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# Understanding the impact of the Widnes Vikings Game Changer programme

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## 1. INTRODUCTION

The role of the voluntary and community sector in delivering activities to reduce inequalities has been recognised within recent public health policy and practice. This asset-based approach builds on the 2010 Public Health White Paper 'Healthy Lives, Healthy People' (DH, 2010)<sup>1</sup>, which presented a focus on wellbeing and prevention, with a shift in power to local communities. The role of community development has been positioned as integral to improving health and wellbeing and the reduction of inequalities (NICE, 2016)<sup>2</sup>. However, evidence regarding the impact and outcomes of community activities is not robustly or readily collected.

Widnes Vikings Rugby League club deliver a community programme that involves delivering interventions to specific population groups across Halton. As part of this, they are delivering a physical activity intervention in schools in Widnes; this project is entitled 'Game Changer'.

### Game Changer

The Game Changer programme is a fundamental movement and multi-skills intervention that involves delivering practical sessions to primary school-aged children throughout the school day, including before and after school, during break times and lunch times, and integrated through the curriculum. Widnes Vikings aimed to deliver this intervention in up to 36 schools across Halton over a 12-week period, with schools then delivering the programme from weeks 12-24. The project has been piloted by Widnes Vikings and a first cohort was delivered between September and December 2016. Delivery of the second cohort commenced in January 2017; whilst the third cohort ran from April to October 2017.

Widnes Vikings collected a number of measures at baseline and at follow-up (12-weeks and 24-weeks). Measures included: weight status, fitness, physical activity and physical self-perception.

Widnes Vikings requested support from the Public Health Institute (PHI), LJMU, to collect additional measures to develop a robust evaluation of the Game Changer project.

## 2. WHAT DID WE DO?

A mixed-methods approach incorporating both qualitative and quantitative methods was undertaken to provide a robust evaluation.

Ethical approval was granted by Liverpool John Moores University Ethics Committee (ethics reference: 16/PBH/013).

### 2.1 Activity and analysis

#### 2.1.1 Quantitative data

##### *Game Changer data*

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<sup>1</sup> DH (2010). Healthy Lives, Healthy People. Available from: <https://www.gov.uk/government/publications/healthy-lives-healthy-people-our-strategy-for-public-health-in-england>

<sup>2</sup> NICE (2016). Community engagement: improving health and wellbeing and reducing health inequalities. Available from: <https://www.nice.org.uk/guidance/ng44>

Game Changer collected quantitative data on the following: weight status, fitness, physical activity and physical self-perception from 29 schools in which their intervention was being delivered. The data were aimed to be collected across three time points, across the twenty-four week intervention by the stakeholder (week 1, 12 and 24). Twelve schools (22 data sets, 509 children) were included in the final analysis as they included all three time points and complete data sets. Of these 12 schools, two were partner schools (3 data sets, 72 children) and two schools (2 data sets, 49 children) had been paying for the programme.<sup>3</sup> Data analysis has included exploration of the outputs of partner and paying schools (see Game Changer key on page 7 and the findings presented in section 3).

#### *Focus group with children including draw and write activity*

Two focus groups were conducted with 13 children across two classes of year two pupils (aged 6-7 years old) from a case study school.<sup>4</sup> This process aimed to look more closely at what the children thought about the Game Changer programme. This was done by making use of a Draw-Write-Tell methodology<sup>5</sup>, and children were asked “How does taking part in Game Changer make you feel? Can you draw a picture and then write about it.” This approach allows for the collection of a large-amount of rich insightful data in a short timescale.

Children were also asked questions about the intervention such as had they heard of Game Changer in their school and what did they think about it.

#### **2.1.2 Process evaluation interviews**

Three process evaluation interviews were undertaken during June-July 2017. These interviews aimed to capture the different perspectives of those involved in the Game Changer intervention. These individuals included three members of staff from Widnes Vikings; the community integrated director, a senior session delivery coach and an assistant delivery coach. There was also an interview with a member of staff from a case study school which was selected by Widnes Vikings.

This information enabled the researchers to produce a logic model that detailed the activities, output and outcomes (actual or expected) of the Game Changer programme (Figure 1). The logic model provided the evaluation team with a clearer understanding of the Game Changer model, and provided a framework on which to focus the evaluation.

All of the interviews and focus groups were transcribed verbatim and thematically analysed.

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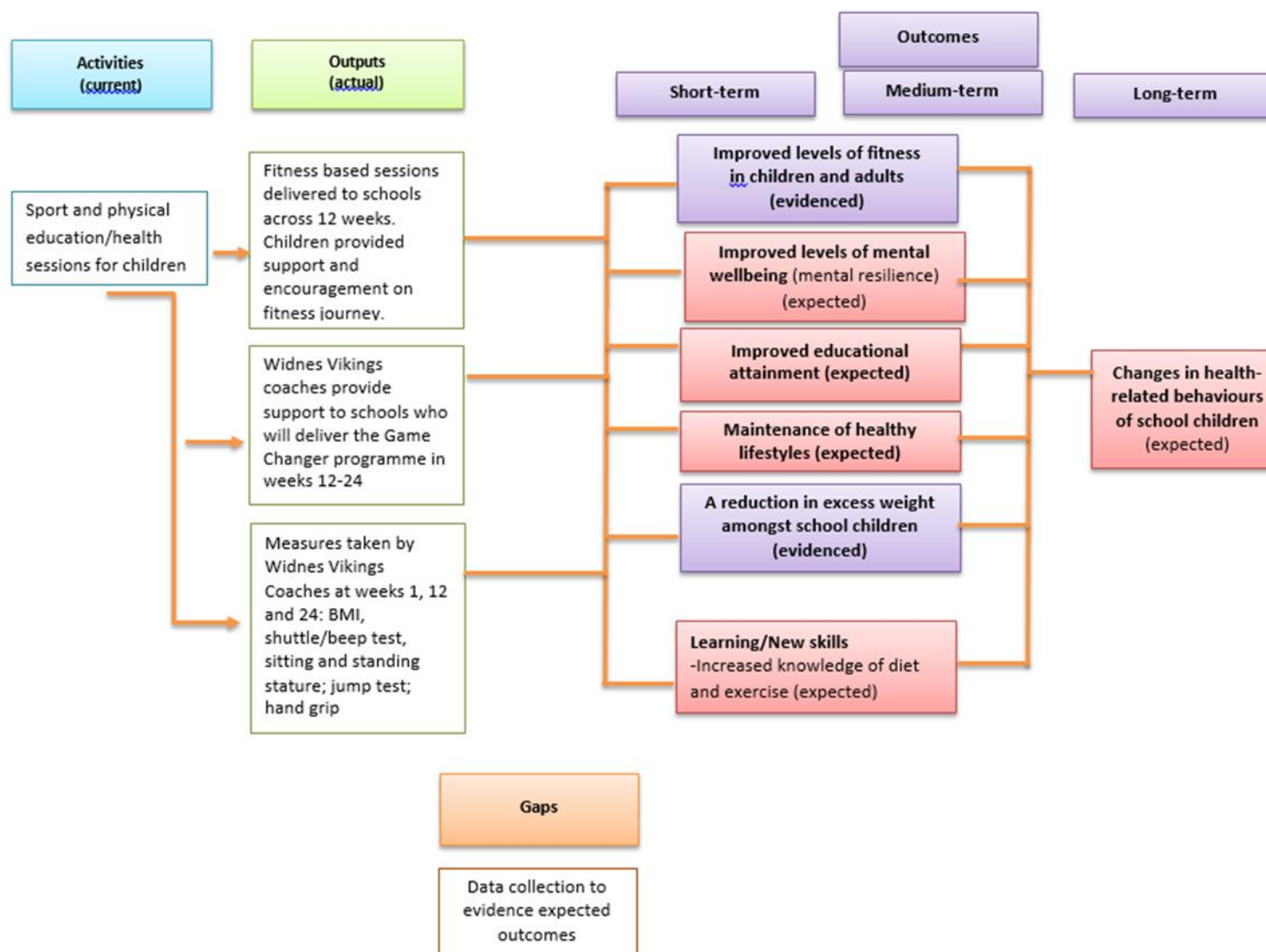
<sup>3</sup> The schools that were included in the “partner schools programme” were schools that received Game Changer alongside additional physical activity provision from Widnes Vikings.

Schools could also initially pay to receive the Game Changer programme as a standalone programme— schools that received other provision from Widnes Vikings alongside Game Changer; and schools that paid for “game change” as a stand-alone programme.

<sup>4</sup> This case study school was selected by Widnes Vikings and was a school that has fully participated and embraced the intervention.

<sup>5</sup> Angell, C., Alexander, J. and Hunt, J.A. (2015). Draw, write and tell’: A literature review and methodological development on the ‘draw and write’ research method. *Journal of Early Childhood Research*, 13(1) 17–28. 28

Figure 1: Widnes Vikings Game Changer Programme Logic Model



Data was analysed using the statistical software package SPSS. Data analysis focused on comparisons of year groups, across those schools who had completed datasets. Data were analysed descriptively (investigating means). Where possible, statistical analysis was carried out to explore whether differences between means were significant. Firstly, repeated measures analysis was conducted. This was to ascertain the difference in mean scores across the three time periods, for each test (Jump, bleep etc.) and time period (week 1, 12 and 24). Secondly, independent samples T-tests were conducted. This looked at statistical significance (also known as the P. value, using a margin of .05) of the difference in mean score for each test, at each time. As such, references to 'significance' relates to the P. value taken from the T-tests. These show that it can be assumed the differences in mean scores did not to have happen by chance and is reliable. In the analysis presented in section 2, the mean differences are taken from the repeated measures tests and the significance is taken from the T-tests.

A number of data cleaning steps were undertaken before the data were analysed. These can be found in Appendix 1. The steps below were taken as the data were transformed into SPSS. Each of the schools involved was coded using a number to help best facilitate within year group analysis but does not feature within the total analysis.

The analysis included variables relating to physical fitness, these variables were: jump (distance in centimetres [CM]), hand grip, bleep test (in laps completed) and shuttle test (in seconds). These were measured as they align with the programme outcomes of improved physical conditioning and were selected by the stakeholder. Data were analysed by school and across year groups. In addition, analysis has been carried out to explore any differences in mode of delivery (as detailed below).

#### **Game Changer Data Key:**

##### **Key 1: Partner school – yes/no**

Partner School = Yes	Schools where Widnes Vikings delivered their physical activity provision in which Game Changer was included at no additional cost.
Partner School = No	<ul style="list-style-type: none"> <li>- Schools that paid just for Game Changer and received no additional provision.</li> <li>- Schools that did not pay for Game Changer and received no additional provision.</li> </ul>

##### **Key 2: Paying school – yes/no**

Paying School = Yes	Schools that paid for Game Changer only to be delivered by Widnes Vikings.
Paying School = No	<ul style="list-style-type: none"> <li>- Schools that received Game Changer only and did not pay.</li> <li>- Schools that received their physical activity provision from Widnes Vikings and were then offered Game Changer as an ad-on to this.</li> </ul>

### Key 3: Week 24 after summer – yes/no

Week 24 After Summer = Yes	Schools that had their week 24 measures taken after the summer break (the next academic school year beginning in September 2017)
Week 24 After Summer = No	Schools that had their week 24 measures taken before summer (within the same academic school year that finished in July 2017).

## 3. WHAT DID WE FIND?

### 3.1 Quantitative data analysis

As described in the methods section, the most meaningful method of data analysis across all schools was to compare year groups; exploration of differences between partner and paying schools are presented where relevant. The data below highlights key findings for Year groups 2, 3 and 4 - additional tables and graphs for these data can be found in Appendix 2.

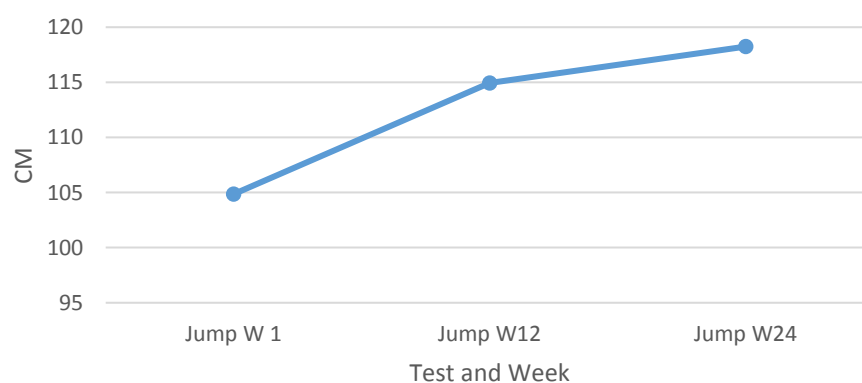
#### 3.1.1 Total Data Set Analysis

The total data set contained a total of 509 participants across the 12 schools included within the intervention analysis:

YEAR GROUP	TOTAL NUMBER OF CHILDREN
YEAR 2	201
YEAR 3	172
YEAR 4	89
YEAR 3/4	38

### Jump test

Figure 2: Total mean scores for jump (in centimetres)

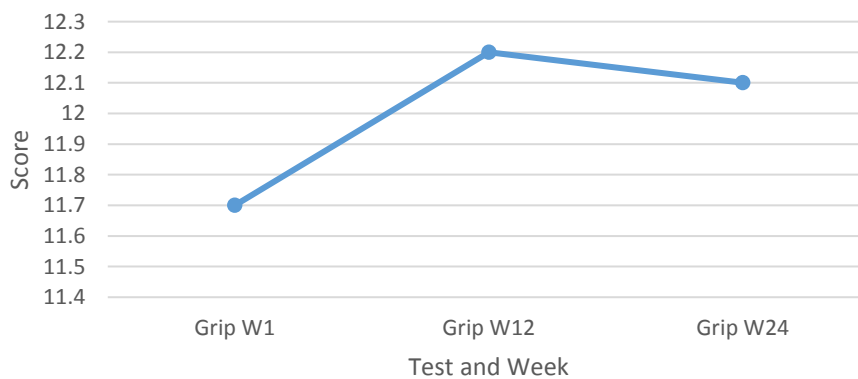




- Across the whole data set, the mean jump distance was seen to increase from weeks 1 to 12 and weeks 12 to 24 by 10cm and 4cm respectively.
- Those who were not in a partner school (compared to partner school) made a larger mean change from weeks 1 to 24 (14cms). The gap between the non-partner and partner school also appeared to narrow.
- Those children who were not in a paying school (compared to a paying school) displayed a greater mean change of 14cm across the 24 week period compared and the gap between the non-paying and paying schools appeared to narrow.
- Those children who had their week 24 measure taken after the summer break showed an increased mean change of 18cm between from weeks 1 to 24. Interestingly, whilst the baseline measure for this group was slightly lower than that of the children who had their week 24 measure taken before the summer break, their mean score at 24 weeks was 5cm higher.
- None of these findings were statistically significant.

### Hand grip

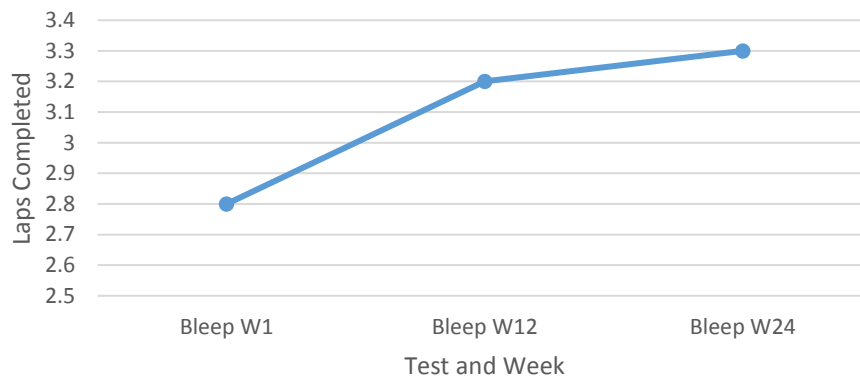
Figure 3: Total mean scores for hand grip



- Across the whole data set hand grip increased by a mean of 0.5 from week 1 to week 12, but then decreased by 0.1 from weeks 12 to 24.
- Within the partner and non-partner school groups there was minimal mean change from weeks 1 to 24 (0.2 and 0.4 respectively). A similar trend is true when comparing those who were in a paying school and those who were not.
- Children who had the week 24 measure taken before and after the summer break both showed a change of 0.4, with those having their measure taken before the summer break having a higher baseline reading (12.1 compared to 10.5).
- The mean difference between the groups, across weeks 1, 12 and 24 were all considered statistically significant. All P. values are less than .05.

