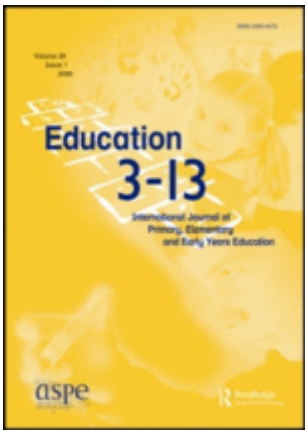

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Implementing physically active teaching and learning in primary school curricula in the United Kingdom

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Keywords; active learning, public health, primary school, physical activity, pedagogy

Abstract

There currently exists worldwide concern around obesity, inactivity and sedentary school curricula. EduMove (Education through Movement) offers physically active and movement-based teaching and learning promoting cross-curricula delivery in schools. This research assessed effectiveness of mechanisms and processes underpinning the claims of EduMove, stakeholder relationships and Student Practitioner delivery. Semi-structured interviews were undertaken with Teachers and Student Practitioners relating to physical activity, delivery methods and enjoyment levels to gauge understanding and engagement with the EduMove philosophy. Findings demonstrated increases in pupil concentration and confidence, although wider outcomes relating to school-wide physical activity, health and educational attainment need further exploration. Students as delivery agents was positive in relation to stakeholder interaction, although further training is required to achieve more sustainable outcomes. Embedding movement within cross curricula planning has potential after evidence of enthusiasm and acceptance although further professional development is required to deliver activities that address complex societal and curricula issues.

Introduction

Physical activity has numerous health benefits in school aged children (Janssen and Leblanc 2010). Global physical activity guidelines recommend 60 minutes of daily moderate to vigorous physical activity (WHO 2017). It is widely reported most children do not meet these guidelines; for instance a recent review of 9 to 11 year olds from across twelve countries identified less than 5% met the guidelines on a daily basis (Gomes et al 2017). Analysis of active healthy kids report cards across fifteen countries identified ten countries that scored grade D (20%–39% meet physical activity guidelines) to grade F (<20% meet physical activity guidelines) (Tremblay et al 2016). Alongside observed low levels of moderate to vigorous physical activity in children there is separate concern about high levels of sedentariness which may independently infer poorer health outcomes (Carson et al 2016).

Physical activity behaviour develops early in childhood and has moderate stability from youth to adulthood (Telamar et al 2014), although a decline in physical activity trajectories has been observed from children aged seven years (Farooq et al 2017). A recent review across ten countries identified a cross-sectional decrease in physical activity of 4.2 % per annum after age 5 attributed primarily to lower levels of light-intensity physical activity and greater sedentary time (Cooper et al 2015). A single country longitudinal study also observed a trend toward lower physical activity and a corresponding increase in sedentary time from age 11 to 12 years (Telford et al 2013). Recent 24 hour movement guidelines for children have promoted a need to consider whole day activity patterns that combine both accumulation of moderate to vigorous physical activity alongside restriction of sitting time; for instance the Canadian guidelines suggest no more than 2 hours per day of screen time and limited sitting for extended periods (Tremblay et al 2016).

School is seen as an important setting to promote physical activity and restrict sedentary time since children spend a substantial part of their waking time at school. A recent multi-level worldwide review highlighted local school contexts as important correlates to physical activity in children (Gomes et al 2017). There is a growing body of research exploring school recesses and playground environment (Ridgers et al 2006; Broekhuizen 2014) and after school, extra-curricular and physical education provision (Wallhead et al 2004; Pate et al 2011) as opportunities to promote moderate to vigorous physical activity. The overall effect of existing interventions is small, for instance a recent review suggested an effect of approximately 4 more minutes of moderate-to-vigorous physical activity (MVPA) per day (Metcalf et al 2012). Many interventions are underpinned by the expansion of opportunities to be active for instance by the inclusion of a new occasion to be active; or the extension of an existing physical activity opportunity by increasing the amount of time allocated for that opportunity (Beets et al

2016). Whilst this research provides an important consideration for public health it does not consider the impact of sedentary time and risks raising inequalities. In a recent discussion paper Beets et al (2016) postulate one further mechanism of promoting physical activity is the enhancement of existing physical activity opportunities through strategies designed to increase physical activity above routine practice. The concept of physically active teaching and learning (PATL) falls into this category of intervention type.

