

PHYSICAL EDUCATION AND SPORT- EDUCATION EVIDENCE PAPER

Key points /Executive Summary

PE Provision and physical literacy

- Many schools in Wales, particularly secondary schools, do not meet the aim of providing at least two hours of curriculum time for physical education (PE) per week. There has been little change in amount of time offered by schools over the last 15 years. The majority of Heads of PE in secondary schools (87%) feel that more time should be allocated to PE and over half of junior PE coordinators also agreed (54%)
- Welsh Government has set out its commitment to make '*physical literacy as important as reading and writing*'. The 2013 *School Sport Survey* shows that 64% of junior PE coordinators and 58% of secondary Heads of PE agreed with the statement '*My school regards physical literacy to be as important as numeracy and literacy*'. Almost a third of secondary Heads of PE disagreed.

Improving behaviour and engaging pupils

- PE is a subject that in its own right provides opportunities to learn positive behaviour and develop social skills. This review has found that there is also some scientific evidence to complement anecdotal reports on how pupils who have a good experience of taking part in PE and sport can have a positive impact on other classroom learning. The evidence suggests that PE and sport can be used as a tool to reduce the potential for disruptive behaviour and poor attendance within the school setting, and can help to create optimum conditions for learning and academic achievement.

Academic achievement

- No evidence has been found to suggest that taking part in sport has a negative effect on attainment levels in other areas of the curriculum, even if the curricular time is adjusted to increase the time spent on sport and PE and reduce the amount given to other subjects.
- In many cases, the evidence demonstrates that providing more opportunities for PE and sport within the curriculum is positively associated with improved academic performance and higher levels of attainment as measured by numeracy and literacy tests.
- Our data from Wales supports these research findings. We have demonstrated a positive relationship between frequent participation in sport and attainment levels. Schools that have higher levels of frequent sports participation (*hooked on sport*) are more likely to have higher percentages of pupils achieving the Level 2 threshold (5 GCSE or equivalent qualifications A*-C). The effects are the same even when taking into account socio-economic factors that we know can influence participation and attainment levels.

- The relationship of participating in sport during school years and attainment can be a long term one. At an individual level, adults who take part in organised sport when at school and enjoying sport at school are more likely to hold a formal qualification than those who did not take part or enjoy school sport.

Future employability

- Graduates in Wales who were active and participated in sport were more likely to live in affluent households than graduates who did not frequently participate. Similarly, non-graduates who were active and participated in sport were more likely to have above average household incomes than non-graduates who were not active. In both cases being active and participating in sport were linked to an increase in the proportion of people with above average household income.

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Introduction

The benefits of sport and physical activity in terms of the contribution that they make to people's individual health and well-being are well known. We would be rightly concerned if a young person left school unable to read or write and as a society we understand the subsequent impact that this would have on their life chances. Yet every year we seem to be comfortable allowing young people to finish their formal education without the necessary skills to keep themselves healthy and lead active livesⁱ.

Sport and physical education also have a valuable contribution to make in their own right within the education system, as well as to the health agenda. The development and mastery of sporting skills, the enjoyment of taking part, the sociability aspects and associated affective benefits are obvious to sport's advocates. There have also been many claims that taking part in physical education and sport can have a positive impact on the behaviour and attendance of school pupils, their self-esteem, their level of confidence, their ability to demonstrate positive social behaviours (in and out of education) and importantly, in terms of the influence sport and PE can have on overall academic achievementⁱⁱ.

This paper examines the scientific evidence and the weight of the case behind these claims. It considers both the range of critically reviewed academic literature from around the world as well as the evidence from Wales itself from the *School Sport Survey*ⁱⁱⁱ and *Active Adults Survey*^{iv}. The paper will focus on the following areas:

- The current state of play in terms of physical education in Wales
- The evidence, focusing on:
 - The relationship between PE, sport and behaviour at school
 - Can PE and sport have an impact on academic achievement?
 - What do we know about PE, sport, further and higher education and future employability?
- The potential solutions - what principles need to be considered in order to have an impact on the current situation?

The evidence reviewed covers sport and physical education during junior and secondary school years through to the role of sport in further and higher education. We also consider the longer term effects that participation in PE and sport during school years can have into adulthood.

Section 1: The current state of play

Physical Education (PE) is currently a statutory subject within the National Curriculum and the Welsh Government set out in its 2011 *Programme of Government* the commitment to make '*physical literacy as important as reading and writing*'. The 2013 progress report stated that Welsh Government remained "committed to ensuring children and young people are provided with basic physical skills from an early age and that physical literacy is as important a developmental skill as reading and writing". Developing a physically literate nation is a key part of to improving engagement in lifelong physical activity, a priority in Wales. In 2012, the Minister for Housing, Regeneration and Heritage (whose responsibilities included Sport), and the Minister for Education and Skills convened *The Schools and Physical Activity Task and Finish Group*¹. The group's aim was to provide recommendations to the Welsh Government on how operationalize the above commitment and how to develop the roles of schools in increasing the levels of physical activity in children and young people.

More recently, the prominence of health and wellbeing as one of the six Areas of Learning and Experience recommended in Professor Donaldson's review of the curriculum in Wales^v, in tandem with the aspirations of the Well-being of Future Generations (Wales) Bill^{vi}, highlight the need to ensure that the education process produces healthy and confident individuals. The importance of physical activity in achieving this goal is recognised.

Over the last decade, funding from Welsh Government has been available for the PE and School Sport (PESS) programme in Wales. This period of funding ended this year and the Welsh Government announced funding for a Physical Literacy Programme for Schools (PLPS) from September through to April 2015 with indicative funding till April 2016.

The aim of PLPS over this time period is to develop a Welsh Physical Literacy Framework that will have an impact on the number of young people who are physically literate. To trial this framework through a targeted intervention support programme for schools from the most deprived areas. This intervention will sit alongside Schools Challenge Cymru.

In Wales we have a wealth of data that helps us understand the current picture of PE and sport in Wales, and in the longer term, to evaluate whether these aims are achieved. Sport Wales runs the *School Sport Survey*, which in its current format has been capturing data on participation and provision of sport since 2011². The *School Sport Survey* is a survey of pupils and the teachers who are responsible for physical education (PE) and school sport delivery. It explores children's and young people's participation in extracurricular and community sport, and collects information about the provision of various PE and sports activities in schools across Wales. Pupils are asked about their attitudes to sport, what puts them off, and what would help them to do more.

¹ <http://wales.gov.uk/topics/educationandskills/publications/wagreviews/physical-literacy-review/?lang=en>

² Prior to 2011, separate surveys of participation in junior and secondary schools and separate surveys of PE provision have taken place. These were previously paper-based self-completion surveys of a sample of schools in Wales. The current *School Sport Survey* is open to all schools in Wales, including special schools and independent schools and uses online software to capture the data. There are many benefits of using an online approach, including better accuracy and quality of data collected, financial and environmental cost savings, plus time savings via improved systems of reporting results back to key partners.