## Bleep test

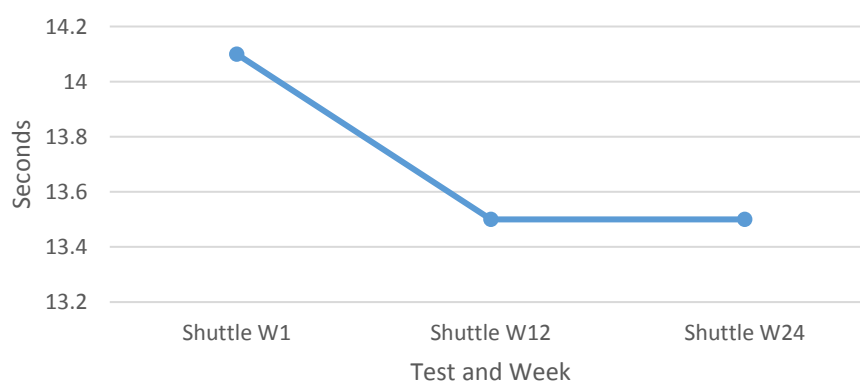
Figure 4: Total mean scores for bleep test



- Across the whole data set, the mean bleep test score was seen to increase from weeks 1 to 12 and weeks 12 to 24 by 0.6 laps and 0.1 laps respectively.
- Those who were not in a partner school (compared to partner school) made a larger mean change from weeks 1 to 24 (0.5 laps compared to 0.3 laps). The gap between the non-partner and partner school also appeared to narrow. This change was considered to be significant.
- The children who were not in a paying school (compared to a paying school) began at a higher baseline reading (2.9 laps compared to 2.7 laps) and also displayed a greater mean change of 0.5 laps across the 24 week period. The gap between the two groups appeared to widen.
- Those children who had their week 24 measures taken after the summer showed an increased mean change of 0.6 laps from weeks 1 to 24. Interestingly, while the baseline measure for those who had their week 24 measure taken after summer had a lower mean score, the gap between the two groups appeared to narrow.
- The mean difference between those in partner schools, across weeks 1, 12 and 24 were all considered statistically significant.

## Shuttle

Figure 5: Total mean scores for shuttle



- Across the whole data set, the mean shuttle was seen to decrease from weeks 1 to 12 by 0.6 seconds and then plateaued between weeks 12 to 24. This decrease indicated an improvement.
- Both the partner and non-partner schools experienced a decrease in total mean shuttle scores across the 24 week period (both experienced a decrease of -0.6 seconds, which indicated an improvement).
- The children who were not in a paying school (compared to a paying school) displayed a greater mean change of 0.6 (compared to 0.4) across the 24 week period, and the gap between the non-paying and the paying schools appeared to narrow.
- Those children who had their week 24 measures taken before the summer break showed a decreased mean change of 0.8 seconds from weeks 1 to 24. Interestingly, while the baseline measure for those who had their week 24 measure taken before and the after summer were the same (14.1 seconds), the gap between the two groups appeared to widen due to an increase in mean scores for the post-summer break measurement group.
- These findings were not statistically significant.

### **Percentage change across the total data set**

Additional analyses was carried out on the total data set to look at the percentage change experienced for each of the tests carried out (please see Table 1 in Appendix 2.1), the findings of which are detailed below. This analyses was carried out on 509 complete data set entries for weeks 1, 12 and 24. For the bleep test findings, only 462 cases were included due to missing bleep tests. All percentages were rounded when calculated. It is important to note that the percentages detailed below do not comment upon the significance of values included in the analysis. This information is detailed in the preceding paragraphs of this section.

- For the total data set of 509 children, 77% (n=391) experienced an improvement between weeks 1-12; with 59% (298 children) and 78% (n=397) experiencing an improvement between weeks 12-24 and weeks 1-24 respectively. The largest proportion of children to see a decline was 39% (n=199) and this occurred between weeks 12-24.
- From weeks 1-12, nearly 6 out of every 10 children (58%, n=294) experienced an increase in their hand grip score; compared to 51% (n=260) from weeks 12-24 and 57% (n=292) over the total 24 week duration of the Game Changer programme. The largest proportion of children to see a decline was 48% (n=242) and this occurred between weeks 12-24.
- For the bleep test, 7 out of every 10 children (72%, n=333) experienced an improvement from weeks 1-12, similar to the overall improvement between weeks 1 to 24 (71%, n=329). A smaller improvement was seen between weeks 12 to 24 (45%, n=208). The largest proportion of children to see a decline was 49% (n=227) from weeks 12-24.
- Sixty nine percent of the children (n=349) experienced an improvement in their shuttle test between weeks 1-12, compared to 46% (n=234) and 58% (n=293) for weeks 12-24 and 1-24 respectively. The largest proportion of children to see a decline was 52% (n=265) and this occurred between weeks 12-24.

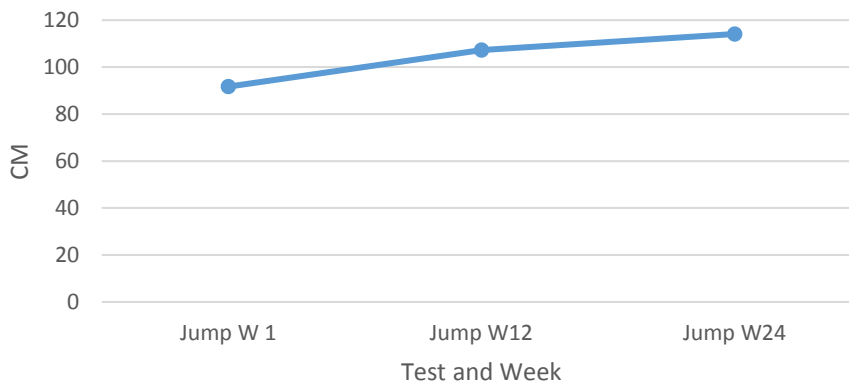
Please note that there was a large range of change within these groups as shown in Appendix 2.1, Table 1.

### 3.1.2 Year 2 data set

There were no partner or paying schools within the Year 2 subset of data. Analysis was conducted only upon total means and week twenty-four data collected after summer.

#### Jump

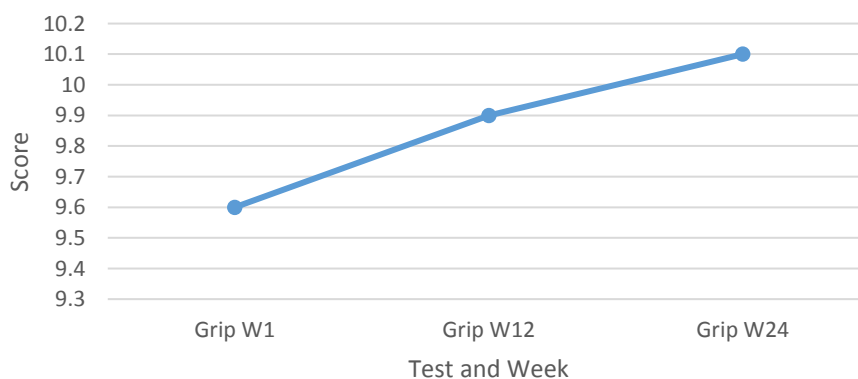
Figure 6: Year 2 total mean scores for jump



- Across the Year 2 data set, the mean jump distance increased from weeks 1 to 12 and weeks 12 to 24 by 15.6cm and 6.8cm respectively.
- Those children who had their week 24 measures taken before the summer break showed an increased mean change of 26.9cm from weeks 1 to 24 (compared to 20.9 in post-summer break measurement). While the baseline measure for those who had their week 24 measure taken after summer is higher, as the change over time was smaller, the gap between the two groups narrowed.
- The mean difference between the groups, across weeks 1, 12 and 24 were all considered statistically significant. All P. values were less than .05.

#### Hand grip

Figure 7: Year 2 total means scores for hand grip

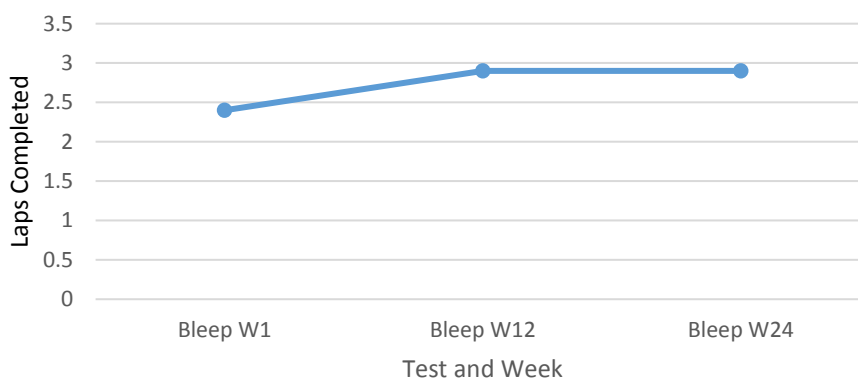


- Across the Year 2 data set, the mean hand grip was seen to increase from weeks 1 to 12 and weeks 12 to 24 by 0.3 and 0.2 respectively.

- Those children who had their week 24 measures taken after the summer break showed an increased mean change of 0.6 from weeks 1 to 24 (compared to a mean change of 0.5 in the pre-summer break measure). Those who had their week 24 measures taken before the summer break evidence a greater change between weeks 1 to 12 and then a decrease from weeks 1 to 24.
- These findings were not statistically significant.

## Bleep

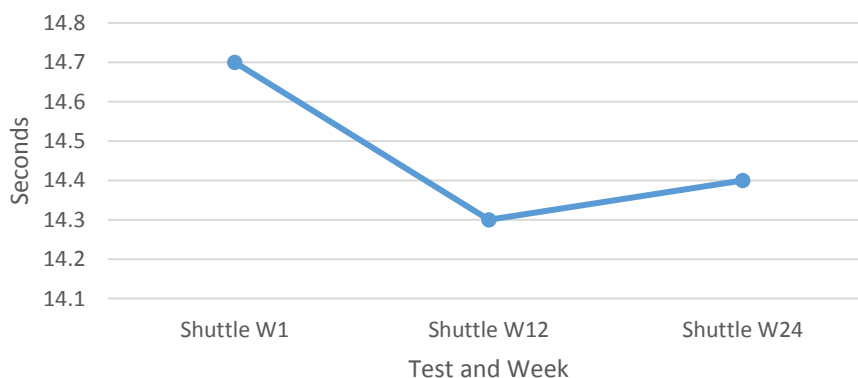
Figure 8: Year 2 total mean scores for bleep test



- Across the Year 2 data set, the mean bleep test was seen to increase from weeks 1 to 24 by 0.5 laps, there was no change between weeks 12 and 24.
- The same change of 0.5 laps was observed in those who did / did not have this measure taken post-the summer break was an equal difference of 0.5 laps between week 24 measures between those children who had their week 24 measures taken before or after summer.
- The mean difference between the groups, across weeks 1, 12 and 24 were all considered statistically significant. All P. values are less than .05.

## Shuttle

Figure 9: Year 2 total mean scores for shuttle

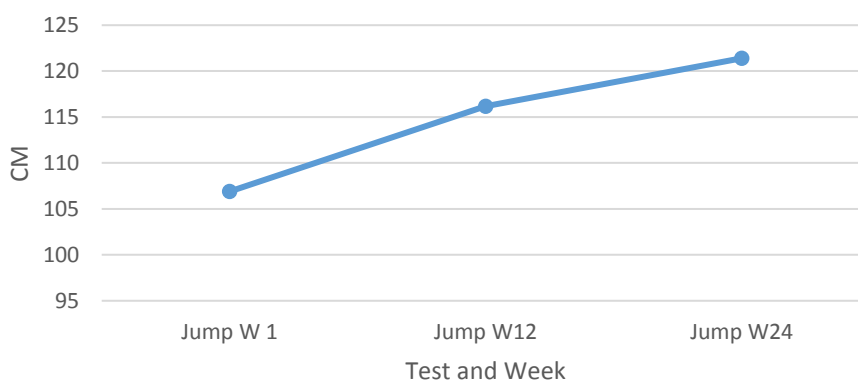


- Across the Year 2 dataset, the mean shuttle was seen to decrease from weeks 1 to 12 and increase from weeks 12 to 24 by -0.4 seconds and +0.1 second respectively.
- Those children who had their week 24 measures taken before the summer break showed a decreased mean change of -0.8 seconds from weeks 1 to 24. While there is a decrease for those who had their week 24 measures after the summer break, there is an increase between weeks 12 and 24 returning it to the baseline score.
- These findings were not statistically significant.

### 3.1.3 Year 3 data set

#### Jump

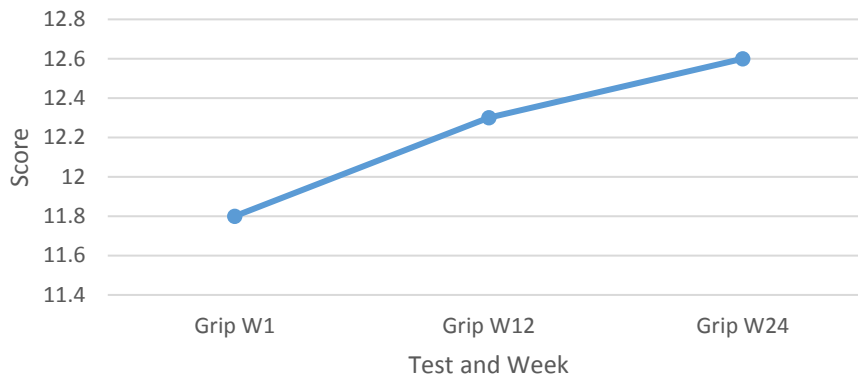
Figure 10: Year 3 total mean scores for jump



- Across the Year 3 data set, the mean jump distance was seen to increase from weeks 1 to 12 and weeks 12 to 24 by 9.3cm and 5.2cm respectively.
- Those who were not in a partner school (compared to partner school) made a slightly larger mean change from weeks 1 to 24 (14.5cm compared to 14cm).
- The children who were in a paying school (compared to not in a paying school) displayed a greater mean change of 25cm across the 24 week period (compared to 12.6cm), with the gap between the non-paying and the paying schools appearing to widen.
- Those children who had their week 24 measures taken before the summer showed an increased mean change of 14.8cm from weeks 1 to 24 (compared to 14cm in those who were measured post-summer break). Interestingly, while the baseline measure for those who had their week 24 measure taken after summer had a higher mean score, the gap between the two groups appeared to narrow.
- These findings were not statistically significant.

## Hand grip

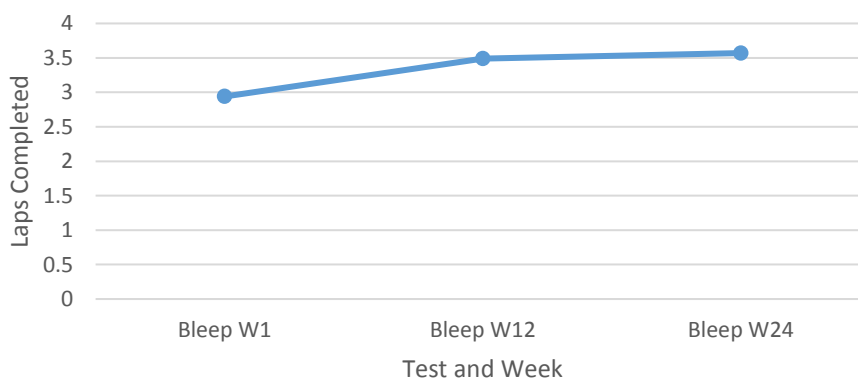
Figure 11: Year 3 total mean scores for hand grip



- Across the Year 3 data set, the mean hand grip was seen to increase from weeks 1 to 12 and weeks 12 to 24 by 0.5 and 0.3 respectively.
- Those who were not in a partner school (compared to those in a partner school) made a larger mean change from weeks 1 to 24 (0.8 compared to 0.4), thus narrowing the gap between the non-partner and partner schools.
- The children who were not in a paying school (compared to in a paying school) displayed a greater mean change of 0.8 (compared to 0.5) across the 24 week period.
- Those children who had their week 24 measures taken before the summer showed an increased mean change of 1.0 from weeks 1 to 24, compared to those who had the measure taken post-summer break (0.4). The baseline measure for those who had their week 24 measure taken after summer had a lower mean score.
- These findings were not statistically significant.