Physically active learning and teaching integrates curriculum learning outcomes (outside of physical education) with physical activity. A recent systematic review and meta-analysis identified thirteen studies focused on PATL lessons which were mainly used to teach new curriculum content in maths, language or science and ranged from 30 to 60 minutes (Watson et al 2017). The results of the meta-analysis showed PATL had a positive effect improving on task time in the classroom and academic achievement but no effect on cognitive functions or physical activity. Despite no overall effect of PATL on physical activity 10 out of 11 PATL interventions reported small increases in physical activity and Watson et al (2017) suggested further research was warranted. The fidelity of the thirteen studies suggested teachers delivered PATL lessons as intended or for at least 50% of the required minutes per week and so indicate some challenge in encouraging adoption of PATL. Since PATL is unique from other forms of school based intervention because it does not compete for time away from curriculum learning and instead has the potential to promote academic achievement there is a need to understand role of teacher as change agent and barriers to implementing PATL. Martin and Murtagh (2015a) proposed application of the behaviour change wheel to explore teachers' capability, opportunity and motivation to utilise PATL and emphasised the importance of teacher satisfaction with PATL methods as an essential factor for the success of a change intervention.

EduMove (Education through Movement) is an innovative PATL approach that aims to promote cross-curricula delivery of core school subjects using enjoyable movement orientated games to develop academic skills, physical literacy and physical activity. It aims to form a holistic cross curricular approach to school based active and movement centred pedagogy within the wider context of educational attainment, physical activity and health through mediating and developing key relationships within the restrictions, priorities and contexts of primary schools. This paper aims to assess the underlying mechanisms relating to stakeholders and the effectiveness of practices demonstrated by EduMove student practitioners who design and deliver sessions.

Methods

Ethical approval was granted by Southampton Solent University Ethics Committee and written informed consent was provided by all participants. A qualitative approach to the collection of data involving structured interviews with a variety of stakeholders was taken. The main research question was to ascertain the effectiveness of the processes and mechanisms of the programme through the views of a wide cross section of stake holders. Picciotto (2012) suggested qualitative methods are better equipped to determine the reasons for success or failure of achieving intended effects in change programmes and the extent and nature of unintended effects, and so were best suited to answer the research question.

Semi-structured interviews were carried out with teachers (n=5) relating to their attitudes towards the core subjects, the methods of delivery and their levels of enjoyment and attainment. These interviews were extended to the student practitioners (n=6) to gauge levels of understanding and engagement with the EduMove philosophy. The student practitioners were questioned on delivery methods and interaction with the pupils and the usefulness and effectiveness of any data or information that was given to them by the school with regards pupil attainment. Interviews were conducted by the researcher and typically lasted around 30-40 minutes and were all digitally recorded. Teachers were interviewed within their own school environs and student practitioners within the University. Interview subjects were purposely selected based on their exposure to and experience of EduMove programmes, so they were able to talk with some degree of knowledge around the methods and effectiveness of implementation. For example, Teachers were from schools who had EduMove interventions previously delivered and student practitioners had completed training and had delivered EduMove programmes within schools. Interview schedule questions were constructed based on the thorough literature review and on a working knowledge of EduMove via observation and involvement and experience of PATL methods more generally from the pedagogical experience in teaching and coaching of the researcher. This led to a broad overview of areas to form questions from relating to; planning, delivery, implementation, integration, benefits, impact, and challenges.

The data from the interviews was transcribed verbatim. Once the data had been collected a thematic analysis was conducted. Thematic coding was used to ascertain the main themes emanating from the research. In this case a more holistic method of coding was employed with repeated topics highlighted throughout the transcripts. This was then collapsed to a manageable number of themes with the transcripts being read once more in an iterative sense to ensure all relevant information had been captured within the thematic framework identified.

Results

Thematic analysis of interview transcripts identified the following relevant areas of prominence as a result of the research conducted;

- Physical activity and fitness
- Active learning
- Incidental learning
- Movement game design

Thematic Coding Table

The themes above are summarised within the following thematic coding table;

Thematic Coding Table (insert here)

COM-B behaviour change model

Michie and colleagues (2011) proposed the COM-B Behaviour Change model, incorporating particular elements of volition and non-volition within an environment which they believed were needed to create meaningful behaviour change. This is shown in Figure 1 below.

Figure 1 – COM-B model of behaviour change (Michie et al 2011)

In short, each element can be viewed as follows;

Capability – psychological and physical capacity

Motivation – reflective and automatic processes that energise and direct behaviour

Opportunity – physical and social factors that make the behaviour possible or prompt it

(Michie et al 2011)

The two way flow from each element to behaviour is also important in that it indicates the dynamic and fluctuating nature of habitual behaviour change and how the interaction of the elements is more of a continuum than one way in nature. In addition, it is important to note that the capability and opportunity to influence the motivation to change which is referred to as a conceptualisation of 'causal associations between the components in an interacting system' (Michie et al 2011, 4) are reliant on each other to ensure meaningful and sustained behaviour change. This seems particularly applicable in a PATL setting where school based environments, although they have huge potential to harness the potential change that can be seen, are a continual web of interlinking processes and mechanisms, all contributing to both conscious and unconscious elements of behaviour in pupils and teachers in terms of PA, health and educational outcomes.

