

**Examining the Impact of
Greenhouse Sports
Programmes in Schools**



**Loughborough
University**

A Scoping Study to
Inform Future Research

Professor Paul Downard
Dr Carolynne Mason
Tarryn Steenekamp

Autumn 2017

Independently reviewed by

PRO BONO ECONOMICS



**Greenhouse
Sports**

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FOREWORD BY MATTHEW SYED

I am grateful to have been involved in sport for the past 40 years, as a player, spectator and, now, writer. I have learned that the benefits of sport - when coached in the right way - can be huge.



Sport is a powerful tool for developing habits, values and life skills in individuals that can help to overcome disadvantage.

Participation can instil discipline, focus and team work, while raising aspirations and self-confidence. I am lucky to have experienced these benefits from a young age, and this is what inspired me to get involved with the amazing work of Mike de Giorgio and Greenhouse. Too many young people are unable to access high quality coaching and sports participation, particularly those living in disadvantaged communities. Sadly, many young people have bad experiences of sport.

Greenhouse Sports coaches provide consistent and thoughtful coaching to young Londoners. At the core of their

work is a fundamental belief that each young person deserves the best chance in life. Steady and often intensive coaching reinforces this message and helps build both sporting and life skills. Young people also develop passion for the sport, and that kernel of self-belief that is so important for life. We want all of our youngsters to leave our programmes with renewed resilience and purpose.

I am delighted Greenhouse Sports has begun the journey to provide empirical evidence for the benefits - physical and psychological - that sport can provide for young people. Those of us who live it and breathe it intrinsically know these truths, but there is no substitute for independent evaluation.

“

I am lucky to have experienced these benefits from a young age, and this is what inspired me to get involved with the amazing work of Mike de Giorgio and Greenhouse.

”



FOREWORD BY SIR ALASDAIR MACDONALD

Morpeth School, where I was headteacher for over 20 years, is typical of many schools in inner-city London with a diverse pupil population, many of whom come from difficult and economically disadvantaged backgrounds.



Even as late as the turn of the century it was common to find schools with low aspirations and expectations but there has been significant change - at Morpeth, we saw attainment at age 16, the 5A*-C measure, rise from 9% to over 70% between 1992 and 2015.

We were, and the school still is, determined to address childhood inequalities. The improvement mentioned above was achieved partly in the classroom but also through a range of other strategies that supported their learning. In contrast to our pupils, children from middle class families benefit from educational/ social capital provided at home - they will have been given opportunities to partake in experiences to develop them as rounded individuals and broaden their horizons. We wanted to recreate

as much of this as possible for pupils at our school so we worked in partnership with a range of organisations to provide opportunities and mentoring support like those our students' more affluent peers take for granted. One such support was a full time Greenhouse Sports table tennis programme, which offered mass participation opportunities as well as world class coaching for the more dedicated. Participation taught our students to set high standards, be disciplined and work effectively as a team. As a result, we saw their confidence increase, their aspirations rise and dedication to their work improve. The programme gave many pupils, who might have become disengaged and disaffected, a reason to come to school. In addition there was a benefit we had not anticipated - becoming one of the top schools in England for table tennis gave the whole school community a lift.

Schools are under continuous pressure to achieve results in a time where budgets are being cut to unprecedented levels. There is a huge risk that the curriculum for children from disadvantaged backgrounds will be seriously reduced and narrowed. In this climate, decisions about what is kept and what is cut are increasingly difficult, and need to be based on solid evidence that demonstrates the contribution of any programme to the overall development, aspirations and skills of the child. Therefore, I am very pleased to see Greenhouse Sports taking a lead in independently evidencing their impact and working in partnership with schools to ensure we are both driving towards the same positive outcomes for the next generation.

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Appendix 1

1.0 EXECUTIVE SUMMARY

Greenhouse Sports is a London-based charity committed to using sport to help young people living in the inner city realise their full potential. Greenhouse Sports coaches provide a high quality, predominantly extra-curricular, sports offer supplemented by additional enrichment opportunities.

“
In 2016/17
Coaches
reached over
7,500 young
people and
delivered
over 50,000
hours of
coaching.”

The programmes are unique in that coaches work full time in one school, specialise in one sport and are embedded within the schools they work in. In 2016/17 Greenhouse Sports ran 49 school-based programmes – 40 in mainstream schools and 9 in schools for pupils with special educational needs in addition to four clubs. Coaches reached over 7,500 young people and delivered over 50,000 hours of coaching in basketball, table tennis, tennis, volleyball, judo, football, swimming and multi-sports. Participants engaged in a total of 444,000 hours before, during and after school and in competitions, enrichment activities and holiday camps.

Greenhouse Sports coaches aim to provide outstanding sports programmes that nurture Social, Thinking, Emotional and Physical (STEP) skills in order to equip young people with the skills they need to succeed in the longer term. Regular internal monitoring and evaluation focused around the STEP skills has previously demonstrated the success of the programmes across these dimensions but this focused approach has not necessarily captured the full impact of the Greenhouse Sports programmes to date.

Loughborough University was commissioned to undertake a small-scale scoping study in order to examine the future possibilities for more broadly examining the impact of the school-based programmes on individual participants and on schools more widely utilising data that is routinely collated by schools. The aims of the scoping study were to:

The aims of the scoping study were to:

- 1) Examine stakeholder (Head Teachers, Teachers, Coaches, Young People’s) views of the impact of Greenhouse Sports provision in schools**
- 2) Identify the processes through which the identified impact is achieved for the stakeholders (How and why do Greenhouse Sports programmes work in schools?)**
- 3) Identify possibilities for better demonstrating the breadth and extent of impact through existing data sources collated by schools (e.g. Attendance/Absenteeism, Behaviour measures, Attainment)**
- 4) Scope a longer term quantitative study involving comparator/control schools**

A mixed-methods case study approach was adopted utilising both qualitative and quantitative data for a small sample of schools (n=4) with a long involvement with the Greenhouse Sports programmes with the aim of informing future, larger scale, research. This report presents the qualitative and quantitative findings and indicates that the Greenhouse Sports programmes impact on young people in realising their full potential by impacting across different dimensions including academic attainment, enhanced employability and by contributing to young people’s physical and mental health and well-being.

Qualitative Findings

Stakeholders were very positive about the value of the Greenhouse Sports programmes with head teachers stating that whilst all the case study schools were facing significant financial constraints, retaining the programmes has remained a high priority. The qualitative interviews indicated that stakeholders believed that the programmes delivered a range of different benefits for participants including transferable skills reflected in the STEP model such as social (communication, making new friends, team work and leadership) and emotional (confidence, determination and self-discipline) skills.

All four head teachers stated that Greenhouse Sports was valuable in supporting the promotion of student wellbeing which was a key priority. Schools are increasingly recognised as important sites for promoting and protecting young people’s mental health (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Weare & Nind, 2011) and yet many schools report lacking the resources to deal with this issue adequately (Parent Zone, 2016). All Greenhouse Sports coaches are Mental Health England First Aid trained. Greenhouse Sports were seen to provide a number of opportunities that are consistent with identified mental health protective factors (Patel et al. 2007) including opportunities for involvement in school life, positive

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Identify the processes through which the identified impact is achieved for the stakeholders (How and why do Greenhouse Sports programmes work in schools?)

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Scope a longer term quantitative study involving comparator/control schools

reinforcement reaped as a result of academic achievement and identity with the school. Additionally the Greenhouse Sports programmes provide other protective opportunities such as the ability to learn from experiences, development of social skills, promotion of self-esteem, positive role models and opportunities for leisure. The comments of participants indicated that students report that taking part in Greenhouse Sports made them happy and enabled them to make new friends. They also valued their participation in Greenhouse Sports as a way of helping to relieve school-related stress.

Interviewees also stated that the Greenhouse Sports programmes were valuable in promoting the physical health of students in both the short and longer term. In the short term the sports programmes contribute to increasing the amount of physical activity undertaken by students. PE staff reported that the number of opportunities to be active in school has declined as a result of resource constraints and the increased demands of the national curriculum which limit what PE staff are able to offer in schools within and beyond the

“Greenhouse Sports programmes contributed to enhancing the attainment of students in both PE and other subjects.”

curriculum. The Greenhouse Sports programmes provide additional high quality opportunities for young people to engage in which extend the school sport offer beyond the school day and beyond the school site. By providing a high quality offer the programmes also potentially support young people to adopt an active lifestyle in the longer term as a result of young people having positive experiences of sport and developing their physical literacy/sports skills. Students also noted the importance of their relationship with the coach as being a primary reason for their sustained involvement in sport. Providing a wider range of sports for young people also helps ensure that young people find sports that match their preferences and as a result of their enjoyment they are more likely to engage in those sports in the longer term. Students also reported Greenhouse Sports Coaches encouraging them to adopt healthier lifestyles including eating more healthily.

Previous research has established the link between school attendance and mental health (Wallace et al. 1997, Ingul, Klockner, Silverman & Nordahl, 2012; Kearney & Albano, 2004. More recently, research conducted by the Department for Education (2016) concluded that student absence from school also has a statistically significant link to poorer attainment in both key stage 2 and key stage 4. Despite its importance, tackling poor attendance is challenging for schools because absence can be symptomatic of wider disengagement from school and therefore punitive approaches prove ineffective. Interviewees suggested that the Greenhouse Sports programmes provide an alternative approach to encourage students to change problem behaviours by offering both a ‘carrot and stick’ where positive behaviour is rewarded with more opportunity and undesirable behaviour is sanctioned by withdrawing valued sports opportunities. Greenhouse Sports coaches were also considered to be effective in encouraging students to behave more appropriately in class and also in mediating between staff and students when needed. School staff reported that some students

who were on the verge of permanent exclusion have remained in school as a result of their involvement with Greenhouse Sports whilst others have become much more engaged in school, and more aspirational, as a result of increased self-belief and by meeting behavioural expectations as a result of their positive sports experiences.

In addition to impacting positively on attendance and behaviour interviewees stated that the Greenhouse Sports programmes also contributed to enhancing the attainment of students in both PE and other subjects. In PE the specialist knowledge of the coach was seen as contributing to higher attainment whilst for other subjects participation in Greenhouse Sports was considered to have resulted in enhanced skills, attitudes and abilities (e.g. persistence, realising the benefits of hard work, self-reliance, self-discipline, responsibility) which enabled students to increase their attainment. Having a stronger identity with the school through sports experiences was also perceived as impacting on attainment positively.

Quantitative Findings

The scoping study utilised pre-existing data routinely collated in schools for all students with the aspiration that robust measures of student progress over time could be accessed. This approach was necessary in order to compare students engaged in the Greenhouse Sports programmes with those that had never been involved in the programmes. The three measures that were examined within the scoping study were attendance, behaviour and attainment as these are the only measures that are routinely collated in all schools.

In order to quantitatively examine any impact of the sports programmes on attendance, behaviour and attainment, data for the previous three years (during which Greenhouse Sports had been on offer) was obtained from three case study schools. The quantitative analysis focused upon ‘within-school’ evaluations of the impact of engagement with the Greenhouse Sports intervention. Outcomes for

students who had engaged with Greenhouse Sports were compared to outcomes for other students that were not engaged over three academic years using a ‘panel-data’ design. Changes in outcomes for students were examined over time in association with their engagement with Greenhouse Sports and other factors. By examining change over time, any factors that are specific to the individual, but not measured in the data, are removed from the analysis, so students are compared on a like-by-like basis. Through Regression Analysis of the panel data, β parameters that measure how a unit change in students’ engagement with Greenhouse Sports influences outcomes (i.e. attendance, behaviour and academic attainment) could be estimated controlling for the ethnicity and gender of the student.

The quantitative results are encouraging and offer strong statistical support for the impact of Greenhouse Sports on student outcomes. The signs of the estimated parameters were all positive, with the exception of the outcome of sanctions for negative behaviour, indicating that the intervention of Greenhouse Sports improves attendance, behaviour and academic attainment. The negative sign associated with sanctions also indicates change for the better in student behaviour despite not being statistically significant.

The estimated parameters were larger for the Greenhouse Sports engagement measure (GSEng), compared to other measures of engagement, namely: total number of hours (totalhrs), number of weeks (nowks) and number of sessions (nosessions) engaged in. This is to be expected as the former measure indicates an overall aggregate engagement with Greenhouse Sports whilst the other measures indicate marginal changes in engagement. The key central message to take from the analysis is that there is widespread evidence that engagement with Greenhouse Sports raises attendance and academic performance, and achieves positive behavioural change.

The key elements identified for the Greenhouse Sports programmes include the value placed on the

“The quantitative results are encouraging and offer strong statistical support for the impact of Greenhouse Sports on student outcomes.”

Greenhouse Sports coaches, the flexible structure of the Greenhouse Sports programmes which adapt to the school context in which they are sited, the student-centred approach and the support offered by the Greenhouse Sports infrastructure.