## Bleep

Figure 12: Year 3 total mean scores for bleep test

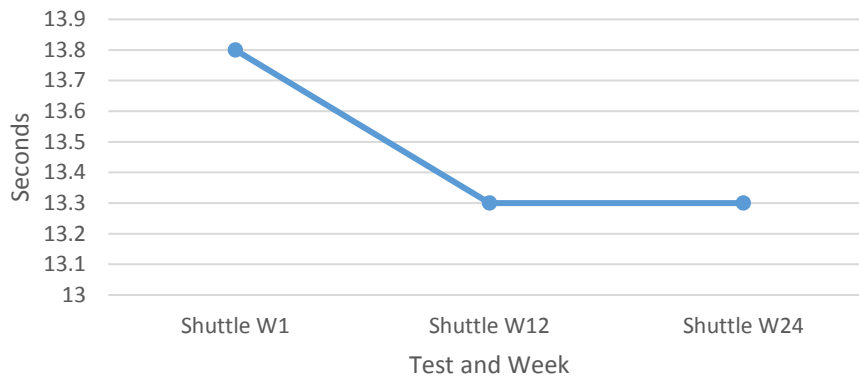


- Across the Year 3 data set, the mean bleep test was seen to increase by 0.5 laps from weeks 1 to 24.
- Those who were not in a partner school (compared to those in a partner school) made a larger mean change from weeks 1 to 24 (0.6 laps compared to 0.3 laps). The gap between the non-partner and partner school also appeared to narrow.

- The children who were not in a paying school (compared to in a paying school) displayed a greater mean change of 0.6 laps across the 24 week period (compared to 0.3 laps).
- Those children who had their week 24 measures taken after the summer showed an increased mean change of 0.7 laps from weeks 1 to 24.
- These findings were not statistically significant.

## Shuttle

Figure 13: Year 3 total mean scores for shuttle



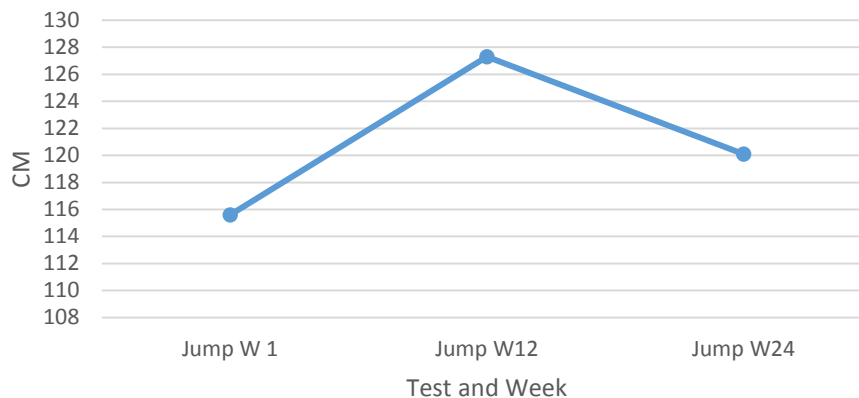
- Across the Year 3 data set, the mean shuttle was seen to decrease from weeks 1 to 12 by 0.5 seconds and plateau between weeks 12 to 24.
- Those not in a partner school (compared to those in a partner school) displayed a decrease in mean of 0.5 seconds across the 24 week period (compared to 0.3 seconds in the partner schools).
- The children who were not in a paying school (compared to a paying school) displayed a mean change of 0.5 seconds across the 24 week period, similar to that experienced in the paying schools (0.4 seconds).
- Those children who had their week 24 measures taken before the summer break showed a decreased change in mean of 0.8 seconds from weeks 1 to 24 (compared to 0.1 seconds in those who had their measurement taken post-summer break).
- These findings were not statistically significant.



### 3.1.4 Year 4 data set

#### Jump

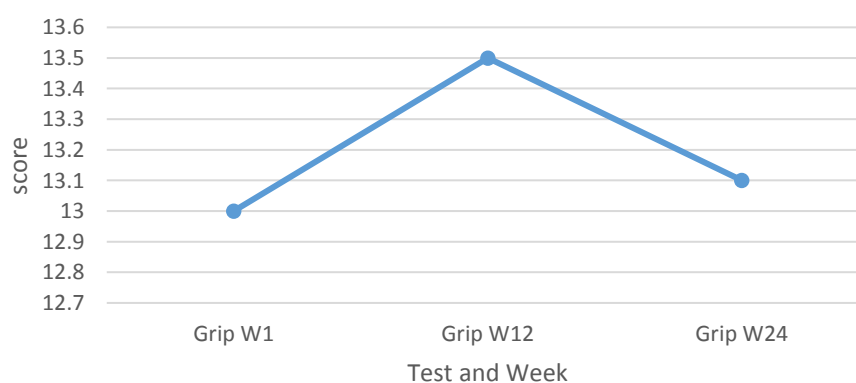
Figure 14: Year 4 total mean scores for jump



- Across the Year 4 data set, the mean jump distance was seen to increase from weeks 1 to 12 by 11.7cm and decrease from weeks 12 to 24 by 7.2cm.
- Those who were in a partner school (compared to not in a partner school) showed a larger mean change from weeks 1 to 24 (8.1cm compared to 3.4 in non-partner schools).
- The children who were not in a paying school (compared to in a paying school) displayed a greater mean change of 8.1cm across the 24 week period, with the mean jump of those in the paying schools decreasing by 6.1cm over the same period (this change noticeably occurred between weeks 12 to 24).
- Those children who had their week 24 measures taken after the summer showed an increased mean change of 12.4cm from weeks 1 to 24 (compared to 1.9cm in post-summer break measurement where a decrease of 10.4cms was seen between weeks 12 and 24).
- These findings were not statistically significant.

#### Hand grip

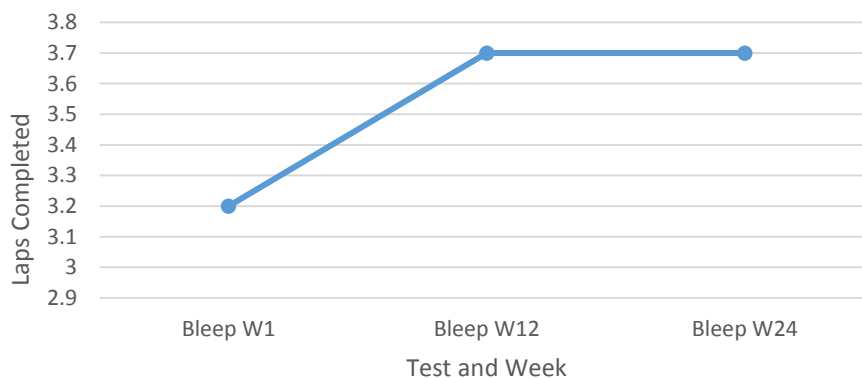
Figure 15: Year 4 total mean scores for hand grip



- Across the Year 4 data set, the mean hand grip was seen to increase from weeks 1 to 12 by 0.5 and decrease by 0.4 from weeks 12 to 24.
- Those who were not in a partner school (compared to in a partner school) illustrated a mean change of 0.2 from weeks 1 to 24. The non-partner schools appeared to experience a decrease in mean hand grip between weeks 12 and 24.
- The children who were not in a paying school (compared to in a paying school) displayed a mean change of 0.2 across the 24 week period, compared to those in paying schools where the mean remained the same. Both cohorts experienced a decrease in their mean from weeks 12 to 24.
- Those children who had their week 24 measures taken after the summer showed an increased mean change of 0.9 from weeks 1 to 24 (compared to a decrease of 0.2 in pre-summer break measurement).
- These findings were not statistically significant.

## Bleep

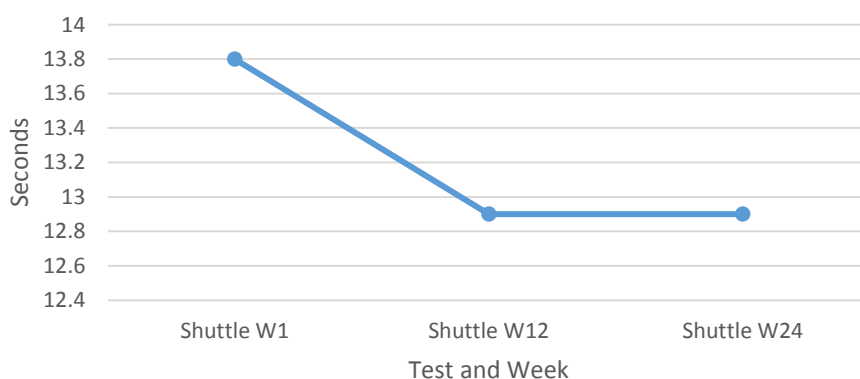
Figure 16: Year 4 total mean scores for bleep test



- Across the Year 4 data set, the mean bleep test was seen to increase from weeks 1 to 12 by 0.5 laps and plateau from weeks 12 to 24.
- Those who were not in a partner school (compared to in a partner school) made a larger mean change from weeks 1 to 24 (0.6 laps compared to those who were 0.3 laps).
- The children who were not in a paying school (compared to in a paying school) displayed a greater mean change of 0.7 laps across the 24 week period (compared to 0.2 laps). The mean also remained the same between weeks 12 and 24 for those children who were not in a paying school.
- Those children who had their week 24 measures taken after the summer showed an increased mean change of 1.0 lap from weeks 1 to 24 (compared to a change of 0.2 laps in those who were tested pre-summer break). The findings for whether the data was captured before or after the summer break was shown to be statistically significant across weeks 1, 12 and 24. All P values are less than .05.
- All other data were not statistically significant.

## Shuttle

Figure 17: Year 4 total mean scores for shuttle test



- Across the Year 4 data set, the mean shuttle was seen to decrease from weeks 1 to 12 by 0.9 seconds and plateau between weeks 12 to 24 (remaining at 12.9 seconds).
- There was no difference in the mean change between those in a partner school or those not in a partner school, with a decrease of 0.8 seconds shown in both groups between weeks 1 and 24.
- Those children who were not in a paying school (compared to a paying school) displayed a decrease in mean change of 1.1 seconds across the 24 week period (compared to a decrease of 0.3 seconds in paying schools).
- The same decrease in the mean change (1.1 seconds) was experienced by those children who did and did not have their week 24 measure taken after the summer break.
- These findings were not statistically significant.

### 3.1.5 Draw and Write Activity

Due to the age of the children taking part in the focus groups the responses were limited in their variety and understanding, however, a summary of the focus groups and examples of the draw and write responses are shown below.

#### *Focus Group 1*

The drawings that were carried out by the children in focus group 1 revealed that all the children had an understanding of the physical activities they were undertaking. Most of the pupils reported that they were 'happy' when doing the activities with some reporting they felt 'nervous'. The children in the focus group did not appear to have an understanding on what Game Changer was, but they understood that staff from Widnes Vikings delivered the physical activity sessions and took the measurements.

#### *Focus Group 2*

In focus group two, all the pupils again understood the physical activities that were undertaken. All of the children reported that the sessions made them feel 'happy'.

Some of the pupils had heard of Game Changer, recalling it was fun and exciting; and a number of pupils remarked on the running task and being weighed with a positive perspective. One pupil, however, said that they "don't like being measured round the waist".

When asked about what their physical education sessions were like at school before Game Changer, pupils in this focus group agreed unanimously that it was boring. When asked about how physical education was made different the pupils said *“The games Widnes Vikings teach us are fun and they’re better because our teachers are boring.”* and *“The teachers don’t do fun stuff in PE.”* Also that the amount of physical activity increased:

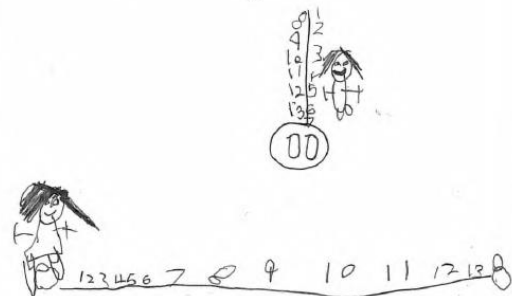
*“We do a little when they aren’t here and a lot when they are.”*

*“I like it that we’re doing more sports – Just when Widnes Vikings come in.”*

The pupils also noted that they replicate some elements of Game Changer when they are out of the classroom playing games such as stuck in the mud.

A selection of the draw and write responses are shown below.

How does taking part in the Game Changer Programme make you feel? Can you draw a picture and then write about it.



we were running and were jumping

How does taking part in the Game Changer Programme make you feel? Can you draw a picture and then write about it.

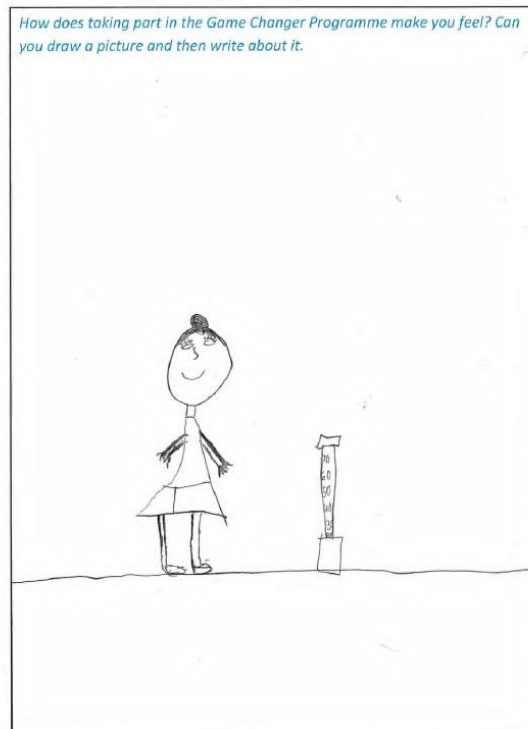
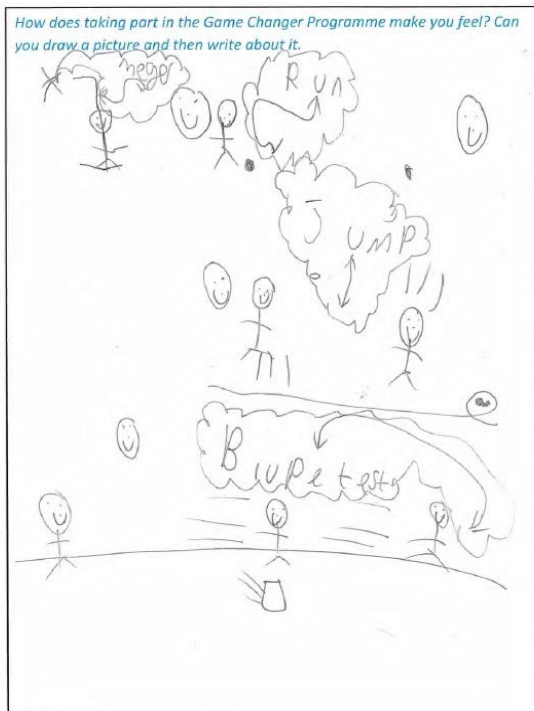
the 15 is my peerole  
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1 2 3 4 5 6 7 8 9 10



How does taking part in the Game Changer Programme make you feel? Can you draw a picture and then write about it.





## 3.2 Qualitative analysis

### 3.2.1 Interview findings

Upon analysing the content of the interviews there were several key and recurring themes that emerged. These themes and illustrative quotes are detailed below.