In the context of PATL, the notion of behaviour change can be clearly applied both from

a PA perspective but also from the viewpoint of on-task behaviour or more widely, classroom performance and engagement.

Martin and Murtagh (2015a) argue for the effective application of behaviour change theory and the COM-B model in a classroom-based PA setting. They directly apply COM-B to the protocol for a specific classroom based intervention citing areas such as 'Education, Persuasion, Training, Environment Restructuring, Modelling…to be achieved through the development of resources, action plans, setting of achievable goals, professional development training, reorganisation of the classroom environment, use of appropriate classroom management techniques, and replacement of old teaching habits with active methods' (Martin & Murtagh 2015a,182-3)

From these broad and wide ranging intervention areas it seems an essential requirement for a Teacher to change their own behaviour in order to accept and implement more movement integration within their classroom and across their teaching delivery. In turn this could then have the potential to positively affect a change in behaviour of pupils to become more receptive to a physical activity biased curriculum which incorporates movement integration as a method to teach academic content but perhaps more significantly to instil the notion of PA benefits more broadly (Martin and Murtagh 2015b) The concept of the 'Teacher as change-agent' seems to hold significant weight here both from a professional development perspective but more widely as a significant influencer of longer term behaviour change, not only within the school setting but more extensively across mitigating lifestyle habits and behaviours. Martin and Murtagh (2015b,121) point to the fact that, 'changing the behaviour of the teacher enabled the students to accumulate more physical activity during the English and Mathematics intervention lessons than during regular lessons while also enhancing their learning and providing enjoyable experiences for them.' Once again this reiterates the importance of 'teacher as change-agent' whereby their behaviour can significantly affect the pupils they directly interact with.

One critique of the COM-B model is its linearity which paradoxically could make it too limited and simplistic to apply successfully to the complexity of a school based intervention such as EduMove. In essence, although one can apply successfully the individual elements, it is the interactive nature of those which could be called into question and where arguably one may see the greatest influence.

For example, the opportunity to promote behaviour change within a school is regularly evident through a number of activities; assemblies, curriculum specific topics, project work, Teacher delivery and influence, outside agency involvement, parental contributions, however the interaction of these elements with capability and motivation is often not evident which leads to isolated and non sustained short term changes in attitude and knowledge but not translated into explicit changes in behaviour. Another example might be an intervention to address poor behaviour in a selected year group (often boys). The motivation by the Teachers is evident in the design and delivery of the activities however the capability of the participants and the environment within which it is

delivered (opportunity) is no different or is not interlinked in a meaningful and cognisant way and as such the intervention fails to make any long lasting changes to the behavioural issues. Often times physical activity or sport is used in this way and there remains a gap in understanding as to how and why, if at all, the activity makes a long term difference.

Michie (2011) particularly evokes the usefulness and applicability of this model through the concept of addressing singular elements to achieve changes in behaviour. 'For example, with one behavioural target the only barrier might be capability, while for another it may be enough to provide or restrict opportunities…' (4). The causal links between one or more elements in relation to a given intervention are also inferred to cause changes in a wider context or to see changes in related externalities elsewhere, however it is hard to see how this can be inferred with a lack of information or links to the influence of the particular external elements. Further, it also states that the model does not take into account changes or influences from external or environmental factors in controlling behaviour again bringing into question how it could be applied effectively within a complex environment with the many vested interest and stakeholders of a school based environment. As Routen et al (2018) state, passive approaches to implementation that are developed in isolation tend to limit knowledge translation and development.
However, in light of those critical viewpoints it remains a model to which elements of a school based intervention such as EduMove can be applied and allows a robust and insightful idea of how behaviour can be influenced and changed in this particular population.

Application of COM–B model

Martin and Murtagh (2015b) directly apply the COM-B model (Michie et al 2011) and adapt the elements to the broad barriers around implementation of an active classroom intervention (Figure 2).

Figure 2 – COM-B behaviour change model applied to active classroom interventions (Martin and Murtagh 2015)

This will be taken one step further in this paper, applying the specific elements of the

EduMove intervention making the model more specifically contextualised (Figure 3).

Figure 3 – Application of COM-B to PATL EduMove intervention

Motivation

The current activity patterns and Edumove and PATL subthemes (table 1) highlight motivational factors within the COM-B model for teachers to adopt PATL methods. It is clear that teachers and student practitioners are aware of the issues of physical inactivity e.g. *'the further up to school they get, the more desk-based it seems to be. And that's just not healthy for children who should be running around and moving' (Teacher interview)* and the role that PATL could play in supporting increases in physical activity e.g. '*Because the concept of EduMove that hopefully increases physical activity within, like, creating more of an active lifestyle….' (Practitioner interview)*

However, the issues of teacher competence and confidence in understanding how to address these issues through a more active curriculum delivery still seems to be an issue. This in part is related to the restrictive and prescriptive curriculum priorities placed upon them and their lack of training in more innovative movement based approaches. For example, *'I mean, we haven't got anything in the planning that relates to this...' (Teacher interview)*

In addition, not having a clear idea of how to integrate the methods came through, for example 'That would've worked better than just going in and not knowing what each other expected…I appreciate that here we work in a very specific way and they have to fit in with us.' (Teacher interview)

Opportunity

The challenges and learning outcomes pressure subtheme highlighted opportunity issues within the COM-B model with teachers and student practitioners emphasising the challenge of balancing movement based physical activity with academic outcomes, for instance

'the academic side was going down a bit because obviously the children concentrate more and getting excited about running around' (Practitioner interview).

