

SEXTON: AN INVESTIGATION INTO WHETHER THERE IS A LINK BETWEEN PRIMARY SCHOOL CHILDREN'S PHYSICAL ACTIVITY LEVELS AND THE TIME SPENT ON SCREEN BASED ACTIVITY ON A TYPICAL SCHOOL DAY

An investigation into whether there is a link between primary school children's physical activity levels and the time spent on screen based activity on a typical school day

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Abstract

This study examines the relationship between children's physical activity levels and time spent on screen based activity during a typical school day. This study involved 273 pupils at Key Stage 2 in six different primary schools in Northern Ireland.

Results for physical activity were obtained by attaching a pedometer at the waist of each member of the cohort at the beginning of the school day. The pedometer was then removed at the end of the school day and the number of steps taken was recorded. Time spent on screen based activity was measured in the form of a questionnaire. Each subject was asked how long in minutes they spent on the following screen based activities; watching television, playing I-pad, using a mobile phone, using a personal computer (PC), playing a console e.g. X-Box, PlayStation.

Results from the pedometers indicated that children at Key Stage 2 take an average of 3680 steps on a typical school day, with a slight variation between genders. Results from the screen time questionnaires suggest that children aged 8-11 spend an average 4.5 hours on screen based activity on a typical school day. The majority of this time spent on screen based activity was spent playing an I-pad or android with an average time of 63 minutes.

Statistical analysis, in the form of a spearman rank test found that there was a negative correlation between time spent on physical activity and time spent on screen based activity. Further research into the links between children's physical activity levels and time spent on screen based activity is needed.

Key words

Physical activity, screen based activity, children.

Introduction

1.1 Background to study

Empirical evidence suggests that regular physical activity during the primary years can reduce the likelihood of developing various diseases in adult life. The World Health Organisation (2010) states that participating in one hour per day of moderate to vigorous physical activity can lead to a more favourable health risk profile in adulthood. However, evidence suggests that only half of 7 year olds in the UK are meeting the recommended levels of physical activity (Griffiths et al., 2013). This statistic has contributed to a reported obesity epidemic, with studies indicating that 8% of children aged 2-15 years were assessed as being obese (PHA, 2012). This has led to the Northern Ireland

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government's publication of a 10 year strategy to tackle the problem. At the heart of the strategy to reduce childhood obesity is an emphasis on increasing physical activity levels of children. However, there are a number of contributing factors to this health problem. Physical inactivity, a high calorie diet, increased sedentary behaviour, genetic predisposition and geographical factors can all influence the overall health of a person.

One of the perceived influences on physical inactivity is an increase in screen based activity amongst children. Research by Sigman (2012) indicates an alarming trend that children are spending too much time on screen based activities and this not only effects physiological well-being but can cause psychological problems due to a rewiring of the brain's circuitry. Despite the warnings of excess screen use, a study by Hinkley et al (2012) found that pre-schoolers spent on average 118 minutes on screen based activity each day. Increased screen based activity is not confined to the UK. A rise in obesity levels amongst children in the U.S and Australia have led to respective governments producing guidelines which suggest that children should be limited to two hours screen time per day.

1.2 Need for study

As childhood obesity and its associated complications often extend into adulthood, a heightened interest in the investigation of the factors involved has arisen. An issue which has received particular focus is children's use of their leisure time. The amount of time children spend in sedentary activities such as watching television, using the computer, or playing video games has increased and is potentially replacing time spent being physically active. A study by Hinkley et al. (2012) supports this view by concluding that the majority of young children are not participating in adequate amounts of physical activity and in excessive amounts of screen-based entertainment.

It could be said that time spent on screen based activity could be time spent being physically active, therefore there is a correlation between the two. However, there is no evidence to suggest that children who spend less time on screen based activity are predisposed to spend more time on physical activity (Melkevik et al., 2010).

There is also conflicting arguments about the effects of too much screen based activity. Those who suggest the dangers point to the fact that other countries, including Australia and Canada, have published guidelines for recommended screen time use for children. However, there is no recommended screen time limit in the UK suggesting that it is not an issue for concern. Moreover, previous studies on the relationship between children's physical activity levels and screen based activity have proved inconclusive (WHO, 2010).

1.3 Aims and objectives

The aims and objectives of this study are to determine if a relationship exists between the two variables: children's physical activity levels and the time spent on screen based activity on a typical school day. The objectives will be met by using pedometers to measure the number of steps taken by each subject over the course of the day. Children's screen time use will be measured in the form of a questionnaire on screen based activity. Six schools have been chosen to ensure a substantial body of results. All results will be recorded and published on a Microsoft Excel document and a variety of graphs. A statistical analysis will be carried out to identify if a relationship exists between the two variables aforementioned.

Review of literature

2.1 Physical activity

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Green and Hardman (2005) define physical activity as 'a complex behavioural variable that varies from day to day, in intensity, frequency and duration, and consists of both unavoidable activity and voluntary activity.' The World Health Organisation (WHO, 2014) defines physical activity as 'any bodily movement produced by skeletal muscles that requires energy expenditure.' Europe, and in particular, Northern Ireland is said to be suffering from an obesity epidemic. Physical inactivity, though not in isolation, is one of the major contributing factors. A study by Griffiths et al (2013) found that only half of seven year old children in the UK achieve recommended levels of physical activity. The Public Health Agency (PHA, 2013) for Northern Ireland reported that 76% of 9-11 year olds do not meet the recommended physical activity levels. The WHO state in their publication, 'Global recommendations on physical activity for health' (2013) that physical inactivity is now identified as the fourth leading risk factor for global mortality.

There is a wealth of empirical evidence which suggests that physical activity has a direct link with health. The amount and type of physical activity taken during childhood can be used a barometer of the likelihood of developing health problems such as obesity or type 2 diabetes in adult life. A study by the American College of Sports medicine (2006) found that physically active persons can reduce the risk of coronary heart and cardiovascular disease by as much as 50%. Physical activity is reported to have numerous fitness and health benefits. The World Health Organisation (WHO, 2011) suggests the scientific evidence available for the age group 5–17 years supports the overall conclusion that physical activity provides fundamental health benefits for children and youth. Appropriate levels of physical activity contribute to the development of: Healthy musculoskeletal tissues (i.e. bones, muscles and joints); Healthy cardiovascular system (i.e. heart and lungs); Neuromuscular awareness (i.e. coordination and movement control); and it also facilitates maintenance of a healthy body weight.