Theme	Quote(s)
<b>1. Background and development of the project</b>	
This theme looked at what informed the intervention; design, background information, the Game Changer pilot study and the branding of the programme.	
<b><i>Project development and design</i></b>  There were several key elements that fed into the overall background and design to the Game Changer programme. Understanding obesity as an issue and the negative implications of obesity upon health and wellbeing was identified as being one of the most influencing factors in the design of Game Changer.  From this stemmed a focus upon the current physical activity provision in the area and how it is being delivered (including how much is being delivered). This was also considered to have influenced the Game Changer design. It was highlighted that Widnes Vikings did not just want to replicate what other sports clubs already engaged with educational institutions were doing. They wanted to offer / do more.  One of the interview participants made direct reference to the National Child Measurement Programme (NCMP) and how this was a large influencing factor for the Game Changer intervention. There also appeared to be a focus upon achieving numerical targets in line with the NCMP, these include reducing body mass index (BMI), waist circumference and weight. It was also highlighted that one of the key	  <i>“So working with the strategic partners, there was a call to action put out there that no child in Halton would go to secondary school obese. A real bold, bold statement.” (Participant 1)</i>          <i>“So, a lot of sports clubs in the research go in and do between four and eight weeks of sessions with classes around fitness. Very few combine classroom based activities around that core education. What we decided to do was to make Game Changer a 24 week intervention, of which 12 weeks were delivered by us in the beginning and 12 weeks was then delivered by the school. The idea within that is that they would do fitness tests at week 1, week 12 and week 24. But that across our first 12 weeks we would work with the school to develop their own physical fitness plans that they embed for the final 12 weeks then they would do the test.” (Participant 1)</i>

<p>influences in the design were outcomes given by Halton CCG (Clinical Commissioning Group) in line with the NCMP.</p> <p>One of the participants acknowledged that children would benefit from an improved healthy lifestyle; with an emphasis placed upon children being happier within themselves. It was noted that there was some stigma towards children being measured and weighed in school, as parents felt they would be criticised if their child was classified as overweight.</p>	<p><i>“So it was sort of, measurements and guidelines given to us by Halton CCG the driving force behind this along with us Widnes Vikings they give us particular outcomes that they would like to see especially on the guidelines of the NCMP shown as well.”</i> (Participant 2)</p> <p><i>“...I don’t think they take into account they were concerned at the beginning – ‘oh there’s going to be some measurements taken’, like the heights and weights in reception and ‘we’re gonna get told our child is unfit’ – it’s nothing to do with, nothing like that at all but I do think parents then think ‘well you’re doing it in school time and it’s just an addition to your sporting activity you do in school anyway’ just don’t think they probably understand where this information will be used or how it will be used to help their children.”</i> (Participant 4).</p>
<p><b>Game Changer Pilot</b></p> <p>One of the participants spoke about the Game Changer pilot study year (2015/16), in which three types of intervention were tested. It was commented upon that the pilot showed that a combination of physical activity and education was best.</p> <p>In relation to this, another participant provided more detail about the practical implementation of the Game Changer programme during the pilot year and how they were able to provide feedback that helped to develop the programme when it was rolled out in the 2016/17 academic year.</p>	<p><i>“What we’ve done is, we did a pilot and that was last year in 2016 just before the summer period where we worked with four schools at the time and we just tried to do different interventions, so we worked with a school and just came in a delivered PE- physical activity sessions, we also came into a school and delivered educational sessions and we did another school where we combined the two. An obviously by providing the school, children, parents, teachers with as much information as we could that seemed to be the best philosophy to go with.”</i> (Participant 2).</p> <p><i>“[name] said that there was going to be a new...New sessions brought in to encourage the children to eat healthy, become more healthy and active and to encourage them to do it in different ways that’s not just the sport we involve them in, in school. So he was talking about that, which sounded good and then said would we be part of the pilot scheme, see how the children get on with it, take measurements and see how it improves their ability.”</i> (Participant 4).</p>



### **Branding the Game Changer programme**

Something that was apparent throughout all the interviews with participants was how strongly Widnes Vikings have been able to brand the Game Changer programme. It was felt that the club have worked hard to make Game Changer synonymous with Widnes Vikings. It was clear from the interviews that Widnes Vikings takes its role in the community very seriously and those involved with the Game Changer programme highlighted that it is being conducted in partnership with a passionate and professional organisation.

One of the participants felt that using the brand to enhance the intervention was really important. A public Game Changer day was discussed. The day-long event allowed local children the chance to come to the stadium and engage in some games and educational sessions. It also included a session with players from the team. Whilst this session was separate from the actual intervention it demonstrated the way in which the club works within the local community.

One of the participants mainly focused upon the relationship that their school had with the Widnes Vikings team. As they are part of a wider scheme<sup>6</sup> they have built up a close relationship and the children were firmly aware of this relationship. The children became accustomed to receiving provision from Widnes Vikings regardless of which specific programme it was. Furthermore, the school also personally knows the individuals delivering the sessions, which was felt to enhance the experience of the intervention further.

*"I think the use of the club and the use of the players is the really important part the players. I know this won't benefit the audio [points at photo on wall] but you know, you can see the players in that picture there doing the Game Changer session and the players going out and doing and actively getting involved and that's the benefit of rugby league. The benefit of rugby league is having the players, it's an honest, honest sport their very humble the players they'll go out and put time in schools and do sessions and..."*  
(Participant 1).

*"...we've ran some Game Changer days so they've been held at the stadium by myself and [name] and those sort of days we've had I think it was 200 kids attend each day... so the morning was full of physical activity, so we focused on the different activities what we sort of do in the schools so one was fundamentals, one was multi-skills and one was team based activity, and a fourth one would have been a tour of the stadium. Then goin' into, after they've had lunch players come up, so the players are discussing about health eating, nutrition and so forth..."* (Participant 2).

*"...we thought we'd go ahead with that, because a lot of children were then 'When are they coming back?', 'When are the breakfast clubs and afterschool again?'"* (Participant 4).

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<sup>6</sup> This refers to a scheme called 'partner schools'. Here schools could pay to receive curriculum from Widnes Vikings which may include the delivery of curriculum sessions and school clubs - this is usually a full afternoon followed by an afterschool club and usually in addition to the standard two hours of PE delivered at the school. One of the participants provided a case study perspective from one of these partner schools.

## 2. Health and Wellbeing

This theme looks at fitness/ activity/ sport/ physical activity – making reference to specific activities or movements. This also includes mental health and mentality (elements of where the mentality, or attitudes of individuals have been changed), for example, when the children have been encouraged, or are thinking about elements of the intervention (i.e., healthy eating and exercise). It also details other health related activity - this includes areas such as healthy eating, play leaders, nutrition and educating the children involved.

### **Physical activity**

The theme of physical activity focuses upon aspects such as fitness, sports, and fundamentals of movement, which is considered important for young children. One participant highlighted the way physical activity was a key component of the programme and was very much part of the programmes initial aims. While, two of the participants considered the differences between physical activity provision children are receiving within schools and how Game Changer enhances this. It was highlighted that there are a number of different sporting activities the children perform, and the emphasis is about them being able to replicate these in their own time outside of the programme. One of the participants thought that the children seeing the activities as games was an excellent engagement tool. The children were seen to repeat the activities on the playground thus helping to reinforce the skills, but also encourage others to take part and increase physical activity levels at the same time.

Featuring predominantly in an interview with one participant was helping reinforce positive mental attitudes in the children involved in the intervention. It is very focused on making sure the children feel positive and can think about exercise and health in a new way. This also includes children sharing information and encouraging other children.

While the elements around activity are integral, this participant highlighted that improving the children's attitudes towards sport/activity and healthy eating is/should be the primary goal. This includes things like encouraging other children to be involved

*"It gives staff ideas, if I'm honest of how to encourage the children out of the classroom setting...that they've made a change i.e. on the playground and we've seen them being quiet active on the playground, they are, they're playing the games,...that they've been shown in the Game Changer activities and they've really enjoyed it." (Participant 4).*

*"The expectation was that more children would feel they could become more active out on the playground, sometimes you see them sat there just talking with their friends, which is lovely but they're not as active as some of them maybe...Could be so it was to encourage them to think of other activities they could play together." (Participant 4).*

*"I think it's been beneficial if I can say anything it's beneficial. It's encouraged children to be active and to want to be active, not just 'oh I've got to because it's my PE lesson'. They've had the choice of coming to the breakfast club, they've had the choice of doing*

<p>in games, feeling happier and considering their food instead of not doing so. Encouragement was considered to be key by this participant.</p> <p>Mental health and attitudes was discussed by another participant who considered that adding components of mental resilience and links to negative mental health is something that was being considered for inclusion in the program going forward.</p>	<p><i>the afterschool club after the second twelve weeks. It's encouraged them to want to be active, they've talked about healthy eating, you know those sessions and I think it's been beneficial to the children overall." (Participant 4).</i></p> <p><i>"We know that we've had to develop it for year 2, you know, because we had to get recommissioned to a certain extent and what we've learnt from is, certainly from teacher feedback is about what we need to do more an embed it so, we know that for next year mental resilience is going to be a really important part..." (Participant 1).</i></p>
<p><b>Other health related activity</b></p> <p>Other health related activity was another prominent theme. This consisted of the intervention teaching the children about nutrition, the need for activity, and specifically looking at why food choices are important and making good health decisions. This theme captured the way in which the differing perspectives consider this educational element of the intervention.</p> <p>One participant focused upon taking the health knowledge into the classroom beyond the session. 'Health Leaders'<sup>7</sup> are something that may be implemented to facilitate this in future years of the programme. Two of the participants largely made connections to the benefits of healthy living. There was an emphasis on educating the pupils and others about the health and wellbeing impacts of physical activity.</p> <p>One of the participants also went on to make direct links with healthy eating and how it important to combine this with exercise.</p> <p>One participant also reinforced the importance of understanding the links between healthy eating, and further went on to consider the specific food changes children</p>	<p><i>"So the way we do our sessions is we do the activates then we try to refer it back to the healthy lifestyles and why we need to do this and what can we eat to help keep it up, that's what makes this [Game Changer] different." (Participant 3)</i></p> <p><i>"They'll say 'Miss you know when we talked about healthy eating I've got this in my packed lunchbox, I've also got a biscuit, but I've also got this' because that's what we've said is healthy." (Participant 4)</i></p> <p><i>"...I wouldn't say it's probably changed them at home, however when they're in the school and they're thinking about it... 'we said this was healthy, look what I've got!' It is encouraging them to talk more about it." (Participant 4).</i></p>

<sup>7</sup> 'Health Leaders' are children from older year groups that are specifically trained to help replicate the Game Changer exercises and advocate health improvement during time away from staff. Examples of this include break times and more recreational activities.

<p>were making. For example, the balanced content of packed lunches. However, it was felt that the impact of this change was only apparent within school, but that encouraging the conversation may influence how this is translated to home.</p>	
<p><b>3. The Role of Partnerships</b></p> <p>This theme explores external partnerships and engagement – this relates to any reference of working with another organisation other than Widnes Vikings, including other schools and Halton Clinical Commissioning Group (CCG). It also looks at the role of parents &amp; education of others – this includes the perceived thoughts of and about parents, their role in the intervention and Continuing Professional Development (CPD) for teachers.</p>	
<p><b>External partnerships</b></p> <p>The role of partnership working was integral to the successful delivery of Game Changer. This finding was particularly emphasised by a participant who highlights that more than one organisation has come together to recognise and deal with the issues at hand. This participant focussed upon the role of the schools and working with them through the pilot stage to inform the intervention. There was also a focus on the relationship between Halton CCG, Halton Borough Council and the Cheshire and Merseyside Vanguard all helped shape the project.</p>	<p><i>“...this is very clear partnership with the CCG and the Cheshire and Merseyside Vanguard – very important.” (Participant 1)</i></p>
<p><b>The role of parents and the education of others</b></p> <p>This theme was prominent with all participants, however, the perception of how parents interact with Game Changer varied across different stages of the intervention.</p> <p>One of the participants acknowledged that parents are a vital part of the process and should be educated about Game Changer, but contact with parents was also considered to be low. It was also suggested that parents would just see Game Changer as more PE sessions (even with the inclusion of breakfast/after school clubs). There was a suggestion, however, that if any information was to reach parents it would be from the children discussing it with them.</p>	<p><i>“Parents, I think they probably just see it as another PE session until we are able to this year now and give them some information about how they’ve made improvements or not if that’s the case ...I would think they’ve probably only thought of it as an addition to PE and the Vikings are coming in and their doing their activities even though they got their letters about it and things...” (Participant 4)</i></p> <p><i>“So I think, the chance to really advocate Game Changer in the park and things like that is a whole new opportunity to add to the programme and working with them schools on engaging with parents, and again it’s another key part that we’ve have to take into consideration for year 2 is how we get parents engaged more.” (Participant 1).</i></p>

<p>One participant described how Game Changer could reach parents in the future. This was also supported by a second participant who discussed how those in the schools involved can do more to help include parents and push Game Changer further by trying to help the practices continue outside of the school.</p> <p>The role of parents and education of others was also considered within the context of the performance of the programme and relates largely to the inclusion of continued professional development for teachers involved in the intervention. This is because the influence upon parents has been limited, but educating the educators seems to have been beneficial.</p> <p>This development not only focussed on the practical delivery of Game Changer but was also seen to help the teachers themselves learn and in-turn help the pupils.</p> <p>A third participant also commented on this and provided feedback around those receiving the continuing professional development (CPD) credits from Game Changer.</p>	<p><i>“...bring the parents in and say over the next 12 weeks this is what we’re going do with your children, if you could also could encourage them at home to do this, this, this and this, that could be something that is built into it, that could be quite beneficial to get our parents on board...so it comes across a bit more than it does in a letter” (Participant 4).</i></p> <p><i>“I stated earlier that’s the reason we looked to educate parents, educate teachers, also within the lunchtime activities, educating and delivering CPD (continuing professional development) sessions to play leaders so when we come away from the school and everything is still in place for the school can carry on.” (Participant 2).</i></p> <p><i>“...I’ve done it a couple of times and we try to refer it back to them, teachers are not confident about talking about what they think is healthy and what isn’t healthy.” (Participant 3).</i></p> <p><i>“...the teachers have found it helpful, they’ve gained some CPD from it because they’re in there with [name] whilst he’s doing the sessions and the other lads (Participant 4).</i></p>
<p><b>4. Review of programme and responses</b></p> <p>This theme explored challenges faced/school performance, including: buying into intervention – this includes self-examination, perceptions of Widnes Vikings and looking at differences from paying into the scheme. Also feedback and responses – anything relating to thoughts on the intervention, including the results.</p>	
<p><b>Challenges faced</b></p> <p>One of the factors that was seen to greatly impact the intervention was its actual performance and the involvement of those involved within the intervention.</p>	<p><i>“So in terms of, I’ll use [name of school] as the stand-out. So [name of school] what they do is they do a mile walk/ a mile run every</i></p>

<p>A participant stated that there had been some challenges in going back into schools and collecting the week 24 sample data but did not provide extensive detail upon this subject and believed there were not many other challenges. It is important to note that there is a scheme called 'Partner Schools' in which schools can pay to receive curriculum from Widnes Vikings which can include 3-4 hours of delivery. Alongside this schools could pay directly for the Game Changer intervention during this study, however, this was removed for the next series of Game Changer commencing in September 2017.</p> <p>Two of the participants discussed the delivery of the Game Changer programme, and how they felt that the primary focus of the intervention had been on the way schools had performed throughout the intervention, i.e., the focus upon improvements in levels of physical activity. It was also highlighted how not all schools engaged with the Game Changer Programme even though they were signed up for the provision.</p> <p>One participant described how trying to organise the Game Changer sessions around the other aspects of curriculum can be challenging. This participant acknowledged the role of the school in being important in organising and helping to facilitate the sessions.</p> <p>It was also believed by one participant that when the intervention returns for another year in September 2017 there is more the school will put in place in regard to organisation to help better facilitate the delivery of the intervention.</p>	<p><i>morning before school, I say mile, but it's 10 minutes worth of running or walking not only that but they've had us in continuously, they've actually paying for extra coaching on the back of Game Changer. We've been able to attend local fares of theirs and they've been coming to the stadium – they've attended all the GC days... But what I've noticed is the results, the results seemed to better other schools.” (Participant 2).</i></p> <p><i>“Then we'd go to other schools such as [name of school].... and we're waiting outside for the classes to come out, but the classes haven't been organised. We've waited for lunch clubs, lunch clubs haven't been organised, after school clubs again, we're waiting they've not been organised. Sometimes we turn up to the school and they've got other things on, or their curriculum has been cancelled. We tried to implement either a mile walk or something that, an on school approach and it just...didn't happen.” (Participant 2).</i></p> <p><i>“Because the music sessions were already in place before we'd set a date for Game Changer and on the days they just couldn't move those around so it was a case of I'd spoke to [name]and said they've done the first twelve weeks, we've got some results from them the second twelve, the second lot if you like that they were just not going to be doable, we just haven't got that time and it wasn't feasible to all 40 year 3 children for a quick one hour session...” (Participant 4).</i></p>
<p><b>Feedback about the intervention</b></p> <p>Interviewees described their perspectives on the project, what it does well and what could be improved upon. This feedback was largely positive and included specific reference to the results and measurements for the intervention.</p>	<p><i>“I think it's been really well received, personally what we've found is we've had mixed intake with different schools, so some schools have really thrived and adopted it...” (Participant 2).</i></p>

One participant focused on positive feedback from intervention coaches and teachers who have received the intervention stating it was all positive. This participant also highlighted that social media feedback was positive. It was suggested that this feedback was collected anecdotally but generally provided a positive response from all those involved.