Furthermore, the class size and engaging the whole class was highlighted as a challenge, for example

'… because sometimes due to the nature of it being a relay activity, there were quite a lot of them waiting while one person was being active' (Teacher interview).

The habitus of a school also tends to define how they operate and in turn their unique priorities and needs around pupil attainments and curriculum delivery. The physical restraints of a school are a further complication when negotiating logistics and the underlying processes of a project. Teachers and Senior Leaders often show considerable reticence in deviating from any school wide regulations and as such it can be a challenge to negotiate terms and conditions around outcomes and processes from both perspectives. For example,

'If it's delivered more correctly…so that they then are able to know how our school works…(it)…will then become part of the school…get really involved within a school environment and understand the educational side of it as well…' (Teacher interview)

Waite (2011) refers to the notion of cultural density whereby a school is so embedded in their own day to day process they struggle to allow any new or innovative changes to penetrate the fabric of their school.

Capability

The notion of PATL methods is linked to the pedagogical awareness and capacity of the Teacher and the link to educational outcomes and classroom behaviour. As stated in the results, the consequences of being active showed a clear demonstration of improved concentration, behaviour and retention of information.

For example, 'If all the children are active, then they feel like they have benefited more.' (Teacher interview)

In this context the benefits can be wide ranging and include health, educational and behavioural elements within the classroom and beyond.

In addition, the notion of improvements in on-task behaviour could be seen to be inferred from a more active classroom environment with Teachers referring to the ability of pupils to apply concepts more easily during and after a more active teaching methods;

'we find if they're running around doing the activity…they seem to be able to relate it better.' (Teacher interview)

There was also a clear relationship made between traditional teaching methods being boring and PATL methods being seen as a better, more interesting alternative. In terms of capability this would indicate that Teachers are more inclined towards methods that

could be perceived as boring which if replaced with more active methods, can then interlink with other elements of the model to attempt to invoke some changes;

'try and turn what could be quite a dull lesson into something that's a bit more active.' (Teacher interview)

As a consequence of this a more 'whole school approach' to embedded movement can be looked at as a longer term option that could affect a positive change in behaviour, both in terms of pupil conduct but also around a holistic cross curricular approach to learning. For example,

'I would do it as part of my Maths lessons because I think it was really good for using PE skills and teaching the Maths elements so I would see that as having a place in Maths rather than PE time.' (Teacher interview)

However, it still remained a challenge for the practitioners to integrate the elements of games and education to ensure all priorities were being met and that the most effective use of the time was being made. For instance, *'…to like make them all to do that but also focus on actually doing the actual maths as well…we sort of had to change it around to make sure it integrated and linked well with what we wanted to do with both movement games and the education side.' (Practitioner interview)*

This in turn means that the capability of the school to normalise and integrate movement within the day to day curriculum is more of a challenge however the possibility to do so and to change behaviour of Teachers and pupils remains evident.

Discussion

Physical activity and fitness

The comments from the practitioners and teachers highlighted awareness of the issues of childhood inactivity, sedentary behaviour and fitness. Example statements that confirm this include *'the further up to school they get, the more desk-based it seems to be. And that's just not healthy for children who should be running around and moving' 'their physical activity, the ability and their physical activity levels, their fitness and their stamina is shocking' and 'they're little and they should be running around….perhaps run around the field and there are children who can't make it around. And that worried me that you've got a seven-year-old and you're puffed doing a 400m run. You know?'*

Aligned to this both teachers and student practitioners demonstrated a largely positive attitude towards PATL and integrating Edumove, for instance *'physical*

movements and fitness actually whilst learning, so if you're doing a relay race but answering a question at the end, I think it's still important to incorporate that fitness in there', 'Because the concept of EduMove that hopefully increases physical activity within, like, creating more of an active lifestyle. So, I think if they're not aware of why they're doing it, they're not going to be able to continue with it', 'We'd have them like hopping, skipping. So, we do lots of different movements to help build like their physical interest…', 'an Edumove project is based on movement and skills whilst learning… movement is definitely a big factor'.

