolidate understanding of school breaks as an opportunity for students to develop skills beyond the classroom, rather than viewing school breaks as having little impact on students’ health, learning and development. Rather than a period for students to ‘let off steam and energy’ (Evans & Pellegrini, 1997), the findings from the LEAP intervention show that it can enhance teachers’ understanding of the value of introducing cost-effective materials to a school playground as a strategy with low burden on staff to develop children’s health and physical activity beyond the classroom. In addition to supporting the work of primary school HPE teachers, the use of movable/recycled materials could also be implemented within HPE classes for a range of practical activities such as tabloids, jumping/landings, obstacle courses, problem solving, activity bases, toboggan relays, target sports, striking sports and the development of balance to encourage children to take the concepts home and participate in low cost activities within their own home environment.

To learn more about the LEAP school playground intervention, please visit:

- [https://www.youtube.com/watch?v=JDq24UQuEkg](https://www.youtube.com/watch?v=JDq24UQuEkg) (WIN news report)

References


