

New Games

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Table of Contents

1. Introduction	3
Purpose	4
Primary outcome	5
Secondary outcomes	5
2. Methods	6
Ethics	6
Recruitment	6
Participants	6
Quantitative data	6
Data collection.....	7
Physical activity data.....	7
Wellbeing and behaviour data.....	7
Data Analysis.....	8
Physical activity.....	8
Pupil wellbeing and behaviour.....	8
Qualitative data	9
Aims.....	9
Data collection.....	9
Data analysis	9
3. Results	10
Quantitative data	10
PA behaviour.....	10
Wellbeing and behaviour.....	11
Qualitative data	12
4. Discussion	20
Overview	20
Physical Activity	20
Pupil Wellbeing	21
Pupil Behaviour	22
Teacher's Views	23
Limitations	23
Future Recommendations	24
Summary	24
5. References	25

1. Introduction

This report is an overview of the findings from an evaluation of New Games, a primary school active lesson intervention designed to increase pupil school physical activity (PA), wellbeing, and classroom engagement in a PE lesson, with a specific focus on those pupils who do not engage with traditional PE.

In this report, PA is defined as any bodily movement that requires skeletal muscle input, resulting in energy expenditure (Caspersen, Powell, & Christenson, 1985). This includes many different types of daily activity, including walking cycling, running, exercise, sports, physical education (PE), dance, both indoor and outdoor play activities. Physical activity exists on a continuum, with four main definitions, sedentary behaviour, and light, moderate and vigorous intensity activity. Sedentary behaviour includes sitting or lying down, light activity includes slow walking, gardening, housework, yoga, archery, fishing and golf, moderate activity includes brisk walking, jogging, tennis, volleyball, cycling, skating, badminton, swimming, all of which may increase a participants feeling of warmth and cause them to breath harder than normal. Finally, vigorous activity includes fast running, football, netball, basketball and vigorous swimming, all of which will make it much harder for a participant to hold a conversation, and produces similar but greater effects to moderate physical activity (Biddle, Cavill, & Sallis, 1998).

Children and adults have different patterns of PA, school based intervention should therefore be different to meet the needs of children/school pupils. Children's activity is typically more spontaneous, with intermittent bouts of activity, whereas an adult's activity tends to be sustained episodes of planned activity (Bailey et al., 1995). Younger children may engage in more active play, which refers to unstructured outdoor physical activity in children's free time and can be accumulated throughout the day (Department of Health, 2011).

The Chief Medical Officer (CMO) for the UK has recommended that children and young people should achieve a minimum of 60 minutes of moderate to vigorous physical activity (MVPA) each day (30 minutes at school and 30 minutes at home). This is a minimum requirement and the CMO guidelines suggest children should be active up to several hours a day. Research into physical activity has increased in recent time, due to evidence suggesting that daily physical activity is on the decline, leading to more sedentary lifestyles (Health Survey for England (HSE), 2015). Additionally, national evidence from the HSE (2015) suggests that only 22% of children and young people aged 5-15 years of age are meeting the current physical activity guidelines, with boys being more active than girls (23% and 20% respectively). Moreover, physical activity typically declines with age (NHS Digital, 2016), and

40% of children aged 5-15 years being classified in the 'low activity' group, meaning they were participating in less than 30 minutes MVPA per day. This potentially has many physical, mental and social health issues. In line with this, the Department for Health also highlight the importance of reducing sedentary time for extended periods (Department of Health, 2011), as sedentary time is also an independent risk factor for ill health. This is important as evidence also suggests that health habits within childhood, such as physical activity or sedentary behaviour, are predictive of adult health habits (Telama, 2009), thus an active child is likely to lead to an active adult, and vice versa.

Within a school setting, there is evidence to suggest that children who are more active benefit from improved confidence, peer acceptance, self-esteem, anxiety and stress reduction, and even attention/concentration, cognitive functions and academic achievement (Chalkley, Milton, Foster, 2015). This evidence suggests that any increase in pupil PA and MVPA at school, is likely to bring about these benefits for individuals involved.

It is therefore pertinent that there are well designed interventions to support teachers and schools to maximise the opportunities within a school day to aid pupils to increase their daily PA and MVPA through subjects such as PE. A well-structured, inclusive PE lesson has the potential to have a positive psychological impact on pupil's evaluation of PE and being active.

New Games aims to make PA more inclusive and enjoyable for everyone, whilst improving time spent being active and improving learning behaviour. New Game aims to be flexibly integrated in to the school curriculum, and can be done alongside or separate to traditional PE lessons. New games also provide training, which aims to improve teacher confidence in teaching PE lessons.

Purpose

The purpose of the New Games evaluation is to assess the impact of New Games in a primary school setting, to see if it has an impact on pupil PA and behavioural outcomes, as well as assess how pupils and teachers evaluate New Games.