The physical benefits of physical activity have been well documented. However, regular participation in physical activity can also lead to positive mental attitudes and reduce levels of stress and anxiety. The chief medical officer (CMO) for Northern Ireland, Dr McBride (DHSSPSNI, 2014) supports this view suggesting, "Being physically active has undoubted benefits for everyone's health and wellbeing. It helps protect against many of Northern Ireland's biggest causes of early death like heart disease, obesity and stroke. It also makes you feel better and helps promote good mental health." In support of this, Campos (2011) suggests that, 'exercise leaves people with feelings associated with accomplishment, productivity, and enthusiasm about further exercising.' WHO guidelines suggest that children aged 5-17 years old should accumulate at least 60 minutes of moderate to vigorous-intensity physical activity (MVPA) daily. In support of these guidelines, Janson and Leblanc (2010) suggest there is strong and consistent evidence to suggest that participating in as little as 2 or 3 hours of MVPA per week is associated with health benefits. Furthermore, a recent publication by UK Chief Medical Officers (2013) launch advice on activity and fitness levels state that children and young people (5-18 year olds) should partake in physical activity for 60 minutes and up to several hours every day, three days a week and this should include vigorous activities that strengthen muscles and bone.

The current Northern Ireland curriculum (CCEA, 2007) lists physical education (PE) as one of its seven areas of learning. This is to be provided through opportunities to take part in; athletics, games, dance, swimming (Key Stage 2 only) and gymnastics. However, schools do not have a statutory requirement on the amount of PE they are to teach. The Department of Education for Northern Ireland (DENI) recommends that schools should provide pupils with a minimum of 2 hours curricular PE per week. PE4 life (2005) identifies the importance of physical education suggesting that, 'It provides the skills that allow young people to take responsibility for their own health. 'The British Heart Foundation (BHF, 2010) indicates the important roles schools have to play by stating,

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Schools need to maximise the opportunities for children to take part in physical activity during and around the school day. Children should be encouraged to participate in extracurricular activities, to be physically active at break-times and to walk and cycle to school.

The statistics aforementioned on levels of physical activity provide alarming reading. Physical inactivity during childhood is a major contributor to the development of chronic diseases in adult life and thus has a profound impact on healthcare costs. It would appear that schools are best placed to instil the habits of physical activity for lifelong participation.

2.2 Screen based activity

Screen based activity is said to include: time spent watching television; time spent on a laptop, tablet or PC and also time spent using a mobile device. With regard to computer usage; the dawn of social media and associated internet sites has seen an increasing number of people using computers for longer periods of time. Computer use is also widespread among children. Sigman (2012) suggests that by the age of ten, children in Britain have access to five different screens at home. Moreover, a BBC report (2007) found that four in ten children aged between 8 and 11 years are regularly using the internet, and even very young children have PCs or laptops in their bedrooms. In support of this, data collected from Kids' Life and Times (KLT) survey (2009) indicate widespread access to, and use of, technology such as mobile phones and computers among primary seven children in Northern Ireland. This increase in technology is evident in other countries too suggesting a possible global trend. The American Association of Paediatricians (AAP, 2013) state, the average 8-year-old spends eight hours a day using various forms of media.

Modern advances in media and technology, particularly in the last decade, have changed the way people live. The way people cook, clean, travel and indeed the way people communicate involve just some of these advances in technology. Modern society has been referred to as a 'net generation' where information is available at the touch of a button. Facebook, Twitter and Snap chat are part of common parlance and form an integral part of many people's daily lives. Some of the benefits of screen based activity include; the entertainment value through games and videos; the educational value through access to information via the internet and the communicative value through social media, email and video calls. However, there are contrasting opinions on the physiological and psychological impact of screen based activity. This increase in computer usage, particularly in children, has caused some concern amongst certain groups in society. A recent study at Bristol University (2010) carried out on 1000 children found that those children who spent more than two hours per day watching TV or using a computer were at an increased risk of psychological difficulties. Furthermore Langhammer (2014) of the ATL said:

We're hearing reports of very young children who are arriving into school quite unable to concentrate or to socialise properly because they're spending so much time on digital games or social media.

Recent reports suggest that over exposure to violent computer games is related to a greater propensity for aggressive behaviour. An ATL report (2012) found that children are becoming more violent as they are being left unsupervised by their parents to play inappropriate computer games. A study by Browne et al. (2005) concluded that there is consistent evidence that violent imagery in television, film and video and computer games has substantial short term effects on arousal, thoughts and emotions, increasing the likelihood of aggressive or fearful behaviour in younger children, especially in boys. Another adverse effect of screen based behaviour is cyber bullying.

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Anderson et al. (2007) state that, 'This type of communication has provided fertile ground for the bully to send mean or obscene messages to others.' As children have more access to internet and social media sites many children are vulnerable to online bullying. In light of recent negative attitudes towards over exposure of media, the shadow public health minister for the UK (2013), Diane Abbott, has also called for parents to cut the amount of time families spend in front of the television or playing on a computer. Similarly, the U.S Department of Health (2012) published its recommendations that, children less than two years of age should not be in front of a screen at all and that over that age the maximum screen time should be limited to two hours per day.

Whilst computer and media use has obvious educational benefits many people feel that there are associated risks of overuse and that their educational value has been overplayed. A European based study of 15-year-old students in 31 countries concluded that those using computers at school several times a week performed 'sizeably and statistically significantly worse' in both maths and reading than those who used them less often, (Fuchs and Woessmann, 2004) as cited in Sigman (pp106, 2012) .

Screen based activity is not limited to leisure time. Using ICT is one of the cross curricular skills of the current Northern Ireland Curriculum, (CCEA, 2007). Therefore, computer usage has become an integral part of the modern classroom. A recent publication from the Department of Education for Northern Ireland (DENI, 2013) states,

Access to the 'digital classroom' and its e-learning tools, lessons and resources will be possible from any internet connected device, 24 hours a day - allowing teachers, pupils and parents to work in partnership to support learning.