Future Research

A number of issues arose from the quantitative analysis suggesting refinement of insight including:

- Engagement with Greenhouse Sports can influence the results strongly. Further analysis and measurement of the variables that allow for selection into the engagement would help to ameliorate the confounding influences that might be implied.
- Better mapping and consistency of longitudinal educational performance measures would enhance the analysis.
- Data from comparable schools in which Greenhouse Sports is not involved should be analysed to provide a counterfactual insight into educational outcomes.

It would also be useful to give greater consideration to which students are being targeted for what benefit and to ensure that any evaluation seeks to capture the most appropriate impact. Additionally it may be useful to examine the contribution that different sports offer students and the role of gender on the impact of the programmes.

2.0 INTRODUCTION

Greenhouse Sports is a London-based charity committed to using sport to help young people living in the inner city realise their full potential.

2.1 Overview of the Greenhouse Sports Programme

This research focused on the charity's mainstream school-based programmes which involve high quality coaches working full time to deliver bespoke programmes within schools for the duration of the academic year.

Many coaches stay with the schools for a number of years. Coaches are specialists in their sport and they focus on this sport exclusively. Some schools benefit from more than one coach and therefore the school benefits from more than one sport being offered within a school through Greenhouse Sports. The coaches provide a range of different opportunities for students including sessions before and after school and lunchtime sessions. Coaches also support a small amount of curriculum PE activities (maximum of 3 hours per week) and provide both small group and one to one intensive coaching/mentoring sessions to students. In intensive sessions the young people who attend have been identified as being students who would benefit from more focused attention and the sessions tend to have more specific targets – either sporting or behavioural.

Coaches also support a number of additional opportunities for students including sporting fixtures and competitions, residential experiences and spectator opportunities at events including:

- Access to Olympic sports equipment and venues
- Free tickets to exclusive sporting events across the UK, including Wimbledon Tennis

Championships, international athletics, NBA Games and international football tournaments

- Opportunities for international travel and training – for example, to training camps in Europe or the United States
- Exclusive opportunities from Greenhouse Sports corporate partners
- Opportunities for players to access performance pathways
- Invitations to talent spotting sessions and try-outs for national teams

Greenhouse Sports coaches work full time in one school and are embedded within the schools they work in. This approach is therefore in contrast to many other sports coaching opportunities that are provided by external coaches in schools, which typically provide a limited number of hours per week often to a number of different schools over the course of an academic year.

In 2016/17 Greenhouse Sports ran 49 school-based programmes – 40 in mainstream schools and 9 in schools for pupils with special educational needs, in addition to four clubs. Coaches reached over 7,500 young people and delivered over 50,000 hours of coaching in basketball, table tennis, tennis, volleyball, judo, football, swimming and multi-sports. Participants engaged in a total of 444,000 hours before, during and after school and in competitions, enrichments and holiday camps.



“Loughborough was commissioned to examine the possibilities for more broadly examining the impact of the school-based programmes.

2.2 Research Aims

Greenhouse Sports coaches aim to provide outstanding sports programmes that nurture Social, Thinking, Emotional and Physical (STEP) skills to equip young people with the skills they need to fulfil their potential in the longer term. Regular monitoring and evaluation data, primarily focused around the STEP skills, is collated by Greenhouse Sports staff. Whilst this approach has been very useful it has been recognised by Greenhouse Sports staff that this focused approach to data collection has not necessarily captured the full impact of the Greenhouse Sports programmes.

Loughborough University was commissioned to undertake a scoping study to examine the possibilities for more broadly examining the impact of the school-based programmes in order to better reflect the full impact of the coaching programme both on individual participants and on schools more widely.

The scoping study was developed in order to:

- 1) Examine stakeholder (Head Teachers, Teachers, Coaches, Young People) views of the impact of Greenhouse Sports provision in schools
- 2) Identify the processes through which the identified impact is achieved for the stakeholders (How and why do Greenhouse Sports programmes work in schools?)
- 3) Identify possibilities for better demonstrating the breadth and extent of impact through existing data sources collated by schools (e.g. Attendance/Absenteeism, Behaviour, Attainment)
- 4) Scope a longer term quantitative study involving comparator/control schools

2.3 Research Approach

The scoping study was conducted using a mixed-methods case study approach utilising both qualitative and quantitative data collation with the former being essential for unpicking the causal chains/processes and the latter for identifying intervention causal outcomes.

Both qualitative and quantitative research strands were undertaken in order to develop an explanatory theory of change which can be understood simply as a theory of how and why an initiative works and a systematic examination of the links between activities, outcomes, and contexts of the initiative. The key strengths of a theory of change lie not only in its capacity to determine whether key assumptions and programme theories are supported through data collection and analysis, but also in its capacity to indicate how and why changes occur as a result of an initiative.

2.3.1 Case Study Selection

The case studies were deliberately selected in order to maximise the opportunity to develop a relevant ‘theory of change’ for Greenhouse Sports. The cases are not necessarily representative of the Greenhouse Sports school-based programme as a whole but instead they were selected in order for the research team to be able to meet the aims of the scoping study and best inform future research directions.

All four case study schools had been involved with Greenhouse Sports for at least two years and therefore stakeholders were expected to be in a position to comment on the processes inherent within the Greenhouse Sports approach.

Table 1: Examples of Stakeholder Interview Topics

School Staff	Coaches	Young People
School Context	Previous experience	Role of sport and physical activity in young people's lives
Reasons for involvement in the programme	Coaching approach	Attitudes to school
Reason for identifying the target young people	Overview of the programme delivery	Engagement in/Experiences of the Greenhouse Sports programme
Aspirations for the programme	Support offered by the school	Role of the coach
Role of the coach	Overview of the participants	Impact on the school and young people (STEP)
Impact on the school and young people	Challenges overcome/ongoing	How and why does the programme work?
Evidence of impact	Impact on the school and young people	Future plans aspirations
Motivations for sustaining involvement	How and why does the programme work?	
Comparison with other programmes the school operates		
How and why does the programme work?		

The schools were also selected based on the knowledge of the Greenhouse Sports staff team as they were considered to be schools with longstanding and effective relationships with the charity. This approach ensured that the senior management of the schools were supportive of the research which ensured access to the schools for qualitative data collection in a timely manner and access to the relevant anonymised student data required for the quantitative analysis.

2.3.2. Qualitative Data Collection

The qualitative data collection documented the views of key stakeholders (Head Teachers, Teachers, Coaches and Young

People) on the impact of Greenhouse Sports programmes. The interviews focused on better understanding the wider impact of the programme and their beliefs about how and why the sports programmes are effective in these schools. Example interview topics are shown in Table 1.

Loughborough University staff adopt a high level of rigour to research ethics, and are committed to abiding by appropriate professional guidelines and standards in all of our work. As this study involved young people who are considered to be vulnerable as a result of being aged under 18 years, full ethical approval was gained prior to commencing fieldwork¹. Table 2 provides an overview of the qualitative interviews that were conducted.

¹ The terms of engagement for the evaluation abided by the Loughborough University Research Ethics Committee Research Code of Practice and the study was conducted with adherence to Loughborough University's written policy guidelines for informed consent and confidentiality, Data Protection and Child Protection.


Table 2: Summary of Qualitative Interviews Conducted

School A	School B	School C	School D
Head Teacher	Head Teacher	Head Teacher	Head Teacher
Head Coach Table Tennis	Head Coach Basketball	Head Coach Tennis	Head Coach Basketball
Head Coach Basketball	Head Coach Tennis	Head of PE	Head of PE
Head of PE	Head of PE	Focus Groups	Focus Group
Focus Group	Focus Group		

2.3.3. Quantitative Data Collection

In addition to the qualitative data collection, the research team and Greenhouse Sports staff also identified quantitative data routinely collated by schools that could be used to in order to more objectively evidence the broader impact of the sports programmes in schools. The scoping study utilised pre-existing data routinely collated in schools for all students with the aspiration that robust measures of student progress over time could be accessed. This approach was necessary in order to be able to compare students engaged in the Greenhouse Sports programmes with those that had never been involved in the programmes. The three measures that were examined within the scoping study were attendance, behaviour and attainment as these are the only measures that are routinely collated in all schools.

In order to claim that the sports programmes have led to any recorded changes, evidence is required that indicates whether any change that has occurred is actually due to the intervention being researched

or alternatively is due to other confounding variables. An example of a confounding variable would be the maturation of the participants during their involvement with Greenhouse Sports. That is any positive changes in participants' STEP skills could have arisen as a result of participants growing older and maturing rather than as a result of their involvement in the sports programmes. A robust approach would overcome this uncertainty by comparing the progress over time of the participants in the programme with the progress of a matched control group who share similar characteristics at the start of the programme. The progress of the two groups can then be compared in order to see whether the participants in the sports programmes have made significantly more progress than their counterparts who did not take part in the programme.

In examining the available quantitative data, reference was made to the principles of The Maryland Scientifics Method Scale (SMS). The SMS was developed in order to assess the robustness of evaluation approaches.

Table 3 provides some contextual data relating to the four case study schools.

Table 3: Contextual Data for Case Study Schools

	School A	School B	School C	School D	National Average
Age range	11-18	11-19	4-18	11-19	
School Type	Voluntary Aided School	Academy - Converter Mainstream	Academy - Converter Mainstream	Academy Sponsor Led Mainstream	
Gender of Entry	Mixed (47.8% F, 52.2% M)	Female (100%)	Mixed (46.8% F, 53.2% M)	Mixed (48.6% F, 51.4% M)	
Ofsted Rating	Requires Improvement	Outstanding	Outstanding	Outstanding	
No of pupils on roll (2015-16)	668	1104	1352	1749	
Pupils with a statement of special educational needs (SEN) or education, health and care (EHC) plan (2015-16)	1.9%	1.4%	4.7%	1.9%	3.9%
Pupils whose first language is not English (2015-16)	26.2%	54.8%	79.6%	24%	15.7%
Pupils eligible for free school meals at any time during the past 6 years (2015-16)	70%	55.6%	71%	42.5%	29.3%
Overall Absence*	7.1%	4.1%	3.8%	4.4%	5.2%
Persistent Absence**	20.5%	6.8%	7.6%	9.6%	13.1%

* Overall Absence - Percentage of possible mornings or afternoons recorded as an absence from school for whatever reason, whether authorised or unauthorised, across the full academic year.

** Persistent Absence - The percentage of pupils missing 10% or more of the mornings or afternoons they could attend, meaning that if a pupil's overall rate of absence is 10% or higher they will be classified as persistently absent.

3.0

QUALITATIVE RESEARCH FINDINGS

3.1 Introduction

This section of the report presents the findings from the qualitative interviews with adults and young people from the four case study schools. Firstly this section examines stakeholders' (Head Teachers, Teachers, Coaches, Young People) views on the value and impact of Greenhouse Sports programmes in schools. It then presents stakeholder perceptions around the impact of the Greenhouse Sports programmes on participants.

As noted above Greenhouse Sports programmes vary between schools and each school has an offer that is tailored to provide a bespoke offer to individual schools that inevitably evolve over time. Table 4 below summarises some of the key features of the Greenhouse Sports offer in the four case study schools during the academic year 2015-2016.

The figure indicates that Schools A and B benefit from two Greenhouse Sports coaches and two different sports whilst Schools C and D each have one coach and therefore one sport is on offer in each of these schools. The number of coaching hours offered in the schools and the number of students involved in the schools also necessarily varies in line with the number of sports programmes that operate within the schools and also with the sport on offer.

In School C for example the number of students involved in the tennis programme is 68 whilst in School D the number of students involved in basketball is 206.

3.2 Value and Impact of the Greenhouse Sports Programmes in Schools

Despite the variations between the four schools, the qualitative interviews with stakeholders revealed that the Greenhouse Sports programmes were valued very highly by both adults and young people within the case study schools.