In order to achieve this, a mixed method approach was adopted to examine the programmes impact. Therefore, this evaluation should:

- Objectively measure pupil PA during a standard PE lesson, and in a New Games session
- Explore the teachers experiences with New Games, and the impact it had on their delivery of PE

- Examine the impact New Games has on pupil behaviour within a lesson
- Measure the impact on child wellbeing
- Explore the experience of pupils with New Games
- Gain insight into what works and what does not work about the programme
- Explore the feasibility of New Games in the primary school setting

Primary outcome

The primary outcome of was to identify if New Games impacted pupil physical activity during a PE lesson.

Secondary outcomes

Secondary outcomes of the New Games evaluation included:

- Identifying the impact on teachers delivery of PE
- Explore other benefits / limitations of the New Games
- Measure the impact New Games had on pupil behaviour after 10 weeks
- Measure the impact an New Games had on child wellbeing after 10 weeks
- Explore the perceptions of New Games from a pupil and teacher perspective

2. Methods

Ethics

Ethical approval was granted by the Sheffield Hallam University Sport Ethics Committee on 12/09/2017 to complete this evaluation of the New Games programme with respect to the proposed outcomes and methods.

Recruitment

One school from the Sheffield district was recruited through Sheffield Hallam Universities strategic partner, Learn Sheffield who have a working relationship with almost all schools in Sheffield at Head Teacher level. A commission was put out to all primary schools across Sheffield to participate in the research project, evaluating the impact of the New Games programme. One school who replied to this commission was selected by the research team and based on the schools response.

Participants

Upon discussion with the school, it was agreed that year four classes would be used for the evaluation, of which there were two year four classes in the evaluation school. Within the school, the two class' involved were randomly assigned as an intervention and control condition. Consent was given via a loco parentis form for all pupils within each class of each school, 100% of participants and parents agreed to be involved. The teacher of the intervention class also gave their consent to be involved in the evaluation.

Post follow-up data collection, the intervention teacher was invited to participate in a semi-structured interview with a researcher from the evaluation team. The teacher agreed to be interviewed. On the same day, a subsample of four pupils from the intervention class involved in the New Games evaluation, were invited to take part in a focus group with the same researcher of the evaluation team at their school. The teacher of the intervention class identified the subsample of pupils and all pupils were willing to be involved. Both interview and focus group took place in-person within the schools premises. Interviews and focus groups were semi-structured and followed an interview guide and were recorded using a digital audio recording device to be transcribed for analysis later on.

Quantitative data

The quantitative section of the data collection aimed to:

- Collect and analyse objective pupil PA behaviour data, comparing a control and intervention condition.
- Collect and analyses pupil wellbeing and teacher rated pupil behaviour questionnaires in order to assess New Games impact on pupil wellbeing and behaviour.

Data collection

All objective accelerometer data was collected by the evaluation team at one time point, follow-up. All questionnaire data (e.g. pupil wellbeing and teacher rated pupil behaviour questionnaires) were collected at two time points, baseline and follow-up. Baseline data was collected at week zero, with follow-up data being collected in week ten. Follow-up data collection followed an eight-week intervention period where the control condition received traditional PE lessons and the intervention condition received a block of New Games in replacement for their traditional PE lessons. This way, any difference in PA behaviour, pupil wellbeing, or teacher rated class behaviour between the control and intervention conditions could be analysed.

Physical activity data

PA data was collected on week ten, where participants in both the control and intervention condition wore an accelerometer (ActiGraph wGT3X-BT) for their respective PE lesson. ActiGraph's were chosen due to their light weight for easy application, they provide no real-time activity feedback, thus minimising any risk that a pupil will deviate from their 'normal' activity, Actigraph data can be distilled to infer time in MVPA using evidence-based cut-points, and they have a long battery life. Pupils were asked to wear the accelerometer on their right hip, which is consistent with methodologies from paediatric ActiGraph calibration studies (Evenson et al., 2008; Freedson et al., 2005).

Wellbeing and behaviour data

At baseline, all participants completed a child wellbeing questionnaire and both control and intervention teachers completed a pupil behaviour questionnaire, based on the PE lesson that had just been delivered. At follow-up, pupil wellbeing and teacher rated pupil behaviour data collection procedures were repeated as above. This minimised any other variables influencing the data. The pupil wellbeing questionnaire used was the Children's Happiness Scale, which was developed by the Children's Rights Director for England (Morgan, 2014). Participants ticked all statements that were applicable to them at that time. The lowest score possible was 1.68 and the highest score possible was 4.25, and the mean score for the

questionnaire was 3.22. A higher score represented a higher wellbeing. Teachers completed a seven-item pupil behaviour scale, scoring each pupil on a five point Likert scale, where a score of one meant bad behaviour and five meant really good behaviour. The 7 items were; 1. follows rules and instruction, 2. follows directions, 3. listens attentively, 4. completes work on time, 5. works autonomously, 6. works and plays co-operatively with other children, and 7. works neatly and carefully.

Data Analysis

All quantitative data were analysed using Microsoft Excel, SPSS V.24 and Actilife software, and was written up on Microsoft Word.