Combine this with the UK government's agenda to introduce coding to children at Key Stage one (BBC, 2014) and it is evident children will be spending an increasing amount of time on screen based activity throughout their childhood as education too becomes more dependent on technology.

2.3 Relationship between physical activity and screen based activities

Screen based activity will form an integral part of children's learning. However, research indicates that children's screen based activity is reported to have a significant impact on both their physiological and psychological wellbeing.

A European study involving preschool children on screen time and body fat found that each extra hour of watching TV was associated with an extra 1kg of body fat. (Jackson et al. (2009) as cited in Sigman (2012)). This research supports the research of Hands (2011) which found that sedentary patterns of behaviour in early childhood were predictive of later and concurrent obesity. Furthermore, a study of screen time compared to physical activity levels of pre-schoolers in Australia, (Hinkley, 2012) indicates that the majority of young children are not participating in adequate amounts of physical activity and in excessive amounts of screen-based entertainment. It is likely that physical activity may decline and that screen-based entertainment may increase with age.

Whilst there are differing opinions on the effects of computer/media usage and physical activity in children, Cassidy and Donohue (2014) ironically, have produced an interactive website, 'Zoom Boom Kids' aimed at helping parents, clubs and teachers increase the levels of children's physical activity. Their mission statement is 'to inject more physical activity into children's lives, helping to improve their physical and emotional health today and in the future.' This website includes links to different activities, resources as well as information on child development. The use of interactive games to improve health has been noted by Maddison et al. (2011) who indicate a small but definite effect of an active video game intervention on BMI and body composition in overweight and obese children.

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The impact of excess screen based activity has been well documented. An article written by Page et al. (2010) suggests that children who spend more than two hours per day watching television or using a computer are at an increased risk of high levels of psychological difficulties and this risk increased if the children failed to meet physical activity guidelines. Sigman (2012) indicates serious psychological dangers of exposing children to screen based activities, particularly during childhood. However, whilst it is evident that sedentary behaviour has an effect on physical and mental health, a cross national health study by the WHO (2005/2006) concluded that spending more than two hours daily in screen-based sedentary behaviours is not consistently associated with lower levels of physical activity across genders and geographical regions. This suggests that subsequent guidelines which are implemented in the US and in Australia may not be appropriate in all regions as a tool to increase levels of physical activity in the adolescent population. Similarly, The European Youth Heart Study found that TV viewing and physical activity are independently associated with metabolic risk in children and therefore preventative action may need to target TV viewing and physical activity separately (Ekeland et al. 2006).

In conclusion, it could be argued that screen time usage has an effect on children's physical activity levels, as time spent on screen based activity could be spent being physically active. However, research suggests that there is no positive correlation between children's physical activity levels and their screen time usage. There are other mitigating factors in children's physical activity levels and screen based activities; which are beyond the scope of this project. These include factors such as; access to facilities, motivation, gender and geographical differences.

Methodology

3.1 Research Design

This project was aimed at determining if a correlation exists between; children's physical activity levels in a typical school day, and the time children spend on screen based activities on a typical school day. To ensure a successful study there were numerous points to consider, including: the number and age range of children to be involved; school and parental consent of participation in the study, as well as addressing ethical issues as stipulated by the British Educational Research Association (BERA, 2011). In order to collect the data of the amount of time children spend on physical activity during a school day, a few methods were considered. A simple questionnaire was considered as it would have been relatively straightforward to collect the data. However, it was decided this method may not present a true reflection of children's physical activity levels. It was decided that a pedometer should be attached to each member of the cohort at the beginning of the school day and then collected at the end of the school day. This method would provide a more accurate reflection of children's activity levels over the course of the day. It was noted that pupils receive two hours of timetabled Physical Education each week and receive coaching in Gaelic football, rugby, basketball and soccer. To record the time children spend on screen based activity it was decided that a questionnaire would provide the children with a means of providing accurate information. It was important to note that children have access to two computers in the class as well as an interactive whiteboard (IWB). Children are also timetabled for one hour each week to use the school's computer suite.

3.2 Participants

This study focussed on pupils (subject n.273) from a selection of both urban and rural primary schools in Northern Ireland. The pupils chosen for the study included a mix of boys and girls with a range of academic and physical ability. All pupils involved in the study were in Key Stage two, with an age range of eight to eleven years of age

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3.3 Procedure

Firstly, the school was notified of the purpose of the study. A formal letter was sent to the school (appendix A) and permission sought for the study. Parents/guardians of the children involved in the study were also sent a letter, (appendix B) to be returned with a signature of consent for participation in the study. Parents were assured that information would remain anonymous and confidential. Once permission was granted for the study from the school and consent letters returned, the next stage was to visit the school to ensure logistics of the study were in place i.e. location of a suitable site for attachment and removal of the pedometers, an estimation of time to collect the data, to ensure minimum disturbance in the school and to ensure effective testing.

3.4 Test and data collection

Information was to be collected from six schools to ensure a greater body of results. The school assembly hall of each school was chosen as a suitable location to attach the pedometers to the participants. Questionnaires on screen based activity were distributed to each participant when they had been fitted with their pedometer. The completed questionnaires were collected at the end of the day.

3.4.1 Testing levels of Physical Activity

Quantitative research was used to find the physical activity levels of children on a typical school day. The pedometer was chosen as it records the movement at the hips, ensuring each step taken throughout the day was counted. Data from each pedometer was collated and recorded on a spread sheet using Microsoft Excel.

3.4.2 Testing time spent on screen based activity

Each child received a questionnaire (appendix C). Children were asked to tick the appropriate box to include how long (minutes) they spent on screen based activity. Screen based activities include the following: use of a computer, tablet or android: use of a mobile phone and time spent watching television.

3.5 Statistical analysis

When results were collected the data were recorded on a selection of tables and graphs. This was to ensure easier identification of a relationship between children's physical activity levels on a typical school day and the time spent on screen based activities on a typical school day. A spearman rank test was also carried out on the results to check for a correlation between the two variables: Physical activity and screen based activity.