The four head teachers were very supportive of the Greenhouse Sports programmes noting that whilst all the schools were facing significant challenging financial constraints they believed that retaining the programmes within school has remained a high priority. In terms of the value that the programmes offered the schools the head teachers particularly valued the broader impact that the programmes have in terms of student engagement within school for particular students:

'It's so vital to us, it provides you know so much in terms of student engagement and what we get out of it, that it's well worth what we spend on it.' *Head Teacher*



Table 4: Summary of Greenhouse Sports Programmes in Case Study Schools (2015-2016)

	School A	School B	School C	School D
Coach Specialism	Table Tennis Basketball	Basketball Tennis	Tennis	Basketball
Coaching Hours (2015-16)	2,201	2,346	1,041	1,338
Engagement Hours	15,773	14,201	3,868	10,156
No of students engaged	160	277	68	206
% of participants from BAME	72%	69%	96%	85%
Intensive Sessions	635 hours	627 hours	396 hours	113 hours
Lunchtime Sessions	213 hours	100 hours	88 hours	168 hours
After School Sessions	502 hours	321 hours	168 hours	147 hours
% of students exceeding 60 minutes per day (NB London Average 23%)	59%	27%	56%	44%

‘There are students who really struggled and then you know have been on an intensive programme of mentoring, and we do notice a difference.’ *Head Teacher*

‘I can see it, every day I see the programme, so I see the amount of engagements with people, young students, and I know some of the successes individually of students who, if it wasn’t for them, you know we wouldn’t have succeeded, so I know it works and there’s engagement there’ *Head Teacher*

PE staff were also very positive about the Greenhouse Sports programmes and the value that the programmes add to the schools by complementing, rather than duplicating, the work of the PE staff. PE staff noted that they are

constrained by the requirements of the national curriculum in what sport and physical activity opportunities they are able to offer to students and they are further constrained by the limited number of staff within the school available to provide high quality sports opportunities for students. The Greenhouse Sports programmes are perceived to provide a high quality sports offer that engages students successfully within specialised sport in ways that it would not be possible to achieve in the schools otherwise:

‘The love and the need for sport is there, and I think we’re very thankful to our school that we’re able to provide, because if it was just us three PE teachers, we wouldn’t be opening the doors as much.’ *Head of PE*

The monitoring data collated by Greenhouse Sports indicates that participants in the sports programmes express high levels of satisfaction with the programmes. When asked how strongly participants agreed with the statement ‘The Greenhouse Programme is excellent’ on a scale of 1 to 10 the response ranged between an average of 8.39 and 8.95. These findings are supported by the qualitative interview findings.

A head teacher described the main opportunities resulting from the Greenhouse Sports programmes in his school as being threefold:

- **Improving the quality of sports participation within the school which has been reflected in improved sporting success for the school**
- **Increased numbers of students engaging in sport both within and beyond the school day with the sports programmes providing students with something to do at break and lunchtimes**
- **Mentoring opportunities for a range of students (including high achieving students) provided by the coaches**

Interviews with head teachers and PE staff indicated that interviewees believe that these opportunities result in tangible benefits for the schools which impacts favourably on levels of student engagement in school and is ultimately reflected in improved academic achievement.

In addition to the opportunities for sports participation head teachers also stated that the presence of the Greenhouse Sports programmes is valuable in terms of enhancing the image of the schools with stakeholders including parents and prospective students.

‘I think it’s a big draw with parents, in that you know if you’ve got daughters that are particularly interested in sport, I know for some parents that’s the reason they’ve chosen our school.’ *Head Teacher*

‘When I do talk to parents coming into the school from primary school, or in fact any prize giving, I, in my speech, end of year speech, I talk about all the successes of the school and Greenhouse get mentioned, definitely, I did it last year and I’ll do it this year’. *Head Teacher*

In contrast to the other case study schools Case Study A is a school that is facing a number of challenges as a result of being judged by Ofsted as ‘requiring improvement’ in 2015. Greenhouse Sports adds value to this particular school because the school is working on improving its reputation locally and sporting success helps the school to do this. For example at events for primary school parents and prospective students the Greenhouse Sports offer is mentioned because it is considered valuable in promoting the school.

‘Whenever we have open evenings, we always make sure that ... there’s some sort of sports on display. Students get a feel for it. Primary schools come in. They can play table tennis, it’s quite an accessible sport I think, table tennis, more so than perhaps some other sports. So everybody can play at every level.’ *Head Teacher*

‘They help us, they’re also going to help us out with our scholarship programme this year as well, and also they help out with the primary liaison, you know, that was offering support in primary schools.’ *Head Teacher*

Interviewees suggested that parents of participants are also supportive of the Greenhouse Sports programmes because they see the benefits that the programmes offer their children.

‘Parents, no, they’re on board because they can see the change in their child.’ *Greenhouse Sports Coach*

‘... they started off basketball and the parents... from year 7 and can’t believe it’s the same person in year 8!’ *Greenhouse Sports Coach*

3.3 Impact of Greenhouse Sports Programmes on Students

3.3.1 Introduction

In order to examine the impact of Greenhouse Sports programmes on students it is important to consider the complexity of the programmes and to recognise that different students will have very different experiences of being involved. As outlined above the Greenhouse Sports programmes is primarily an extra-curricular offer that provides a range of different opportunities for young people to engage in sporting opportunities both within, and beyond, their schools.

Greenhouse Sports coaches provide a maximum of 3 hours PE curriculum support per week which is utilised strategically to recruit students to the extra-curricular offer or to support high quality GCSE PE provision. Therefore the vast majority of engagement with the Greenhouse Sports programmes occurs beyond the curriculum before or after school or during lunchtimes. Some students that engage with the Greenhouse Sports programmes are targeted in response to an identified need (e.g. poor attendance, poor behaviour).

Additionally some students are targeted for involvement in Greenhouse Sports programmes for positive reasons such as rewarding positive behaviour or specifically to develop their sports skill. The following sub-sections outline the findings from the qualitative interviews and indicate stakeholder views about the impact of the sports based programmes on students.

Section 4 that follows presents quantitative analysis of attendance, behaviour and attainment data for samples of students engaged in the Greenhouse Sports programmes from three of the case study schools.

3.3.2 Transferable Skills

The STEP evaluation framework (Figure 1, right) utilised by Greenhouse Sports recognises that sport is a powerful medium through which young people can develop a range of transferable skills that are perceived to be valuable in assisting them in achieving their full potential. The four dimensions of the skills framework are: Social, Thinking, Emotional and Physical.

“The vast majority of engagement with the Greenhouse Sports programmes occurs beyond the curriculum before or after school or during lunchtimes.”



Figure 1: STEP Capabilities for Mainstream School and Club Participants

SOCIAL	THINKING	EMOTIONAL	PHYSICAL
Communication Teamwork Leadership	Problem-solving and Creativity Planning Self-reflection	Confidence Determination Self-discipline	Agility, Balance and Coordination Fitness Sporting Skill

Interviews with adults and students suggested that the Social, Emotional and Physical dimensions of the framework were much more frequently articulated by both staff and students. This is not to say that the Thinking skills are not developed through the programmes but rather that interviewees did not identify these as the main benefits of the sports programmes.

Social

Students were very positive about the impact of the sports programmes on developing their social skills. The social experiences offered through Greenhouse Sports were clearly highly valued by students as the following comments illustrate:

‘I like Greenhouse Sports because like I get to make new friends.’ Basketball participant

‘...So like with my basketball team, I feel like we’re all like a family.’ Basketball participant

‘I’ve made more friends from it.’ Tennis participant

‘I wasn’t good at socialising, so by going into it, I made a lot of new friends.’ Tennis participant

‘It helps with socialising because it’s kind of like that one thing you have in common with that person.’ Tennis participant

Adult interviewees recognised the opportunities that participation in the Greenhouse Sports programmes offered participants to develop their transferable leadership skills.

‘And so we work a lot on leadership skills, we work a lot on people taking seven minutes of warm-up, seven minutes of training session element, certain responsibilities within games, that then the others follow, and they follow that then into their French class, into their Spanish class, their English class, their maths class and so on.’ Head of PE

‘The coaches will put certain students in charge of, right, you’re doing this, so therefore you’re looking after the kit, you’re doing that, so you’re making sure everything is clear off the bus. So they’re learning, some of them leadership skills, some of them just how to be part of a team...’ Head of PE

‘Some of them had opportunities to develop leadership skills, advocacy for others, so some of them are on the Greenhouse sort of student leadership committee or something like that, and are you know sharing ideas about what they want from the programme.’ Head Teacher



STEP Capabilities for Mainstream School and Club Participants

Greenhouse Sports constantly strives to improve its programmes and its ability to affect lives for the better. The STEP Framework focuses on the skills at the heart of our mission: the Social, Thinking, Emotional and Physical skills that we seek to develop in our young people. We believe these 12 skills will help our participants to lead happy and healthy lives, and to act as positive social influences both at school and beyond.

Emotional

Adult interviewees were very positive about the impact of the Greenhouse Sports programmes on developing participants' confidence.

'I think tennis has been a good option for students that are perhaps a little bit lower in confidence or not, not so keen to be part of you know the big team sports, because of their confidence and things, and it gives them another avenue to be challenged, another avenue to progress.' *Head of PE*

'I think if you walked around the school at lunchtime, I reckon you'd be able to pick out who the sports people are in the school. And it's, you'd see the confidence, you'd see the way people look up to them. And you would probably go and have a look at their school work and say, this work's on point.' *Head of PE*

'It really does build their confidence, to actually become good at a sport, and become really good, like better than a lot of the kids around you, say like 600 of the kids around you, you're so much better by a long way, from a sport that you literally have learnt from scratch... And so everybody then knows who you are, it's really odd, everybody knows who you are in the school... that table tennis player.' *Greenhouse Sports Coach*

Students were also very positive about the impact of their involvement in Greenhouse Sports on developing their confidence.

'I think it boosted my confidence and now I'm doing really well.' *Tennis participant*

'I'm definitely more of a confident person because of the coaching.' *Tennis participant*

'It made me more confident... because I never used to like really open up to people... I can really open up to people now.'

Tennis participant

'I think it just makes me feel like me... Confident.'

Basketball participant

'At primary school we used to do tennis lessons and then I wasn't really good at it. But when tennis came here, then I gave it a go again the coaching was really good and I think it boosted my confidence and now I'm doing really well.' *Tennis participant*

Adult interviewees discussed the role of sport in developing determination and self-discipline, particularly for students who were seen to be very successful in their sport. For the elite athletes in particular their involvement with Greenhouse Sports required significant input from them in terms of both effort and duration which were both perceived to be reliant upon being self-disciplined and working within the rules and ethos of the game.

'It's discipline, you know, for some of those who are elite athletes, who have got potential, but if we didn't have Greenhouse, there wouldn't be perhaps their potential realised. They're really showing a lot of commitment because the coaches expect them to be there at 7.30 in the morning, so they expect them to be playing. But also the way they play has got to be in a disciplined way, you know, there's no back-chatting, there's no blaming other people.'

Head Teacher

Adult interviewees believed that being self-disciplined and being able to work in ways that are appropriate to the given context were very valuable transferable skills for the students

to develop in order to fulfil their potential. Interviewees believed that sporting opportunities are a powerful medium through which these skills can be learnt and this was considered particularly important for some students who may have very limited opportunities elsewhere in their lives to develop these skills.

'The coach is very strong in instilling discipline, and you know I'm a strong believer in sport that has ... the qualities transcend to real life, commitment, discipline, relationships, all those things are very important in life, and some of the kids really struggle with those things. If it wasn't for sport and wasn't for Greenhouse, because their home life, you know, they don't have people who are listening to them, and just listening, not giving them advice all the time, and encouraging them, they don't always have that at home.' *Head Teacher*

Some interviewees were able to identify particular students for whom lack of confidence was a particular challenge prior to becoming involved in the Greenhouse Sports programme. At one school the Head Teacher spoke about a student who joined the school in year 7 with very poor confidence linked to wider issues around dyslexia, who struggled to find her place within her cohort. Through her involvement with Greenhouse Sports she discovered she is a very talented basketball player which has enabled her to develop her confidence more broadly:

'And it's seen a real sort of transformation in her, just her confidence with the way she approaches everything, and I know that parent is hugely sort of positive and appreciative of the sport.' *Head Teacher*

“

Through her involvement with Greenhouse Sports she discovered she is a very talented basketball player which has enabled her to develop her confidence more broadly

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3.3.3 Mental Health

The World Health Organisation (2013) estimates that 20% of adolescents worldwide will experience a mental health problem in any given year. Meanwhile, within the United Kingdom, at least 10% of children aged five to 16, are believed to suffer from a diagnosable mental health problem (ONS, 2004). Furthermore, a recent longitudinal study amongst pupils in England (Lessof, Ross, Brind, Bell & Newton, 2016) reports that the mental well-being of Year 10 girls has deteriorated in the last decade, with 37% of respondents reporting symptoms of anxiety and depression; including a loss of confidence, reduced concentration and feelings of worthlessness.

Research conducted by Parent Zone (2016), indicates that 91% of teachers report increasing rates of mental illness amongst children and teenagers in their classrooms. Furthermore, 95% of schools indicate that they frequently face issues relating to stress and anxiety amongst their students, with 58% of teachers stating that they deal with mental health problems at schools 'at least monthly' (Parent Zone, 2016). Yet it is alarming that 84% of these schools believe that they lack adequate resources to cope

with pupil mental health issues.

