



## Preliminary findings of Active Classrooms: An intervention to increase physical activity levels of primary school children during class time



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### HIGHLIGHTS

- Teaching active academic lessons can improve physical activity levels of students.
- Two active lessons per day accumulated 13% of the recommended daily MVPA.
- Enjoyment was the dominant theme among participating students.
- Teaching and learning were enhanced resulting in high teacher satisfaction.

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### ABSTRACT

This study evaluates the effects of a behaviour change intervention, which encourages the integration of physical activity into the teaching of academic lessons, on physical activity levels of students. The main outcome is mean minutes of moderate-to-vigorous physical activity (MVPA) daily generated during the intervention lessons. Teacher's perceptions and students' enjoyment of the programme were also evaluated. Students accumulated a mean of 8 min MVPA during the intervention lessons daily. The teacher and students were very satisfied with the programme. Therefore, changing teacher behaviour towards using physically active teaching methods is a promising way of increasing children's physical activity levels.

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### 1. Introduction

Less than 20% of children globally are achieving the recommended 60 min of moderate to vigorous physical activity per day for health benefits (McCoy, Smyth, & Banks, 2012; World Health Organization, 2010). Increasing their physical activity levels has been identified as particularly important to the long-term impact on public health (Waring, Warburton, & Coy, 2007). Schools have been targeted as the best environments to implement physical activity interventions as they are a primary location to reach the

majority of children (Martin & Murtagh, 2015). However, ironically, schools internationally are reported to be one of the dominating locations of sedentary behaviour in children with class time representing a significant sedentary period of the day (Holt, Barte, & Heelan, 2013). Children are required to sit quietly to receive instruction (Gibson et al., 2008). Globally it is recommended that all schools develop policies to address physical activity as part of the school day and not just in physical education (PE) or active travel (World Health Organization, 2010).

School-based interventions, such as Get Moving! (Spruijt-Metz, Nguyen-Michel, Goran, Chou, & Huang, 2008), Bizzy Breaks (Murtagh, Mulvihill, & Markey, 2013), Active and Healthy Schools (Ball, Kovarik, & Leidy, 2015) and Take 10! (Stewart, Dennison, Kohl, & Doyle, 2004) that integrate physical activity throughout the day have been identified as effective tools for increasing physical activity levels (Spruijt-Metz et al., 2008). They are also more sustainable and show longer term outcomes than individual level

Abbreviations: PE, Physical education; MVPA, Moderate to vigorous physical activity; BCW, Behaviour Change Wheel; BCT, Behaviour Change Techniques; WHO, World Health Organisation.

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interventions since they target large populations (Barr-Anderson, AuYoung, Whitt-Glover, Glenn, & Yancey, 2011). The Center for Disease Control and Prevention (CDC) Comprehensive School Physical Activity Program (CSPAP) recommends the inclusion of school-based physical activity opportunities to increase physical activity levels of young people. Specifically it has been recommended that physical activity should be integrated into classroom learning since movement has been found to enhance learning (Centres for Disease Control and Prevention, 2010). However, emphasis on Literacy and Numeracy in primary school classrooms has resulted in a lack of time for physical activity and a lack of emphasis on physical education (Bartholomew & Jowers, 2011). In order to address this problem which places emphasis on academic content to the detriment of physical activity, methods of integrating physical activity into academic lessons in the classroom are warranted. Here we distinguish between activity breaks, which involve the promotion of physical activity in the classroom without curriculum learning outcomes, and methods of promoting physical activity that allow academic content to still be taught. School-based interventions to promote physical activity in this manner include active lessons (Erwin, Abel, Beighle, & Beets, 2011; Gibson et al., 2008), active homework (Lubans & Morgan, 2008) and changes to the classroom environment (Cardon, De Clercq, De Bourdeaudhuij, & Breithecker, 2004). The school curriculum is an ideal avenue for accessing all children and encouraging them to be physically active throughout the day. However, through a review of the literature it is evident that very few studies focus on classroom-based interventions and of those which have only four studies have integrated physical activity into the academic content of the primary school curriculum with physical activity outcomes (Bartholomew & Jowers, 2011; Donnelly et al., 2009; Erwin, Beighle, Morgan, & Noland, 2011; Oliver, Schofield, & McEvoy, 2006; Riley, Morgan, & Lubans, 2012). Results of these studies demonstrate that encouraging classroom teachers to integrate physical activity into the classroom can significantly improve student's physical activity levels during class time and over the entire school day, moving them towards achieving the recommended physical activity guidelines for health benefits. The researchers also found that incorporating movement in lessons can simultaneously contribute to children's academic performance (Erwin, Beighle, et al., 2011; Erwin, Abel, et al., 2011). In these previous studies the implementation of physically active academic lessons contributed to significant improvements in time students spent engaged in academic learning and in 'on-task' behaviours (Grieco, Jowers, & Bartholomew, 2009; Mahar et al., 2006; Riley, Lubans, Morgan, & Young, 2014).