Chapter 4:Results

4.1 Introduction

This study documents the results of an investigation into primary school children's physical activity levels in relation to their screen time usage on a typical school day.

4.2 Subjects

This study involved 273 primary school children of which 134 were female and 139 were male. The subjects chosen were from a selection of six primary schools in different locations and socio economic areas of Northern Ireland.

The subjects' ages ranged from 84 months – 134 months with an average age of 121.35 months with a standard deviation [SD] of ± 12.9 months. The subjects had an average height of 139.1 cm with a standard deviation [SD] of ± 7.58 cm and an average weight of 37.2 kilograms with a standard deviation [SD] of ± 7.86 kilograms.

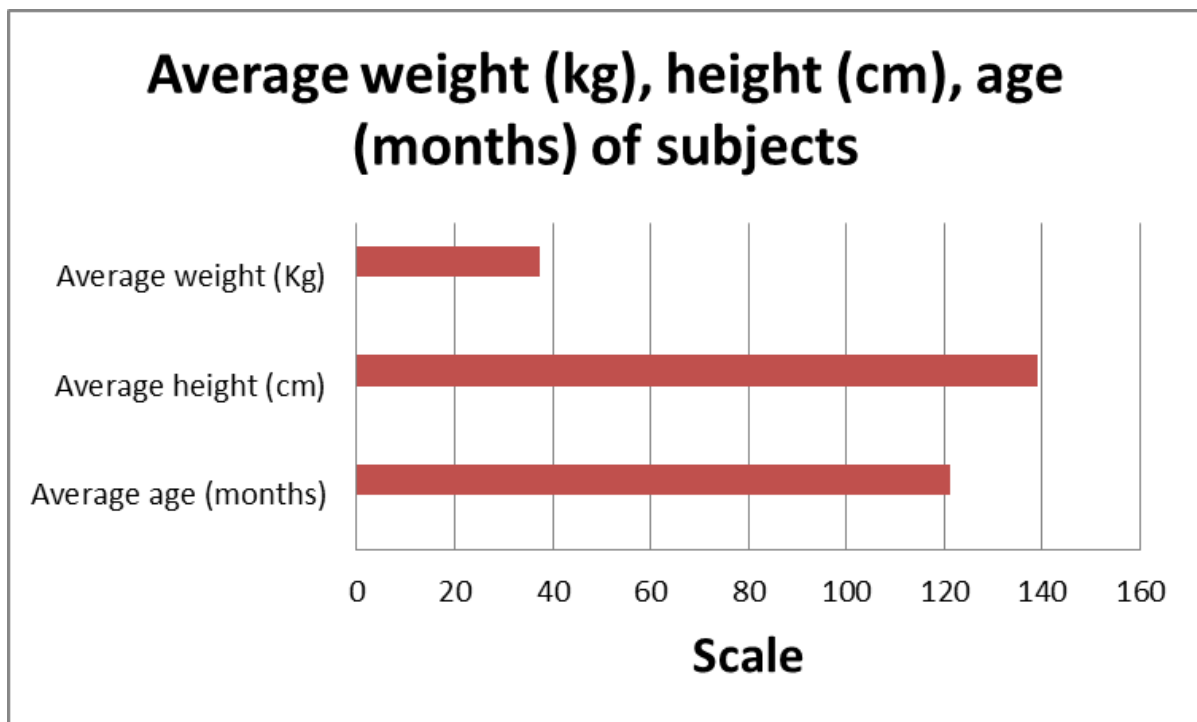


Fig 4.2.1: average age (months) weight (kg) and height (cm) of the subjects.

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4.3 Activity levels

Activity levels were measured by attaching a pedometer to the waist of each subject at the beginning of the school day. The pedometers recorded the movement at the hips of each subject during the course of the school day. The pedometers were collected at the end of the school day and the recordings noted.

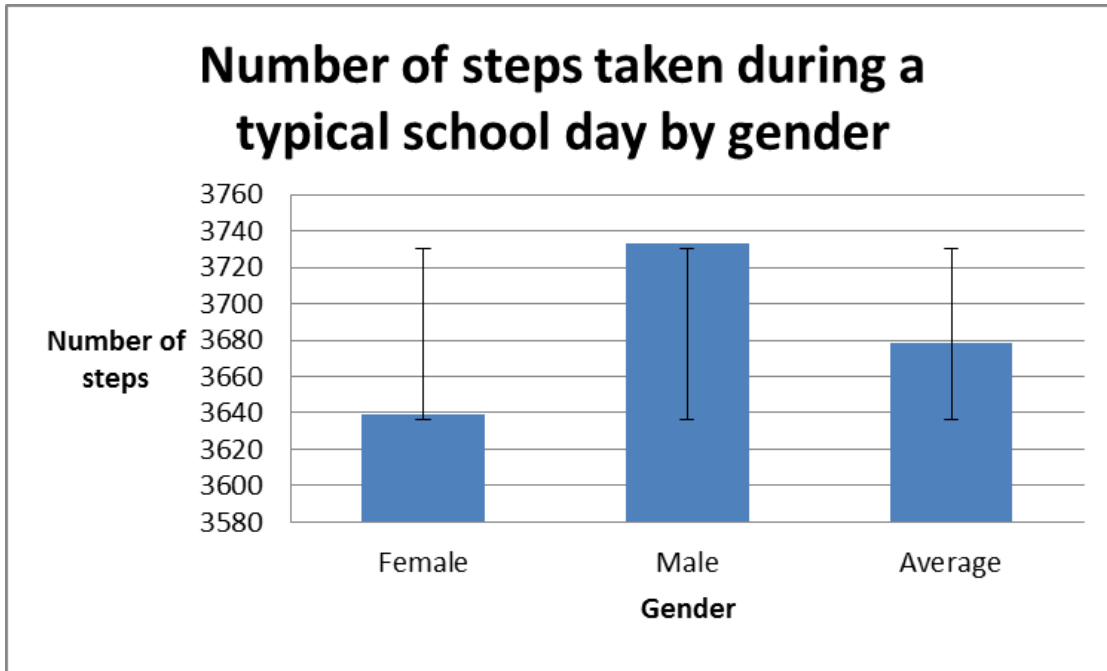


Fig 4.3.1: relationship between numbers of steps taken related to the gender of the subjects.

