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Primary and secondary students' perceptions to enhance the school physical activity environment

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Introduction

A well-designed school environment can facilitate physical activity, yet recent national trends suggest a number of schools have removed spaces or equipment, possess crowded spaces and implement restrictive policies limiting the use of spaces that result in reduced opportunities for students' physical activity (Hyndman, Telford, Finch, & Benson, 2012). Teachers and school decision makers rarely consult students when planning and designing school physical activity environments, instead approaching this process from an adult perspective of what they think students would want and enjoy (Knowles-Yanez, 2005; Sener, 2006; Willenberg et al., 2009). The sole reliance on adults in the design and planning of students' physical activity environments can lead to undesired physical activity settings that can have long-term consequences for students' social and emotional development (Willenberg et al., 2009). In addition, students may believe they have little influence on the set up of their school environments for physical activity. Students' perceptions are an important consideration for teachers and schools when planning school environments for physical activity. Despite students generally being the main consumers of such environments during sport, health, physical education and non-curricular periods, adults are often the decision makers when planning school physical activity environments.

Increasing understanding of the features students' perceive to enhance school physical activity environments will allow for more effective interventions targeting youth physical activity participation (Hyndman et al., 2012). To date, there has been limited insight for teachers of the perceptions of both primary and secondary school students of features to enhance the school physical activity environment. Providing an understanding of students' ideal physical activity facilities could help teachers facilitate increased physical activity levels among students and provide considerations for planning and design of school-based physical activity. Although schools are acknowledged as a key setting for physical activity, it remains unclear which specific features primary and secondary students desire in order to enhance the physical activity environment.

This research therefore addresses an important gap within the literature relating to school-based physical activity. The present investigation employed a mixed methods approach using focus groups and map drawing, which aimed to provide an insight for teachers of primary and secondary students' perceptions of features to enhance the school physical activity environment.

Methods

Participants

The Principals of four government schools (2 primary and 2 secondary) in the western region of Victoria were randomly selected and invited to participate in the study by researchers. All schools from the western region were consecutively numbered, and a random number generator was used to select the four schools. Primary school students (all Year 5 and 6 students; n=197) and secondary school students (all Year 7 and 8 students; n=643) were invited to participate via a letter and consent form distributed. Year five and six primary school students were invited to participate as students over eight-years-old have been revealed to be more capable of accurately self-reporting their own health behaviour (Riley, 2004). In

order to compare the influences on physical activity between primary and secondary school students, year seven and eight secondary school students were invited to participate.

All students interested in participating were instructed to obtain parental consent and return their consent forms to the general office of their school. The first 15 students from each year level were invited to attend the scheduled focus group and/or map drawing session. During this study, 78 students from all four schools aged 10-13-years-old (50% females; 50% males) returned their consent forms by the due date and all students who volunteered participated in the study (Year 5= 29; Year 6= 20; Year 7= 29). The focus group discussions consisted of 54 students (32 primary and 22 secondary) and the map drawing sessions included 24 students (17 primary and 7 secondary).

Ethical approval for the study was obtained from the University of Ballarat Human Research Ethics Committee, the Department of Education and Early Childhood Development (DEECD) and permission was gained from the school Principals.

Focus Group Discussions

For the present study, seven focus groups (4 primary school and 3 secondary school) were conducted for students who agreed to participate. The six to ten students in each focus group were asked a series of questions using a semi-structured interview schedule in relation to their desired features to enhance the school physical activity environment. The focus group discussions were conducted for 30-60 minutes in a quiet room separate to where the map drawing exercise took place simultaneously to prevent the discussion influencing the drawings. All focus group discussions were audio recorded and detailed comments were taken of students' focus group answers and body language during each session to aid transcription.

Map Drawing

Sheets of A3 sized paper were distributed to students including an instruction sheet with the description of each mapping task that asked students to draw their: (1) 'existing school spaces'; (2) 'ideal space for physical activity.' At the completion of the focus groups, students were invited to explain their maps to the researcher at which time they were video recorded. This ensured that map features were correctly interpreted to avoid misunderstanding and to clarify each child's perspective of their drawings. Each of the maps were quantitatively audited to identify the types and locations of school environment features.