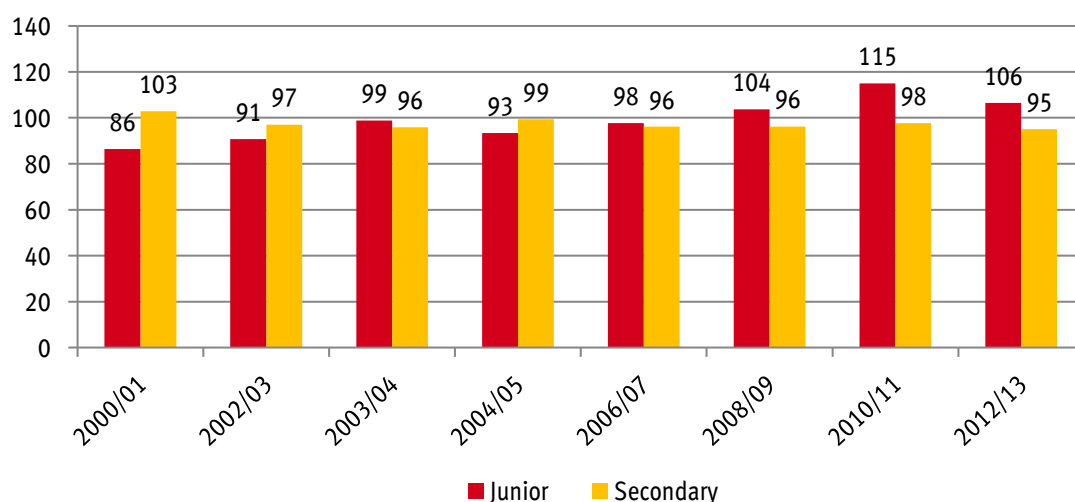
All junior and secondary schools in Wales are invited to take part in the survey. One staff member per school (usually the PE coordinator in primary schools and a Head of PE in secondary schools) is asked to complete a questionnaire to collect information on PE and sports **provision**. Two pupil questionnaires (one for secondary pupils, one for junior pupils) are used to collect information on sports **participation**.

The 2013 survey was the largest sports survey of its kind to date, with 865 responses received from junior schools covering Years 3-6 (66% response rate) and 195 from secondary schools, covering Years 7-11 (89% response rate). The survey captured the voice of almost 110,000 pupils. This gives extremely detailed evidence with which to explore the current picture of sport and PE for pupils and teachers in Wales, which we discuss below.

Provision of Physical Education and Extracurricular participation

Despite the fact that there has been a long standing aim in Wales and across the UK for schools to deliver two hours of high quality PE to every young person each week this is rarely achieved. Over the last ten years, there has been little shift in the amount of time allocated for PE within the curriculum, as shown in Figure 1 below.

Figure 1: Average number of minutes per week for curricular PE



The current picture shows that junior schools provide an average of 106 minutes of PE per week and secondary schools provide an average of 95 minutes of PE per week. While **53%** of junior schools do provide two or more hours a week, only **15%** of secondary schools do so. For pupils in Key Stage 4³

³ Key Stage 0: Nursery and reception years (3–5 years old). Now included as part of the Early Years Foundation Stage

Key Stage 1: Years 1 to 2 (5–7 years old)

Key Stage 2: Years 3 to 6 (7–11 years old)

Key Stage 3: Years 7 to 9 (11–14 years old)

Key Stage 4: Years 10 to 11 (14–16 years old). The exams at the end are typically of the GCSE level.

Key Stage 5 (more commonly referred to as Sixth Form): Years 12 to 13 (16–18 years old). The exams at the end are typically A-Levels, AS-Levels, NVQs or National Diplomas.

(those least likely to be active), the average time available for PE per week is 73 minutes, while at Key Stage 3 it is 109 minutes.

Where schools have a sixth form, they were asked whether during the academic year (2012-2013) was PE a compulsory subject, an optional subject, or unavailable for year 12 pupils. This excluded PE offered as an examination subject. 7% of schools reported that PE was compulsory for Year 12 pupils, 52% said it was optional and 41% said PE was unavailable. For those pupils who may not have as much access to sport outside of the school environment as others, this puts them at a disadvantage at an age where research from around the world shows that participation in sport and physical activity can start to decline.

Attitudes towards PE and Sport

Teachers who completed the provision survey on behalf of their school were also asked about their perceptions of sport and PE within the school. 54% of junior PE coordinators agreed that more time should be devoted to PE at their school and 87% of secondary Heads of PE, with 60% of those heads of PE agreeing strongly. Coupled with this, while 64% of junior PE coordinators agreed with the statement *'My school regards physical literacy to be as important as numeracy and literacy'*, 58% of secondary Heads of PE agreed with this and almost a third disagreed, with the rest neutral.

Although the PE lesson itself is not the only curricular opportunity that pupils have to learn about the benefits of health and physical activity and to develop the necessary physical competence and skills for lifelong activity, it is clearly the principal route to teach those skills in the school environment, along with the extracurricular opportunities that schools provide. We also know that the way PE is delivered does not always meet the needs of certain groups of pupils and in some cases can actively deter them from taking part in curricular time, let alone choosing to do extracurricular sport or to participate outside of the school environment.

Positively, the vast majority of junior pupils (92% of pupils) say they enjoy PE 'a lot' or 'a little', but only 40% of secondary school age girls say they enjoy it 'a lot' compared with 62% of boys. This has an effect on extracurricular participation. In Wales, 76% of pupils in Years 3-11 took part in extracurricular sport at least once in the 2012-13 academic year, but only 47% of pupils take part in extracurricular sport at least once a week. Age and gender have an impact on participation levels, with regular extracurricular participation (at least once a week) falling to around 40% of boys by Year 10/11 and 30% of girls. We also know that some ethnic minority pupils and pupils with a disability also tend to report more negative experiences of sport and PE and participate less than others. The offer and the delivery of that offer has to be made appropriate to different needs in order to engage with all pupils rather than some. Our *School Sport Survey* found that if pupils enjoy school sport 'a lot' they are **almost twice as likely to be regularly active** and take part in sport three or more times a week, they are **also more likely to be hooked on sport if they are confident and comfortable within PE**^{vii}.