Another participant discussed the data being captured to help evaluate the intervention. It was highlighted that the children were enjoying the sessions, and there was positive responses generally, but there was an emphasis on obtaining the data and using the results to evaluate the intervention. From the perspective of this participant, the data and the results they may indicate (relating to the performance of the children) were considered unimportant. It was instead acknowledged that whilst the data was useful, the primary concern was seeing a visible improvement in the attitudes of the children involved. This participant also had a positive perspective on the intervention as a whole.

*"Like I say, I would rather see the children wanting to be active and thinking about healthy eating more than any of the results will show I would just hope that it is of benefit to [name] and the team getting their results and seeing a difference, do you know what I mean? I wouldn't say, really in all honesty say it matters to me what numbers are down on paper as long as we see an improvement and an encouragement in the children I think that is what matters most." (Participant 4).*

*"...It's been really good yeah we've enjoyed it, we've enjoyed having them in..." (Participant 4).*



## 4. SUMMARY OF THE FINDINGS

### 4.1 Quantitative data

Findings from the Game Changer data demonstrated improvements in physical outcomes of children across the year groups, as measured by jump, hand grip, bleep and shuttle. Statistical analysis indicates that many of the improvements were statistically significant. Specifically, this was evidence across the following measures:

- Total Dataset, All scores for Hand Grip
- Total Dataset, Partner scores for Bleep
- Year 2, Week 24 scores for Jump
- Year 2, Week 24 scores for Bleep
- Year 4, Week 24 scores for Bleep

Data were analysed to explore whether any differences existing between those schools who were 'partner' schools (so received existing physical activity provision from Widnes Vikings prior to intervention) and those schools who were paying for Game Changer (compared to those who were not). For year 3, greater improvements were seen across most physical measures, and these changes were often greater for those schools who were not partner schools and were not paying for the Game Changer provision. For year 4, there were fewer differences, but still evidence that some physical outcome measure changes were greater for non-partner or non-paying schools.

These findings may suggest that those schools who already had Game Changer provision (the 'partner' schools) were receiving more physical activity than those who were not partner schools, and that perhaps may have been performing higher as a result of this. Findings may also suggest that those schools paying for Game Changer may have a focus on physical activity as a priority within the school, compared to those who did not. However, data regarding this has not been available and it is not possible to test these assumptions at this stage. These findings demonstrate that further research should be undertaken to explore the baseline models of physical activity provision available within each school to explore the type and amount of physical activity schools are delivering; this information would help to evidence whether the changes that are seen can be directly attributed to the Game Changer intervention.

### 4.2 Qualitative data

From the interviews there are several clear points that can be drawn when considering all information provided:

#### **Background and development of the programme**

It is clear throughout these evaluations that the programme had focused and clear aims. It had a firm operation structure and sought to capture data to help with the evaluation of the programme. This is alongside designed and catered delivery of both physical activity session, knowledge about healthy lifestyles and continued professional development. Game Changer is also aware that it can develop as a programme.

#### **Health and wellbeing**

From design to implementation it is evident that health and wellbeing is the primary focus of the Game Changer intervention; with improving physical health, healthy lifestyles and wellbeing as key desired



outcomes. It is acknowledged that more can be done in relation to providing information outside of school (for example, to parents), however, it is evident that the activities are encouraging children positively.

### **The role of partnerships**

Work with external partners was seen to be one of the leading influences behind the inception of the programme. The interviews highlighted that Widnes Vikings make use of their existing relationship, with for example, Halton CCG and the Cheshire and Liverpool Vanguard, to help to inform and tailor the design and delivery of the Game Changer programme.

### **Review of Programme and responses**

It was identified that there is a need to involve parents more across the Game Changer programme. There was an understanding of the importance of their involvement in trying to achieve the programme aims and objectives. It was considered that combining and increasing the education side of the intervention for all involved may lead to increased longevity for the programme and improved/increased outcomes.

It was also highlighted that equipping the schools with the skills to continue the delivery on their own (after week 12 when the formal teaching had ceased) was integral to the success of the programme.

There is a clear emphasis within these interviews about organisation and willingness to adopt the philosophy of the intervention. It was highlighted that frustrations may arise for those delivering the intervention when it is not possible to deliver elements of the programme due to, for example, lack of room provision, but also not seeing a school reaping the rewards from the intervention. This provides scope for how the intervention can develop and help those school which may be struggling.

Generally the perspective of the intervention is good and it has seemingly been well received throughout the evaluations conducted. This is hugely positive for Game Changer and will help shape the intervention as it heads into its second fully year of operation.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

Overall, it is clear that the Game Changer Programme is viewed positively by those who run the programme and those who take part, however, it is difficult to ascertain at this point in time specific outcomes or changes that are experienced by the children taking part that can be directly attributed to the Game Changer programme. It is also difficult to know or identify what the wider outcomes of this programme may be.

There are a number of recommendations that may be made in relation to the programme going forward, which are detailed below:

### **The Game Changer Model of Delivery**

In line with previous academic research and NICE Guidelines for promoting physical activity in children and young people,<sup>8</sup> there is no one 'gold standard' model of physical activity intervention. Recommendations from the literature highlight that a non-prescriptive model is required to address

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<sup>8</sup> NICE (2009). Physical activity for children and young people. Available from: <https://www.nice.org.uk/guidance/ph17> [Accessed 21<sup>st</sup> December 2017].

specific needs of the settings and that, for school-based interventions, activity should be promoted in and around the school day.

In light of existing evidence, Game Changer provide a non-prescriptive approach to promoting and encouraging physical activity, using a whole school approach. However, in order to support further roll-out and evidencing of impact, the programme would benefit from the development of a document that details the model of delivery so that it is evident what the aims, objectives and proposed outcomes of Game Changer are (in relation to physical activity and healthy eating) and how the programme is (or can be) delivered within the schools. The researchers acknowledge that there is an element of customised delivery within schools (as highlighted in the process evaluation interviews), but recommend that key elements of programme delivery be documented. This level of detail would be useful so that future evaluations can explore the extent to which schools are adhering to key elements of Game Changer, identify which elements are most successful in generating change, and provide evidence of how the programme can be replicated on a wider scale.

For the current evaluation, no information was available regarding the types or extent of physical activity that was already being carried out in schools. It was therefore not possible to draw any conclusions on how and where Game Changer had made an impact. In order to evidence attribution, future work could carry out a short and simple audit of existing physical activity provision in schools, prior to Game Changer being delivered.

### **Evidencing the impact of Game Changer: Robustness of data collection**

**Completeness of data set:** It is important to ensure that data that are collected are as complete as possible so that it can be included in analysis and contribute to the widening, developing evidence around the Game Changer Programme. It is acknowledged that issues may be present within schools, for example, with space to carry out testing, but this is something that may be addressed in advance of the programme commencing.

**Collection of week 24 data pre and post -summer holidays:** Where week 24 data was collected after the summer period there is a distinguishable difference in the data when compared to those that did not have their week 24 data collected after the summer break. This is emphasised largely from the Year 2 data subset. However, without statistical significance (apart from the cases above) and causality this is only an observation. Ideally all data should be collected within the academic school year. Where this is not possible, it is recommended that the data for this cohort of children should be analysed separately with further supporting evidence around activity that children have been engaging with over the summer holiday's collected to build up a picture of how this may impact upon the tests that are carried out.

**BMI:** BMI analysis has not been included in this analysis as there were missing variables within the data set (gender and date of birth) that meant the researchers could not independently calculate BMI. It is recommended that where BMI is calculated with children it should follow the appropriate analysis to enable age-related classifications of underweight, overweight and obesity (as per the UK90 reference chart and outlined by Cole, Freeman & Preece, 1995<sup>9</sup>).

**School physical activity provision:** It is important to establish what physical activity provision schools are providing before the Game Changer programme begins at week 1 and then what elements of the

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<sup>9</sup> Cole T.J., Freeman, J.V. and Preece, M.A. (1995). Body mass index reference curves for the UK, 1990. *Archives of Disease in Childhood*, 73, 25-9.

Game Changer activities they go on to implement between weeks 12-24. It may be suggested by the data that schools may not be implementing the intervention to the same degree as the coaches from Widnes Vikings and it is important to establish what the challenges or barriers to this may be.

**Healthy eating information:** It was mentioned in the interviews that Game Changer also delivers information around healthy eating. Further investigation needs to be undertaken around this element of the programme to establish its impact/usefulness within the school setting, but also the value this information has to children outside the school setting with regards to their eating habits/food choices.

## 5. APPENDICES

### Appendix 1: Notes on data cleaning

Before data analysis could be conducted the data had to be cleaned to ensure for the most reliable and robust analysis possible for the data set. Details of data that was removed or excluded from analysis are as follows:

- Of the thirty-six schools initially involved there were seven who only had twelve weeks of delivery and no testing.
- Of the remaining twenty-nine schools twelve had data for all three test points (weeks 1, 12 and 24). There was a total of twenty-two full data sets from different year (2, 3 and 4) groups across those twelve schools.
- A further school/year group had to be removed from the data set as the data provided for School Group 15 and School Group 16 were identical. As such twenty-four cases were removed from the total data set.
- As no date of births were provided for the children schools with data that was split year groups (3/4) were not included in within year group analysis.
- There were also three individual cases that were removed.
  - A case where the decimal point was in the wrong place giving an outlier, it cannot be determined what the figure should be and as such was removed.
  - There was a case where the participant was marked injured and as such was removed.
  - There was another case where there was missing data for one of the data collection points only and as such was removed.
- There were forty-seven cases where all bleep data was missing. As such this data was not removed but did mean two data sets were not included in this analysis influencing means. This includes data from the Year 2 and Year 4 subsets of bleep test analysis.
- Descriptive statistics were conducted to investigate for outliers in the data, this revealed there were six outliers for Hand Grip at week 1 from School Group 18. However, it was simply a misplaced decimal and it was possible to discern what the number was supposed to be. After this there appeared to be no other outliers and the data was ready to be analysed.
- When conducting analysis on the Year 2 subset it is noted that there are no paying or partner schools included in this analysis.

## Appendix 2: Additional data tables and charts

### Appendix 2.1 Total school data set

**Table 1: Percentage difference for each test and measure\*: weeks 1 to 24**

Measure Week	Jump			Hand Grip			Bleep**			Shuttle***		
	1-12	12-24	1-24	1-12	12-24	1-24	1-12	12-24	1-24	1-12	12-24	1-24
Number and % of children who experienced improvement % Range	391	298	397	294	260	292	333	208	329	349	234	293
	77%	59%	78%	58%	51%	57%	72%	45%	71%	69%	46%	58%
	1% to 219%	1% to 230%	1% to 266%	1% to 407%	1% to 265%	1% to 320%	2% to 144%	2% to 191%	2% to 214%	-1% to -32%	-1% to -42%	-1% to -36%
Number and % of children who saw no change	3	12	9	8	7	6	27	27	38	21	10	9
	1%	2%	2%	2%	1%	1%	6%	6%	8%	4%	2%	2%
Number and % of children who saw a decline % Range	115	199	103	207	242	211	102	227	95	139	265	209
	23%	39%	20%	41%	48%	41%	22%	49%	21%	27%	52%	41%
	-1% to -64%	-1% to -50%	-1% to -46%	-1% to -75%	-1% to -85%	-1% to -83%	-2% to -38%	-2% to -47%	-2% to -46%	1% to 65%	1% to 76%	1% to 57%

\* Total number of Participants/Cases was 509 except for bleep tested noted below.

\*\* Total of 462 cases due to missed bleep tests.

\*\*\* Shuttle scores are reversed, as such a minus score represents improvement, whilst a positive score shows a decline. The percentages are also. -% scores display improvement, positive score decline.

All percentages were rounded when calculated.

**Table 2: Partner and paying school figures**

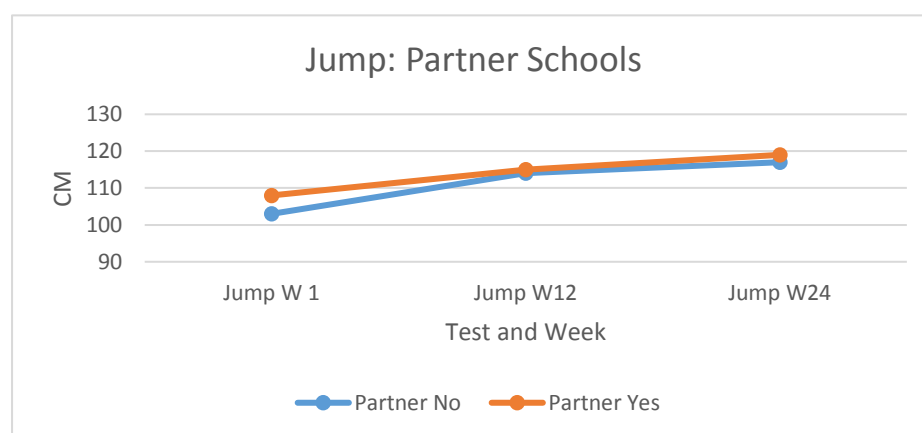
	School Group	Number of Participants
Partner School	8	28
	10	24
	11	20
Paying School	14	25
	*15	24
	16	24

\*Removed due to duplication with school group 16

**Table 3: Total means for jump (in centimetre - CM)**

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Total Means:	No	Yes	No	Yes	No	Yes
Jump W 1	104.86	103	108	102	113	105	103
Jump W12	114.93	114	115	113	120	114	115
Jump W24	118.24	117	119	116	122	117	121
SD	1.41	1.4	3.6	1.4	3.4	1.8	1.5
	1.37	1.4	3.4	1.4	3.3	1.7	1.3
	1.26	1.2	3.2	1.3	3.1	1.6	1.2
N=	509	465	44	461	48	216	293

**Figure 18: Partner school scores for jump (CM)**



**Figure 19: Paying school scores for jump (CM)**

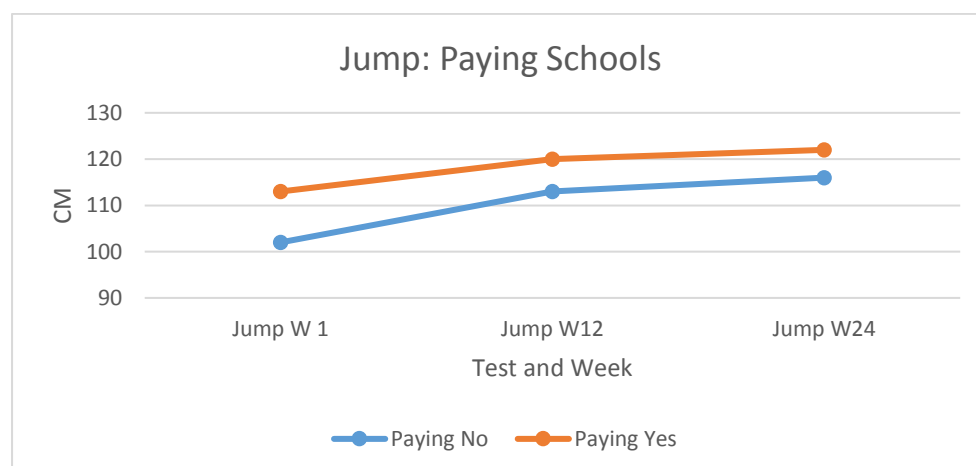


Figure 20: Measure after summer scores for jump (CM)

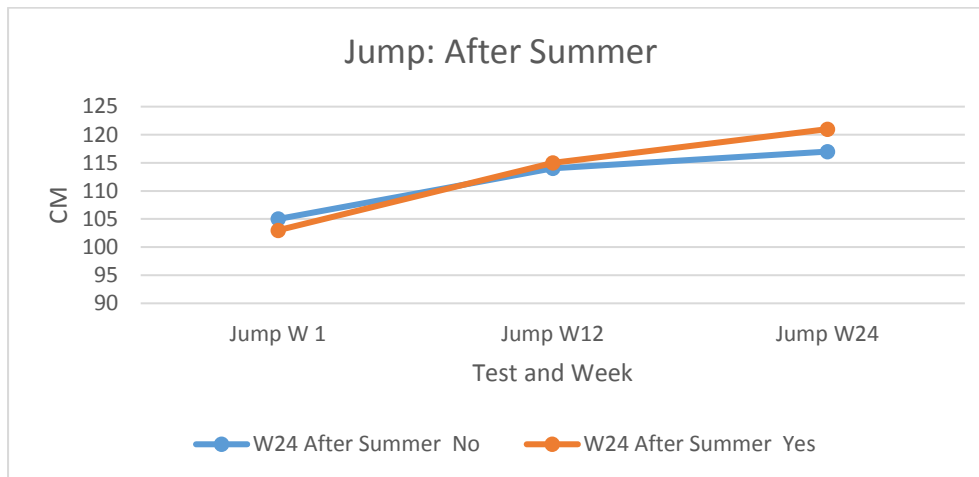


Table 4: Total difference in mean score for jump (CM)

Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Jump W 1	6.0	.116	11.9	.001	1.8	.403
Jump W12	1.5	.669	6.4	.072	3.0	.144
Jump W24	1.2	.721	5.0	.133	6.6	.001

\* T-Test: Significance, 2-tailed.