Data Management

All focus group data was de-identified and referred to by pseudonym. Data collected from focus group sessions were transcribed verbatim and analysed using the NVivo version 8 software package (QSR International). All audio recorded focus group and video recorded mapping sessions were transcribed by a trained transcriptionist. The analysis of the transcriptions were based upon the emerging themes, similarities and differences within and between the primary and secondary school groups'. The information provided in the focus groups was used to determine suggestions from students to enhance the school physical activity environment.

Results

Key themes and quotes identified from both primary and secondary school focus groups can be observed in Table 1 and 2. The themes relating to features to enhance the school physical activity environment included adventure equipment, animals (secondary only), excursions, facility maintenance, fitness equipment, natural features, policy considerations, recreational facilities, sporting facilities and teacher-directed activities (primary only).

Table 1. Key themes from the primary school focus groups and map drawing to enhance the school physical activity environment.

Theme	Quotes	
	Males	Females
Adventure equipment	<p>“...like an indoor rock climbing wall- no harness, but no really big risks. If you fall it’s not going to be far to hit the ground.”</p> <p>“...low ropes course...make it a bit challenging. Have like a mini vertical climbing pen...”</p>	<p>“...they should make a set of high monkey bars, because they are really low everywhere.”</p>
Excursions		<p>“...go out of the school sometimes to be active, like two or three activities. Go to the minor dome or major league, stuff like that.”</p>
Facility maintenance		<p>“...probably updating the facilities because they’ve been there for a very long time.”</p>
Fitness equipment	<p>“...probably like a thing where you hold on to, sort of like a treadmill and you get heaps of speed.”</p>	
Natural features	<p>“I’d put in a hill sort of thing...be cool to have a hill to roll down.”</p> <p>“a big space with a lot of trees so you can be active in the shade.”</p>	<p>“Lots of trees and branches you can climb.”</p>
Policy considerations	<p>“...it can be boring (school physical activity)...you need a change every now and then cause...you would be doing the exact same stuff.”</p>	<p>“I’d probably include more PE lessons.”</p> <p>“...sprinklers to cool you down.”</p>
Recreational facilities	<p>“I reckon there should be a gym sort of thing, not like the exercise sort of gym, but like a fun activity gym...like swing off things and land in a foam pit...do little obstacle courses and stuff.”</p> <p>“I would put like a bouncy sort of thing in like a jumping pillow.”</p> <p>“I’d probably have an obstacle course or something.”</p> <p>“motorbikes...a Nintendo wii.</p> <p>“...a waterslide, but only once a week and in summer.”</p> <p>“...a mega bike where a group of people could sit on it and pedal.”</p>	<p>“...ten slides, wrapped around each other like at wet n wild...they go around and then into the water. Swirly slides and everything.”</p> <p>“Would be cool to have big mazes, big hedges and you have to find a way out and that.”</p> <p>“I’d have mini golf.”</p> <p>“An indoor mega stadium with wii guitar hero and wii fitness.”</p> <p>“...we should have a very ,very big pool with a waterslide going into it, a diving board you can swim around and one to jump off...only for the 5-6’s so the little kids don’t drown.”</p>
Sporting facilities	<p>“...little holes where you can put the tennis nets in. So that you can like take them out and everything like that.”</p> <p>“...an extra big court to practice soccer around it.”</p>	<p>“I would do lots of running around school...probably like a running track (should be included).”</p> <p>“I like the idea of a pool and maybe an indoor basketball court that doesn’t have all concrete and stuff so you don’t hurt yourself.”</p>
Teacher directed activities	<p>“Some of the teachers could hold activities outside phys ed classes and if you didn’t want to do activities you could do whatever activities you want...some teachers might teach you to go around on the bike or something.”</p>	

Table 2. Key themes from the secondary school focus groups and map drawing to enhance the school physical activity environment.