The role of physical education

PE itself has historically been viewed as providing a benefit to health, and assisting a natural pattern of the growth of the child. While this is important in its own right, the subject of PE can provide a learning opportunity that no other subject covers in terms of its scope to achieve wide-ranging aims and opportunities for cross-curriculum learning. Stratton suggests “Within physical education, the development of motor skills falls within the psychomotor domain. Whereas this domain is unique to physical education as a national curriculum subject, it is but one of 4 domains of learning which physical educators espouse to”^{viii}. These domains are as follows:-

- Psychomotor:- skills/fitness;
- Cognitive:- Knowledge/understanding;
- Affective:- Attitudes/relationships;
- Behaviour: - Behavioural skills used outside physical education.

Through the process of planning, performing and evaluating, positive behavioural skills, motor skill, fitness, social skills and self-esteem should be promoted. Stratton goes on to say that overall, delivery of the physical education curriculum through these domains should result in the development of physical (psychomotor), and academic (cognitive) performance, which we discuss below.

Social Interaction

PE also provides a context in which there are opportunities for interpersonal competencies to be acquired, appreciated and shaped as a result of interactions with others. In particular, Almond cites the importance of PE in the development of social learning and relationships, as PE gives the opportunity for children to:

- learn to mix with others;
- establish relationships;
- co-operate on a task;
- share the learning process;
- show caring, consideration of others, unselfishness;
- learn trust and respect for others;
- exercise fairness and tolerance.^{ix}

Given that we know that PE has never in recent years formed a large part of the total curriculum time available, it is unlikely that increasing delivery alone will make a difference to the issues surrounding the current obesity ‘crisis’ and low levels of physical activity. Cale and Harris suggest “...it is important to be realistic about what physical education can achieve given the range of purposes it has been claimed to have and that it accounts for only a small proportion of young people’s time. In reality, physical education rarely takes up more than 1% of a child’s waking time

(Fox 2004) and at least half of this might justifiably involve only light or physically passive activity (Stratton et al., 2008). Therefore, physical education cannot by itself address the physical activity needs of young people (Fox et al., 2004) nor cannot or should not be held responsible for reducing obesity. **Rather, its role should be to stimulate interest, enjoyment, knowledge, understanding, competence and confidence in physical activity and sport for health and well-being** (our emphasis)^x.”

Taking into account the last highlighted point is critical if we are to make a difference to pupils’ lives in the long term. Our data tells us that PE and school sport does all of the things highlighted above for many pupils, it can also have a negative effect on some, and exactly the reverse effect to the one desired. Numerous studies have highlighted how teenagers, particularly girls, start to drop out of sport and become disengaged at adolescence, and qualitative research highlights the fact that girls have been put off sport for life by their negative experiences of PE lessons and the way sport was delivered when they were at school^{xixixiii} and more recently, we know that similar negative experiences are experienced by pupils from some BME groups and pupils who have a disability^{xiv}.

There is evidence to show that the level of basic movement skill can significantly predict the amount of time adolescents are involved in organised physical activity (Okely, Booth and Paterson 2001, cited in Baily et al page 8). Contemporary studies consistently show that mature movement patterns are not only influenced by maturation but also by environmental factors such as equipment, cue information and feedback. In other words, it seems that the role of physical education in teaching people how to develop movement skills and consequently the appropriate sporting skills for participation and future performance can have a direct impact on how active they will be. It is therefore imperative to lay the foundations through education (parental and school) so that individuals are able to take responsibility for their own health by being equipped to be physically active throughout their lives.

Providing an environment for learning where pupils can experience PE and sport opportunities that develop their ability, confidence and enjoyment (ACE) are a key part of helping to prepare pupils to develop the skills and behaviours required for lifelong participation in sport. Critical to this environment are teachers and other ‘deliverers’ of PE and sport. (Refer here to the Empowering Teaching findings and how this can be used going forward). Given the findings discussed above, increasing the emphasis we place on listening to and understanding the needs of different pupils is likely to have a positive impact on participation levels in schools and in the longer term, and should routinely be part of the teaching, coaching, planning and delivery of sport.

We have seen that curricular PE and sport can only do so much with its current allocation of time in terms of its contribution to physical activity levels, but its role in terms of engaging pupils, helping them become physically literate is crucial to an active healthy life during and beyond school years. As well as taking part and enjoying PE and sport for its own sake, getting this right means there are many accompanying benefits, which we discuss below.

Section 2: THE RELATIONSHIP BETWEEN SPORT, PE AND BEHAVIOUR

When we consider 'behaviour' in relation to PE and sport it can be viewed both as something that contributes to the development of positive behaviours to be learned and encouraged via participation, but that it can also be used as a tool to address poor behaviour – something that can help us 'fix' poor or disruptive behaviour. The value of PE and sport in their own right lies in the idea that they provide a vehicle for individuals to work collaboratively and constructively, to develop trust in each other, to be fair, respectful, to take personal responsibility – in short, sport and PE promote positive social behaviour and are enjoyed and valued by many.

In a curriculum that is under pressure for time, is it not surprising that advocates of PE and sport assert that good quality PE and sport can also have an impact on mental alertness, concentration and improved behaviour levels, which in turn provide optimum conditions for learning and academic performance in other subject areas. Disruptive behaviour clearly can have a negative impact on pupils' ability to learn and poor behaviour of some can have a negative impact on other pupils' ability to learn. In this section we explore whether there is evidence to substantiate the beliefs that taking part in sport and PE leads to improved classroom behaviour and attendance at school.

This premise that PE can contribute to positive behaviours is not a new one. Bailey et al^{xv} state that "The notion that games might prove to be an antidote to anti-social behaviour among working-class boys had been evident in government policy-making circles in Britain from at least the 1920s (Kirk 1992). In 1960, the Wolfenden report on Sport and the Community^{xvi} placed sport and games as a general social good for all and supported the notion that sport might be a common denominator for people who are from different social classes or from different nations. This notion of *sport for all* and the importance of ensuring equality of access and opportunity are still very much present today in our thinking around sport, PE and education (although it can be argued that the way that sport in schools and colleges is delivered does not entirely fit with this premise^{xvii}, despite the Equality Act 2010).

Moving towards more recent times, De Mondenard (1989) found that those provided with more physical activity were more calm and attentive with fewer disciplinary problems, and fewer days absent all of which could have a positive influence on academic performance (cited in Almond, L., and Sonia McGeorge (1998)^{xviii}. Research has shown that social benefits can be accrued from taking part in PE and sport, particularly in relation to skills such as cooperation, teamwork, empathy and personal responsibility (Ennis 1999; Wright, White and Gaebler-Spira 2004, cited in Bailey et al). There is evidence to show that pupils' attendance and behaviour and attitude within school can be improved through PE and sport (QCA 2001) as well as reducing anti-social or criminal behaviour (Cameron and MacDougall 2000, Andrews and Andrews 2003, cited in Bailey et al p10).