Physical activity

Considering the accelerometer data, all recorded data was downloaded from the accelerometer and saved as raw files (created automatically) as well as .agd files with a 15 second epoch. Evenson (2008) cut-point values were used to classify activity into activity intensities (See Table 1).

Table 1. Evenson (2008) cut-point values

Activity intensity	Counts per minute (CPM)
Sedentary	0 - 100 CPM
Light	101 – 2295 CPM
Moderate	2296 – 4011 CPM
Vigorous	4012 + CPM

In SPSS, an independent ANOVA was completed in order to determine if there were any differences by condition in PA behaviour, followed by an effect size calculation. P-values were used to see if there were any significant differences between conditions, whilst, effect sizes were used to measure the magnitude of any impact New Games was potentially having on pupil PA behaviour.

Pupil wellbeing and behaviour

Regarding pupil wellbeing and behaviour, SPSS was used to complete two separate two (time; baseline and follow-up) by two (condition; control and intervention) mixed ANOVA's, providing information of the main effects of time, condition and interaction effect. T-tests were then used to determine where any significant differences ($p < .05$) lay within the results.

Qualitative data

Aims

The qualitative section of the evaluation aimed to:

- Conduct a semi-structured interview with a teacher involved in the New Games evaluation in order to explore their views and experience of New Games.
- Conduct a focus group with a subsample of children from each school involved in the New Games evaluation to explore their views and experience of New Games.

Data collection

One teacher from the school involved in the New Games evaluation was invited to an interview with a researcher from the evaluation team. The teacher agreed to be interviewed. Pupils involved in the New Games evaluation were invited to be involved in a small focus group to explore their experiences with New Games. The teacher of the class involved in the New Games evaluation selected a subsample of willing participants from the intervention class. Parental consent was given via a pupil loco parentis, giving parents the opportunity to remove their child from the selection process. There were eight children involved in the focus group.

Both the interview and focus group took place in-person at the recruited school, and both utilised a semi-structured approach, following an interview guide. Interview guides were designed so that questions explored users' thoughts and opinions of New Games, experience of New Games as well as perceived impact on pupils. Focus group and interview data were recorded on a digital sound recorder, transcribed verbatim by an external transcription company and anonymised before analysis.

Data analysis

Focus group and interview transcripts were analysed thematically by the evaluation team. Analysis involved identifying patterns (themes) and common threads across all the data. Analysis identified the range of views and themes within the dataset.

3. Results

Fifty nine (7.42 Years old, 36 male, 23 female) year four primary school participants across two classes (control n : 29, intervention n : 30) were involved in the evaluation of the New Games programme, all based within one primary school in Sheffield.

Quantitative data

PA behaviour

PA data from each conditions 60-minute PE lessons were compared (control vs intervention) at follow-up. This would offer direct lesson comparison between the control and intervention condition.

Table 2. PE lessons descriptive and significance statistics for physical activity behaviour at follow-up.

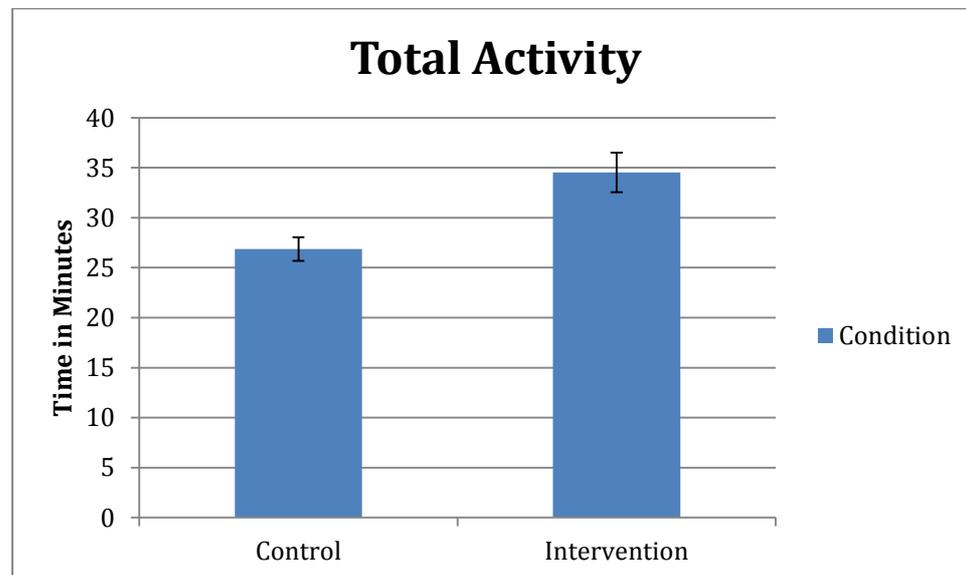
Physical Activity Outcome	Condition	Time in Minutes	PA difference between groups (minutes)
Sedentary behaviour (minutes)	Control	33.12	7.66**
	Intervention	25.46	
Light Activity (minutes)	Control	15.41	5.44***
	Intervention	20.85	
Total Activity (minutes)	Control	26.87	7.66**
	Intervention	34.53	
MVPA (minutes)	Control	11.45	2.23
	Intervention	13.68	

Note: ** $p < .01$, *** $p < .001$.