Table 5: Total means for hand grip

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
		No	Yes	No	Yes	No	Yes
Grip W1	11.7	11.5	12.4	11.4	12.6	12.1	10.5
Grip W12	12.2	11.7	13.6	12.1	12.5	12.8	10.5
Grip W24	12.1	11.9	12.6	11.8	12.8	12.5	10.9
SD	0.19	0.19	0.49	0.2	0.47	0.24	0.19
	0.18	0.19	0.48	0.19	0.46	0.24	1.8
	0.19	0.19	0.48	0.2	0.46	0.24	0.18
N=	509	465	44	461	48	216	293

Figure 21: *Partner school scores for hand grip*

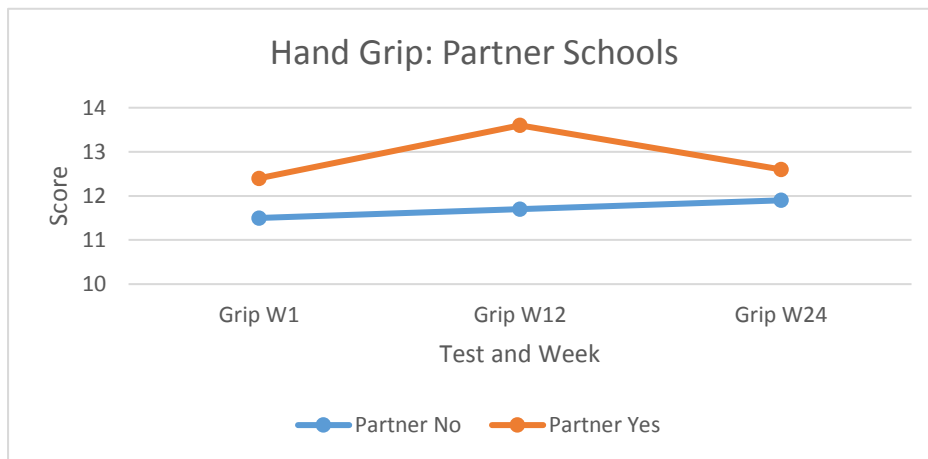


Figure 22: *Paying school scores for hand grip*

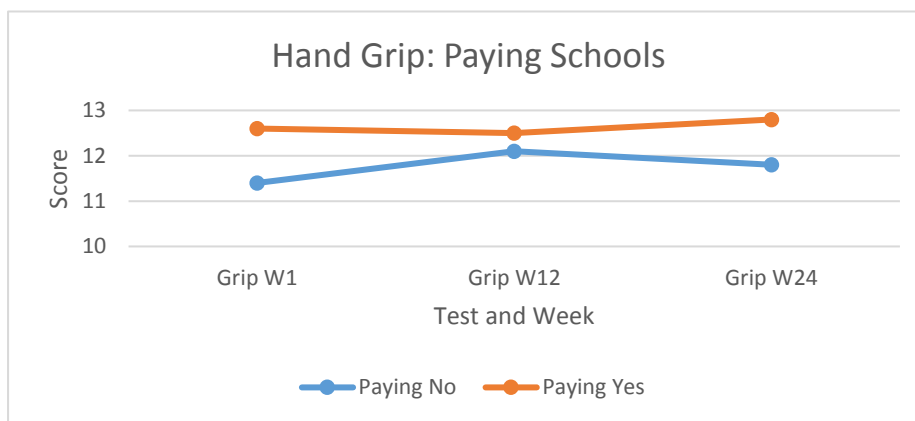
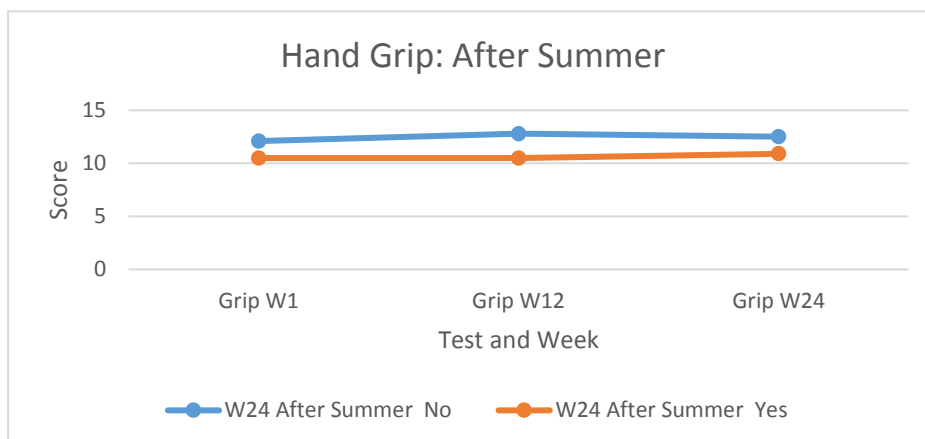


Figure 23: *Measure after summer scores for hand grip*





**Table 6: Total difference in mean score for hand grip**

Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Grip W1	1.4	.006	1.7	.001	1.3	.000
Grip W12	2.4	.000	1.2	.012	1.9	.000
Grip W24	1.1	.027	1.4	.003	1.3	.000

\* T-Test: Significance, 2-tailed.

**Table 7: Total means for bleep test**

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
		No	Yes	No	Yes	No	Yes
Bleep W1	2.8	2.7	3.3	2.9	2.7	2.9	2.6
Bleep W12	3.2	3.1	3.5	3.3	3	3.2	3.1
Bleep W24	3.3	3.2	3.6	3.4	2.9	3.3	3.2
SD	0.05	0.06	0.14	0.06	0.13	0.07	0.05
	0.07	0.07	0.18	0.07	0.17	0.9	0.07
	0.07	0.08	0.19	0.08	0.18	0.1	0.07
N=	462	416	44	414	48	169	293

**Figure 24: Partner school scores for bleep test**

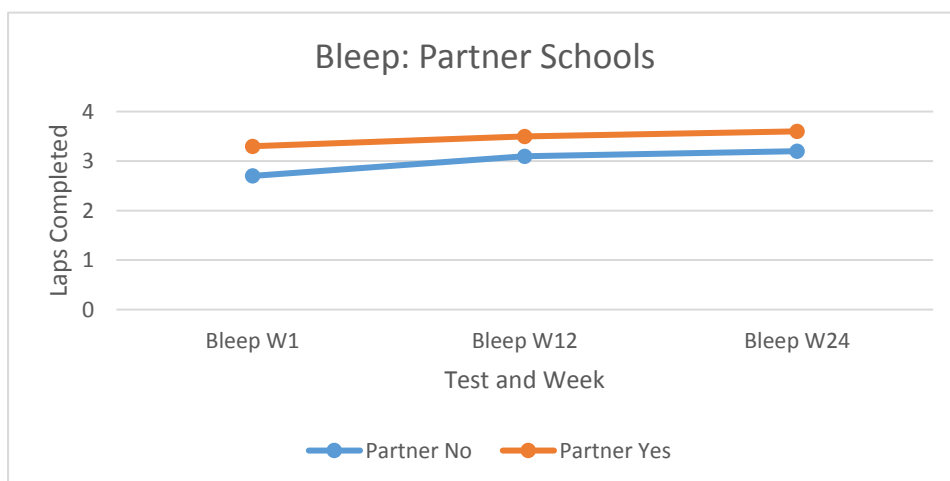


Figure 25: *Paying school scores for bleep test*

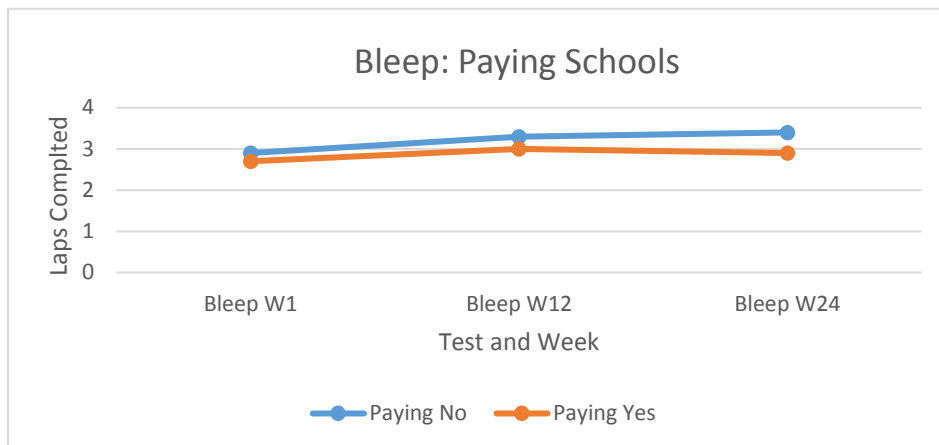


Figure 26: *Measure after summer scores for bleep test*

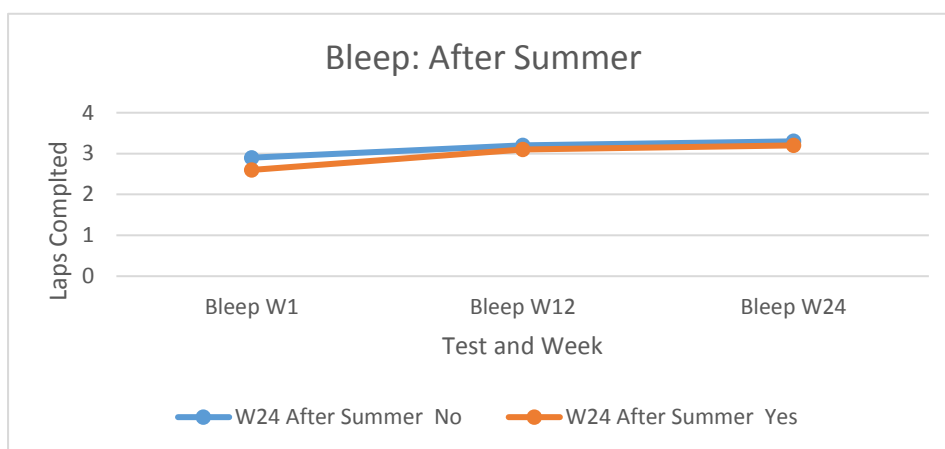


Table 8: *Total difference in mean score for bleep test*

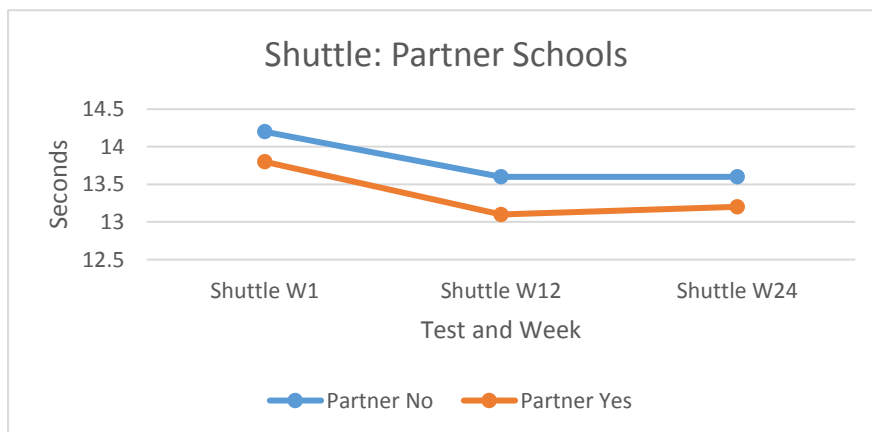
Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Bleep W1	.68	.000	.01	.933	.24	.011
Bleep W12	.42	.025	.21	.242	.06	.559
Bleep W24	.39	.050	.35	.067	.09	.431

\* T-Test: Significance, 2-tailed.

**Table 9: Total means for shuttle**

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Total Means:	No	Yes	No	Yes	No	Yes
Shuttle W1	14.1	14.2	13.8	14.2	13.7	14.1	14.1
Shuttle W12	13.5	13.6	13.1	13.6	13.1	13.4	13.6
Shuttle W24	13.5	13.6	13.2	13.6	13.4	13.3	14
SD	0.09	0.09	0.25	0.1	0.23	0.12	0.09
	0.09	0.09	0.24	0.1	0.23	0.12	0.09
	0.09	0.09	0.24	0.1	0.23	0.12	0.09
N=	509	465	44	461	48	216	293

**Figure 27: Partner school scores for shuttle test**



**Figure 28: Paying school scores for shuttle**

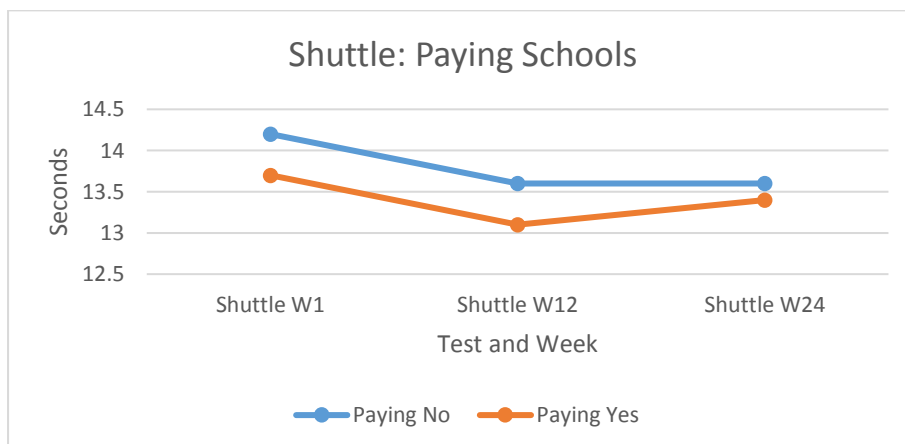


Figure 29: Measure after summer scores for shuttle

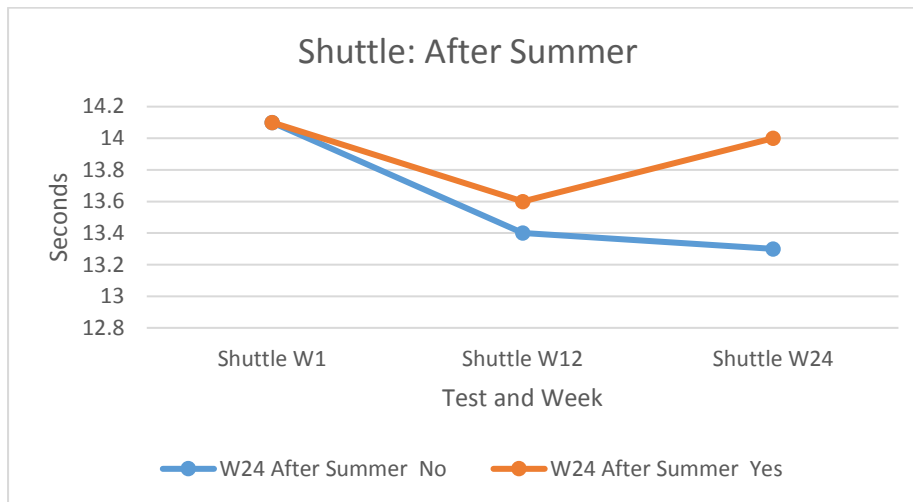


Table 10: Total difference in mean score for shuttle

Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Shuttle W1	.46	.081	.51	.045	.25	.120
Shuttle W12	.59	.024	.60	.016	.09	.523
Shuttle W24	.57	.029	.41	.095	.62	.000