However, large scale and long term studies in this area have been lacking, and it is of course difficult to understand what other influencers are present in programmes and initiatives that aim to use sport and PE as a means of reducing anti-social behaviour. More recently, the Youth Sport Trust (YST) provided evidence to the 2010 Parliament Education Committee. They stated in a memorandum^{xix} that there is a growing evidence base that clearly demonstrates the impact of sport in improving behaviour and attendance in schools, and they commented that "the improvement of

both can also positively impact on academic achievement". The YST referenced a number of recent reports and 'in progress' studies that demonstrate the value of sport, and competition in particular, in improving the behaviour of young people. For instance, a recent Centre for Policy Studies report says:

*"Competitive sport provides many teenage boys with what they crave – **an outlet for their energy and aggression**, a group with which to identify and a chance to prove themselves in front of their peers and to win the approbation of older males. Boys are motivated by competition even if they lose." In Wasted: The betrayal of white working class and black Caribbean boys, Harriet Sergeant, 2010.*

YST also noted that in 2010 the Centre for Social Justice was undertaking a project into harnessing the power of sport to transform the lives of disadvantaged young people, recognising that:

"Sporting activity can serve as a means through which young people at risk of falling into crime, drug addiction or youth unemployment can be engaged and steered into educational or vocational schemes. In addition, much voluntary sector work has focused on the impact that sport can have upon pupil behaviour in schools, resulting in improved attendance, concentration, goal-setting and even academic performance. The possibilities for achievement and development contained within organised, structured recreational programmes are especially valuable when applied to those whose exclusion from education or involvement in drug use or petty criminal activity has left them with no comparable experiences."

There are strong beliefs that sport and PE are tools that can be used to effect positive change or diversion from undesirable behaviour, but less certainty over what processes are at work to create this process. We do know that physical activity itself has a positive effect on cognitive function, which is discussed below, and that it can suppress negative emotions. Researchers at Tel Aviv University^{xx} found statistical evidence that showed sports are beneficial to a child's behavioural, cognitive, and emotional well-being. Tests of 649 children showed that a continuous programme of sports helped to boost self-control and discipline, and reduced aggression in children. While verbal therapy does help children to control their behaviour, research indicates that it does not reduce negative emotions. Participation in sport, however, is able to reduce aggressive behaviour by suppressing those negative emotions.

The children researched participated in a variety of sports for five hours a week, three times a week, students ranging from grades 3-6 played group sports such as basketball or soccer. Twice a week, they participated in martial arts, including judo and karate. After 24 weeks, researchers compared questionnaires responses from the beginning of the program with those administered at the end. Results showed improvement in participants' self-control, self-observation, problem-solving skills, and delayed gratification—which ultimately led to a decrease in the incidence of aggression.

There was, however, less of an impact on girls compared with boys: girls had a much weaker response to sports programming than their male classmates and statistically, there was little change in the female population. Shahar, the main author of the study, reasoned that girls do not often suffer from the same aggression problems as boys, and are less likely to exhibit a passion for sport –

commenting that finding something that they loved and that motivated them was the key. This certainly reflects findings from School Sport Survey and numerous other research sources around gender and sport and PE if we want to successfully engage with all pupils in school, not just a selection.

PE is a subject that in its own right provides opportunities to learn positive behaviour and develop social skills. This review has found that there is also some scientific evidence to complement anecdotal reports on how pupils who have a good experience of taking part in PE and sport can have a positive impact on other classroom learning. This suggests that PE and sport can be used as a tool to reduce the potential for disruptive behaviour within the school setting, and used to help create optimum conditions for learning and academic achievement. The evidence around this is discussed in Section 3 below.

Section 3: CAN PE AND SPORT HAVE AN IMPACT ON ACADEMIC ACHIEVEMENT?

Around 25% of the Welsh Government's programme budget for 2013-14 was broadly allocated towards the outcome theme of improving the educational attainment of pupils in Wales^{xxi}. In this section we explore whether there is any evidence to support claims that levels of academic achievement be improved by taking part in sport and PE. If so, how does this happen – what mechanisms are at work? We then consider whether there is evidence to show that sport and PE specifically help with numeracy and literacy improvement and meeting Welsh targets. Does spending curricular time on PE and sport have any bearing on other subject areas?

The evidence on sport, PE and academic achievement

Research in this area is not new, but has shown mixed results. A classic study of the relationship between PESS and general school performance took place in France between 1951 -1961 (Hervet 1952, cited in Bailey et al). Researchers reduced 'academic' curriculum time by 26%, replacing it with PESS, yet academic results did not worsen and there were fewer discipline problems, greater attentiveness and less absenteeism (p14).

A second quasi-experimental study conducted between 1970 and 1977 involved 546 junior school students; this noted that students involved in an experimental 5 hours of physical education per week had a higher academic performance than their control counterparts who were enrolled in the normal school program for 40 min per week. The supplemental 260 minutes allocated to PE was necessarily taken from time for other academic teaching (i.e. an average 14% curtailment of academic instruction). Despite this curricular change, during the last 5 years of junior school, the overall academic performance of the experimental students improved relative to the controls (cited at <http://www.ijbnpa.org/content/5/1/10>).

Moving towards more recently published research, the Culture and Sport Evidence (CASE) programme, led by the Department for Culture Media and Sport, has studied published evidence on the varied benefits of sport. As part of this programme: <https://www.gov.uk/case-programme>, systematic reviews were conducted across the culture and sporting sectors to examine what

interventions are effective in delivering positive learning outcomes for young people. These reviews draw evidence from the CASE research evidence database established by the EPPI Centre at the University of London that includes over 5,700 sources. In 2010, Rowe^{xxii} summarised the results for sport:

- Young people's participation in organised sports activities, when compared to non-participation, improves their numeracy skills.
- Young people's participation in extra-curricular activities linked to organised sport, when compared to non-participation in extra-curricular activities linked to organised sport, improves a range of learning outcomes for underachieving pupils. These findings are based on six 'high' quality studies conducted in the United Kingdom and North America. Study populations included young people within the range of 4-16 years old.

The size of the impacts identified could be interpreted as follows:

- The participation of young people in organised sport could increase their numeracy scores, on average, by 8% above that of non-participants (all other things being equal).
- The participation of underachieving young people in extra-curricular learning activities linked to sport could increase their numeracy skills, on average, by 29% above that of non-participants (all other things being equal). These findings apply to both junior and secondary school aged children
- The participation of underachieving young people in extra-curricular learning activities linked to sport could increase their transferable skills, on average, by between 12% and 16% above that of non-participants (all other things being equal). These findings apply to both junior and secondary school aged children.

Rowe, as does Bailey et al, suggested that the lack of studies was a concern – only six were above the quality bar. This is part consequence of the standard being very quantitatively focused and requiring pre and post measures and control groups. There are arguments that other sorts of evidence (outside of the standard medical model) should also count.