While there are a host of risk factors for mental illness in young people, on an educational level, academic pressures - especially in the context of limited employment opportunities for school leavers - have been found to be one of the greatest risk factors for suicide and poor mental health (Andrews, Hall, Teeson & Henderson, 1999; Rutter & Smith, 1995). Furthermore, the failure of schools to provide an appropriate environment to support attendance and poor attainment levels has also been found to impact upon mental health amongst adolescents (Patel, Flisher, Hetrick & McGorry, 2007). Bullying is also considered a risk factor for mental illness (Patel, Flisher, Hetrick & McGorry, 2007), with a recent study indicating that 36% of Year 10 students experience instances of bullying (Lessof, Ross, Brind, Bell & Newton, 2016) and Childline reporting that 24,000 of its counselling sessions with children in 2016 related to bullying (NSPCC, 2017). However, traditional bullying in schools seems to have, by some extent, been replaced by online bullying. A study by NSPCC (2014), which investigated the social media experiences of 11 to 16-year-olds, reports that 28% of

those surveyed have 'been upset' by something on a social network platform within the past year. The study also reports that 37% of these upsetting social media experiences were related to trolling, 22% were due to exclusion from an online social group and 14% reported that they had felt pressured to look or act a certain way.

In the light of evidence of rising levels of need, together with reductions in the provision of specialist child and adolescent mental health services (YoungMinds, 2013), schools across the United Kingdom are increasingly in focus as key sites for mental health and well-being support (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Weare & Nind, 2011). However, with teaching staff already under pressure due to an extensive workload it is unfair to expect all responsibility to sit with them. It is also evident that with state funding under threat (Roberts & Bolton, 2017), mental health provision will not necessarily be a top priority for schools in future.

An association between non-attendance at school and child, adolescent and adult mental health difficulties was documented twenty years ago (Wallace et al. 1997). More

recent evidence supports a causal relationship between poor mental health and absenteeism at school (Ingul, Klockner, Silverman & Nordahl, 2012; Kearney & Albano, 2004). Thus it is understandable that mental illness also impacts educational achievement and is also linked to substance abuse, sexual health issues and violence (Patel, Flisher, Hetrick & McGorry, 2007).

Interviewees in the case study schools identified that many of the students who engage in the Greenhouse Sports programmes face a number of challenges that have the potential to impact negatively on their mental health and well-being due to the pressures that they face both at home and in school. Interviewees stated that school staff were very aware of these challenges and therefore health and well-being are key priorities within the case study schools.

Mental health is also recognised as a priority area for Greenhouse Sports and all their coaches are therefore Mental Health England First Aid trained. The Greenhouse Sports programmes are perceived to be valuable in terms of the contribution that they provide in managing this issue.

20%

of adolescents worldwide will experience a mental health problem

37%

of respondents reported symptoms of anxiety and depression

58%

of teachers dealt with mental health problems at least monthly

84%

of schools believe they lack adequate resources to cope

“

The adrenalin, stealing the ball from the other players, just like achieving something that you thought you could never achieve, that just makes me so happy.

”

‘I think pupil wellbeing is probably the biggest impact you’ll see in the school. I dread to think of this school without it.’ *Head of PE*

‘And I definitely think the way that it feeds into our priority around wellbeing, but also priorities around sort of challenging students and ensuring really high levels of achievement, I’m fairly confident that there’s soft evidence, or that feeling there that it’s feeding into those.’ *Head Teacher*

Patel et al. (2007) identify a number of protective factors for the mental health of children and young people arising from the school context, including opportunities for involvement in school life, positive reinforcement from academic achievement and identity with the school. Other protective factors include the ability to learn from experiences, good self-esteem, social skills, positive role models and opportunities for

leisure. The evidence presented within this report indicates that the Greenhouse Sports programmes offer many of these protective opportunities and therefore it is perhaps not surprising that interviewees from the case study schools believe that the programmes contribute to promoting the wellbeing of students.

Whilst students did not mention the impact of the programmes by referring to mental health specifically many students suggested that being in the sports sessions made them happy and that their involvement with the programmes had made them happier overall because they enjoy the sessions.

‘It’s made me a lot happier, like knowing that I can come to a session and that I’m doing something I like a lot, and yeah, it’s just made me so much happier than before I did it.’ *Tennis participant*

‘...it’s made me really happy to be in the sessions.’ *Basketball participant*



‘The adrenalin, stealing the ball from the other players, just like achieving something that you thought you could never achieve, that just makes me so happy. And doing all the MBA stuff and you know like the little, I don’t know, reverse lay ups, I thought was cool ... and now I can do it, it’s like, I’ve achieved something, so yeah. Achieving the impossible.’ *Basketball participant*

The social opportunities provided by engagement with Greenhouse Sports, both within school and beyond the school through attendance at competitions, were also noted by students:

‘And socially, like you just make new friends, you meet new people. And what’s funny, when you meet new people, those people know your friends as well, so it’s like a big community.’ *Basketball participant*

‘Because when you have a new team and then you meet new people ...It’s nice to get to know them.’ *Basketball participant*

Students also noted that taking part in Greenhouse Sports was valuable to them in terms of alleviating stress levels as described by this student:

‘Say if you’re stressed, just play basketball ...you’re letting out everything, when you’re shooting, you’re letting out everything. You get aggressive, you’re not angry and like you’re playing defence, you feel like ...You’re releasing it all.’ *Basketball Participant*

3.3.4 Physical Health

Just as there are growing concerns about young people's mental health within the UK there are parallel concerns about low levels of physical activity amongst both young people and adults. According to the Department of Health, young people should exceed 60 minutes of physical activity every day in order to reap the health benefits associated with physical activity. Schools have been seen by successive governments in the UK as being important settings in which to encourage young people to be physically active, now and in the future, but currently school sport provision typically accounts for only 100 minutes of physically activity per week.

A number of the interviewees reported that the opportunities for students to engage in sport within school had diminished in recent years as a result of funding constraints and that therefore the Greenhouse Sports programmes helped schools to fill this gap. In addition to the pressure of funding constraints, the Head of PE at one school stated that PE staff are increasingly under pressure to ensure that students achieve high grades in their exams. He described how he now considered himself to be a Teacher of Physical Education rather than a PE teacher. By this he meant he faced similar constraints to teachers of other subjects, arising from the need to fulfill academic targets and this has impacted negatively on the opportunities for students to be physically active in school. As PE teachers have been required to undertake more administrative tasks they have less time to support sports beyond the curriculum and this has reduced the sports opportunities on offer to students. Greenhouse Sports programmes were seen by the

Head of PE as providing much needed opportunities for students to be active within and beyond the school.

In London only 16% of young people exceed 60 minutes of physical activity per day. Greenhouse Sports programmes contribute to increasing the daily activity levels of participants. The percentage of students engaged in Greenhouse Sports who exceed 60 minutes per day of physical activity is more than 16% in all four of the case study schools. (Figure 4).

In addition to making a contribution to the quantity of physical activity undertaken by young people the Greenhouse Sports programmes were also perceived by interviewees to be increasing opportunities for young people to become regular participants in sport. This is important because several studies have indicated that participation in physical activity and / or sports at a young age has a positive correlation with the level of physical activity in later life (Barnekow-Bergkvist et al., 1998; Engstrom, 1991; Perkins et al., 2004; Tammelin et al., 2003; Telama et al., 2006). However because of the low to moderate level of association with these studies, an active child does not necessarily become an active adolescent or an active adult (European Heart Network, 2001). Importantly however, Matton et al.(2006) found in a study of adolescent Flemish girls that girls who were active during adolescence more were likely to stay active as adults whilst two thirds of those who were less active as adolescents stayed less active as adults. This indicates that whilst being active as an adolescent does not necessarily mean an individual will remain active as an adult, an inactive adolescent is more likely to be an inactive adult.

Other studies have also indicated that:

- **Individuals are not likely to begin participating in sport if they have not participated in the past, underscoring the importance of getting youth involved in sport activities so that they can develop life-long sporting habits (Perkins et al., 2004).**
- **The probability of being active in adulthood is much higher if physical activity in childhood lasts for several years (three years for males and 6 years for females) (Telama et al., 2005,2006).**
- **Participation in high-level competition resulted in a higher probability of physical activity in later-life. (Telama et al. 2006) although the impact of this was greater for men than women.**

The Greenhouse Sports programmes help to ensure that there is a greater range of high quality sport on offer in schools and this is important in both recruiting young people into sport and also in retaining them in the longer term as noted by one student:

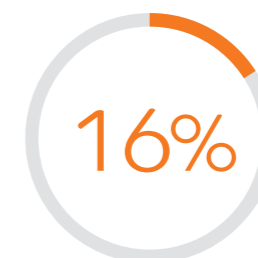
'Because if you only have one sport, and like for example you'd like table tennis but table tennis isn't offered, I think like as you go up through school, you might go off sport. But if you have a variety of sports, then you have like different choices. And you can go for the one that you like. It depends what kind of sport that people like, because basketball's more of a team sport, then table tennis is more of like a fast ...individual sport.' Table Tennis Participant



According to the Department of Health, young people should exceed 60 minutes of physical activity every day in order to reap the health benefits associated with physical activity.



Currently school sport provision typically accounts for only 100 minutes of physical activity per week.



of young people in London exceed 60 minutes of physical activity per day

The females in this focus group confirmed that they would not have been interested in taking up basketball if this had been the only offer in their school. They were very committed to Table Tennis but note the importance of their relationship with their coach in sustaining their involvement in the sport.

Some interviewees stated that the Greenhouse Sports programmes provided additional opportunities for students to take part in sport and to be physically active beyond the school day and into the school holidays.

‘And I think in other ways it develops and extends our extra-curricular offer and the offers we have in terms of sport being available before and after school, and through the holidays.’ *Head Teacher*

Some students also shared how their enjoyment of the Greenhouse Sports programmes had resulted in them taking part in more sports opportunities at the weekends and during the school holidays too.

‘We started doing like after school classes, and that got to a habit as well. And then we started going to like a club outside school, and it was on a Saturday on our free time, and that got turned into a habit, playing games was turned into a habit, so then you just carried on like that, and then right now you just think about that, the amount of times I play tennis is just unbelievable. And I would never think I would have done it without [coach] or even just coming to the school, with Greenhouse.’ *Former Tennis Participant*

Students also suggested that the Greenhouse Sports coaches encouraged them to get fitter and to adopt healthy lifestyles including eating healthily:

‘I didn’t realise that I was really fit when I was playing basketball, because I would train every day, Coach would make us do like conditioning and stuff like that. And like the moment I stopped playing basketball, because obviously like the seasons over, I realised that I’ve gone so unhealthy, because Coach is encouraging me to eat healthy as well.’ *Basketball Participant*

“

Where the behavioural issues are most challenging and students are on the verge of being permanently excluded, the Greenhouse Sports opportunities can be one of a very limited number of available tools to re-engage students through **building positive relationships** with an adult in school through their engagement in sport.

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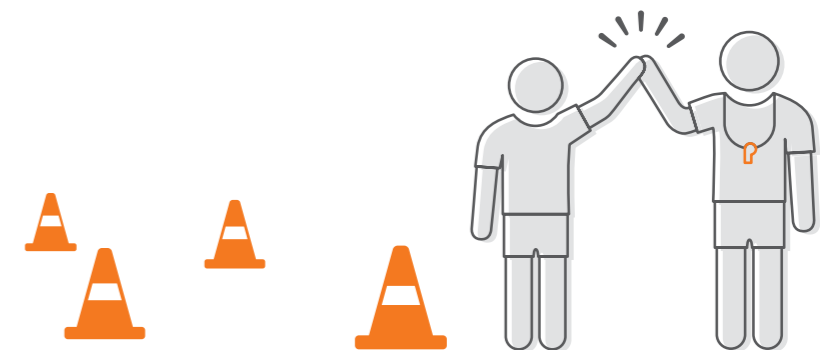
3.3.5 Attitudes to Learning and Engagement within School

A key aspect of the Greenhouse Sports programmes is the opportunity that the programmes provide to engage particular students in sport as a way of encouraging positive behaviour change for students who are not engaging well in school. Students who are perceived to have issues with poor attendance, poor behaviour, punctuality or who are struggling to engage in lessons are targeted to work with the sports coach as a means of encouraging them to become more engaged in school with the ultimate aim of enabling the student to maximise their potential. Challenges such as lack of engagement in school, persistent lateness and poor attendance at school are complex issues for schools to manage but all are indicators that students may not reach their potential at school and beyond.

Research conducted by the Department for Education (2016) found that

increased overall absence from school was associated with a decreased likelihood of achieving key attainment outcomes in both key stage 2 and key stage 4. The analysis controlled for other factors known to affect achievement including prior attainment and pupil characteristics and concluded that student absence has a statistically significant negative link to attainment.

Despite recognising the link between attendance and attainment, interviewees suggested that traditional sanctions utilised in schools (e.g. detentions, exclusions) are of limited use in tackling poor attendance because if students do not attend or engage with the school they are unlikely to engage in the identified sanctions. Interviewees suggested that the Greenhouse Sports programmes have value in terms of providing both a ‘carrot and stick’ for students who have issues with attendance and behaviour in school in that the opportunities are useful for rewarding positive behaviours and for removing as a form of sanction for poor behaviour.



“As students begin to experience progress and success in their sporting endeavours this can then help them to develop self-confidence and belief.”