Despite this evidence, few teachers use physically active teaching methods (Morgan & Hansen, 2008). Since what children do in the classroom is largely influenced by the teacher, teachers and their attitudes play a central role in determining the success or failure (Fullan, 2007) of classroom based interventions therefore, it is essential that teachers are satisfied with the programme. Cothran, Kulinna, and Garn (2010) evaluated teachers' perceptions to physical activity interventions and they found that teachers' willingness to engage in physical activity interventions is influenced by their care for students' wellbeing and interest in their own wellbeing. Teachers' beliefs, perceptions and attitudes towards physical activity have been identified as the greatest barriers to physical activity promotion in the classroom (Morgan & Hansen, 2008) with time and assessment pressures also being identified (Cothran et al., 2010). More specifically, classroom management issues, maintaining teacher control, connection to the academic curriculum as well as student enjoyment of the lessons are among the factors which influence teacher decisions of including activity breaks in the classroom (McMullen, Kulinna, &

Cothran, 2014). In a recent systematic review, 'lack of time' emerged as the most consistently identified barrier to implementation in school-based physical activity interventions (Naylor et al., 2015). Considering the increasing demands placed on teachers, physical activity integration across the curriculum is emerging as an important opportunity for physical activity promotion. Implementing change in the classroom is ultimately a personal, individual decision by teachers, therefore encouraging classroom teachers to assume responsibility for integrating physical activity into academic lessons requires behavioural change on the part of the teacher, as well as presenting them with interventions that fit with their schedules, curriculum and their beliefs and values about teaching.

Of the existing classroom based physical activity interventions, only Texas I-CAN! (Bartholomew & Jowers, 2011) and the Physical Activity Across the Curriculum (PAAC) study (Donnelly et al., 2009) focus on the behaviour of the teacher. For example Texas I-CAN! (Bartholomew & Jowers, 2011) emphasises the importance of teacher attitudes and perceived behaviour control for successful interventions. The authors proposed that teacher training programmes might be best centred on the Theory of Planned Behaviour (Ajzen, 1985) which emphasises these factors. They reported that teacher implementation was enhanced by providing the teachers with training, equipment and lesson ideas to integrate physical activity into academic lessons. In the PAAC intervention Gibson et al. (2008) emphasise that behavioural changes are mediated by self-efficacy of the teacher to perform the behaviour. Teachers' level of confidence in their ability to incorporate physical activity into lesson plans is achieved through teacher training sessions and goal setting in the PAAC study and these features are consistent with social cognitive theories. However, it has been argued that the Theory of Planned Behaviour does not address impulsivity, habit, self-control, associative learning and emotional processing which all have important roles in behavioural outcomes (Michie, van Stralen, & West, 2011), and other behavioural change interventions including social cognition models do not analyse the target behaviour in context to develop an effective intervention. Therefore, this paper proposes an alternative to these behaviour change models by characterising the intervention and linking it to an analysis of the targeted behaviour through the use of the Behaviour Change Wheel (BCW) framework (Michie et al., 2011). This framework not only allows the intervention to fit with the teachers' belief systems, which is essential to encourage compliance (Cothran et al., 2010) but, also analyses the nature of the outcome behaviour as a starting point for identifying the type of interventions that are likely to be effective in encouraging teachers to assume responsibility for integrating physical activity into academic lessons. This focus on teacher behaviour and designing the intervention with the outcome behaviour as a starting point contributes to the uniqueness of the study.

### 1.1. Use of behaviour change theory

There is evidence that physical activity interventions informed by theoretically driven behaviour change models are more successful and lead to stronger more lasting changes (Michie & Abraham, 2004) than those that are not. The Active Classrooms intervention design is guided by the Behaviour Change Wheel framework (Michie et al., 2011). This works on the principle that the target behaviour must be analysed to identify the type of interventions that are likely to be effective in bringing about the behaviour, with a target population, in a specific context. The capabilities, opportunities and motivations of the individual to perform the target behaviour are analysed and mapped onto

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