Figure 4.3.1 shows that the male subjects are completing approximately 100 steps more than their female counterparts. This data supports the findings of Riddoch et al. (2004) which suggests that boys are more active than girls at this age. The male subjects completed an average of 3,734 steps and females completed an average of 3,639 steps.

These figures are significantly lower than The Canadian Health Measures Survey (2009) which suggests that 12,000 steps best estimates a target of 60 minutes physical activity per day. However, it must be noted that the pedometers used in this study recorded the steps taken during school time only.

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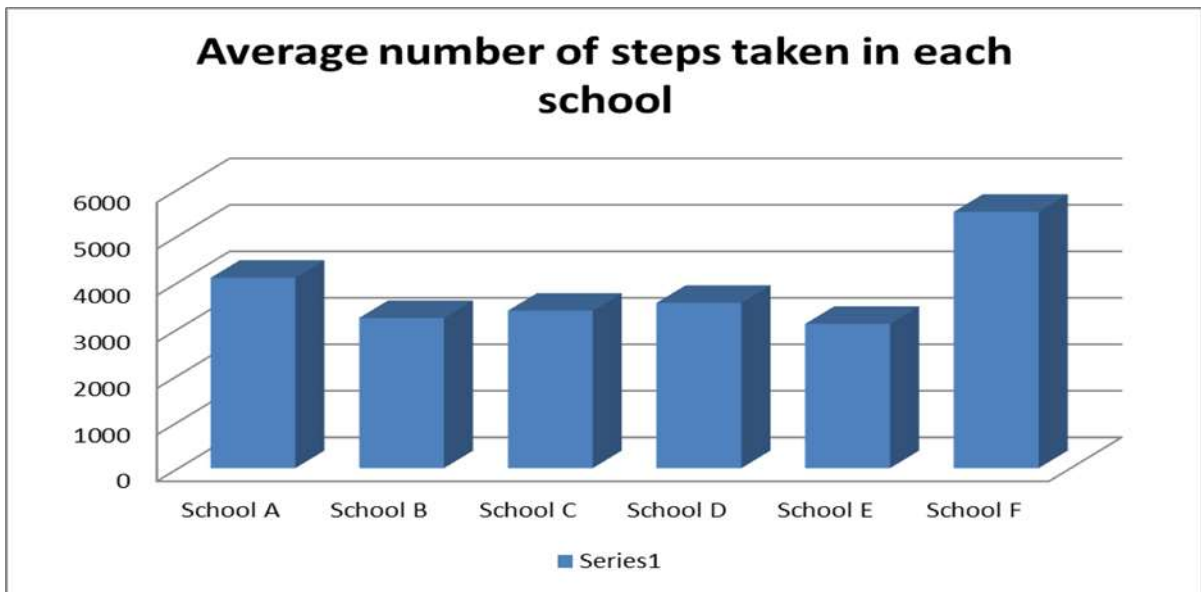


Fig 4.3.2: Average number of steps taken in each school

Figure 4.3.2 identifies the difference in values of pedometer readings according to each school. School F had significantly higher pedometer readings than the other 5 schools; with an average of 5516 steps taken with a standard deviation of [SD + 902 steps]. School E had the lowest average of pedometer readings with an average of 3104 steps taken. The range of figures may suggest that other factors, such as the length of break time (minutes) or size of the school play area (m²) may have had an impact on the overall readings.

4.4 Screen time usage

Screen time usage was measured by form of a questionnaire. Each subject indicated how long they spent in minutes on the following activities: watching TV; playing an I-pad, using a PC; using a mobile phone and playing a console.