Attendance and Behaviour

Interviewees reported that for some students attending school is very challenging and they need to be encouraged to attend school.

‘Greenhouse might be the only reason that they come to school!’ *Head of PE*

Where the behavioural issues are most challenging and students are on the verge of being permanently excluded the Greenhouse Sports opportunities can be one of a very limited number of available tools to re-engage students through building positive relationships with an adult in school through their engagement in sport. The contribution of the coach was explained by students who said that the coach asked them to calm down when they misbehaved in class. When asked why they calm down for the coach and not for the classroom teacher the students explained that they had a much stronger connection to the coach formed through their sports participation. A student stated:

‘If we’re misbehaving in class, that’s when she’ll [The Greenhouse Sports coach] try and like fix us up, basically... She normally calms us down and tells us what we should do to like stay focused in the lesson and get on with the lesson... With the teacher, you’re just there for the lesson, but with coach I think you have longer with her because you’re with training as well ... I think she does like other stuff apart from table tennis. Like taking us out for trips which shows like our other personalities apart from sport.’ *Table Tennis Participant*

For some students their involvement with the Greenhouse Sports programme had resulted in them being able to remain in the school at a time when their future there looked uncertain and there was a strong likelihood of students being excluded which would have resulted in significant costs for both the school and the student concerned.

‘I could probably name four off the top of my head that are maybe attendance, and I reckon or four or five that were behaviour concerns. So when I talk, when I say behaviour concern, I’m talking the school would have lost money getting rid of them somewhere else, and by retaining them, the school saved money and probably saved the kid’s life because they would have gone to a PRU, Pupil Referral Unit, done nothing, maths and English ... And that’s only, that’s all because we’ve got Greenhouse coaches in the school.’ *Head of PE*

‘And we have had a small number of students where, I think the only reason they’re still here is because they’ve had that input and that steady support and approach.’ *Head Teacher*

As noted by this Head of PE, as students begin to experience progress and success in their sporting endeavours this can then help them to develop self-confidence and belief, which can be significant in helping the students engage in school and raise their aspirations. It is important to recognise the complexity of this process which requires considerable expertise, time and dedication to achieve.

‘So you give them someone and you give them something. And once you give it to them, you can take it away. And what we have is we have a learning support unit, which is a separate building, where our two coaches go down, build relationships, have a little joke, have a little laugh, don’t even touch a basketball, just go down there, be a buddy, build a relationship, why are you in here for, why are you ... da da da, and you keep on going. And then they say, well here’s a ball, let’s see how you can shoot. Oh OK, so now you’re going to come back to school and we give them half timetables, so they might go maths, English and they work with Coach because they’ve built a

relationship with the Coach. Then they’re in there during maths and, in there during Spanish and geography playing basketball whilst you know all their other friends are in there getting better at sport, their confidence is growing. Then the conversation starts, well there’s a breakfast club tomorrow at half seven, are you going to come?’ *Head of PE*

For some students attendance may not be a problematic issue but their behaviour and lack of engagement in school are considered to be problematic for both the individuals concerned and for the school more widely. Interviewees reported that for some students, involvement in the Greenhouse Sports programmes resulted in visible positive changes in their attitudes and behaviour in school, which led to more successful engagement in school and compliance with the expectations of school staff.

‘I think we’ve seen significant improvements in behaviour from some of the students that were targeted for support. So a sort of increased understanding of the impact of your actions, the need to be disciplined.’ *Head Teacher*

Interviewees also noted however that it was not always students who were exhibiting challenging behaviour that were targeted for involvement in the Greenhouse Sports programmes. Students were also identified for targeted support when school staff felt they could benefit from additional one to one support for a number of different reasons. For some students this targeted support happened within PE lessons and was focused on improving their physical skills whilst other students were identified because they were facing particular challenges in their lives such as being a new arrival to the UK with no spoken English language skills.

Attainment

For some students improvements in their attendance at school and in their behaviour result in those students accessing the curriculum more effectively and therefore students are perceived to have a much greater chance of reaching their full potential. Their improved engagement in school is therefore perceived to be instrumental in them achieving higher levels of attainment academically. In addition to Greenhouse Sports programmes contributing to improved attendance and behaviour for targeted students interviewees also believed that students developed a range of skills and abilities through their involvement in sport which enhanced their ability to be more effective learners regardless of their reasons for being involved in Greenhouse Sports. As a result of becoming more effective learners the Greenhouse Sports Programmes were believed to contribute to students achieving higher levels of academic attainment.

A number of interviewees suggested that the Greenhouse Sports programmes contribute to better GCSE PE outcomes as a result of the specialist high quality coaching.

‘It supplements the PE delivery, the PE curriculum, and they do interact ... So in the year 11 GCSE PE practicals, the ones who were doing basketball for their qualification were trained by Coach... he’s integrated within that, and does that well. So there is a strong integration there, and the pupils, GCSE grades are impacted on, you know, the moderator who came in and watched the PE group of about twenty, thirty, whatever, you know outstanding, really high quality PE, basketball skills and team skills within it. So the coaching they had got was proper coaching from a proper specialist, so that had an impact on GCSE outcomes.’ *Head Teacher*

“Interviewees also suggested that students learnt to be self-reliant and self-disciplined through their sporting experiences.”

A number of interviewees indicated that the students who engaged in the sports programmes over a long time period learnt valuable lessons about hard work and persistence. Some students experienced success in sport as a result of their persistence and then became more motivated in their studies because they had realised the benefits of working hard. Interviewees also suggested that students learnt to be self-reliant and self-disciplined through their sporting experiences.

‘Just life lessons of making sure you’re being punctual, making sure you’re being professional, making ... Just things like that, that I wish, I would have loved to have that, that discipline basically, I think discipline is the key one there.’ *Greenhouse Sports Coach*

A Head of PE suggested that, due to the many pressures on school staff, schools do not provide many opportunities for students to develop personal responsibility but he felt that by participating in sport students experienced the importance of being responsible for their own actions.

‘That’s the other side of the coach, in not just being sporting excellence but going out and ... But truly I think giving kids a responsibility is something that schools are really fearful to do. And we give these kids the responsibility of you’re going to go to another school, but you’re representing the school. And once you give them the responsibility and they take it and they hold on to it, they grow, they mature.’ *Head of PE*

‘What others, some schools do, and I know we were doing it before we had that element of going to other schools to do sport and stuff, is we did it all for them, oh you be quiet, and you do this, you do this, and we was all very much vocal as staff. And they kind of just followed us and they weren’t doing it for themselves. Now, these kids will walk around, walk into a school, they’ll be very quiet, they’ll

be very, thank you Sir, how are you ... and everyone follows them. It’s giving them responsibility and allowing them to grow through the responsibility is something that try and push on them.’ *Head of PE*

Interviewees also suggested that sporting opportunities were a useful way for students to develop a stronger connection with their school and to be a positive representative of the school. Where those experiences are positive interviewees suggested that the benefits transfer into school life more broadly as the experiences encourage students to strive for success in other areas of their life and these experiences become mutually reinforcing.

‘It’s what can we do to reward you for playing sport for your school? And in turn, that kind of makes them think, I want to play for my school, this is what I’m doing for my school, it builds an attachment to the school, and a relationship builds and eventually you get to a point where they want to be in school every day, they want to do well for their school, they want to do well for themselves and it just grows and grows.’ *Head of PE*

‘The kids, they’re ...they want to get out, they want to learn something, they want to do well. And these guys [the coaches] really buy into it and push them and push them and push them and push them.’ *Head of PE*

3.3.6 Former Students Case Study

This sub-section reports the findings from a focus group with older young people who had previously been involved in Greenhouse Sports. It illustrates the importance of examining the impact of sports programmes over the long term and also highlights that the full benefit of the programmes is not evident in the short term.

Three young men aged 19 who were part of the first Greenhouse Sports cohort at their school took part in

a focus group. Of these young men two were now studying at university and the third was due to start in the Autumn. They reflected back on their experiences of being involved in the Greenhouse Sports tennis programme very favourably. They recounted how they played tennis ‘practically everyday’ most lunchtimes, twice a week after school and during PE too. They also participated in a number of additional opportunities through the Greenhouse Sports programme including a trip to London’s O2, visits to Wimbledon and umpiring for the London Youth Games.

‘That’s the main memories that I can remember from the school time here ...Yeah, it’s not the timetabled hours in class, it’s just the times that I was playing tennis, going to places with [coach]’ *Former Tennis Participant*

‘We had a lot of fun when we used to play, a lot. And I don’t know, like it gave us positive memories.’ *Former Tennis Participant*

The former students reflected on the enjoyment they had experienced whilst playing tennis in school and they stated the positive impact that the tennis sessions had on relieving exam stress for them in the run up to their GCSE exams.

‘It released the stress as well ... because we were obviously doing our GCSEs at that time, and then for that one hour when you play tennis, your mind is just focused on the tennis and not about exams you’ve got coming up. And yeah, that’s the main thing I think. And also you’re playing with your close friends as well, so it’s not like you’re playing with strangers and then obviously you’re having more fun, you’re talking as well with your friends about it.’

They also noted that they were all very competitive individuals and therefore playing tennis was something they enjoyed because they liked to compete.

The three young men cemented their friendship through the tennis

programme when they arrived at the school in year 7. For one of the students arriving at the school was challenging as he had previously lived in Holland and did not speak any English when he arrived. He described how supportive the school was in helping him develop his English skills but he also felt that the coach had been particularly helpful:

‘The school brought me on this like ... they gave me this confidence of me speaking English with others and then it made it much easier for me. Tennis was good, yeah, and [coach] obviously knew that I came from Holland and my English was not that good with like the others. And then she like ... there was times I would just speak English with her and then she can just like interact and then make it easier. Because obviously from the moment I started playing tennis, I really thought like, oh [coach] is a real good teacher, she’s a really nice person as well, so it was much easier for me to speak as well with her.’ *Former Tennis Participant*

The former students described how they felt that the tennis coach was more like a friend than a teacher and someone they would speak to out of lessons. When asked whether they felt they had developed any skills through playing tennis they stated that they had developed communication, team work and leadership skills. They also felt that their experiences had enhanced their self-confidence and their willingness to work hard.

‘So like you know when you stand at the beginning, you know you’re barely able to hit a ball ... and you try and swing but all you hit is fresh air! But over time, when you develop your skills and you know go to training and stuff, you know you become better, you start you’re able to hit those difficult shots. And then you, so when you go to play competitively, you know, you start winning more games and stuff, and that helps build up confidence over time.’ *Former Tennis Participant*

“ They reflected that the opportunities they had in sport helped them to **develop skills** that they have continued to refine over time as they have matured. ”

The young men reflected that the opportunities they had in sport helped them to develop skills that they have continued to refine over time as they have matured. By way of example they described how umpiring at the London Youth Games required them to be patient, communicate well and ignore the comments of irate parents. Whilst they accepted that these skills could be learnt in other ways they felt that learning the skills through sport was particularly effective:

‘I think it all started with the sports, like every time we play with like, in a sport, like a big team sport especially, because like tennis, even though it’s like a one on one game, yeah, we had like a whole team behind us, and at times we wouldn’t play the game. It would be four of us all in one game that we’re playing at the same time, and obviously encourage each other, stay focused and that, and then from that, and then especially with the stuff outside, life, you just, you know how to deal with stuff right now, yeah.’ Former Tennis Participant

The young men reflected on how they felt that their tennis experiences were now helping them to make the transition to university due to their strong self-belief. They also believed that playing tennis had encouraged them to develop their resilience:

‘I think if I didn’t play tennis, I don’t think most of the stuff I’m doing right now I would have been able to do as good I’m doing it right now, in a way, as in like he said as well, the confidence as well and like the hard work as well, because I hate losing (laughs) and then especially with tennis, sometimes I’ll lose to my friends and I’m like, oh I can’t take it! And that’s what I get as well with that now as well with like work and like essays and exams and that, I don’t want to like fail, and I want to be as good as I can ...It’s taught us resilience.’ Former Tennis Participant

The former students felt that the tennis they played at school helped them with managing their academic demands by providing an opportunity to switch off from their studying. They commented

how in year 11 this was particularly beneficial for them because the coach enabled them to play tennis after they had attended additional English and Maths booster sessions after school.

‘Sometimes there might be times, especially in year 11, that we had like after school classes for like maths or English that we had to go to. But then most of the times, even after that we finish around like an hour, 4.30, then she’d still be there and she said, oh do you guys want to play tennis? And it’s just ... like work that you just had that has gone down and then you just only think about tennis and then it just lights up your day and you’re quite happy, go home happy.’ Former Tennis Participant

The young men also commented that the coach was good at recognising the stress that the former students were under during exam times and that she was very supportive of them - even helping them with their exam revision.