Theme	Quotes	
	Males	Females
Adventure equipment	<p>“Definitely a rock climbing wall, just a huge wall and you can abseil down it as well...lots of spaces...with soft mats and stuff.”</p> <p>“I’d like to have a space where you can have metal poles and climb up and hang around the top of it, as dangerous as it is, it is really, really fun...swing across and that.”</p> <p>“Adventure flying fox...have like a seat and you hang on to it and because it’s bushland you could make it go down the hill.”</p> <p>“Tobogganning, bumper cars, paint ball.”</p>	<p>“A rock climbing wall...ropes at the top and everything...really long so like when you get to the top...there’s a ladder you can climb up...go down a big slide.”</p> <p>“...the one (flying fox) with the triangle on thick ropes...need to hold on...have a harness on...its on the discovery channel.”</p> <p>“Moss slides, really slippery moss.”</p> <p>“...trees...with rope hanging off them, the tyre swings...you stand on them and someone pushes you.”</p>
Animals		<p>“...lots of animals...it can be pretty fun to be physically active with...muck around with dogs and all that, ride horses.”</p> <p>“...dog walking would be great...it would be great to have a big area to go dog walking and running.”</p> <p>“...horse riding...you could block off the oval.”</p>
Excursions		<p>“I think more excursions...you could go to YMCA for an excursion, like we are going swimming this term.”</p> <p>“One class could go to the pool, the other class horse riding, the other class hunting.”</p>
Facility maintenance	<p>“...better football field, instead of some parts muddy and some parts really hard.”</p>	
Natural features	<p>“There should be lots of trees. I love trees and want to climb them.”</p> <p>“...a lake full of water...to do kayaking...sailing.”</p>	<p>“...we could have a tree over the swimming pool and a rope hanging off it that you could swing into the swimming pool.”</p>
Policy considerations	<p>“...borrow sports equipment whenever we want...you hand in something of value like your phone or something and then that way you’ve gotta bring it back, otherwise you don’t get your value.”</p> <p>“...just scan your student ID card and get to borrow sports equipment, because if you’re not down there in 5 minutes you can’t borrow.”</p> <p>“Music playing when you are being active.”</p>	<p>“A space to socialise, a space to hang out, a space for sport...all different spaces for all different people.”</p> <p>“...there should be more air conditioning when we are active inside.”</p>
Recreational facilities	<p>“A wii. You could have a tv and then do the sport and watch other people do the sport.”</p> <p>“A skate park, jumping castle, a plastic tunnel.”</p>	<p>“I think it’s important to have a skate park, although you would need more time.”</p> <p>“...bikes...that would be cool.”</p> <p>“...we don’t want a playground, we are too old for that.”</p>
Sporting facilities	<p>“I’d have a massive trampoline and then a massive foam pit.”</p> <p>“...an enclosed area with soft walls and stuff.”</p>	<p>“...more basketball and netball facilities near our classrooms.”</p> <p>“A swimming pool for everyone. Take it in turns, you would have like a schedule...should go by house or year level.”</p> <p>“Trampolines and stuff, but have mats on the side. You could have like foam mats and blocks.”</p> <p>“Just a running track.”</p>

Discussion

This study provides greater understanding for teachers of the features both late primary and early secondary school students' perceive would enhance the school physical activity environment. Such features can be used by teachers and those responsible for decision making to inform school-based physical activity interventions and planning. Factors within the physical environment that can facilitate students' physical activity have been examined (Hyndman et al., 2012), yet there is limited research exploring students' perceptions of features that will enhance the school physical activity environment. Similar to the students' perceptions within the present study, a frequently studied physical environmental factor (mainly in secondary schools) has been the availability of facilities in the outdoor school setting (e.g. sporting courts and grass areas; Haug, Torsheim, Sallis, & Samdal, 2010). The availability of facilities has had mixed outcomes with a sledding hill, soccer field (Haug et al., 2010) and green space (Haug, Torsheim, & Samdal, 2008) being associated with physical activity. In contrast, no association has been found for ball areas, skiing areas, water, woods (Haug, Torsheim, & Samdal, 2008) and grass sporting fields (Willenberg et al., 2009). However, studies examining the quantity of physical facilities (Haug et al., 2010; Haug et al., 2008; Haug, Torsheim, & Samdal, 2009) and sport-specific facilities (Jones et al., 2010) have revealed positive correlations with physical activity. These findings suggest that not all physical activity facilities correlate with physical activity participation, yet schools should focus on the provision of substantial equipment to ensure students have an optimal chance to engage in their desired type of physical activity.