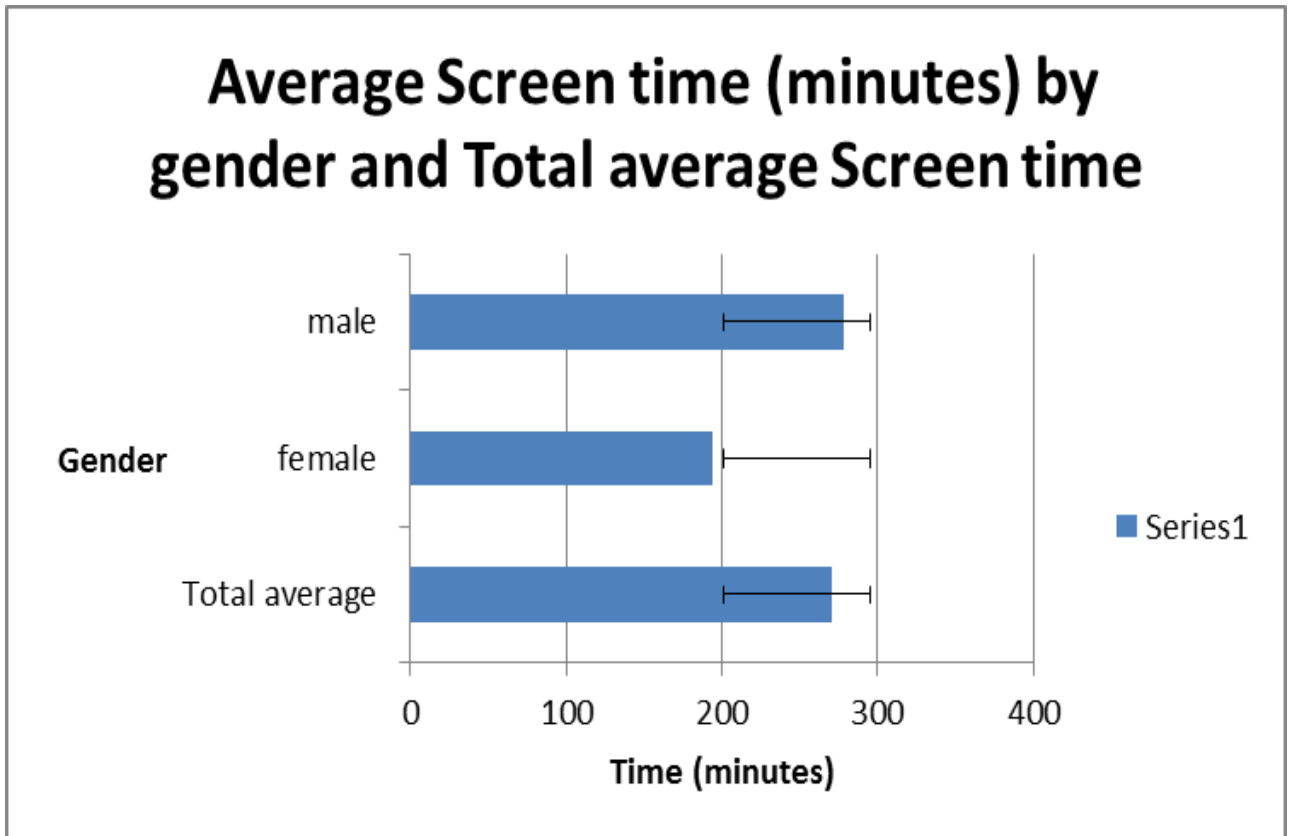


Fig 4.4.1: Average screen time by gender and total average screen time

Fig 4.4.1 shows the average length of time in minutes spent on screen based activity by gender. The graph shows clearly that males spend more time than females on screen based activity with figures of 279 minutes and 195 minutes respectively. This information supports a study by The Kaiser Family Foundation (2010) which found that children aged 7-11 spend up to 4.5 hours on screen based activity.

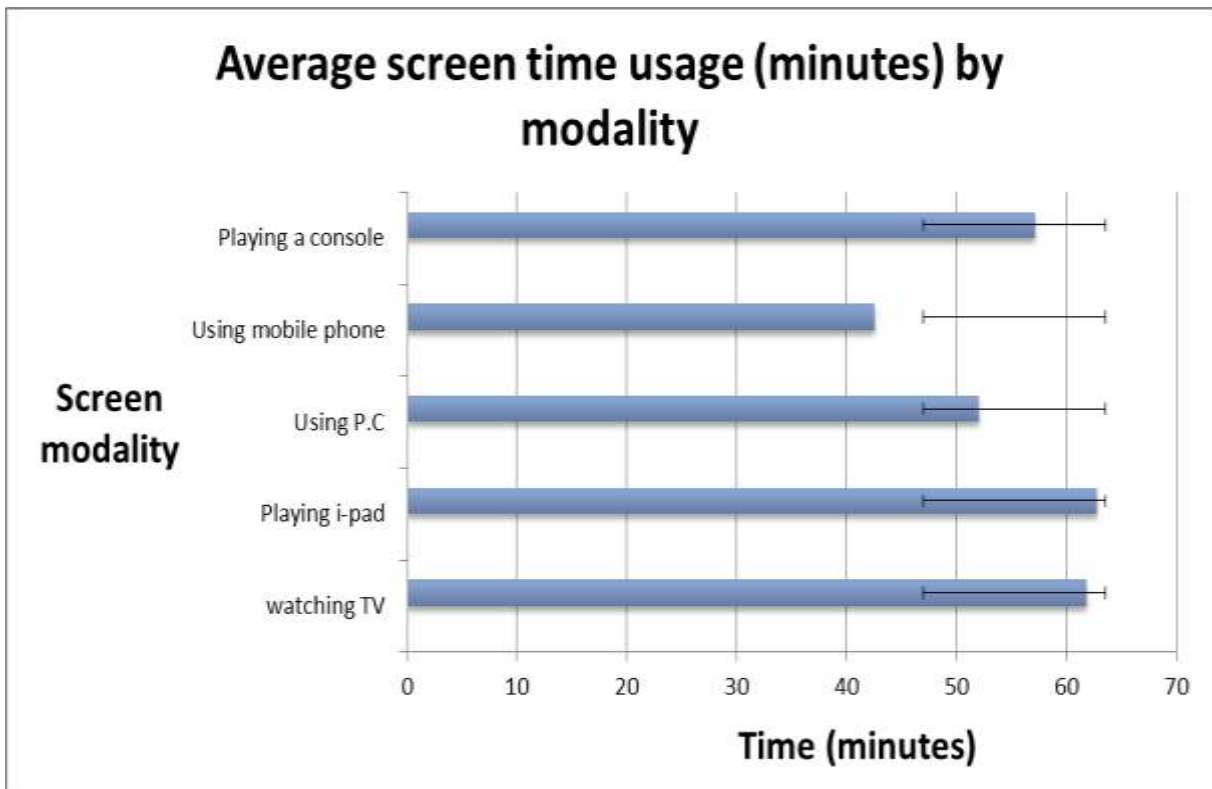


Fig 4.4.2: Average length of time in minutes spent on each modality of screen use.

Playing an I-pad accounted for the greatest average screen time usage with subjects spending an average of 63 minutes with a standard deviation of [SD] \pm 39 minutes Using a mobile phone accounted for the lowest average screen time use with an average of 42 minutes with a standard deviation [SD] \pm 31minutes.

There were differences in screen modality use between both genders also. The male subjects spent an average of 67 minutes on I-pads whilst the female subjects spent slightly less time with an average of 59 minutes. The female subjects, however, spent longer on mobile phones with an average time of 41 minutes compared to the males who spent an average of 30 minutes.