Acute 60-minute PA behaviour (Table 2) comparisons revealed that there was a significant difference between the control and intervention conditions for sedentary behaviour (control $M = 33.12$, $SD = 6.39$, intervention $M = 25.46$, $SD = 10.90$, $t(57) = 3.27$, $p < .01$), light activity (control $M = 15.41$, $SD = 3.72$, intervention $M = 20.85$, $SD = 6.66$, $t(57) = -3.85$, $p < .001$), and total activity (control $M = 26.87$, $SD = 6.39$, intervention $M = 34.53$, $SD = 10.90$, $t(57) = -3.27$, $p < .01$) in the expected direction (i.e. the intervention condition were more active and less sedentary). There was no significant difference between conditions in MVPA (control $M = 11.45$, $SD = 3.48$, intervention $M = 13.68$, $SD = 5.78$, $t(57) = -1.78$, $p = .08$), however it did go

in the expected direction (i.e. the intervention condition spent more time in MVPA than the control condition).

Figure 1. Pupil total activity during a 60-minute PE lesson at follow-up (95% CI)



A Cohen's *d* effect size calculator (Becker, 2018) was used to measure the magnitude of effect of the PE lessons total activity and MVPA between conditions. Cohen *d* effect sizes report that an effect of .2 is a small effect size, .5 is a medium effect size, and .8 is a large effect size. Analysis between conditions revealed a large effect size for total activity (Cohen *d* = .85) and a medium effect size for MVPA (Cohen *d* = .46). Therefore, New Games was having an obvious (i.e. it would be noticeable from the naked eye) impact on pupil's total physical activity and a moderate impact on pupils MVPA during a 60-minute PE lesson.

Wellbeing and behaviour

Considering pupil wellbeing, a two (time) by two (condition) mixed ANOVA revealed a non-significant effect of time ($F(1,48) = .49, p = .48$) and interaction effect ($F(1,48) = .00, p = .98$). A significant overall effect of condition however ($F(1,48) = 4.97, p < .05$), was found. T-tests were therefore completed on conditions to see where any significance may lay. At baseline, a significant difference between the control and intervention condition was found (control $M = 3.14, SD = .24$, intervention = $M = 2.97, SD = .28, t(49) = 2.29, p < .05$), with the control condition scoring higher than the intervention group. At follow-up, a non-significant difference between conditions (Baseline: Follow-up: control $M = 3.16, SD = .34$, intervention $M = 3.00, SD = .38, t(49) = 1.52, p = .13$) was found, with both conditions scoring about the questionnaire mean. Thus, New Games seemingly had a non-significant impact of pupil wellbeing, with the control condition found to have generally better pupil wellbeing.

Considering pupil behaviour a two (time) by two (condition) mixed ANOVA revealed a significant effect of time ($F(1,50) = 4.3, p < .05$) and found a non-significant interaction effect ($F(1,50) = .82, p = .37$) and condition effect ($F(1,50) = .00, p = .99$). Paired samples t-tests were completed to measure where any differences lay over time. Regarding the control condition, there was a non-significant difference between baseline and follow-up (baseline $M = 4.37, SD = .71$, follow-up $M = 4.46, SD = .62, t(25) = -.70, p = .49$), whereas a significant difference was found between baseline and follow-up data in the intervention condition (baseline $M = 4.30, SD = .70$, follow-up $M = 4.53, SD = .68, t(25) = -2.71, p < .05$), where the intervention conditions behaviour improved over time. Paired sample t-test between individual items revealed that behavioural item 1 (follows rules and instructions; baseline $M = 3.42, SD = 1.23$, follow-up $M = 4.30, SD = .88, t(25) = -4.73, p < .005$), item 3 (listened attentively; baseline $M = 4.07, SD = 1.09$, follow-up $M = 4.57, SD = .85, t(25) = -3.13, p < .01$) and item 6 (worked and played cooperatively with other children: baseline $M = 4.34, SD = .93$, follow-up $M = 4.80, SD = .56, t(25) = -2.60, p < .05$) significantly changed over time. In each case, the behavioural item improved over time, thus New Games was found to have a positive impact on these behavioural items over time when compared to a traditional PE lesson.

Qualitative data

The qualitative findings are presented as five themes:

- The existing physical activity culture
- School environment importance for PA
- The overall evaluation of New Games
 - Enjoyment
 - Both pupils (novel, challenging, kept active) and teachers (simple and engaged pupils)
 - PE comparison
- Pupil and teacher perceived impact of New Games
- Future recommendations for New Games

Table 1. Key for quotes

Participant group	Sign
Male pupil	M
Female pupil	F
Teacher	T
Researcher	I

The existing physical activity culture

Both pupils and teacher interviews started by asking what they thought about physical activity. This was important to set the scene and to help evaluate the impact New Games potentially had for each user group. Both the teacher and pupils reported that physical activity (PA) was very important in general and at school. The teacher viewed PA to benefit both pupils physical health and mental wellbeing;

T: "My thoughts are obviously they're very beneficial for their physical health; and their wellbeing as well."