Results did show that in some cases the physical aspect of the sessions did suffer due in part to the pressure of having to cover traditional core subject areas and a lack of creativity and balance in game design. The innovative nature of the programme philosophy was sometimes clashing with the need from more traditional record keeping or assessment and the pressure to demonstrate an educational slant, for instance *'…they really enjoyed the first part of it. It's running and getting all of their letters. And then they come back, and then they'd…we'd made them sit down. But that bit wasn't so enjoyable', 'I would say it was probably a mixture about half and half of them being active or sitting and discussing because sometimes due to the nature of it being a relay activity, there were quite a lot of them waiting while one person was being active', 'I think they needed to be active, but again, you know, gain something in a literacy focus' and 'Obviously, changing the games up trying to incorporate more physical aspects and more sort of game orientated aspects, the academic side was going down a bit because obviously the children concentrate more and getting excited about running around.'*

Active Learning

The discourse of active learning has been at the forefront of teaching pedagogy for a number of years and as such is an important aspect not only within and EduMove context but as a mainstream teaching method. However results showed that EduMove tended to emphasise the success and importance of an active teaching and learning strategy and show how much the pupils could achieve from it in a holistic manner, not only in a physical or curriculum focussed way. The importance of active learning is emphasised by a number of writers (Petty 2009; Kirk et al 2012; Dollman et al 2006) Indeed in the context of active learning as physical activity, Dollman et al (2006,153) propose that 'physical activity in schools has a positive influence on concentration, learning and academic success.' This contention seems to hold weight with the results of this study in that the majority of practitioners saw the need for the sessions to be as active as possible, and for the Teachers it seemed that as a consequence of being active, pupils demonstrated improved concentration, retention of information and even behaviour.

The following extracts confirm this notion;

'they're actually doing it rather than just listening.'

'If all the children are active, then they feel like they have benefited more.'

'we find if they're running around doing the activity…they seem to be able to relate it better.'

'try and turn what could be quite a dull lesson into something that's a bit more active.'

The importance of this theme from an educational perspective should not be underestimated. The benefits of pupils being active can stimulate the pre-frontal cortex in order to improve general learning and problem solving. In essence, neural pathways are opened allowing a readiness and ability to learn (take10.net, n.d). Petty (2009) looks at active learning as a prerequisite to the idea of constructivism. This theory states that the active nature of tasks allows pupils to create their own meanings and therefore allows a deeper understanding of material and concepts. It is baffling, therefore, that schools do not do more lessons of an active nature.

Incidental learning

An emergent theme from the research that has been identified is Incidental Learning which refers to learning without overt knowledge or without the realisation that learning is taking place. With EduMove if the quality of the activity allows, learning is arguably still taking place but without the explicit knowledge of the participants (Flintoff & Scraton, 2001; Jones & Cheetham, 2001). Furthermore, this phenomenon can be said to have more of an effect on the understanding of the subject that is being studied through the movement games if a perceived fun environment is created. A study by Cothran & Ennis (1998) refers to the idea that fun was used as an instrumental goal in physical education. In other words if students are having fun they have more chance of being engaged with the subject matter and then have more chance of learning.

This theme seems highly complicit with the EduMove philosophy as the following comments indicate;

'it's about trying to teach curriculum subjects in a different way. I think it's a really good idea because it's about—sounds a bit bad—but it's about tricking people into learning. They didn't realise what they're learning and it just kind of embeds into their brain.'

'It's important that the games are involving maths…they're going to enjoy it more because they're not necessarily aware that they're learning'

'Well, it's they don't realise they're learning sometimes.'

There is a danger however that unless the games and movement activities are well designed and balance the element of fun with that of learning then pupils will see the programme akin to PE lessons which is often seen as a break from the rigours of academia and offers an element of catharsis. Smith and Parr's (2007) work showed how PE is often termed as an opportunity to let off steam giving a release from the academic aspects of school.

Movement game design

One of the fundamental aspects of the EduMove programme is the design and delivery of the movement games and activities that underpin the learning of the educational aspects. In that sense it is imperative that the design of the games and how they fit into the context of the overall programme design is clear and unambiguous. The Teaching Games for Understanding (Stolz and Pill 2013; Butler 2010) framework is a well established pedagogical method which offers a useful reference point. In writing on its effectiveness, Rink (in Butler 2010) looks to the overarching effectiveness of the technique by saying that, 'methodologies that involve the learner more holistically, both in terms of the domains of learning as well as in the content to be learned have a better chance of producing learning and of contributing to student development in a broader sense' (34). This can be related to EduMove in the sense that the games and activities must engage the pupils and foster and nurture an extensive and empowered interest not only in the physical aspect but also in the educational theme as well.