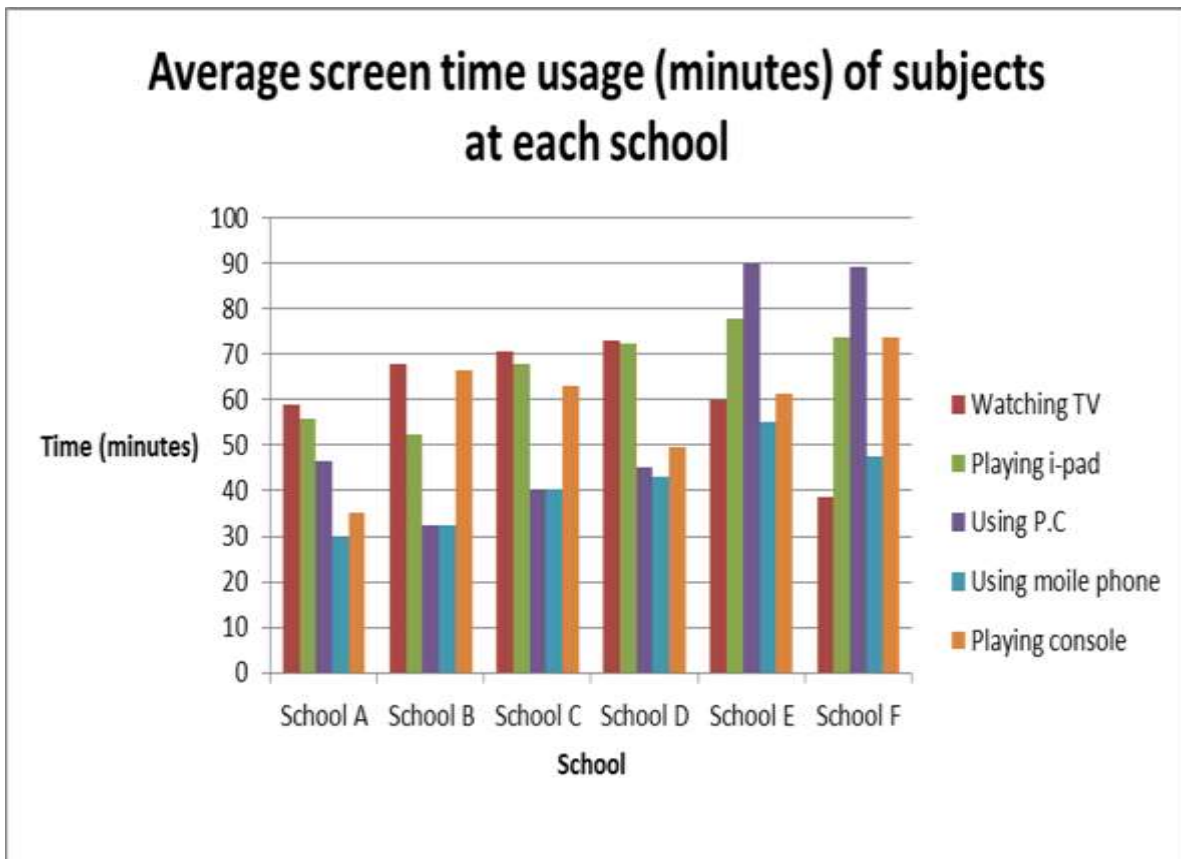


Fig 4.4.3: Average time spent on screen use by modality within each school.

The data indicates that in 66 % of the schools, watching television accounted for the greatest average screen time usage, which supports the results of a study by The Kaiser Family Foundation (2010) which found that children spend most of their leisure time watching television. The data also shows that in 83% of schools, playing an I-pad accounted for the second greatest average of screen time usage.

4.5 Physical activity against screen time

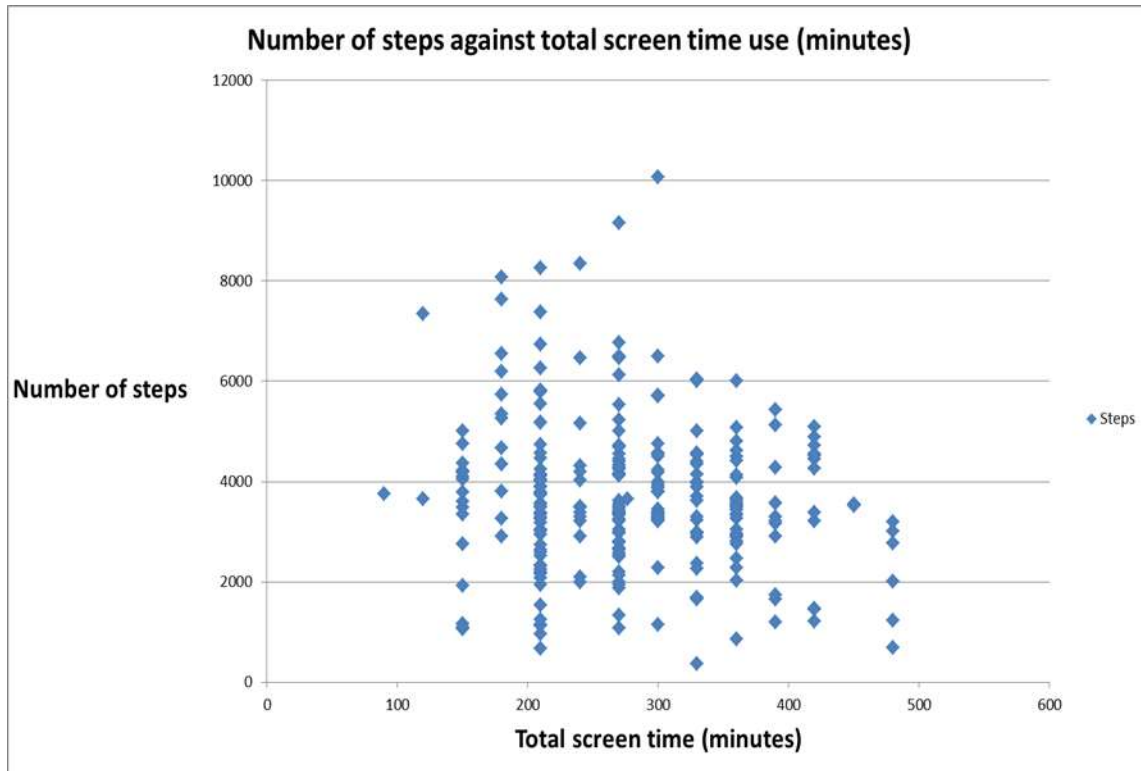


Fig 4.5.1: The relationship between the number of steps taken and the total time spent on screen use.