The teacher went onto state that they perceived PA as a method to moderate pupil stress levels, *"Yeah, it's well known that exercise decreases stress levels"*. Pupils supported this finding that PA benefited their mental health, stating that being active made them *"Happy"* and *"hyped"*. One of the pupils linked being active and their enjoyment at school:

F: "When I'm active, and when I've enjoyed the school, is when it's like, when I enjoy school being active I get happy and things, and I start getting excited and things."

The teacher perceived PA to have an impact of pupil learning, concentration and engagement in a lesson at school. T: *"I think exercise and activity promotes learning in a way that you wouldn't necessarily think, because it stimulates."*

It is worth noting that the teacher was generally discussing PA at this point, not PE specifically. That being said, a positive evaluation of PA was the overarching opinion of this teacher.

School environment importance for PA

Findings support that from a teachers perspective, school was an important environment to promote PA behaviour. This was reported to be due to positive health benefits, learning benefits such as improved concentration and engagement, and finally, due to some pupils leading a sedentary life style outside of school. As explained by the teacher stated:

"I think it's incredibly important, because obviously the health benefits anyway."

"I think personally it benefits the other side of their education. So it helps them with their concentration, and helps them be more engaged in their other lessons."

"A lot of the children that we work with wouldn't necessarily be getting a lot of exercise outside of school anyway. So it's really important that they're accessing that in school."

PE lessons at school were therefore seen as important to increase pupil PA, due to the perceived potential sedentary home life, improved learning, concentration and engagement at school, as well as it *"gives them a break"*.

The subject of PE was not always seen as favourable however, as findings suggest that teachers evaluation of PE was not always favourable due to external factors, such as the weather:

T: "I love the idea of teaching PE, but I'm a cold person... was just like urgh, do we really have to do it? And I think perhaps quite a few teachers feel that way, I'm probably not alone in that."

What actual impact this view had on PE engagement is unknown, but teacher perceptions of enjoyment for teaching PE is worth noting.

The overall evaluation of New Games

Both pupils and teachers spoke favourably of the New Games style of teaching PE, with themes revolving around enjoyment and comparison to traditional PE. Pupils reported New Games to be enjoyable due to novel way of being taught PE, whilst reporting they enjoyed that New Games was challenging them.

Enjoyment

Generally, pupils reported enjoying the New Games PE lessons, stating that they would like to do New Games lessons in the future. For example:

M: "because them games what we played with Dale was like fun, and it was like so good."

This was supported by teacher perceptions as the teacher expressed: *T: "And I think the children really enjoyed them."* This finding also supports the novel methods of New Games when compared to traditional PE lessons.

Pupils often reported enjoying the New Games experience due to the novel experience of the methods behind New Games, the freedom New Games provided pupils, as well as pupils reporting that New Games challenged them. For example pupils expressed:

F: "Because we don't do them kind of things. We do like stuck in the mud and stuff." (Novel)

F: "I think it's different because we normally do like jumping in mud and do circles around the yard and things, and then Dale did something different." (Novel)

M: "It were like good, because you can go people wherever you want to go." (Freedom)

M: " I like the game because it when you weren't allowed out of the bounds, so it were harder". (Challenge)

F: It's because when you jump on them, and then someone else can't take your one, and then they have to keep on running around." (Challenge)

The robot themed New Games game in particular was reported as a favourite by pupils:

M: "Good, because I like games where Dale gave out robot."

F: "He (Dale) was good because he tells us good games and things".

Teachers also reported enjoying teaching New Games, as stated: *T: "You know what, I personally really enjoyed teaching them".* This was supported by the teacher stating that New Games was simple to implement, and did not require much equipment. For example:

T: "Yeah it didn't require tone of extra things, I didn't have to make anything. It was quite simple equipment that I could have used."

Teacher perceptions of pupil enjoyment was also positive, stating that the New Games methods were similar to games pupils would normally play in leisure time, thus were really enjoyable. For example:

T: "They love Tiggy Scarecrow and stuff like that, but I think because it (New Games) felt like those kind of games, they felt a little bit more like they weren't doing... I: A PE lesson T: Yeah, a PE lesson, as like they're not learning the skills of netball say."

T: "because it's not, I think when they think of PE, it's not necessarily what they think of."

In addition, the teacher perceived that New Games kept pupils moving throughout the lesson and were generally more active, which fed into their enjoyment in the lesson. As expressed:

T: "But actually the New Games kept them all moving, and I don't think they realised that they were actually doing as much as they were."

T: "But I certainly noticed them, their enjoyment of PE went up."