As one interview subject commented, *'they learn more from each other than I think, sometimes, than they learn from us. Especially if it's a game situation, they're almost making out the rules themselves and before you know it, they've understood about correspondence or something.'*

In addition it seems prudent to note that if the game or elements of play are designed well then it frees up the teacher or coach to foster more positive relationships and interactions with the participants and as a result have less behaviour and management issues to deal with (Launder and Piltz 2013) Furthermore De Rossi (2011) reiterates the idea that, 'in order to maintain a physically active lifestyle, physical activities should be fun…In addition, they should be characterised by a high variety of stimuli which require responses from a variety of movement capacities' (3).

Comments from interviewees, both student and teacher, illustrate the importance of these areas;

'Obviously, changing the games up trying to incorporate more physical aspects and more sort of game orientated aspects'

'we sort of had to change it around to make sure it integrated and linked well with what we

wanted to do with both movement games and the education side'

'so at the moment their theme is Africa. So we try and come up with, you know, fraction games that have something to do with Africa. So we've got that overriding theme the whole way through from the classroom out to the playing field'

'although the topic changed of what area of Maths they were covering, the structure of the games that they are playing was very similar each week.'

Of course, there were also challenges in game design and how to integrate the physical and the educational elements and to ensure that it matches the requirements of the school and its curriculum expectations. The results suggest this area to be one of the most challenging yet significant in the success of the EduMove programme. One reason for this may be to do with the perception of what the game constitutes and what it is trying to achieve, and how that can then be used to facilitate the correct area of learning. Lester (2011) uses the term play to describe children and the games they undertake and identifies the difficulties in that, 'understandings and applications of play in contemporary educational policy place great value on the importance of identifying 'what counts' in terms of good quality play, and then apply these methods and activities as a means to support children's educational progress and achievement' (20).

This can be directly linked to the EduMove game design in as much as the student practitioners and the schools sometimes are unclear as to what constitutes the most appropriate content to ensure all outcomes are met.

Comments linked to this were as follows;

'the games we were coming up with, we weren't sure whether they were age-appropriate but also ability appropriate and whether it would be improving their abilities in school.'

'Initially, we started off with a heavy focus on the physical side of things. And then, we got…we came in and started getting a bit worried as such that maybe…because we were in a school environment and it was an actual scheduled classroom lesson…should focus more on the academic side of it because we didn't want the school to get sort of annoyed that we were just like sort of coaches making them run around or anything like that. So, then, it sort of flipped reverse and we started them focusing more on sort of the academic side of things'

Some Teachers commented on the fact that there seemed to be a lack of physical activity in the session, indicating an issue with the balance of the game design and understanding of content regarding the need to ensure some kind of 'traditional' learning had taken place ie some paper based or sedentary type learning.

'it was less physical activity than I expected. So, I don't know how it could be made more physical. Every time I kind of looked over, they weren't doing much physical activity'

'I would say it was probably a mixture about half and half of them being active or sitting and discussing because sometimes due to the nature of it being a relay activity, there were quite a lot of them waiting while one person was being active'

'It would've been nice to see as little paper-based work as possible where it was, you know, through movement.'

Based on the findings of the study, the Student Practitioner delivery structure of the Edumove Program in itself causes some challenges in particular due to the variety of delivery styles, understanding of the Edumove concept and the ability to create appropriate movement games. Furthermore, the habitus and culture of school caused some areas of concern around negotiating outcomes and embedding EduMove within exiting curricula. Accessibility of data from the school and the way in which the practitioners have built a relationship with specific school based contacts to inform and negotiate the delivery of the programme is another emergent area. Results tended to show that the relationship with the school was not as strong as it could be and as a consequence the EduMove principles and ideals were not fully embedded into the habitus of the school. Additionally, the vested interests were not clear as to the agreed outcomes of the EduMove intervention and as such this caused a lack of robustness and a clear framework for the programme to follow.

A more positive outcome is that pupils and teachers reacted positively to the programme theory and the intervention delivery, with pupils involved in the sessions demonstrating an enthusiastic and fun outlook on the involvement of the games and activities, although there was less evidence to suggest any improvement in the stated academic areas as a result of the project. The coaching ability of student practitioners was also reported in a positive light with an enthusiastic and fun environment maintained throughout. However at times this tended to detract from the educational aspect of some programmes and practitioners found it challenging to balance the fun element with the need to ensure an understanding of the academic subject material, exhibiting a lack of coherence around this essential interconnectedness. In terms of the health-related benefits, this theme was implicit in the running of an EduMove programme although in some areas this may have been more explicitly defined. Linking to the previous point the need for an element of moderate to vigorous activity combined with a variety of physical skills within an EduMove session to address physical literacy was often not fully developed again due to the pressures of demonstrating an understanding of academic subjects, often through the completion of paper based worksheets. This then led in some programmes to a level of inactivity in the session which contradicts EduMove's core principles. However the paradigm of active learning was seen as an area of obvious benefit with pupils being out of their traditional classroom environment and utilising active methods to stimulate and improve their education.