‘She understood that at times we’d be really stressed out and that we’d be under pressure before our exams... [Coach] really pushed us because times where we were really low and we were like, oh I don’t want to do my exams, I don’t want to do it anymore ...she’d always be there for us.’ Former Tennis Participant

The former students also looked back on their own behaviour and stated that looking back they had not always behaved well and they had challenged the coach. They reported that they had once been banned from the tennis programme for a month because of their decision to play ‘hide and seek’ whilst on a visit to Wimbledon. They clearly valued the coach’s commitment to them when she allowed them to re-join the tennis programme having been convinced that they were remorseful about their actions.

‘[Coach] is more like a friend to us, so we don’t see her as like a, like a tutor or a, or a coach as you could say, we see her more as like a person. I think because also like during school time, lunchtime, the only big activity that we could do is play tennis.’ Former Tennis Participant

3.4 Key Elements of The Greenhouse Sports Approach

The qualitative interviews highlighted that there are a number of key elements that ensure that the multi-faceted Greenhouse Sports programmes work in individual and unique school contexts. These elements include the value placed on the Greenhouse Sports coaches, the structure of Greenhouse Sports programmes, the Student-Centred Approach and the support provided by the Greenhouse Sports infrastructure.

The Greenhouse Sports Coach

Greenhouse Sports coaches are highly valued by both school staff and students. All Greenhouse Sports coaches are high quality coaches and this is essential in ensuring that students are offered a high quality sports experience. If students do not experience high quality coaching they are unlikely to engage in the sport in the long term and therefore the programme will have limited impact on the students. PE staff were keen to ensure that coaches add value to what PE staff already do within the curriculum.

‘I want my kids to have the best coach that is around.’ Head of PE

‘I want to see something that I can’t do myself. Little technical bits that I thought, I’ve never seen that before, you’re in. And that can make all the difference.’ Head of PE

‘Outstanding, they are just ... fantastic. I learn from them, I almost feel like when I’m in their lessons with the students I’m listening to them to learn from them’ Head of PE

‘I really feel like it’s hard to fault them.’ Head of PE

The students were also very positive about the abilities of their coaches and students clearly enjoy the sport that the coaches deliver:

‘The coaching was really good.’ Tennis participant

‘Yeah, I think he, yeah, he’s a really, really good coach.’ Tennis participant

‘I think like we have a good relationship because we’re not like just ... like if I, I can talk to him about tennis a lot but it’s not like, it’s not just him telling us what to do, like he kind of has conversations with us, so it’s kind of nice, yeah.’ Tennis participant

‘We can have lots of jokes with our coach.’ Tennis participant

‘Yeah, very approachable... more informal than the actual teachers.’ Basketball participant

‘But like you can still have jokes with her and she’s really fun, and if you behave and you’re dedicated, she’ll let you have fun lessons as well.’ Basketball participant

‘Like even though he’s a good person, he also encourages us to play basketball and he pushes us towards our, like our goals. So if you want to achieve better ... he will like help us get there.’ Basketball participant

In addition to their ability to coach at a high level and their ability to provide enjoyable experiences it is essential that the coach ‘fits’ the school and therefore selecting the right coach from the outset is a key decision. A Head of PE described how he sat in on the interview panel because he needed to ensure that the coach would gel with the PE staff and the rest of the school family.

‘The strengths I would have played out already, their coaching ability, their ability to interact with our people, relating to our people. Not just, I’ve never heard one of them say, that’s not my ... that’s nothing to do with me. And that, in a school like ours is key. To see something, to understand the school rules, to enforce the school rules, is above what they’re being paid to do, but they still do it’ Head of PE

Beyond being a high quality sports coach Greenhouse Sports coaches are perceived to be very hard working and dedicated to their roles and this is appreciated by the participants in the programmes:

“ Coaches are also seen to value **student’s academic achievements** and students are aware that their involvement with the sports programmes is intrinsically linked with their performance elsewhere. ”

‘I feel like because, like with coach, because she lives far away, like she doesn’t really have to come in early ...or leave late. So I think because she comes in early and leaves late, it shows that she cares how much we improve.’ *Table Tennis Participant*

The coach’s ability to build strong relationships with both staff and students is a vital element of their approach and this is particularly true of the mentoring work that the coaches undertake on behalf of students who are struggling within school. The coaches often act as mediators in situations where students and staff are not communicating effectively with each other and this can be very significant in terms of improving outcomes for students in the longer term.

‘I’ll go into the lesson, just go up to them. Obviously kids are going to behave a little bit differently when you’re in there, you know, but I feel I have to do a lot of negotiating, one with the child, one with the teacher, just so they’ll allow the child to stay in the lesson’ *Greenhouse Sports Coach*

‘Our coaches as a real go-between between the teachers or heads of years and the student, and they’re like the middle person. And so the kid feels very comfortable talking in front of the coach because they’ve already said what they want to say to the head of year, and you’ve got a real nice mix of people and it gets resolution.’ *Head of PE*

Coaches also communicate with parents on behalf of the school for some students and this can ease conflict on a number of levels for the student involved particularly when the coaches contact parents with positive news. They also appreciate the positive outcomes for their child in terms of addressing challenging behaviour.

‘Their parents really buy into it. It’s the communication with coach that they’ve had. He will call home if they’ve had a bad lesson, the same way he’ll call home if they’ve had a good lesson.’ *Head of PE*

Some interviewees suggested that they believe that not all students realise that by engaging with Greenhouse Sports their school is providing a unique opportunity that is not common to all schools.

‘We’ve had one girl who left in year 7 that was heavily coached, heavily mentored, she had some behaviour problems, went to another school, there’s nothing there for her, and she’s now put her papers back in to come here.’ *Head of PE*

Greenhouse Sports coaches often attempt to encourage students to improve their attendance by incentivising students with rewards over a long duration. Again the skills of the coach are integral to this process being successful. The coach needs to ensure that the targets they set for students are motivating and are therefore both achievable and yet challenging enough for students to feel that they are being rewarded for an achievement that has required effort:

‘You know now there’s a girl who’s just earned her bat two days ago, she’s been in year 7 since September, and the reward was, if you’ve managed to come to school for two whole weeks (laughs) you’ll earn your bat, and she’s just done it, you know, it’s took her this long to do it.’ *Greenhouse Sports Coach*

Greenhouse Sports coaches are also seen to value student’s academic achievements and students are aware that their involvement with the sports programmes is intrinsically linked with their performance elsewhere in the school. Some Greenhouse Sports coaches offer support with homework and all ensure that students prioritise their academic studies.

‘And we also do like a homework club, so especially for the year 10s and 11s, if they’re falling behind in their work, they can then come into the homework club and then catch up with their work before they take part in the basketball.’ *Greenhouse Sports Coach*

Structure of Greenhouse Sports Programmes

Another key element of the Greenhouse Sports programmes is that coaches are embedded within the schools in which they work. This ensures that the coaches operate within the culture and ethos of the school and also ensures that the coaches add value to the schools in which they work.

‘She understands exactly you know what the challenge is that the PE teachers do have within the curriculum. She seeks to make sure that her work complements what’s happening in the PE department. She, we actually put her on a management course that some of our other teachers were doing, because she is a very capable manager.’ *Head Teacher*

‘Greenhouse I would say is integrated fully into the school, you see it you know every day, all day. Everybody understands it. Where you’ve got the logos and the advertising clearly, but also you know the kids are playing basketball, playing table tennis, all day, every day. It’s right in front of the main school, the way the school’s designed. And there’s a large amount of students who are involved in it.’ *Head Teacher*

‘And I think they are really good at following the values and the visions of our PE department, as well as you know having input of their own in order to help the department develop.’ *Head of PE*

Being embedded within the school does not however mean that Greenhouse Sports coaches are not empowered to make decisions within the schools as they feel trusted by leaders within the case study schools:

“The beauty of this school, for me, is that they actually just let you get on with what you think ... the head of PE says all the time, look, you’re the expert, you do what you think.” *Greenhouse Sports Coach*

Student-Centred Approach

The Greenhouse Sports approach is student-centred and it is the needs of the students that determine the actions of the coach. Students recognised that their coaches were very committed to them and this commitment was instrumental in forming strong relationships.

Students stated that they felt that it was important that their involvement with Greenhouse Sports was optional and they suggested that if they were obliged to come every week they would find this off putting. They enjoy the flexibility that the programme offers.

Consistency in delivery and reliability were also noted by coaches as being at the heart of their delivery of the sports programmes:

‘One of the things I think is because we’re consistent, you know the kids know, when they turn up at school I’m going to be here.’ *Greenhouse Sports Coach*

‘I know the head teacher is, is really behind Greenhouse and what we’ve done... So I think she sees it as a big deal and a big part of the school.’ *Greenhouse Sports Coach*

‘So I think those sorts of staff are very positive of that and very aware of it. And I would imagine that the form tutors of the girls that are heavily involved would also be very conscious of it. And there are staff that go over to watch games and watch training.’ *Head Teacher*

Support from Greenhouse Sports

The Greenhouse Sports coaches are supported by a team of staff and the coaches recognised the importance of having this strong infra-structure in place in order to support their work in schools.

The strong reputation of Greenhouse Sports was also important to schools making a commitment to the programme.

‘As an organisation, Greenhouse Sports I think are coming from a very ethical place. And so as a school leader, looking at organisations that are out there, I’m attracted to that.’ *(Head Teacher)*

4.0

QUANTITATIVE DATA ANALYSIS

4.1 Introduction

The qualitative research findings indicated that school staff believe that engagement in the Greenhouse Sports programmes has a favourable impact on student outcomes including attendance and academic attainment. However, concerns were expressed by some interviewees that currently this link has not been demonstrated robustly and instead is based on anecdotal data.

This section of the report presents findings from quantitative analysis undertaken to attempt to better demonstrate the breadth and extent of the impact of Greenhouse Sports. The analysis is based on pre-existing data collated by three of the case study schools.

4.2 Design

Data relating to the previous three years (during which Greenhouse Sports had been on offer) was obtained from three of the case study schools. Data was utilised from case study schools A, B and C. At school D there had been several changes in the

approaches to data collection during the relevant timeframe which meant that the data was not considered to be suitable for the scoping study.

The analysis focused upon 'within-school' evaluations of the impact of engagement with the Greenhouse Sports intervention. Figure 2 illustrates the modified structure of design. Unlike the Maryland 3 scale this design structure does not facilitate control for a counterfactual influence that might be due to common factors across schools, for example in an area, regardless of whether Greenhouse Sports were active in a school.

Therefore, to isolate the impact of the intervention by Greenhouse Sports within each school, students who had engaged with Greenhouse Sports were compared to other students that were not engaged over three academic years. Students were also identified by their National Curriculum year – or cohort – to control for common factors, that is, peer group effects that reflect the influence that students have on one another. Explicitly monitoring the outcomes through time and also for sets of students that



Figure 2: Evaluation Design



belong to a cohort produces a 'panel-data' design for statistical analysis.

The panel-data design means that changes in outcomes for students, such as their attendance, or a measure of their academic performance, can be examined over time in association with their engagement with Greenhouse Sports and other factors. By examining change over time, any factors that are specific to the individual, but not measured in the data, are removed from the analysis, so students are compared on a like-by-like basis. Using regression analysis designed to analyse panel data, β parameters that measure how a unit change in students' engagement with Greenhouse Sports influences an outcome variable of interest (such as attendance or educational attainment), can be estimated. The sign of the estimated parameter indicates the direction of the relationship that is identified whilst the number that is estimated gives the magnitude of the relationship that is uncovered. If Greenhouse Sports are successful in helping student attendance and educational attainment, the estimates of the parameters should be positive in sign. This indicates that an increase in engagement with Greenhouse Sports leads to an increase in attendance, improved behaviour or improved educational attainment.

An important issue that should be accounted for is to control for other factors that might influence the outcomes. In the current analysis the ethnicity and gender of the student are accounted for. This is in addition to the common factors that could influence the outcomes for students through their belonging to a particular national curriculum year as noted above. (Appendix 1 gives more technical details of the statistical method adopted).

4.3 Data Accessed from Schools

For each school, data was provided on each of the variables required to undertake the regression estimation. Table 5 provides a label for each variable as well as its definition.

The outcomes explored for Schools A and B were attendance, behaviour and attainment in English and Maths. Only attendance and Merits/Sanctions data were available for School C. Table 5 outlines four different measures of student 'engagement' with the Greenhouse Sports programmes. These were used to capture the treatment implied in Figure 2. The first of these measures is GSEng which indicates whether or not a student met the identified threshold of engagement with Greenhouse Sports. This was determined as being two hours per week for the purpose of this study. The remaining measures were total hours of engagement, number of weeks of engagement and number of sessions of engagement.

Scrutiny of the data indicated that two main issues required some consideration. Firstly, the academic performance variables should be viewed with some caution. In Schools A and B, after Year 10, KS3 grading systems changed from National Curriculum levels categorised by numerical levels sub-divided by categories a, b, and c, to grades subdivided numerically. No attempt was made to match the scores other than the categories a, b and c were allocated scores as 0.67, 0.33 and 0.0 to capture the relative level of difference in the previous grading system numerically. The structural change across the grading systems was not accounted for in the modelling. Future work could explore this issue in more detail with schools to identify the most relevant conversion.