This culminated in the teacher stating that during a New Games PE lesson, pupils were more engaged in the PE lesson and were looking forward to their PE lessons. As expressed by:

T: "The game were quite short and snappy... So I think perhaps that kept them all moving, and kept them all engaged in it."

T: "Yeah, they wanted to do PE, they were asking. And I had parents coming to me and saying, 'oh are they doing it again this week'... 'oh they enjoyed that last week' or whatever and they'd like to do that again. So that was obviously really positive."

PE comparison

Pupils were asked how a New Games lesson compared to a more traditional PE lesson and which they'd prefer. Pupils were quite mixed in their opinions. For example, a few participants stated they preferred "Normal PE" (M & F), whilst a few others stated, "I like them both" (M & F). Pupils were asked to give some greater detail as to why they were undecided. A few different reasons were reported including, preferring more traditional sports, finding some of the games too challenging, a high level of concentration was needed to learn new rules, and pupils reported being bored. For example:

F: "I prefer like sports, I don't prefer the kind of games."

M: "It were just boring."

F: Harder, because I'm not used to them kind of stuff."

F: Hard, because people keep on talking and then they don't let me concentrate to the teacher."

F: "Because I don't want to do it because if I did it again we would have to thingy, learn, because we'll probably forget about it, we would have to learn all the sessions again."

Pupil and teacher perceived impact of New Games –

Pupils in the focus group spoke generally favourably of New Games, stating that it was fun and enjoyable. Regarding the impact on the New Games PE lesson from a pupils perspective, there was a mixed response. For example, some pupils found the New Games lessons made it easier to concentrate in the lesson as they were enjoying themselves, however some other pupils reported that because New Games was a novel experience for the class, it made it harder to concentrate because some pupils were not listening to the teacher for being too excited.

F: "Hard, because people keep on talking and then they don't let me concentrate to the teacher."

Another pupil reported that they found it harder to concentrate in the New Games lesson because they were not accustomed to the New Games style of games and teaching PE. As expressed by:

F: Harder, because I'm not used to them kind of stuff."

The New Games lessons were reported to have a perceived impact on pupils engagement in the PE lesson. As well as pupils reporting they enjoyed the New Games lessons, Dale, founder of New Games and the teacher of New Games in this pilot, was reported to be liked by many pupils as they found him to be engaging and 'fun'. For example, pupils reported that Dale did 'funny dances' that made them laugh, adding to the enjoyment of the lesson. This reportedly had a positive knock on effect onto pupil's engagement into the lesson. The teacher of the class perceived the pupils to be more engaged in the New Games lesson when compared to a more traditional PE lesson. As expressed:

T: "Yeah, they appear to be more engaged while we were there. I mean you still got the odd couple who were like oh I don't want to do this anymore, but then after a little bit they saw their friends enjoying it, and I think they wanted to join back in again."

&

T: "because the games were quite short and snappy, and then you move on to the next thing. So I think perhaps that kept them all moving, and kept them all engaged in it."

&

T: "but I certainly noticed them, their enjoyment of PE went up, and I certainly noticed some children were much, once they'd done that they were much more eager to do whatever we were doing after."

The New Games style of PE was therefore perceived by the teacher of the class to have a positive impact on pupil's engagement in the PE lessons, increased PA, and even improved motivation and concentration in class' after their PE lesson, supported by:

T: "You know what, I personally really enjoyed teaching them afterwards. And I think the children really enjoyed them (New Games PE lessons), because it's not, I think when they think of PE it's not necessarily what they think of."

New Games was also described to have an impact on the teacher's perception of what a PE lesson is, and the scope of how it can be taught, whilst still achieving the national curriculum. For example:

T: "So it just made me a little bit more open to doing things in different ways, I guess, and trying different things."

New Games was overall seen as favourably by the teacher in this pilot as it supported pupil engagement in the PE lesson, was perceived to increase pupil PA, and was easy for the teacher to implement, as expressed by:

T: "Yeah, it didn't require tons of extra things. I didn't have to make anything. It was quite simple equipment that I could have used. And the equipment that was brought that he used were things that I could have just adapted."

Future recommendations for New Games

Within the interview / focus group process, pupils and teacher were given the opportunity to make any recommendations for New Games. Pupils described a few recommendations which generally revolved around one theme of including some sport aspects within the lesson. For example:

M: "Like sport and stuff, more sports or something."

M: "make it exercise and stuff. Sports is basically exercise, it's just like running and everything, kicking and all that stuff. "

F: "I think I would change that spot game as well, because all you had to do was find a spot and run".

The teachers recommendations for New Games mainly revolved around aligning the New Games PE lessons more strongly with the PE curriculum. For example:

T: "Perhaps integrating some of the skills that have to be taught somehow in the PE curriculum."

T: "Because I know that if I did those games every lesson, I would have to also then teach some of the other skills. So I would maybe ask how could you integrate them in a way that would also teach (the curriculum)."

The teacher did also recommend how New Games could incorporate some elements of sports into the New Games PE lessons, again stating that this would align with the PE curriculum.