Conclusion

In the context of EduMove it may then be possible to offer the idea that physical activity should be legislated as part of the curriculum for a mandatory time, and from a wider perspective that physical activity within the workplace should be part of the legislature of society. Although radical, this type of approach may reap the benefits that many groups and organisations are clamouring for.

There are some moves within the Welsh Education system to include physical literacy as a core curriculum component. The Chair of Sports Wales, Laura McAllister, said: "Given the Welsh government's commitment to making physical literacy as important a development skill as reading and writing, the group felt that changing the status of physical education is the only credible and secure way of ensuring this." This is encouraging but seems to be a single voice in a sea of malcontents.

From a longer term perspective, it is recommended that schools look to embed more active and outdoor learning as part of their curriculum so it becomes more the norm in the day to day learning experiences. This is much more of a challenge to the existing target driven culture that permeates the primary curriculum at present and is not currently a standard opportunity.

It is also hoped that Teachers may take on board some of the principles of active learning, physical activity, core subject understanding through movement games and associated benefits in order that the project could show some sustainability within certain environments. It is the intention to offer CPD for Teachers on the EduMove philosophy, offering ideas and areas to consider in order to implement an EduMove programme within their own school environment.

As referred to throughout, one of the main themes of EduMove is to improve the activity levels of those involved and as a consequence address relevant health and fitness issues. From the research it became clear that this was left more as an assumption and was not explicit within the programme. In some cases the level of activity needed to be higher in the sessions as it seemed that practitioners were spending too much time working on the academic problem solving in a sedentary fashion rather than designing games that incorporated it more. It would seem that game design should reflect more of a balance between physical activity and educational topic and as a result the health and fitness benefits may become more prominent within the programme.

In considering all the above areas it seems that the potential for EduMove to enter a 'gap in the market' is particularly strong due to its innovative approach around movement and learning in a cross curricular approach within lesson time. The following quote seems to summarise the potential that a cross curricula approach such as EduMove encourages and would bring to a school environment;

> 'Given the number of effective physical activity interventions adopting cross-curricular approaches, it may be pertinent for education and health decision makers to view physical activity in schools through a whole-school approach. In other words, share the responsibilities of physical activity across the entire school community and across the curriculum. Much in the same way as numeracy and literacy are areas of focus in Mathematics and English, respectively, but are also cross curricular in nature and can/have been explored in other curriculum areas.' (Dudley et al 2011, 373)

In a wider sense the potential impact of education through movement games could reach farther than this study can encompass. A long term notion of embedding movement games within cross curricula planning seems realistic after this research has shown the enthusiasm and acceptance of such a programme. Indeed the recent development of the outdoor learning paradigm with schools seeing the benefits of teaching outside the classroom seems to fit well with this idea (Beames & Ross 2010) although too often the outside is seen as a panacea for learning and there is a lack of structure and outcome to a lesson in this environment (Waite 2011). It would seem appropriate here to identify the huge potential that programmes such as this have to harness the potential complicit nature of a school environment to deliver activities that address wide ranging and complex societal issues, and which can also contribute to academic outcomes, with further research called for to monitor and evaluate this to produce a stronger more influential evidence base.

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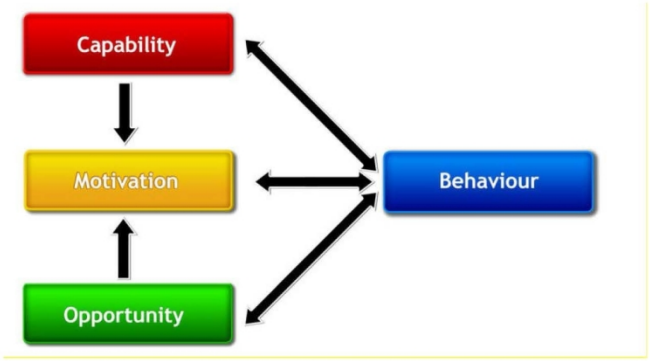
Theme	Subtheme	Codes
Physical activity and fitness	*Current activity patterns*	'the further up to school they get, the more desk-based it seems to be. And that's just not healthy for children who should be running around and moving' 'their physical activity, the ability and their physical activity levels, their fitness and their stamina is shocking' 'they're little and they should be running around….perhaps run around the field and there are children who can't make it around. And that worried me that you've got a seven year old and you're puffed doing a 400m run. You know?'
	Edumove and PATL	'physical movements and fitness actually whilst learning, so if you're doing a relay race but answering a question at the end, I think it's still important to incorporate that fitness in there' 'Because the concept of EduMove that hopefully increases physical activity within, like, creating more of an active lifestyle. So, I think if they're not aware of why they're doing it, they're not going to be able to continue with it' 'We'd have them like hopping, skipping. So, we do lots of different movements to help build like their physical interest…' 'an Edumove project is based on movement and skills whilst learning… movement is definitely a big factor'.
	Challenges and learning outcome pressures	'...they really enjoyed the first part of it. It's running and getting all of their letters. And then they come back, and then they'd...we'd made them sit down. But that bit wasn't so enjoyable' 'I would say it was probably a mixture about half and half of them being active or sitting and discussing because sometimes due to the nature of it being a relay activity, there were quite a lot of them waiting while one person was being active' 'I think they needed to be active, but again, you know, gain something in a literacy focus' 'Obviously, changing the games up trying to incorporate more physical aspects and more sort of game orientated aspects, the academic side was going down a bit because obviously the children concentrate more and getting excited about running around.'
Active learning	*Integration*	'I would do it as part of my Maths lessons because I think it was really good for using PE skills and teaching the Maths elements so I would see that as having a place in Maths rather than PE time.' 'try and turn what could be quite a dull lesson into something that's a bit more active.'