\* T-Test: Significance, 2-tailed

## Appendix 2.2 - Year 2 DATA SET

Table 11: Year 2 means for: Jump (CM)

Totals:		W24 Data Taken After Summer Break	
	Total Means:	No	Yes
Jump W1	91.7	77.6	96.4
Jump W12	107.3	94.8	111.5
Jump W24	114.1	104.5	117.3
SD	1.6	3.5	1.8
	1.4	3.1	1.6
	1.2	2.5	1.3
N=	201	44	157

Figure 30: Year 2 measure after summer scores for jump (CM)

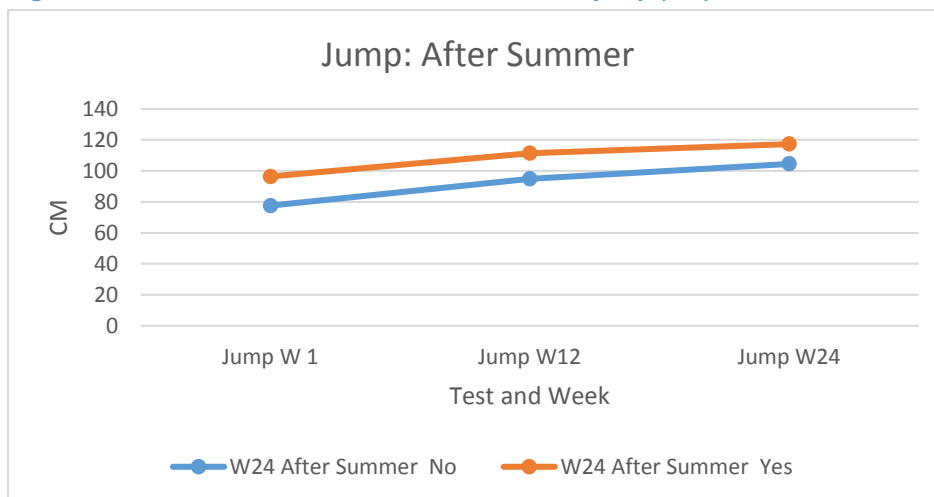


Table 12: Year 2 difference in mean score for jump (CM)

Mean Differences	W24 Data Taken After Summer Break	
	Mean Difference	Sig.*
Jump W 1	18.49	.000
Jump W12	16.61	.000
Jump W24	11.75	.001

\* T-Test: Significance, 2-tailed.

Table 13: Year 2 means for: hand grip

Totals:		W24 Data Taken After Summer Break	
	Total Means:	No	Yes
Grip W1	9.6	9	9.4
Grip W12	9.9	9.8	9.7
Grip W24	10.1	9.5	10
SD	0.54	0.42	0.22
	0.53	0.41	0.22
	0.55	0.43	0.22
N=	201	44	157

Figure 31: Year 2 measure after summer scores for hand grip

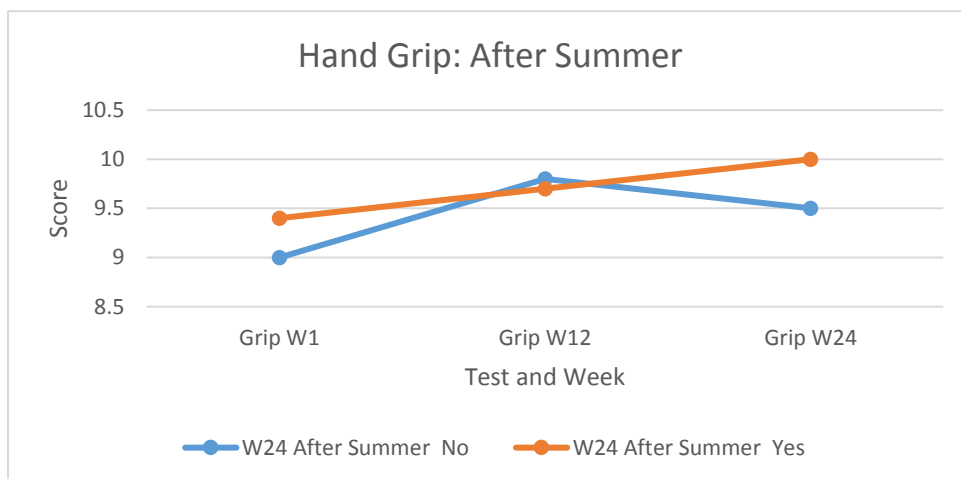


Table 14: Year 2 difference in mean score for hand grip

Mean Differences	W24 Data Taken After Summer Break	
	Mean Difference	Sig.*
Grip W1	.30	.532
Grip W12	.15	.754
Grip W24	.55	.267

\* T-Test: Significance, 2-tailed.

Table 15: Year 2 means for: Bleep test

Totals:		W24 Data Taken After Summer Break	
	Total Means:	No	Yes
Bleep W1	2.4	2.8	2.4
Bleep W12	2.9	3.2	2.8
Bleep W24	2.9	3.3	2.9
SD	0.04	0.13	0.05
	0.06	0.16	0.06
	0.06	0.18	0.07
N=	179	22	157

Figure 32: Year 2 measure after summer scores for bleep test

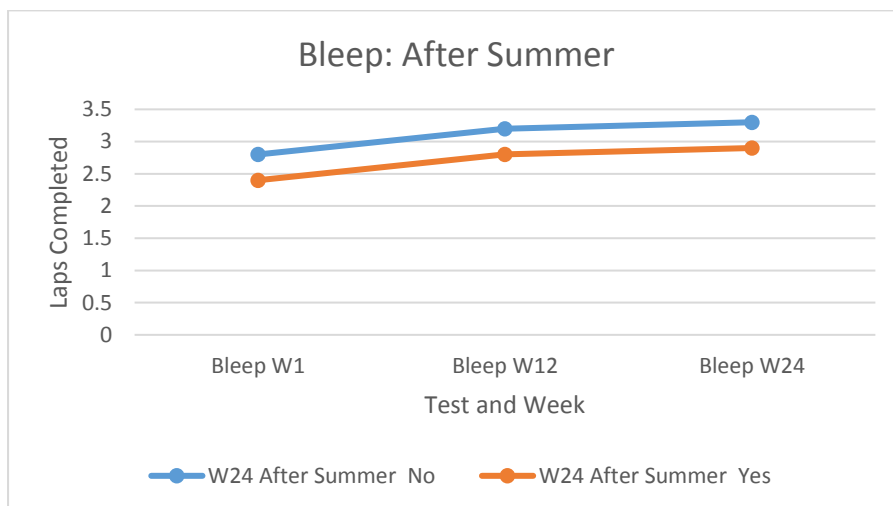


Table 16: Year 2 difference in mean score for bleep test

Mean Differences	W24 Data Taken After Summer Break	
	Mean Difference	Sig.*
Bleep W1	.41	.005
Bleep W12	.42	.024
Bleep W24	.50	.019

\* T-Test: Significance, 2-tailed.

Table 17: Year 2 means for: shuttle

Totals:		W24 Data Taken After Summer Break	
	Total Means:	No	Yes
Shuttle W1	14.7	15.3	14.4
Shuttle W12	14.3	15	14
Shuttle W24	14.4	14.5	14.4
SD	0.11	0.23	0.12
	0.1	0.21	0.11
	0.1	0.21	0.11
N=	201	44	157

Figure 33: Year 2 measure after summer scores for shuttle

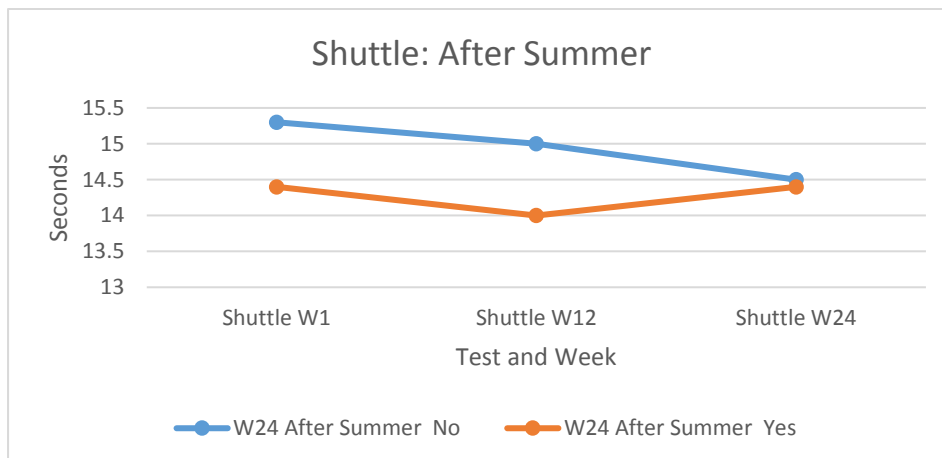


Table 18: Year 2 Difference in Mean Score for Shuttle

Mean Differences	W24 Data Taken After Summer Break	
	Mean Difference	Sig.*
Shuttle W1	1.1	.000
Shuttle W12	1.0	.000
Shuttle W24	.10	.698

\* T-Test: Significance, 2-tailed.

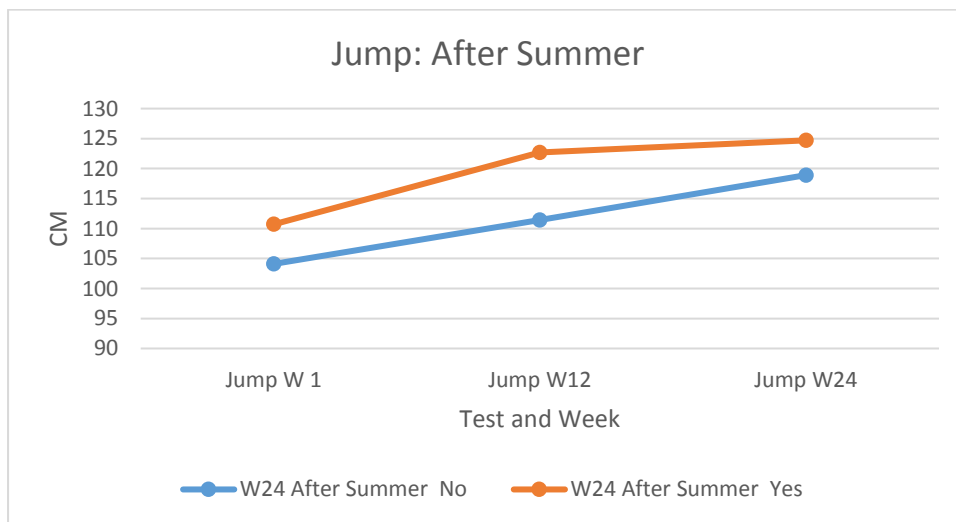


## Appendix 2.3 – YEAR 3 DATA SET

Table 19: Year 3 means for jump (CM)

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Total Means:	No	Yes	No	Yes	No	Yes
Jump W 1	106.9	107.1	106	107.5	103.9	104.1	110.7
Jump W12	116.2	116.8	112.7	117.2	110.7	111.4	122.7
Jump W24	121.4	121.6	120	120.1	128.9	118.9	124.7
SD	1.5	1.6	4.1	1.6	4.1	1.9	2.4
	1.9	2	5	2	5	2.4	3
	1.5	1.6	4	1.6	4	1.9	2.4
N=	172	148	24	148	24	103	69

Figure 34: Year 3 measure after summer scores for jump (CM)



**Table 20: Year 3 difference in mean score for jump (CM)**

Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Jump W 1	6.0	.215	10.4	.023	11.8	.014
Jump W12	10.4	.038	2.6	.573	9.6	.057
Jump W24	.77	.885	3.3	.502	22.7	.000

\* T-Test: Significance, 2-tailed

**Table 21: Year 3 means for hand grip**

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Total Means:	No	Yes	No	Yes	No	Yes
Grip W1	11.8	11.7	12.8	11.8	12.1	12.1	11.5
Grip W12	12.3	12.1	13.8	12.4	11.8	12.9	11.6
Grip W24	12.6	12.5	13.2	12.6	12.6	13.1	11.9
SD	0.25	0.27	0.66	0.27	0.66	0.31	0.4
	0.24	0.26	0.65	0.26	0.65	0.31	0.39
	0.24	0.26	0.63	0.26	0.63	0.3	0.38
N=	172	148	24	148	24	103	69

**Figure 35: Year 3 means for hand grip**

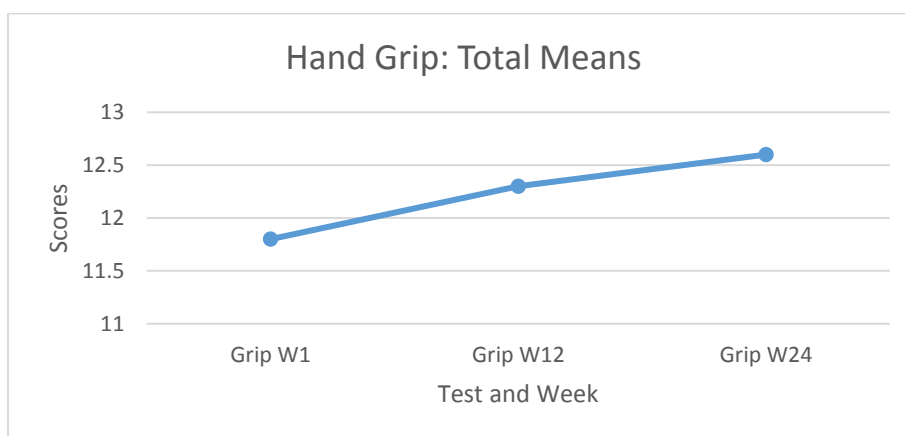


Figure 36: Year 3 measure after summer scores for hand grip

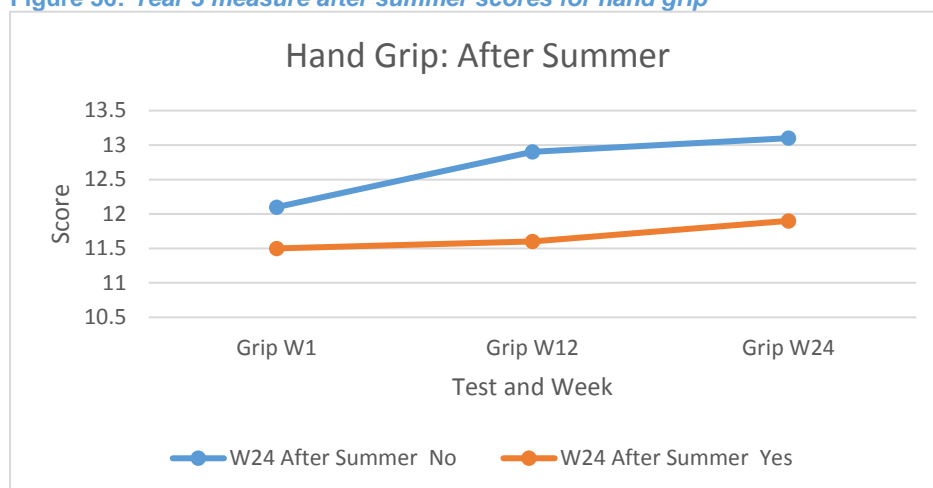


Table 22: Year 3 difference in mean score for hand grip

Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Grip W1	1.2	.076	.40	.580	.75	.139
Grip W12	1.7	.017	.63	.382	1.3	.007
Grip W24	.69	.263	.01	.986	1.2	.010

\* T-Test: Significance, 2-tailed

Table 23: Year 3 means for bleep test

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
		No	Yes	No	Yes	No	Yes
Bleep W1	2.94	2.85	3.53	3	2.6	2.84	3.08
Bleep W12	3.49	3.44	3.77	3.5	2.97	3.25	3.8
Bleep W24	3.57	3.53	3.8	3.6	2.87	3.37	3.84
SD	0.07	0.08	0.2	0.08	0.2	0.1	0.12
	0.09	0.1	2.5	0.1	0.25	0.12	0.15
	0.1	0.11	2.7	0.11	0.27	0.13	0.16
N=	172	148	24	148	24	103	69