T: " Yeah, for example football or tennis, how could those little games be integrated into that so the children didn't necessarily realise early on that they were playing or doing those skills."

4. Discussion

Overview

The primary aim of this evaluation was to investigate the effects of New Games on primary school pupil's physical activity during a PE lesson. New games adopt a novel pedagogical approach, when compared to traditional methods of delivering a PE lesson, aiming to be more inclusive in engaging children during a PE lesson. A secondary aim was to understand pupils and teachers view of New Games and explore any further impact New Games was having on pupil behaviour, engagement, and social experiences during a PE lesson. The current study utilised a mixed methods approach in order to assess the potential impact New Games had on pupils when compared to a traditional PE lesson.

Physical Activity

The data from the present study revealed that New Games, on the whole, had a positive, significant impact on pupil total physical activity and sedentary behaviour. The amount of time spent being active was significantly greater in the New Games group by 7.66 minutes when compared to the traditional PE lesson group. Importantly, this took pupils average minutes spent being active over the 50% of the lesson mark, to 34.53 minutes (57.55%) when compared to 26.87 minutes (44.78%) in the traditional PE lesson. This is an important finding as PE is often relied on within a school to engage pupil's in being active, which although it is one of its aims, it is not however the only aim of PE. For example, alongside stimulating pupils activity, PE should also educate students using activity, develop physical competence in motor skills, develop pupil physical literacy (pupils physical ability to move and confidence in which to move), expand psychological components such as resilience, communication, team work and decision making (Department for Education, 2013; Physical Education Learning Outcomes Framework, 2002). Thus, due to pupils general PA being on the decline (HSE (2015), an intervention that can demonstrate increased pupil PA is positive. Interestingly however, during the teacher interview, it was reported that New Games would benefit from being more closely related to the curriculum, supporting the other aims of PE (Department for Education, 2013) in a bit more direct fashion. How this could be achieved would be a worthy next step for New Games

Regarding MVPA, note, CMO physical activity guidelines for children and young people is 60 minutes of MVPA per day, 30 minutes of which should be within school time. Although the New Games PE lesson did not significantly increase pupil MVPA when compared to a traditional PE lesson (13.68 minutes and 11.45 minutes respectively) the 2.23 minute difference in pupil MVPA was of a medium effect size (Cohen's *d*), meaning that although the difference was non-significant, the magnitude of the impact of increasing MVPA by 2.23

minutes is meaningful. In addition, when considering roughly 20% of children and young people do not currently meet CMO guidelines (HSE, 2015), any intervention that has a positive impact of child MVPA should be encouraged as it will likely have a positive impact on the physical, mental and behavioural factors previous literature has highlighted as being of a result to increased fitness and physical activity (Chalkley, Milton, Foster, 2015).

Pupil Wellbeing

In regards to pupil wellbeing, the quantitative results (pupil questionnaires) from the current study suggest that New Games did not have an impact on pupil wellbeing when compared to a traditional PE lesson. The qualitative data did not support that New Games had a more favourable result to pupil wellbeing either. Pupils however, did report really enjoying New Games, stating that they enjoyed New Games due to it being different, fun, challenging, had a wide variety of games and it gave them some freedom to move around, which was supported by the PA data. The variety of the activities that were part of the New Games programme were spoke about positively as the games that pupils were not as fond of, were over quickly, as a lot of the games were short in duration. Thus, the New Games model is able to cater for the preferences of pupils within a whole class, by providing an assortment of different activities over short periods. Compared to a traditional PE lesson, pupils also enjoyed the novelty of the activities undertaken during the New Games programme. In the teacher interview it was stated that a lot of the games were similar to games the students would play during break times. This supports the notion that New Games has the potential to engage more pupils during PE, as New Games are more like the fun and enjoyable games pupils play in their own time. This could potentially provide positive reinforcement to PE and long-term PA benefits. Finally, the teacher added that their perception of pupil's enjoyment of New Games was positive, again linking it to the novel way of teaching PE. Some further exploration is needed here to evidence what, if any, this increased enjoyment was having on pupil wellbeing.

Building on pupil enjoyment, it was also reported that pupil's really enjoyed the delivery of New Games. They said that they found the instructor to be very funny and liked the way that they taught the sessions. This demonstrates the importance of a positive demeanour and pupil evaluation of an instructor can have at engaging pupils. A potential limitation of New Games is the scalability of the programme, given that pupils were speaking very specifically about the instructor in questions. Staff with a similar approach to delivering the intervention may be needed to uphold the positive feedback of New Games from pupils.

Some pupil's however, did report that there were aspects of New Games that they were less favourable of, stating they had frustrations with having to learn New Games and waiting for things to be explained instead of just starting with a more traditional sport or activity. It is plausible to assume that if New Games was continued in the school that the children would learn the games and this frustration may reduce. When pupils were asked which they would prefer, New Games or a traditional PE lesson, the pupils were split between New Games and traditional PE. This was due to some pupil's reporting that they really enjoyed the 'sport' aspect of PE. Linking to the previous point that New Games being similar to the games pupils play at break time, perhaps traditional PE offers those pupils a good balance of unconventional (New Games) and conventional activity / sport. Going forward, New Games should look to explore how this could be addressed.