		'…(it)…will then become part of the school…get really involved within a school environment and understand the educational side of it as well…' '…to like make them all to do that but also focus on actually doing the actual maths as well…we sort of had to change it around to make sure it integrated and linked well with what we wanted to do with both movement games and the education side.'
	Fun and engagement	'If all the children are active, then they feel like they have benefited more.' 'they're actually doing it rather than just listening.' 'It's important to...that the children enjoy it and that they learn both the physical element and the educational element…to be enthusiastic all the time. Obviously, praising at the right moments and manage behaviour in the right times. And then, obviously, within delivery, make sure that you're interacting with the children.' 'It has to be as fun as possible because if people are enjoying what they're doing, the learning outcomes will come naturally. It's when they get bored, that you start having to fight people and you're forcing them to learn again, it becomes a bit more like a classroom.'
	Links to curriculum	'we find if they're running around doing the activity…they seem to be able to relate it better.' 'Well, I think it's having a bit of imagination…I would rather be creative.' 'But it was a kind of a case of me sitting down and working with them to make it work here, if that makes sense.' 'Obviously, you come up with your own ideas and what you want to do and what you want to get out of it. But it's very important to marry that up with the school because that makes your relationship with the school a lot easier.'
Incidental learning	*Implementation*	'I think it's a really good idea because it's about—sounds a bit bad—but it's about tricking people into learning' 'Well, it's they don't realise they're learning sometimes.' 'It's important that the children aren't just running, stopping, then doing maths. It's important that the games are involving maths because not only will it be stop, start, but for their brains as well, if they're distracted by it, they got to jump over the hurdle and then do this.'
	Benefits	'so you're going out there and you're not making them realise that they're learning which is obviously the best way actually for people to learn.' 'They didn't realise what they're learning and it just kind of embeds into their brain.'

		'…they're going to enjoy it more because they're not necessarily aware that they're learning'
Movement game design	*Planning*	'So we try and come up with, you know, fraction games that have something to do with Africa. So we've got that overriding theme the whole way through from the classroom out to the playing field.' 'Initially, we started off with a heavy focus on the physical side of things. And then, we got…we came in and started getting a bit worried as such that maybe…because we were in a school environment and it was an actual scheduled classroom lesson…'
	Delivery	'We did struggle with the variety of games that we could use. Because obviously, we'd get one game and that would be really good.' 'sometimes due to the nature of it being a relay activity, there were quite a lot of them waiting while one person was being active…It would've been nice to see as little paper-based work as possible where it was, you know, through movement.' 'by going out and everybody's playing and everybody's doing something, they're not just sitting and listening and being able to sort of drift off into their own little thoughts'
	Adapting	'to try and adapt to what we were doing, to try and find loads of different games is quite hard because you have to think about how you can incorporate the actual learning of it.' 'And the games we were coming up with, we weren't sure whether they were like age-appropriate but also ability appropriate and whether it would be improving their abilities in school.' '….should focus more on the academic side of it because we didn't want the school to get sort of annoyed that we were just like sort of coaches making them run around or anything like that.'



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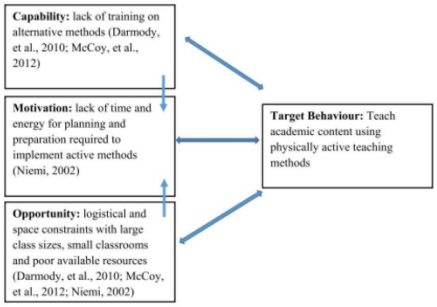

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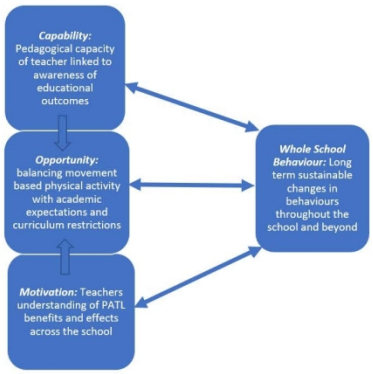

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