Table 5: Variables

Outcome Variables	Definition
Attendance	Attendance record in the year
Behaviour	Behaviour record in the year
ENGrade ²	Attainment in English (Schools A and B)
MAGrade	Attainment in Maths (Schools A and B)
TotalMerits	Merits awarded for positive behaviour(School C only)
TotalNeg	Sanctions awarded for negative behaviour(School C only)
Greenhouse Variables	Definition
GSEng	Student achieved Greenhouse Threshold of engagement i.e. attendance of 2 hours per week (1 - Yes; 0 - No)
totalhrs	Total hours of engagement in the year
nowks	Total number of weeks engagement in the year
nosessions	Total number of sessions engagement in the year
Control Variables	Definition
Gender	Male (1) or Female (0)
Ethnicity	Categorised as White English, Black, Asian1, Asian2, Other ³
NCYear	National Curriculum year

- In Schools A and B after Year 10 grading systems changed from National Curriculum levels categorised by levels sub divided by categories a, b, and c to grades subdivided numerically. No attempt was made to match the scores other than the categories a, b and c were allocated scores on 0.67, 0.33 and 0.0 to capture the relative level differences numerically. The structural change across the grading systems was not accounted for in the modelling. Future work could explore this issue in more detail with schools to identify the conversion factor.
- Asian was subdivided to account for the sporting practices that might vary from, for example countries like India, Pakistan, Bangladesh versus China, Vietnam etc.

Secondly, exploring the distribution of engagement with Greenhouse Sports across the national curriculum years suggested a strong ‘drop off’ according to cohort as students’ progress through the school for School A. This is revealed in **Table 6**. This suggests that there is an extremely strong cohort effect in the data associated with the decline in engagement. This ‘selection effect’ associated with the programme could confound the results when seeking to identify the effect of engagement as the decision to engage or not seems to be important. Consequently, for School A the model was estimated both with and without the national curriculum year included as a control. If it was included no significant results were identified. If it was excluded, then significant results were identified. The results presented in **Table 7** for this school should, thus, be viewed with caution, indicating the potential to have an effect only.

Table 6: Engagement by Year

NCYear	School A Mean	School B Mean	School C Mean
GSEng⁴			
7	0.45	0.06	0.01
8	0.21	0.06	0.03
9	0.13	0.07	0.02
10	0.05	0.05	0.02
11	0.03	0.02	0.01
12		0.01	
13		0.01	
totalhrs			
7	103.90	12.13	2.01
8	60.44	16.38	4.38
9	38.20	19.48	4.25
10	13.93	14.42	2.91
11	7.53	3.99	0.60
12		2.11	0.01
13		1.00	
Nowks			
7	22.93	3.65	0.88
8	12.63	4.24	1.91
9	7.71	4.61	1.80
10	2.77	2.71	1.26
11	1.24	1.23	0.37
12		0.75	0.05
13		0.41	
nosessions			
7	71.01	7.97	1.33
8	35.48	11.85	2.89
9	24.33	15.71	2.14
10	8.63	12.21	1.45
11	4.37	2.84	0.40
12		1.84	0.01
13		0.78	

4. The numbers for this binary engagement measure can be thought of as the proportion of students.

4.4 Results

Table 7 presents the results of the regression analysis. n represents the number of students in the sample that was used to estimate the regression. The first column represents the school data that are analysed.

The subsequent columns indicate the outcome variable that is analysed. For each school, as

indicated by a block of rows, results from the analysis of a particular measure of engagement with Greenhouse Sports is presented. For each measure and for each outcome variable 2 numbers are presented. The upper number is the estimate of the β parameter which indicates the impact of a change in engagement

Table 7: Panel Data Estimates

	Attendance	Behaviour	ENGrade	MAGrade	TotalMerits	TotalING
School A⁵						
GSEng	2.284*** (4.09)	2.427 (0.67)	0.108 (0.94)	0.237 (0.84)		
totalhrs	0.00835*** (5.44)	0.0365*** (2.70)	0.000718** (2.13)	0.00267*** (4.29)		
nowks	0.0644*** (3.26)	0.112 (1.27)	0.00486* (1.81)	0.0227*** (5.14)		
nosessions	0.0152*** (4.91)	0.0546** (2.29)	0.00110* (1.88)	0.00455*** (4.32)		
n	627	627	611	625		
School B						
GSEng	1.738** (2.14)	-0.0776** (-2.21)	0.349*** (3.68)	0.438*** (3.60)		
totalhrs	0.00428*** (3.86)	0.0000844 (0.63)	0.00112*** (3.48)	0.00137*** (2.78)		
nowks	0.0241*** (3.25)	-0.00165* (-1.73)	0.0113*** (5.01)	0.0184*** (7.39)		
nosessions	0.00563*** (4.28)	0.0000100 (0.06)	0.00134*** (3.02)	0.00186*** (3.76)		
n	2077	2042	1514	1517		
School C						
GSEng	8.576** (2.51)				13.89*** (2.98)	-3.372 (-1.61)
totalhrs	0.0892*** (4.55)				0.110*** (2.85)	-0.0106 (-0.69)
nowks	0.241*** (3.27)				0.364*** (3.15)	-0.0566 (-1.21)
nosessions	0.129*** (3.90)				0.234*** (4.88)	-0.0225 (-0.85)
n	3790				3484	2919

5. In this school no control was added for the NC year. These results should be interpreted with caution.

t statistics in parentheses

* p < 0.1

** p < 0.05

*** p < 0.01

with Greenhouse Sports on the outcome variable. The sign of the number indicates the direction of the relationship. The lower of each of the numbers is a t-statistic that is used to identify the statistical significance of the estimated parameter. For ease of reference asterisks are used to indicate statistically significant estimates, with p referring to the significance level.⁶ Statistically significant estimates indicate that the estimated parameter represents what would happen in the wider population of similar schools to those investigated in the research.

To provide an insight into the results, consider the following examples of interpreting the parameters (all of which can be interpreted in this way):



School A

The parameter estimate of 2.284 associated with the outcome of Attendance and the Greenhouse Sports engagement measure GSEng (meeting the threshold definition of 2 hours engagement per week), indicates that if students meet this threshold, their attendance increases by 2.284%. The parameter estimate of 0.00486 associated with the outcome of English Grade and the Greenhouse Sports measure of nowks, implies that an additional week of engagement with Greenhouse Sports will improve the English grade by 0.00486 points.



School B

Here, for the outcome of Attendance and the Greenhouse Sports engagement measure of GSEng (meeting the threshold definition of 2 hours engagement per week) the value of 1.738 means that in meeting the threshold attendance improves by 1.738%. For the total hours of engagement for the same school, a value of 0.00428 implies that one extra hour of engagement in Greenhouse Sports activity increases attendance by 0.0043%. Likewise for the measure of nosessions and the outcome of ENGrade, the number 0.00134 indicates that an additional session with Greenhouse Sports raises the English grade by 0.00134 points.



School C

For School C the parameter estimate of 8.576 associated with the outcome of Attendance and the Greenhouse Sports engagement measure GSEng (meeting the threshold definition of 2 hours engagement per week) implies that if students meet this threshold their attendance is 8.576% higher. The parameter estimate of 0.364 associated with the number of weeks of engagement with Greenhouse Sports and the outcome of total merits implies that an additional week of engagement will raise total merits by 0.364 points.

The key central message to take from the analysis is that there is widespread evidence that engagement with Greenhouse Sports achieves positive behavioural change and raises attendance and academic performance.

A number of general points can be also noted from the results. The first is that the signs of the estimated parameters are all positive, with the exception of the outcome of sanctions for negative behaviour and, in School B, the outcome of behaviour directly. The positive signs indicate that the intervention of Greenhouse Sports improves attendance and academic attainment generally, and behaviour in School A. The negative sign associated with sanctions in School C, moreover, also indicates change for the better in student behaviour despite not being statistically significant. In this sample, thus, appropriate behaviour change was observed. However, in School B it is shown that the variables measuring Greenhouse Sports engagement (GSEng) and the number of weeks of engagement reduces desirable

behaviour. As the results on the behavioural outcomes are less general both across different schools and different measures of engagement, any claims associated with impacts on behaviour are more fragile.

The second point is that the estimated parameters are larger for the Greenhouse Sports engagement measure GSEng, compared to totalhrs, nowks and nosessions. This is to be expected as the former measure indicates an overall aggregate engagement with Greenhouse Sports. The other measures indicate marginal changes in engagement. The scale of the impacts can be viewed in noting that there is evidence, for example, from School B that reaching such a threshold could raise academic performance by approximately a third of a grade.⁷

6. The significance level is the probability of rejecting the null hypothesis that the true value of the parameter for which we have an estimate is equal to zero. This would imply that there would be no relationship in the population between engagement with Greenhouse Sport and the outcome investigated. $p < 0.05$ for example means that rejecting the null hypothesis above would involve, at most, a 5% chance of error.

7. Of course caution should be attached to the scaling problem of these measures.

5.0 GREENHOUSE SPORTS THEORY OF CHANGE

5.1 Introduction

A Theory of Change articulates how and why a programme has an impact on its beneficiaries. Theories of Change can be represented diagrammatically in order to demonstrate the key elements of the programme responsible for the success of the programmes in achieving the ultimate aim for beneficiaries. This section provides a Theory of Change for the Greenhouse Sports programmes based on the research evidence presented within this report. It therefore reflects the views of school staff and students engaged in the research.

5.2 Greenhouse Sports Theory of Change

The starting point for developing a Theory of Change is the ultimate aim for the programme.

For Greenhouse Sports programmes the ultimate aim is to use sport to help young people living in the inner city realise their full potential.

The findings presented in the previous two sections of this report have indicated that the Greenhouse Sports programmes have been developed to assist young people in realising their full potential across a number of different dimensions including academic attainment, enhanced employability and by contributing to young people's physical and mental health and well-being now and in the future.

Figure 3 outlines a Theory of Change

for the Greenhouse Sports programmes based on the research evidence presented within this report. The diagram indicates that the three main activities that the programme offers are:

- Opportunities to engage in high quality sports opportunities,
- Opportunities to build positive relationships with dedicated coaches
- Additional developmental opportunities offered through sport within and beyond school.

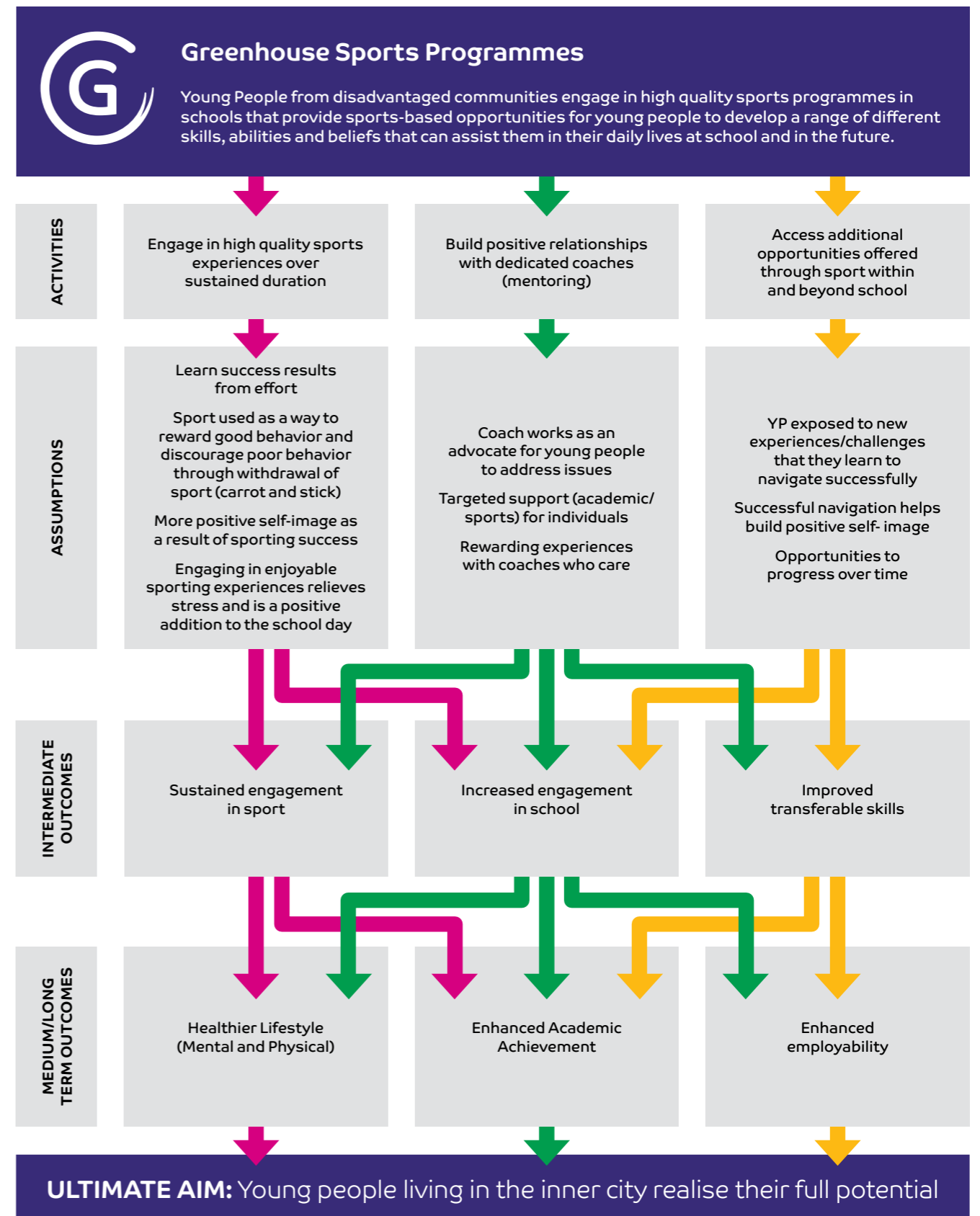
Although these are presented as separate 'activities' in reality there is significant overlap between these activities and all are inter-dependent. By engaging in these three identified 'activities' students can benefit from three broad positive intermediate outcomes:

- Sustained engagement in sport
- Increased engagement in school
- Transferable skills

Again there is considerable interdependence between these three outcomes which are mutually reinforcing. Through these intermediate outcomes it is predicted that students will benefit from longer term positive outcomes which will assist in young people to fulfil their potential in the future. These longer term outcomes are:

- Healthier lifestyle
- Increased academic attainment
- Enhanced employability

Figure 3: The Greenhouse Sports Programme Theory of Change



6.0

AREAS FOR FUTURE WORK

The scoping study has identified that the stakeholders in the Greenhouse Sports programmes value the programmes highly and perceive the programmes to add considerable value to the schools in which they operate. It has also identified that the sports programmes have a broad impact which goes beyond the STEP framework.

A theory of change has been presented which attempts to capture how and why the sports programmes are effective.

The quantitative analysis indicates that there is evidence that the programme has favourable impacts on attainment and attendance for students.

However, a number of issues do arise from the quantitative analysis and are suggestive of refinement of insight that is needed.

- a) **The process of engagement with Greenhouse Sports can influence the results strongly as indicated by School A. Further analysis and measurement of the variables that allow for selection into the engagement would help to ameliorate the confounding influences that might be implied; that is that something different was happening to affect the choice to engage which is not distinguished from the experience that engagement brings. This would involve data that measures student outcomes, and characteristics before they entered onto the programme as well as data on students that do not engage at all.**
- b) **Better mapping and consistency of longitudinal educational performance measures would help. Even if continuous scales might not be possible, it might be possible to identify threshold levels of comparable performance. However, the advantages of using the panel-data estimators above, which**

help to compare the same individuals over time would be compromised.

- c) **Data from comparable schools in which Greenhouse Sports is not involved should be analysed to provide a counterfactual insight into educational outcomes.**

The scoping study has also highlighted that students engage in the sports programmes for different reasons and in different ways and for this reason it would be useful to give greater consideration to which students are being targeted for what benefit and in order to ensure that any evaluation actually capture the most appropriate impact. It is also acknowledged that a greater understanding of what proportion of students are self-selecting to be involved in the programmes is required. This is important in order to examine whether self-selecting students may exhibit higher levels of school engagement overall when compared to the rest of the student population.

It was also suggested by interviewees that different sports offer different opportunities for students and it may well be useful for future research to examine the contribution that different sports offer students. Additionally it may be useful to examine the impact of gender on the impact of the programmes.

The scoping study has suggested that the Greenhouse Sports programmes have the potential to promote both physical and mental health in young people and this could also be usefully explored in future research.



REFERENCES

- Andrews, G., Hall, W., Teeson, M., & Hendersen, S. (1999). *The mental health of Australians*. Canberra: Commonwealth Department of Health and Aged Care.
- Barnekow-Bergkvist, M., Hedberg, G., Janlert, U. and Jansson, E. (1998). "Predication of physical fitness and physical activity levels in adulthood by physical performance and physical activity in adolescence - an 18 year follow- up study.", *Scandinavian Journal of Medicine & Science in Sports*, vol. 8, pp. 299-308.
- Department for Education (2016) *The link between absence and attainment at KS2 and KS4 2013/14 academic year*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/509679/The-link-between-absence-and-attainment-at-KS2-and-KS4-2013-to-2014-academic-year.pdf
- Durlak, J.A., Weissberg, R.P., Dymnicki, A.B., Taylor, R.D., & Schellinger, K.B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, 82, 405–432.
- Engstrom, L. (1991). "Exercise adherence in sport for all from youth to adulthood" in *Sport for All*, eds. P. Oja and R. Telama, Elsevier, Amsterdam.
- European Heart Network (2001). *Children and Young People - the Importance of Physical Activity*, European Heart Initiative, Belgium.
- Ingul, J.M., Klockner, C.J., Silverman, W.K., & Nordahl, H.M. (2012). Adolescent school absenteeism: modelling social and individual risk factors. *Child and Adolescent Mental Health*, 17(2), 93–100.
- Kearney, C.A., & Albano, A.M. (2004). The functional profiles of school refusal behaviour: Diagnostic aspects. *Behaviour Modification*, 28, 147–161.
- Lesso, C., Ross, A., Brind, R., Bell, E., & Newton, S. (2016). *Longitudinal Study of Young People in England cohort 2: health and wellbeing at wave 2*. London: Department for Education.
- Matton, L., Thomis, M., Wijndaele, K, Duvigneaud, N., Beunen, G., Claessens, B.V., Philippaerts, R. and Lefevre, J. (2006) "Tracking of Physical Fitness and Physical Activity from Youth to Adulthood in Females", vol. 38, no. 6, pp. 1114 -1120

- NSPCC. (2017) *How safe are our children? The most comprehensive overview of child protection in the UK 2017*. Retrieved from <https://www.nspcc.org.uk/globalassets/documents/research-reports/how-safe-children-2017-report.pdf>
- NSPCC. (2014). *The experiences of 11-16 year olds on social networking sites*. Retrieved from <https://www.nspcc.org.uk/globalassets/documents/research-reports/experiences-11-16-year-olds-social-networking-sites-report.pdf>
- Office for National Statistics. (2004). *Mental health of children and young people in Great Britain*. Retrieved from <http://content.digital.nhs.uk/catalogue/PUB06116/ment-heal-chil-youn-peop-gb-2004-rep2.pdf>
- Parent Zone. (2016). 'The Perfect Generation': Is the internet undermining young people's mental health? Retrieved from <https://parentzone.org.uk/article/report-perfect-generation-internet-undermining-young-people%E2%80%99s-mental-health>
- Patel, V., Flisher, A.J., Hetrick, S., & McGorry, P. (2007). Mental health of young people: a global public-health challenge. *Lancet*, 369, 1302–1313.
- Perkins, D., Jacobs, J., Barber, B. and Eccles, J. (2004). "Childhood and Adolescent Sports Participation as Predictors of Participation in Sports and Physical Fitness Activities During Young Adulthood.", *Youth and Society*, vol. 35, no. 4, pp. 495-520.
- Roberts, N., & Bolton, P. (2017). *School funding in England: Current system and proposals for 'fairer school funding'*. London: House of Commons.
- Rutter, M., & Smith, D. (1995). *Psychosocial disorders in young people: time trends and their causes*. Chichester: Wiley.
- Tammelin, T., Nayha, S., Hills, A. and Jarvelin, M. (2003). "Adolescent participation in sports and adult physical activity", *American Journal of Preventive Medicine*, vol. 24, no. 1, pp. 22.
- Telama, R., Yang, X., Hirvensalo, M. and Raitakari, O. (2006). "Participation in Organized Youth Sport as a Predictor of Adult Physical Activity: A 21- Year Longitudinal Study", *Pediatric Exercise Science*, vol. 17, pp. 76-88.
- Telama, R., Yang, X., Laasko, L. and Viikari, J. (1997). "Physical activity in childhood and adolescence as predictor of physical activity in young adulthood", *American Journal of Preventive Medicine*, , no. 13, pp. 317-387.
- Telama, R., Yang, X., Viikari, J., Valimaki, I., Wanne, O. and Raitakari, O. (2005). "Physical Activity from Childhood to Adulthood. A 21 year Tracking Study", *American Journal of Preventive Medicine*, vol. 28, pp. 267-273.
- Wallace, S.A., Crown J.M., Berger, M. & Cox, A.D. (1997). *Child and adolescent mental health*. In S.A. Wallace, A.D. Cox, J.M. Crown & M.Berger (Eds.) *Child and adolescent mental health: Health care needs assessment: Second series*. Milton Keynes: Radcliffe Medical Press
- Weare, K., & Nind, M. (2011). *Mental health promotion and problem prevention in schools: What does the evidence say?* Health Promotion International, 26, 29–69.
- World Health Organisation. (2013). *Caring for children and adolescents with mental disorders: Setting WHO directions*. Geneva: World Health Organization.
- YoungMinds. (2013). *Local authorities and CAMHS budgets 2012/2013*. London: YoungMinds

APPENDIX 1

Equation 1 describes the panel-data design of the regression analysis.

$$\text{Outcome}_{it} = \beta_1 \text{Greenhouse}_{it} + \sum_j \beta_j \text{Control}_{jit} + \eta_i + \varepsilon_{it}$$

This equation shows that the analysis examines an outcome variable for a pupil 'i' over national curriculum years 't'. The equation shows that a measurement of engagement with Greenhouse Sports for some students over time could influence this outcome. Importantly, moreover, this panel-data design takes account of (unobserved) individual factors that could influence the outcome, because it measures the same person over time. The effect η_i represents these unobserved possible effects that are time invariant as they belong only to individual student

'i'. The unobserved variable ε_{it} then represents other idiosyncratic factors that could influence the outcome and arising from individuals or over time.

The object of the analysis is to estimate the β parameters of the equation as these indicate the (conditional average) direction and size of the effect of the variables on the right-hand side of the equation on the outcome. As these are estimated from a sample of data (a school, set of students, and years) the statistical significance of these parameter estimates can be established. Of relevance for this

study is that a statistically significant estimate of β_1 would indicate that students that have experienced engagement with Greenhouse Sports have seen their outcomes change as a result of that engagement.

An important feature of the analysis is to control for other factors that might influence the outcomes. An additional set of 'j' control variables should, thus, also enter the analysis. In this analysis, the ethnicity and gender of the student, as well as common factors that could influence the outcome through belonging to a particular national curriculum year were accounted for. The need for these variables in the analysis depends on both statistical and theoretical criteria. For example, in the first case the estimate of equation 1 can proceed by either:

**Fixed effects estimation
or
Random effects estimation**

Fixed effects estimation focuses on estimating β_1 by variation over time in the variables for the same individual. As a result the control variables for common characteristics of the individual over time, such as their ethnicity or gender, are excluded from the analysis.⁸ Random effects estimation focuses on estimating β_1 explicitly allowing for variability within individuals over time in the statistical inference. This means that the effects of time invariant variables can be estimated. The choice between each of these estimators can be made with respect to the Hausman test.⁹

From a theoretical perspective the choice of whether or not to control for cohort effects needs to be made. In general, it can be assumed that this is an important factor to account for as student peers may well influence one another.

8 Technically the Fixed effects estimator controls for the fact that any unobserved features of the individual are time invariant and may also be correlated with the other factors that might influence the outcomes. In the Random effects model variation across individuals is assumed to be random and uncorrelated with the other factors included in the model. In this model, the influence of time invariant characteristics like gender can be estimated:

9 In a panel data context such as this Ordinary Least Squares regression analysis produces inefficient estimates relative to panel estimators as the differences in the variance of the errors associated with repeated measures on the same individual, which reflects unobserved heterogeneity of behaviours, are not accounted for. In this case the random effects estimator can produce consistent estimates that are more efficient than OLS. The OLS estimator also assumes that unobserved individual factors are uncorrelated with the observed variables included in the model. If this assumption does not hold then the OLS estimator also produces biased estimates and the random effects model inconsistent estimates. However, the fixed effects estimator produces consistent estimates. Choice between the random and fixed effects estimators models, and by implication the OLS estimator, can take place through appeal to the Hausman specification test, which addresses the consistency of an estimator in comparison to an alternative, less efficient, estimator which is already known to be consistent. If the unobserved effects in the panel mode are exogenous the random and fixed effects models' time varying coefficients should be asymptotically equivalent, that is there should be no systematic differences. In the estimates. The Hausman test addresses this difference. Table 1 indicates which estimator was used.



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