Overall, it appears that pupils enjoyed their experience with New Games from what they, and their teacher reported. Although they had some frustrations with learning New Games, once they knew the games they appeared to enjoy them and stated they would like to continue to take part in New Games. This supports New Games claim that it is an effective way of engaging children in a PE lesson using novel ideas.

Pupil Behaviour

Behavioural data illustrated that New Games had a significant, positive impact on overall pupil behaviour when comparing the intervention group over time (i.e. baseline and follow-up). Specifically, pupils in the intervention group improved their ability to:

- Follow rules and instructions
- Listen attentively
- Play co-operatively with other children

In support of this, the teacher interviewed reported that pupils were more engaged (compared to traditional PE) and suggested this may be due to the snappy nature of how New Games was delivered, using multiple shorter games within a lesson, and that pupils were enjoying New Games, thus more engaged in the lesson. In addition, the qualitative data suggested that the positive behavioural impact on pupils lasted beyond the 60 minute PE lesson, as pupils were reportedly eager to engage with lessons after having taken part in New Games. This indicates that the enjoyment of New Games, coupled with the benefits of increased PA may help pupils to remain focused during classroom lessons, post PE lesson. This is in line with other research highlighting the PA can have a positive behavioural impact on classroom behaviour (Chalkley, Milton, Foster, 2015). This may be because acute PA increases cognitive function in pre-adolescent children (Verburgh et al., (2014)). These results

suggest that a larger scale study over a longer time would be beneficial, to see what impact New Games had on cognitive function and academic attainment.

Some students did however report that they found New Games methods somewhat disrupting and increased the difficulty to concentrate in the PE lesson due to other pupils being too excited and talking over the New Games instructor. This was not an overriding opinion and the teacher reported observing this behaviour, however stating that in general, pupils were well behaved.

Teacher's Views

The current study allowed for the teacher to provide their overall evaluation of New Games. They reported New Games to be an enjoyable way to deliver PE, whilst perceiving many positive benefits on the pupil's behaviour and enjoyment in the lesson. It was stated that they found it easy, with little equipment needed and felt confident delivering the content, maybe more so than traditional PE. This is a positive sign that New Games could easily be implemented in other schools with teachers being trained to deliver the sessions.

In contrast, it was reported however, that New Games is not currently aligned with the National Curriculum for PE. This means that the core skills required to be taught during PE lessons were not directly being delivered. The teacher voiced concerns that key skills/sports i.e. tennis and football were not included in New Games. The teacher suggested that if New Games could be modified so that it included elements that were required by the national curriculum, it would be feasible that it could be included in future PE lessons.

Limitations

This study was a single centre study with a small sample size that was drawn from one year four class. It is therefore uncertain how generalizable the findings are. Further studies involving more schools from different socioeconomic backgrounds are needed to explore this. A study conducted over a longer-time period would also facilitate the exploration of if any effects that New Games had on pupils are sustained long-term, and if any change here could support long-term health benefits, pupil behaviour and wellbeing and academic performance.

New Games was also only delivered for 10 weeks. A longer period of delivery may have allowed students more time to learn the novel methods of New Games, or it may have shown that over time the novelty wore off. A longer study follow-up would benefit New Games, demonstrating long-term impact of New Games.

Future Recommendations

Within the interviews/focus groups the teachers and pupils provided feedback on New Games. Some pupils suggested that New Games could include more sports elements as they enjoy traditional sports and games. This would be a complex balance to strike, as the New Games methods were also reported to be really enjoyable, engaging, as well as supported students to increase their PA during a 60 minute PE lesson. That being said, this finding was also supported with the teacher's recommendation that New Games should align more with the national curriculum to include the skills required to be taught during PE. However, the ease of delivery is something that should be kept consistent, as it was reported as a big benefit of New Games.

Pupil's reported enjoying New Games and the teacher found it easy to deliver and felt more confident than when delivering a normal PE lessons. If scaled up, The New Games instructor's style of delivery should be emulated if possible and remain consistent as pupils enjoyed the style of delivery. This, along with increase PA may have lead to the result of improved pupil engagement during the PE lesson. This could be achieved through highlighting the values or specific delivery style New Games should be delivered in.

Summary

Overall, the novel teaching methods of New Games was a positive experience for both teacher and pupils. New Games was found to have a significant impact on pupil PA, namely sedentary behaviour and total activity during a 60 minute PE lesson, whilst also having a positive impact on MVPA, supporting children to meet CMO guidelines. New Games was reported to be enjoyable, varied, novel and easy to deliver. Further research is needed to conclusively say with confidence the impact New Games could have on pupil wellbeing, behaviour and PA, this could be achieved through a longer follow-up period, a larger sample size, and varying pupil age groups.

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