More recently, research in the United States has suggested that participation in team sport is the only *extracurricular* activity that has a consistent and significant impact on students' grades at school (Irvin et al, cited in Bloom, 2013 – BUCS report). The development of mentoring relationships, the ability to work with others, time management skills, initiative, determination and focus were all said to be developed through team sport, which in turn had a positive impact upon students' grades. Participation in team sport was also related to a higher likelihood of completing high school and going on to university. The authors found that the positive effects of such activities remained the same regardless of students' socio-economic backgrounds.

Evidence, although limited in terms of the amount of high quality studies, suggests that taking part in PE and sport can improve academic performance.

Why do PE and sport improve attainment levels?

Most of the research in this area considers physical activity within PE and sport as a means of improving cognitive function. Kravitz (2010)^{xxiii} summarises some of the known effects of exercise on brain cognition in children. He reports that Sibey and Etnier (2003) concluded in their research review that a significant positive relationship exists between physical activity and cognitive function in children aged 4-18 years. They noted that physical activity improves a youth's perceptual skills, intelligence quotient, achievement, verbal tests, mathematic tests, developmental level and academic readiness. Hillman and colleagues (2008) propose the findings with brain function in youth clearly indicate that exercise early in a person's life can be of great magnitude for the improvement of cognitive health during childhood and this may extend throughout one's adult lifespan. The authors continue that many physical activity requirements in schools have been reduced or eliminated to increase a student's academic performance and yet no evidence exists that the removal of exercise has positively influenced academic achievement. In fact, Field, Diego and Sanders (2001) showed that high school seniors who did more exercise and sports participation (7 or more hours per week) had higher grade averages, used drugs less frequently, and had better parental relationships than those who did little exercise and sports participation (<2 hours) a week.

The Sport and Recreation Alliance's report *Game of Life*^{xxiv} includes a broad literature review into the impact of physical activity, nutrition and obesity on cognitive ability and school performance. They report that Burkhalter and Hillman (2011) concluded that the evidence supports a positive association between physical activity participation and increased cognitive health and function, and, furthermore, that obesity is associated with poor cognitive health. The review concludes that evidence for the relationship between physical activity and cognitive health either shows a positive relation or none at all, but that on balance because participating in physical activity doesn't detract from educational performance and has additional health benefits, the relationship can be perceived as a positive one.

This supports the findings of Trudeau and Shephard's (2008) review of school-based physical activity, school sport, physical education and academic performance. They summarised that quasi-experimental data indicate that allocating up to an additional hour per day of curricular time to PA programmes does not affect the academic performance of junior school students negatively, even though the time allocated to other subjects usually shows a corresponding reduction. An additional curricular emphasis on PE may result in small absolute gains in grade point average (GPA), and such findings strongly suggest a relative increase in performance per unit of academic teaching time. Further, the overwhelmingly majority of such programmes have demonstrated an improvement in some measures of physical fitness. From their review, the researchers conclude that, "physical activity can be added to the school curriculum by taking time from other subjects without risk of hindering student academic achievement. On the other hand, adding time to 'academic' or 'curricular' subjects by taking time from physical education programmes does not enhance grades in these subjects and may be detrimental to health" (Trudeau and Shephard, 2008^{xxv}).

The authors of *Game for Life* note, however (p92), that it is difficult to control for any potential bias with cross-sectional studies, and in particular the researchers highlight socioeconomic status as a potential confounder given that it is a strong predictor of both academic achievement and

participation in physical activity for children. We take account of this in our analysis of data from Wales, discussed further below. The authors state that nevertheless, in the studies where confounding variables were controlled the results remained true. A cross-sectional survey of 9,000 Australian schoolchildren aged between seven and 15 found that academic achievement was positively associated with physical activity and that this was statistically significant for girls and boys (Dwyer et al., 2011, cited in Trudeau and Shephard, 2008).

This evidence suggests that it is the physical activity element of PE and sport that has a physiological effect on cognition and improved learning across the curriculum. More research is needed to understand what other processes occur through taking part in PE and sport that are associated with academic performance. In the section below, we consider whether levels of numeracy and literacy and attainment targets specifically are associated with participation in PE and sport.

Sport, PE and numeracy and literacy

The *Game for Life* report makes reference to research undertaken by Chomitz et al. in 2009, who found that the likelihood of passing the maths and English achievement tests increased with the number of fitness tests passed, and that this relationship was stronger for maths. 35% of those who passed no fitness tests passed maths, compared to 80% of pupils who had passed all five fitness tests. Further analysis calculated that after controlling for variables, the odds of passing the maths test increased by 38% for each increase in number of fitness tests passed. For English, 73% of pupils who didn't pass fitness tests passed English compared to 93% of those who passed the five fitness tests. Again from further analysis the researchers calculated that after controlling for variables, the odds of passing the English test increased by 24% for each increase in number of fitness tests passed. Unfortunately the research gives us no understanding of why maths performance was more positively affected by physical fitness and cannot establish causality, but the authors suggested that may be that individuals who are more motivated to achieve academically are also more highly motivated to achieve in fitness tests.

An alternative suggestion is that PE and sport can offer many opportunities to directly bring in cross-curricular learning via mathematical understanding. The national curriculum states that in PE, learners develop their number skills by using mathematical information and data. They use the language of position (including co-ordinates and compass points) and movement, as well as data handling and measures in athletic and adventurous activities. They use scale in plans and maps. They measure and record performances, e.g. time, distance and height, and use the data to set targets and improve their performance^{xxvi}. This is just one example of how PE can provide an opportunity for rounded curriculum learning – PE can also provide multiple opportunities for pupils to develop skills in communication, ICT, and personal and social education (PSE).

Many of the studies referred to here use Maths and English performance as a measure of overall academic performance, although this doesn't necessarily give a rounded picture of children's academic abilities. However these subjects are essential for continued study, future employment prospects and the evidence for improvements in attitude and attention span in younger children as a result of being more physically active apply to any subject being studied. One of the most prominent

theories suggests that academic performance is enhanced because of physiological changes in the brain that result from the physical changes in the body associated with exercise (as outlined above). Another proposes that the process of physical activity provides children with learning experiences and the opportunity to develop mechanisms that aid proper cognitive development and which can be transferred into other areas of life (Sibley and Etnier, 2003).

Evidence from Wales

We have seen that a range of academic research from over the past 50 or so years highlights that PE and sport can have a positive relationship with attainment levels. We have undertaken secondary analysis of *School Sport Survey* data and Welsh Government educational attainment data from the academic year 2012-2013, to explore whether similar relationships can be demonstrated from our latest data sets for Wales.