**Table 24: Year 3 difference in mean score for bleep test**

Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Bleep W1	.69	.004	.39	.110	.22	.196
Bleep W12	.36	.228	.55	.069	.45	.033
Bleep W24	.24	.426	.82	.008	.49	.024

\* T-Test: Significance, 2-tailed

**Table 25: Year 3 means for shuttle**

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
		No	Yes	No	Yes	No	Yes
Shuttle W1	13.8	13.8	13.5	13.7	14	14	13.5
Shuttle W12	13.3	13.3	12.9	13.3	13.3	13.5	13
Shuttle W24	13.3	13.3	13.2	13.2	13.6	13.2	13.4
SD	0.1	0.11	0.28	0.11	0.28	0.11	0.28
	0.13	0.14	0.35	0.14	0.35	0.14	0.35
	0.1	0.11	0.27	0.11	0.27	0.11	0.27
N=	172	148	24	148	24	103	69

**Figure 37: Year 3 means for shuttle**

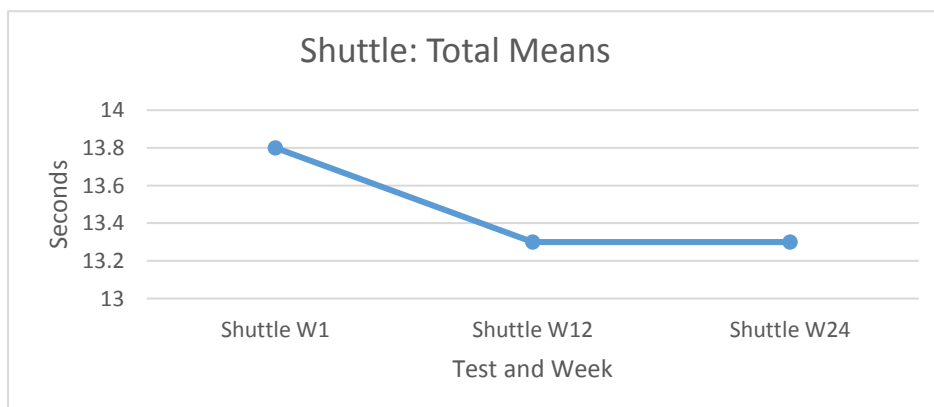


Figure 38: Year 3 partner school scores for shuttle

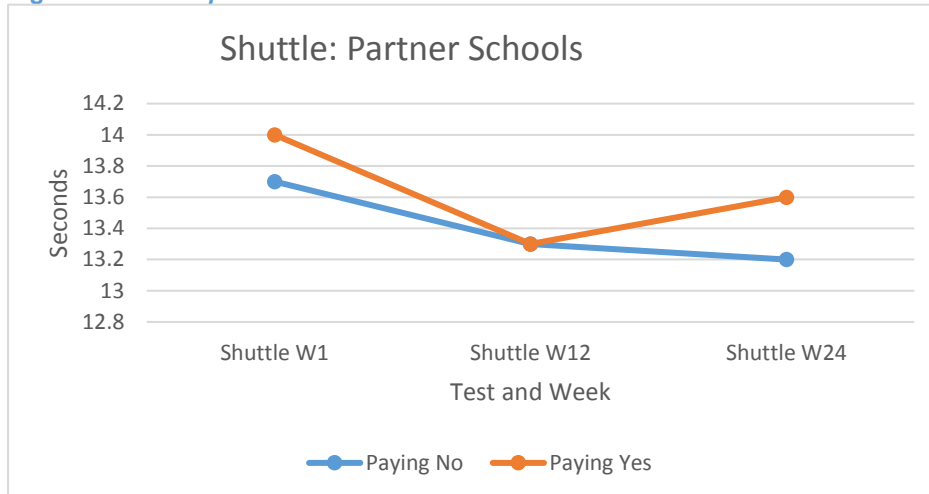


Figure 39: Year 3 measures after summer scores for shuttle

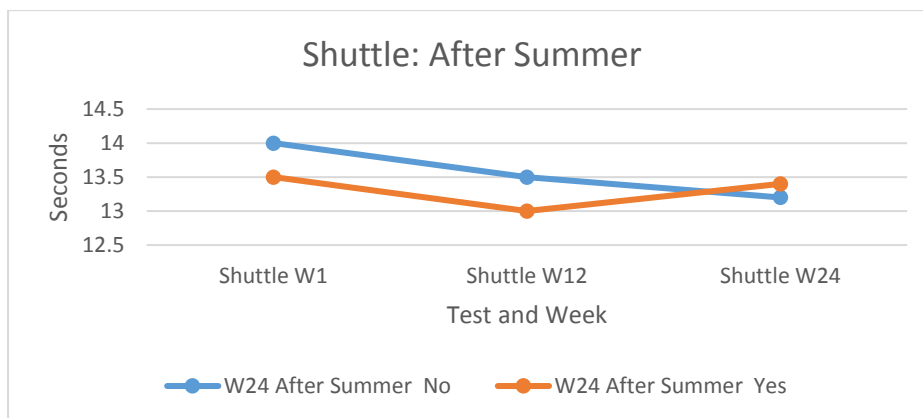


Table 26: Year 3 difference in mean score for shuttle

Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Shuttle W1	.41	.204	.23	.468	.30	.187
Shuttle W12	.51	.190	.04	.919	.58	.035
Shuttle W24	.14	.647	.39	.214	.17	.426.

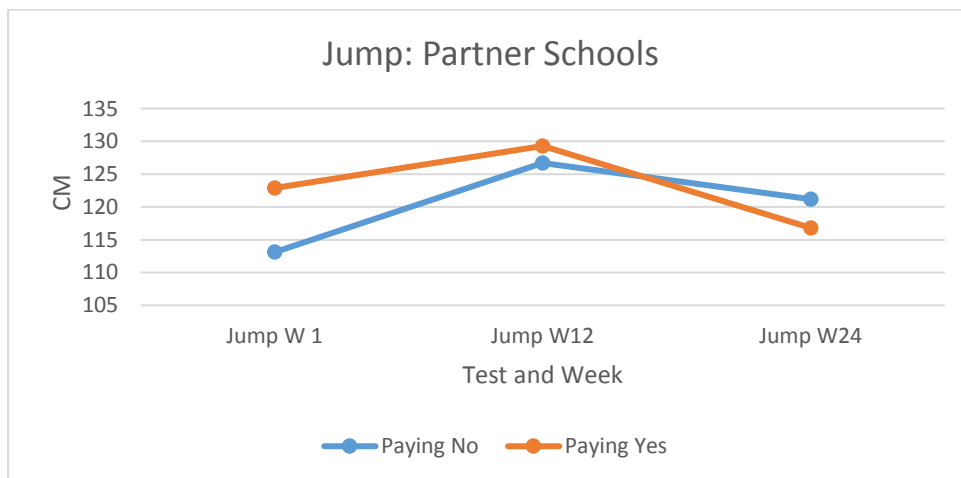
\* T-Test: Significance, 2-tailed

## Appendix 2.4 - Year 4 DATA SET

**Table 27: Year 4 means for jump (CM)**

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Total Means:	No	Yes	No	Yes	No	Yes
Jump W 1	115.6	117.2	110.6	113.1	122.9	223.6	124.5
Jump W12	127.3	130	119.3	126.7	129.3	124.9	134.8
Jump W24	120.1	120.6	118.7	121.2	116.8	114.5	136.9
SD	1.8	2.1	3.9	2.1	3.5	2.1	3.9
	2	2.3	4.3	2.4	3.9	2.3	4.3
	1.9	3.9	4.1	2.3	3.7	2.2	4.1
N=	89	69	20	65	24	69	20

**Figure 40: Year 4 partner school scores for jump (CM)**



**Table 28: Year 4 difference in mean score for jump (CM)**

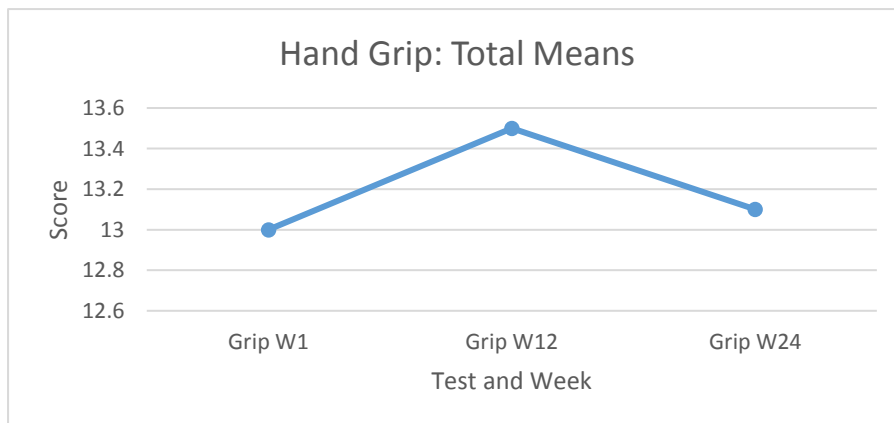
Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Jump W 1	6.0	.215	10.4	.023	11.8	.014
Jump W12	10.4	.038	2.6	.573	9.6	.057
Jump W24	.77	.885	3.3	.502	22.7	.000

\* T-Test: Significance, 2-tailed

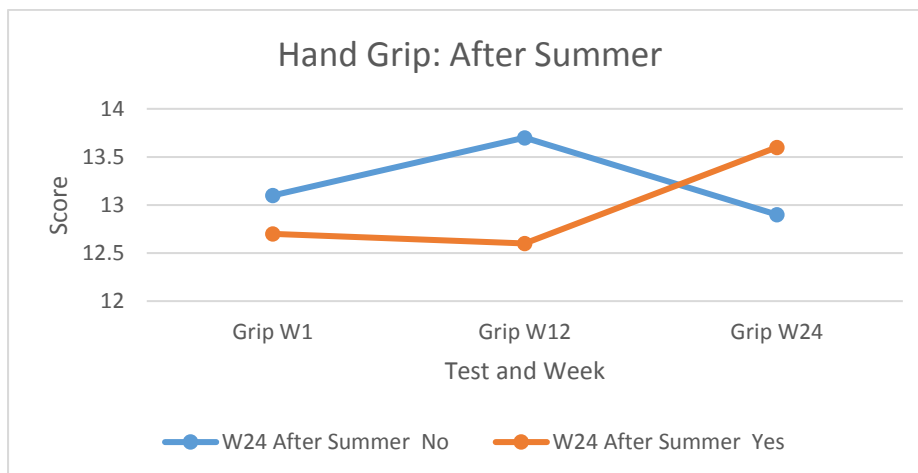
**Table 29: Year 4 means for hand grip**

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Total Means:	No	Yes	No	Yes	No	Yes
Grip W1	13	13.4	11.8	12.9	13.1	13.1	12.7
Grip W12	13.5	13.5	13.4	13.5	13.3	13.7	12.6
Grip W24	13.1	13.6	11.8	13.1	13.1	12.9	13.6
SD	0.28	0.31	0.59	0.32	0.5	0.31	0.59
	0.28	0.32	0.6	0.33	0.55	0.32	0.6
	0.33	0.37	0.7	0.39	0.64	0.38	0.7
N=	89	69	20	65	24	69	20

**Figure 41: Year 4 means for hand grip**



**Figure 42: Year 4 measures after summer scores for hand grip**



**Table 30: Year 4 difference in mean score for hand grip**

Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Grip W1	1.6	.016	.10	.874	.52	.459
Grip W12	.10	.885	.27	.674	1.1	.113
Grip W24	1.8	.025	.05	.942	.59	.486

\* T-Test: Significance, 2-tailed

**Table 31: Year 4 means for bleep test**

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
		No	Yes	No	Yes	No	Yes
Bleep W1	3.2	3.3	3.1	3.4	2.8	3	3.7
Bleep W12	3.7	3.9	3.3	4.1	3	3.2	4.8
Bleep W24	3.7	3.9	3.4	4.1	3	3.2	4.7
SD	0.15	0.16	0.27	0.19	0.24	0.18	0.27
	0.14	0.17	0.26	0.18	0.23	0.17	0.26
	0.17	0.21	0.31	0.21	0.28	0.21	0.31
N=	64	44	20	40	24	44	20

**Figure 43: Year 4 total means for bleep test**

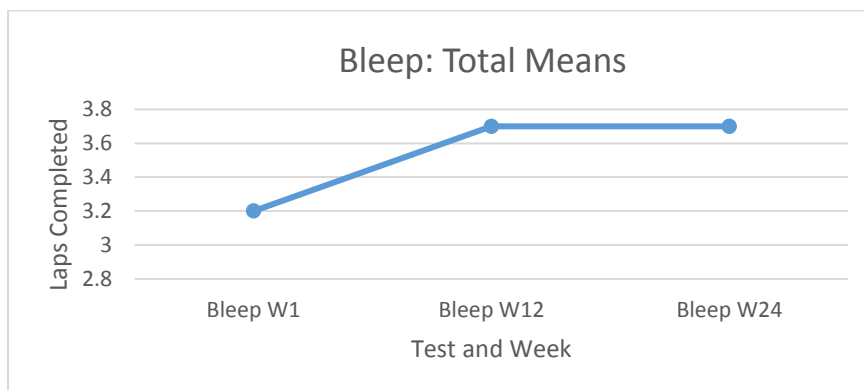




Table 32: Year 4 difference in mean score for bleep test

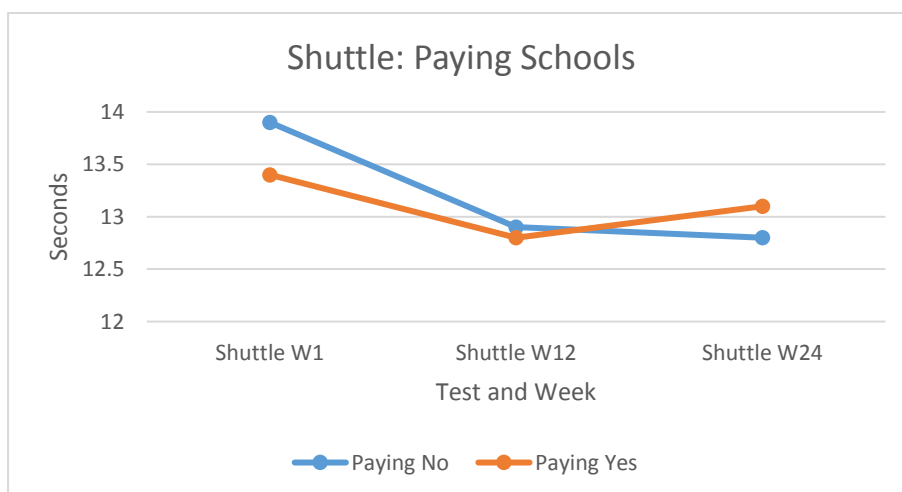
Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Bleep W1	.16	.629	.57	.076	.78	.018
Bleep W12	.50	.181	1.0	.002	1.6	.000
Bleep W24	.38	.362	1.0	.008	1.5	.000

\* T-Test: Significance, 2-tailed

Table 33: Year 4 means for shuttle

Totals:		Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Total Means:	No	Yes	No	Yes	No	Yes
Shuttle W1	13.8	13.6	14.1	13.9	13.4	14.1	12.8
Shuttle W12	12.9	12.7	13.4	12.9	12.8	13.1	12.3
Shuttle W24	12.9	12.8	13.3	12.8	13.1	13	12.7
SD	0.16	0.19	0.35	0.19	0.32	0.19	0.35
	0.13	0.15	0.27	0.15	0.25	0.15	0.27
	0.13	0.15	0.28	0.16	0.26	1.5	0.28
N=	89	69	20	65	24	69	20

Figure 44: Year 4 paying school scores for shuttle



**Table 34: Year 4 difference in mean score for shuttle**

Mean Differences	Partner Schools		Paying Schools		W24 Data Taken After Summer Break	
	Mean Difference	Sig.*	Mean Difference	Sig.*	Mean Difference	Sig.*
Shuttle W1	.43	.321	.49	.226	1.2	.003
Shuttle W12	.63	.050	.06	.826	.75	.019
Shuttle W24	.51	.119	.28	.369	.33	.567

\* T-Test: Significance, 2-tailed