The data indicates that the subject with the greatest number of steps taken (10,065) did not spend the least time on screen based activity with a time of 300 minutes total screen time. However, this is above the average of total screen time for all subjects (271 minutes). The subject with the least number of steps taken (364) spent 340 minutes on screen based activity

A spearman rank correlation was conducted and a negative correlation result of $R = -1.078$ indicates a negative correlation between physical activity levels and screen time usage. This supports the findings of the WHO (2004/5) cross national health study which found that more than two hours screen based activity is not consistent with lower levels of physical activity.

The results of this study indicate that children's physical activity levels are not related to the amount of time spent on screen based activity on a typical school day.

Conclusion

Analysing the results it can be said that boys on average are marginally more physically active than girls during a typical school day. Results show that screen based activity by modality varies across the schools involved in the study. However, it can be said that playing an I-pad is the most popular screen based activity whilst using a mobile phone is the least popular: this may be due to socio-economic factors or reflect cultural trends.

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5.1 Recommendations

It is the view of this author that a greater body of research is needed in this area. This study was completed in six schools. It could be recommended to complete this study in a greater variety of schools to provide more conclusive results. It would be recommended to carry out this study over the course of a week to get a better reflection of children's physical activity levels and their screen time usage.

5.2 Limitations

There were various limitations to this study, including the following:

- This study was limited to six schools. Perhaps a greater body of research may have produced different results. The subjects involved in this study were at Key stage two; a study to include subjects at the foundation stage and Key Stage one could enhance this investigation.
- This study was limited to one school day.
- The schools involved had different sizes of play areas, this would directly impact the pedometer scores; subjects with more play area may have had increased readings.
- Inclement weather conditions also had an effect on this study. When testing at one of the schools, the children were confined to the classroom for play time as it was raining outside. This had an obvious effect on the pedometer readings.
- The pedometers used for the study were also limited in recording physical activity as they do not record any physical exertion by the upper extremities. In addition, the pedometers did not record the intensity level of the activity performed.
- Another possible limitation to this study was the time of year. This study was carried out in November. A study across different months of the year may produce different results.
- The questionnaire for screen based activity was limited in that children recorded their estimated time spent on each activity. A log book of screen use may have been a more accurate way of recording screen time usage.
- Other possible limitations included the type of footwear or uniform the children were wearing.
- The nature of the study involved testing children. When wearing the pedometer many children played on the idea of recording the highest score on the pedometer. This did not offer a true reflection of physical activity levels.

References

- Anderson, Tara, and Brian Sturm. "Cyber bullying: From playground to computer." *Young Adult Library Services* 5.2 (2007):24
- BBC (2007) <http://www.bbc.co.uk/news/uk-northern-ireland-27513174>
- Browne, K., and Hamilton-Giachristis, C. "The influence of violent media on children and adolescents: a public health approach." *The Lancet*. 19-25February 2005, Vol. 365(9460):702-710
- Campos, D. (2011) *JUMP START HEALTH, Practical Ideas to Promote Wellness in Kids of All Ages*, Teachers College Press, New York
- Canadian medical association journal 174.6 (2006):801-809
- CCEA (2007)
http://www.nicurriculum.org.uk/key_stages_1_and_2/areas_of_learning/physical_education/
- CCEA (2007)
http://www.nicurriculum.org.uk/docs/key_stages_1_and_2/statutory_requirements/ks2_pe.pdf

SEXTON: AN INVESTIGATION INTO WHETHER THERE IS A LINK BETWEEN PRIMARY SCHOOL CHILDREN'S PHYSICAL ACTIVITY LEVELS AND THE TIME SPENT ON SCREEN BASED ACTIVITY ON A TYPICAL SCHOOL DAY

CCEA (2007)

http://www.nicurriculum.org.uk/key_stages_1_and_2/skills_and_capabilities/UICT/docs/useful_resources/essential_documents/UICT_Handbook.pdf

DENI http://www.deni.gov.uk/index/curriculum-and-learningt-new/curriculum-and-assessment-2/15_ict_in_schools/ict_information_and_news.htm

Department of Health and Social Services <http://www.dhsspsni.gov.uk/index/statistics/lcb/physical-activity.htm>

Green, K. and Hardman, K. (2005) *Physical Education, Essential Issues*, SAGE Publications Ltd, London.

Griffiths, Lucy J., et al. "How active are our children?" Findings from the Millennium Cohort Study." *BMJ open* 3.8 (2013): e002893.

Hands, Beth P., et al. "The associations between physical activity, screen time and weight from 6 to 14 yrs: the Raine Study." *Journal of Science and Medicine in Sport* 14.5 (2011): 397-403.

Henry J. Kaiser Foundation, "Generation M2: Media in the Lives of 8-18 Year Olds," January (2010)

Hinkley, Trina, et al. "Pre-schooler's physical activity, screen time, and compliance with recommendations." *Medicine and science in sports and exercise* 44.3 (2012): 458-465.

Maddison, Ralph et al. "Effects of active video games on body composition: a randomised controlled trial." *The American journal of clinical nutrition* 94.1 (2011):156-163.

Melkevik, O., Torsheim, T., Rasmussen, M.,(2010) *Patterns of screen-based sedentary behavior and physical activity and associations with overweight among Norwegian adolescents: a latent profile approach*

Page, Angie S. et al. "Children's screen viewing is related to psychological difficulties irrespective of physical activity." *Paediatrics* 126.5 (2010) e1101-e1107.

PE4 life (2005) *Developing and Promoting Quality Physical Education*, PE4life, US.

Public Health Agency (2013) <http://www.publichealth.hscni.net/news/it-all-adds-plan-kids-60-minutes-activity>

Riddoch, Chris J., et al. "Physical activity levels and patterns of 9-and 15-yr-old European children." *Medicine and science in sports and exercise* 36.1 (2004): 86-92.

Sigman, Aric. "The impact of screen media on children: a Eurovision for parliament." *Improving the quality of childhood in Europe* 3 (2012):88-121.

Warburton, Darren ER, Crystal Whitney Nicol, and Shannon SD Bredin. "Health benefits of physical activity: the evidence."