Partial correlation was used to explore the relationship between participation in sport (the percentage of pupils participating in three or more sessions per week which we describe as being '*hooked on sport*') and educational attainment levels as defined by the percentage of pupils achieving the Level 2 threshold of 5 GCSE or equivalent qualifications A*-C).^{xxvii}

Our analysis reveals a positive association between these variables. Since this relationship is likely to be strongly influenced by socioeconomic factors, with pupils from lower income families in the main having poorer grades and low levels of sports participation, we explored the association further using data on free school meal entitlement (% of pupils entitled to free school meals) to control for this effect.

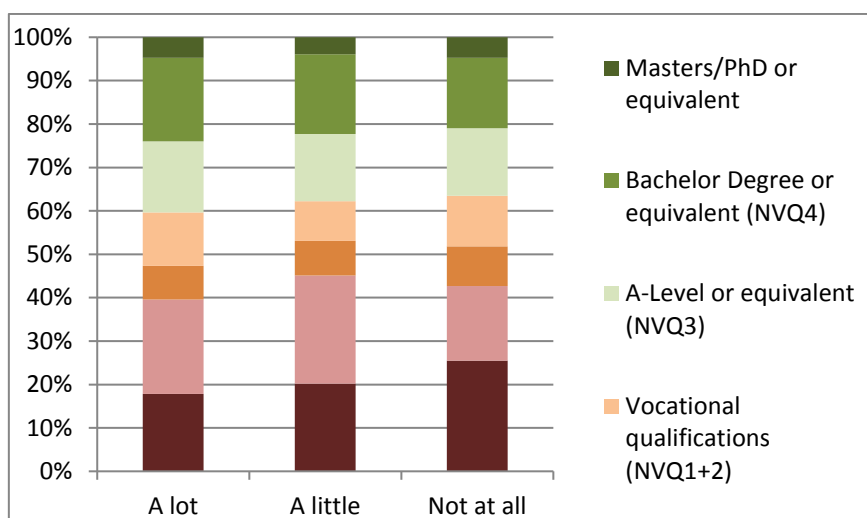
Despite adjustments for this confounding variable, a significant association remained between levels of sport participation and educational attainment. Those schools with a greater proportion of pupils who are '*hooked on sport*' were also more likely to have a higher percentage of pupils who gained the Level 2 threshold (5 GCSE or equivalent qualifications A*-C).

Active Adults Survey analysis

What are the links between taking part in sport and future employability or academic achievement levels? The evidence cited above has shown a positive relationship – but are there any links or relationships within our *Active Adults Survey* that indicate a longer term effect of taking part in sport at school?

Figure 2 shows that those adults who did not enjoy sport at school are more likely to have no formal qualifications and less likely to achieve further qualifications. Adults that enjoyed sport 'a lot' or 'a little' while at school were more likely to achieve a GCSE than those who did not enjoy sport at all. A higher proportion of adults that enjoyed sport a lot achieved A—levels or degrees. A point to note is that despite many not enjoying sport at all at school they were still able to achieve higher degrees. This suggests that the relationship between sport and academic achievement is not straightforward.

Figure 2: Enjoyment of sport at school compared to highest qualification achieved



Active Adults 2012 Base: all adults in Wales, aged 15 and above (n=13,145)

The Active Adults Survey also asks to what extent respondents agreed with the statement ‘While at secondary school, I regularly took/take part in organised sport outside of school lessons’. Table 1 shows the results.

Table 1: Percentage of adults who participated in organised sport outside of school lessons while at school and their level of qualification

| | Completely agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Completely disagree | Total |
|--------------------------------------|------------------|----------------|----------------------------|-------------------|---------------------|-------|
| No formal qualifications | 13.5 | 19.3 | 20.2 | 26.9 | 28.1 | 19.9 |
| GCSE/O-level/CSE | 19.9 | 24.2 | 25.1 | 22.4 | 21.2 | 21.4 |
| Vocational qualifications (NVQ1+2) | 11.9 | 11.1 | 11.0 | 11.4 | 10.7 | 11.3 |
| A-Level or equivalent (NVQ3) | 18.9 | 14.5 | 12.8 | 12.9 | 13.6 | 15.9 |
| Bachelor Degree or equivalent (NVQ4) | 21.5 | 18.3 | 16.2 | 13.4 | 15.0 | 18.3 |
| Masters/PhD or equivalent | 5.5 | 4.6 | 4.4 | 3.4 | 3.2 | 4.5 |
| Other | 8.2 | 7.8 | 9.5 | 8.4 | 7.3 | 8.0 |

| Quality of statistics | | |
|-----------------------|---|-------------------|
| No shading | Estimate is precise | $0 \leq CV < 5$ |
| | Estimate is reasonably precise | $5 \leq CV < 10$ |
| | Estimate is considered acceptable | $10 \leq CV < 20$ |
| | Estimate is not reliable or CV is not available | $CV \geq 20$ |
| - | Value is suppressed due to small cell size (i.e. <30 people gave that response) | |

Table 1 highlights that if adults disagreed that they participated in organised sport outside of school they were more likely to hold no formal qualifications than those that did participate. Those that

achieved A-level qualifications and degrees were more likely to agree they participated in organised sport outside of school lessons while at school. Therefore the table also demonstrates **that those who participated in organised sport outside of school lessons while at school are most likely to remain in education and achieve further qualifications.**

Key points

- No evidence has been found to suggest that taking part in sport has a negative effect on attainment levels in other areas of the curriculum, even if the curricular time is adjusted to increase the time spent on sport and PE and reduce the amount given to other subjects.
- In many cases, the evidence demonstrates that providing more opportunities for PE and sport within the curriculum is positively associated with improved academic performance and higher levels of attainment as measured by numeracy and literacy tests.
- Our data from Wales supports these research findings. We have demonstrated a positive relationship between frequent participation in sport and attainment levels. Schools that have higher levels of frequent sports participation (*hooked on sport*) are more likely to have higher percentages of pupils achieving the Level 2 threshold (5 GCSE or equivalent qualifications A*-C).
- The relationship of participating in sport during school years and attainment can be a long term one. At an individual level, adults who take part in organised sport when at school and enjoying sport at school are more likely to hold a formal qualification than those who did not take part or enjoy school sport.

To this end, this evidence reaffirms the recommendations made in the PE Task force report to make PE a core subject. The evidence suggests that increasing the time given to *appropriate, high quality PE and sport* could contribute to improved levels of attainment in schools. With Wales falling in rank with its PISA⁴ scores in 2012^{xxviii} there is potential for sport and PE to be used far more widely as a supporting tool towards the Welsh Government aim of improving into the top 20 PISA nations in the 2015 tests^{xxix}. There is no evidence to suggest that spending more time on PE and sport could have a poor impact on numeracy and literacy targets – and in fact, increasing provision could have a positive effect.