Understanding how students are physically active within the physical environment is important to identify and develop effective school physical activity interventions (Hyndman, Benson, Ullah, & Telford, 2014; Hyndman, Telford, Finch, Ullah, & Benson, 2013). Consistent with a 2012 review (Ridgers, Salmon, Parrish, Stanley, & Okely, 2012), the present study highlights a need for greater facility provision and variety of facilities. In addition, access to fixed facilities for older students have been identified as being positively associated with higher physical activity levels. Similar to the current findings, previous mixed methods research has revealed students have preferences for grassed areas for running/games and students have highlighted the benefits of metal structures in comparison to wooden facilities in schools for physical activity (Willenberg et al., 2009). As some students may prefer to be physically active on fixed facilities made of different materials (e.g. wood, plastic, metal), providing students with the opportunity to be active with different types of materials of their choice could help to facilitate students' physical activity participation (Ridgers et al., 2012). Providing a variety of physical activity facilities has been consistently reported to be a key factor positively correlated with students' physical activity (Dyment & Bell, 2008; Hyndman, Benson, & Telford, 2014; Hyndman et al., 2012). Providing students with diversity of options can promote 'choice', established to be a major aspect of students' enjoyment of the school physical activity environment (Stellino, Sinclair, Partridge, & King, 2010). Ensuring there are facilities within the school that promote adequate choices can accommodate physical activity for students' different individual preferences for physical activities or facilities and ensure that facilities can cater for different sex, ages and weight statuses (Stellino et al., 2010).

A number of suggestions from the present study to encourage school-based physical activity have been reflected in previous studies. A recent study identified that students perceived sporting facilities, adventure type facilities and fixed facilities as facilitators for school physical activity (Hyndman et al., 2012) in contrast to lounge and food areas. Features within the natural environment (e.g. trees, grass and rocks) have also been perceived as important influences to engage children in school physical activity (Dyment, 2005; Dyment & Bell, 2007, 2008; Dyment, Bell, & Lucas, 2009). It has been revealed that spaces need to be suitable for certain activities (e.g. football on a field rather than court) and that weather could be a key influence on school physical activity patterns (Stanley, Boshoff, & Dollman, 2012). In contrast, students can perceive the size of spaces, crowded spaces, conditions of facilities and type of weather as potential barriers to physical activity in schools (Stanley et al., 2012). It is important to gain an understanding of students' perceptions to enhance school-based physical

activity to inform interventions and to develop self-report measures assessing variables from the students' perspectives (Hyndman et al., 2013).