In the final section below, we consider the longer term potential impacts of getting the initial PE and sport offer ‘right’ within the education system. We consider the evidence around the role of sport within the FE/HE sector and its connections with employment levels in adult life.

⁴ In 2012, the latest PISA international education tests scores were published and they showed that Wales has fallen in ranking and were bottom in the UK. Welsh Government commissioned the Organisation of Economic Cooperation and Development (OECD) to undertake a review and they reported that "From an international perspective, the performance of 15-year-olds in Wales on Pisa is low overall, and there are too many students performing at low levels. The Pisa 2012 reading and science assessments showed that almost one in five Welsh students did not achieve level two which is considered the baseline of proficiency at which students begin to demonstrate competencies to actively participate in life".

Section 4: SPORT, EDUCATION AND EMPLOYMENT OPPORTUNITIES

In 2013, Sheffield Hallam undertook a study on behalf of British Universities & Colleges Sport (BUCS) ^{xxx} to look at *'The Impact of Engagement in Sport on Graduate Employability'*. A key question was 'Does engagement in sport impact positively on graduate employment and longer term employability?' They reviewed literature, undertook junior research of a survey of graduates and secondary analysis of Sport England's and the Department for Culture, Media and Sport's (DCMS) *Active People Survey*. Their study included graduates from a range of ages and different subject areas, with over 5,800 graduates responding. There was not an over-representation from those graduates that studied sport-related courses, as these accounted for just 1.6% of the sample.

Their key findings were that:

- Secondary analysis of the Sport England Active People 6 dataset (155,853 responses) reveals that graduates who take part in sport have a higher annual household income than graduates who do no sport. This premium is £6,344 per annum.
- For graduates who take part in sport and undertake volunteering activity related to sport the difference in annual household income is even higher, a further premium of £2,704 per annum.
- The graduate survey found a similar relationship to the findings in the Active People Survey data. Those who took part in sport at university (£32,344) had a personal income greater than those who attended the gym only (£28,080), or did not engage in sport (£26,728). Those who did not engage in sport had the lowest levels of income. In short, participation and volunteering in sport is associated with a premium in salary of between £4264 and £5616 per annum.
- Graduates who had also been involved in the organisation and management of university sport reported that this experience had the greatest impact on developing key skills for employability. Furthermore they were also the least likely to have encountered a period of unemployment in their career than other groups.
- Graduates who did no sport and no other extra-curricular activities at university were amongst the lowest earners, and were the most likely to have had periods of unemployment.

This research covered students from across the UK, but there was no breakdown of analysis specifically for Welsh students. Therefore we have undertaken secondary analysis of the recently published *Active Adults Survey* data in a similar way to this study, showing some important comparable findings.

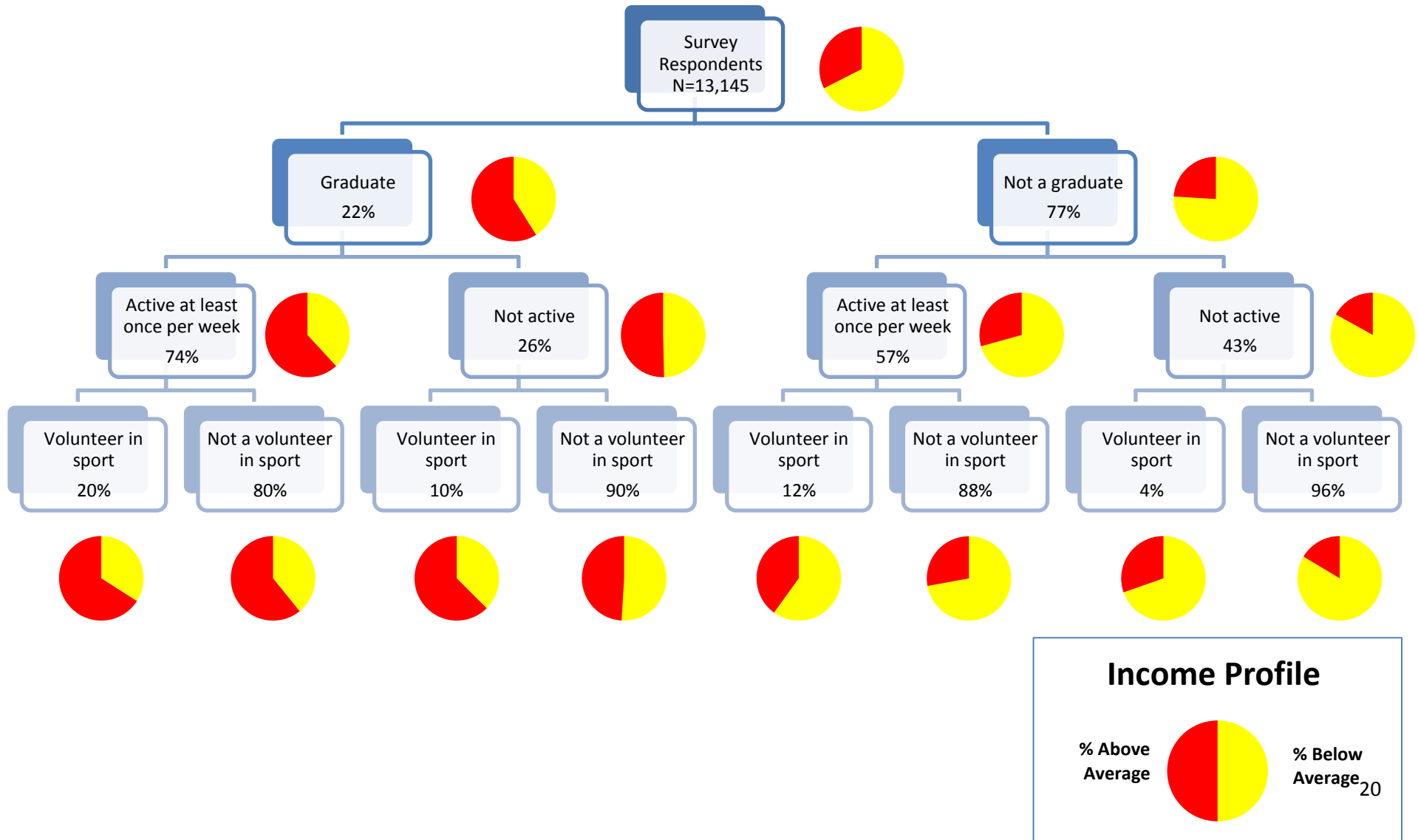
Active Adult Survey 2012 was explored with regards to average annual household income in order to determine whether there was a relationship between income levels; whether or not respondents were graduates; whether or not they were active and took part in sport; and whether or not they

volunteered in sport. In 2012, 13,145 adults aged 15 and over took part in the survey. The average household income in Wales was approximately £31,200 and the majority of respondents lived in households with income below this level⁵. Most survey respondents did not hold a graduate bachelor's degree or above, however, 22% of the sample consisted of graduates.

Figure 3 below shows the results.

⁵ Note: An average annual income of £31,200 presents an overoptimistic scenario and is skewed by the activities of the most affluent households. This means that the mode (most frequent) and the median (the middle value) are most likely to fall in the lower income categories (see below). Regardless for the purpose of this study it provides an adequate yardstick with which to study the effects of education, and engagement with sport.

Figure 3: The impact of education, participation in sport and volunteering on household income



The main findings from the analysis are:

- Almost three in every four graduates (74%) were active and participated in sport at least once per week. Non-graduates were less likely to be active and participate in sport;
- The income profile of graduates compared favourably with non-graduates. A greater proportion of graduates (59%) had above average household incomes (the corresponding proportion for non-graduates was 24%);
- Graduates who were active and participated in sport were more likely to live in affluent households than graduates who did not frequently participate. Similarly, non-graduates who were active and participated in sport were more likely to have above average household incomes than non-graduates who were not active. In both cases being active and participating in sport were linked to an increase in the proportion of people with above average household income;
- Those who were active and participated in sport were more likely to be a volunteer in sport. Respondents who volunteered in sport were more likely to have above average household incomes than those who did not volunteer;
- The proportion of respondents with above average household income was highest (66%) amongst respondents who were graduates and were active and participated in sport and volunteered. In contrast the highest proportion of respondents with below average annual household incomes was non-graduates who were not active and did not volunteer in sport;
- While these results do not enable us to prove any causal links between education, sport activity, and income they were indicative of a positive relationship.

‘Employability’ - What do employers think about the role of sport?

Sport and Physical Education have a specific role in further and higher education as well as in the school setting. There are many benefits of sport as a vehicle for improving an individual’s employability – not only studying sport for a career in sport/PE itself, but as a means of being a more employable person in any number of spheres.

The authors of the BUCS report interviewed a wide range of employers on this issue and their opinions were almost without exception positive. 78 different employers completed an online survey on the topic and only five were less positive about the impact of sport, making comments to indicate that they either did not believe that sport has an impact upon employability or that they believed participation in other extracurricular activities was more beneficial. In addition, the researchers had positive feedback about the benefits of engagement in sport for graduate employability from other sources including email correspondence, telephone interviews and face-to-face interviews at a Graduate Recruitment Fair.

The authors note that in some cases, employers stated that they sought out participation and experiences of sport as part of the recruitment process and as a means of candidate selection. The benefits gained by taking part in sport were valued as key transferable skills into the employment market and the ability to function well in a variety of roles and circumstances. For example, employers described a wide range of skills and attributes as being developed through participation in sport, many providing a long list of potential attributes that would all be valuable in applying for a job in their organisation. The following table, reproduced from page 45 of the authors' report, lists the main employability attributes which were mentioned by employers as being developed through sport.

Figure 4: The Employers' perspective on employability attributes developed through sport^{xxxi}

| | | |
|--------------------------------------|---|-------------------------------|
| Team working | Motivation | Communication |
| Networking/social skills | Confidence | Time management |
| Competitiveness | Resilience | Personal drive |
| Commitment | Able to take instruction | Self-awareness |
| Respect for others | Sense of fun | Tenacity |
| Breadth of interests | Leadership | Organisational skills |
| Flexibility | Good health and mental wellbeing | Self-discipline |
| Determination | Ambition | Problem solving skills |
| Planning and strategic skills | Passion | Energy |
| Ability to multi-task | Initiative | Self-respect |
| Pride | | |

Employers also talked about the health benefits of participation in sport. Firstly, participation was seen as indicative of graduates being fit and healthy, therefore more capable in the workplace on a day-to-day basis due to higher energy levels, stamina and productivity, and resulting in less chance of them taking time off work due to sickness. Secondly, keeping fit and healthy was seen in relation to individuals having a sense of personal responsibility, a care in one's personal appearance and pride in looking after oneself, demonstrating self-discipline, awareness and commitment to self-improvement, and the ability to set and achieve personal goals, all of which were qualities which were valued within the workplace. (p47)

The research summarised in this section demonstrates that sports participation is associated with higher earning potential and clear skills and attributes that support applications for employment and help with performance within the workplace. From participation in sport and PE from early years through to higher education and beyond, evidence suggests that the role of sport within education plays a critical role in the long term success of the system.

Conclusion

The evidence reviewed demonstrates that PE has a critical role in the curriculum - not only in terms of health but the potential impact it can have in helping us meet numeracy and literacy targets, as well as providing a rounded learning experience with many associated benefits. Embedding physical literacy within the school environment can help deliver the aspiration of 'healthy and confident' young people in Wales.

The findings of this review make a case for increasing the amount of time given to PE and sport in schools, particularly from early years. However, it also has to be the *right* kind of delivery otherwise it deters pupils from taking part. Getting it wrong has lifelong consequences.

The quality of teaching and delivery of PE will be crucial. Pupils will be far more likely to enjoy good quality provision, which in turn will help them develop the skills to allow them to participate and take the first steps to lifelong activity. Evidence demonstrates that providing more opportunities for PE and sport within the curriculum is positively associated with improved academic performance and higher levels of attainment as measured by numeracy and literacy tests. Physically active children tend to outperform their inactive peers in the classroom and on tests of achievement. Physically active children also have increased concentration and enhanced attention spans when compared to their less active peers^{xxxii}. Pupils who achieve better attainment levels may have access to more options via Further and Higher Education – and in turn the evidence demonstrates this can have a positive effect on their future employment prospects.

To create the right environment for pupils and students to take part in sport we will need to consider how we support a workforce of empowered teachers; how we ensure initial teacher training structures are successful and how we provide appropriate facilities and create engaging schools where head teachers and staff are supportive of a wide ranging curriculum and sport and physical activity are as important as other subjects. When designing a programme of opportunities for young people to take part in PE and be active then we should take into account all the information we know about how gender, poverty and race can affect participation and academic achievement. Individual pupils experience the same curriculum quite differently^{xxxiii}.

We can get help ourselves get delivery right by paying attention to pupil voice and we have the mechanisms in place to do this. The School Sport Survey (SSS) and Further Education Sport Survey will continue to provide evidence in relation to PE and sport, and findings can be used to kick-start discussions with pupils and partners. We need to take account of the rights of the child to have their opinions considered in the education system and ensure that they feel that they can participate in decision-making in their school.

Creating positive habits from an early age can be easier and more sustainable than trying to influence attitudinal shifts later in life. Providing an optimum learning environment for PE will increase our chances of developing a physically literate nation who are equipped with the skills to stay healthy and active for life.

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