An interesting finding from the present study was the degree of similarity in the themes for both late primary and early secondary school students to encourage physical activity. The only thematic differences between the groups were the suggestions for more teacher-directed activities such as bike classes (primary) and the presence of animal programs such as dog walking and horse riding stables (secondary). Such similarities could be due to the closeness in age, as many of the year seven secondary students were just one or two years older than the primary students. The similarity in perceptions contrast the decline in physical activity evident during the transition between primary and secondary school (Brady, 2004; Hyndman et al., 2012; Pate et al., 2005). The lack of connection from primary to secondary school environments to facilitate physical activity has been reflected by a study conducted by Haug and colleagues (Haug et al., 2008). Haug discovered that students' physical activity peaked in year six, followed by a significant decline in year seven for females and in year eight for males. Despite students' perceptions being similar in the present study, it could be that there is a lack of facilities in secondary schools that cause physical activity declines (Haug et al., 2008). Secondary school students have been found to be three times more likely to be physically active if schools introduced more facilities (Haug et al., 2010). Although secondary school students have perceived a range of suggestions to enhance their physical activity environment in the current study, there is often an increased lure of sedentary opportunities at secondary schools that can negatively influence adolescents' energy, emotions and interest for physical activity (Allison, Dwyer, & Makin, 1999; Kohl & Hobbs, 1998). An increased emphasis on winning and losing in secondary schools associated with structured competition can also reduce secondary students' motivation for physical activity (Bauer, Yang, & Austin, 2004; Hyndman et al., 2012). In addition, the smorgasboard of sedentary opportunities at secondary school could be influencing adolescents' desire for socialisation (Bauer et al., 2004; Hyndman et al., 2012), rather than moving around. Further research into the connection between secondary school facilities and physical activity is therefore warranted.

It is widely recognised that many adolescent females have lower levels of health-enhancing physical activity than males (Niven, Henretty, & Fawkner, 2014), however it is clear in the current study that many of the suggestions for physical activity between genders were similar at the secondary level. Although, the adolescent females suggested some features that contrasted males, including the presence of animal programs and excursions to encourage school-based physical activity. The quality of facilities, activities offered and equipment available within the physical environment of secondary schools are seen as important for adolescent females' physical activity participation (Niven et al., 2014). Therefore, considering females' perceptions to enhance the secondary school physical activity environment could be crucial to developing females' physical activity participation in schools.

Similar to the perceptions of students in the present study, fixed equipment (Willenberg et al., 2009) and obstacle courses (Haug et al., 2010; Haug et al., 2008) have been reported to facilitate students' physical activity. Fixed equipment has been shown to be positively associated with the physical activity levels of junior adolescents (Haug et al., 2010). In contrast, the themes identified in the present study such as climbing areas (primary & secondary ; Haug et al., 2008)) and an enclosed area (secondary; Haug et al., 2008) have been reported to have no association with students' physical activity. Furthermore, no association has been identified for fixed equipment facilities with the physical activity of female adolescents (Haug et al., 2010).

Overall, the primary school students tended to suggest more play-type features with an element of risk as their suggestions to enhance the school physical activity environment. Risk taking is known to increase students' confidence in skills and ensure the development of learning paths and dispositions (Maynard & Waters, 2007). The secondary school students tended to suggest more adventurous and suggested facilities such as adventure swings, skate parks, horse riding stables and racing tracks. Secondary school students often enjoy experiencing higher levels of motor skill development (Okely, Booth, & Patterson, 2001) and more structured physical activities as they age (Malone & Tranter, 2003). It should be noted that many of the suggestions perceived by the students aren't plausible to

implement due to costs, legal responsibilities and supervision requirements associated with school environments, however the skills associated with each suggestion can be considered by teachers.

The methodology used in this study was innovative and to our knowledge was one of the first studies that have employed a combination of focus group discussion with map drawing to examine students' perceptions of features to enhance the school physical activity environment. In addition to the physical environment features, It is important teachers develop policies that ensure students are supported to be physically active. Physical activity policies can be unique to each school (Commonwealth of Australia, 2009) and in order to enhance physical activity environments it is important to ensure written physical activity policies are matched with the implementation of physical activity features (Hardman, 2008; Jenkinson & Benson, 2009).

Conclusion

This mixed methods study provides insight into both primary and secondary students' perceptions of features to enhance their school physical activity environments. It was discovered that the majority of themes identified were relatively similar between both school sectors and genders. The study also identified themes from adolescent females as features to encourage physical activity such as incorporating further excursions and introducing dog walking and horse riding programs. The multiple suggestions of features to enhance physical activity perceived by primary and secondary students' can be used by teachers to gain an awareness of and create environments conducive to enhancing school-based physical activity levels.

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