An investigation into the effects of physical activity on secondary school students' learning, behaviour and assessment

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Abstract

The study looks to determine the effects physical activity (PA) has on student learning, behaviour and assessment. Adopting a mixed-method approach, the dissertation uses both qualitative and quantitative forms of research methodologies, with a sample size of N=29. Teachers were questioned on their perspective of PA participation in the school, benefits of PA for students and barriers to PA. Teachers reported that PA participation decreases as students progress through school, especially in females. Teachers detailed the perceived benefits of PA for students' learning, behaviour and assessment, such as increase focus, mood and cognitive function. Teachers also highlighted workload and time as barriers to PA.

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List of Acronyms and Abbreviations

HSE – Health Service Executive

DES – Department of Education and Skills

SCT – Social Cognitive Theory

PA – Physical Activity

PE – Physical Education

ADHD – Attention Deficit Hyperactivity Disorder

NEPS - National Educational Psychological Service

Chapter One: Introduction

The following chapter describes the origin, background and rationale of the study, before summarising the layout of the dissertation chapters and the content that is contained within each. This chapter provides a quick synopsis of what to expect throughout the remainder of the dissertation.

1.1 Origin of the dissertation

This study aims to develop upon the dissertation statement "*An investigation into the effects of physical activity on secondary school students' learning, behaviour and assessment*". The dissertation statement was created from a personal interest in exercise, along with an observation of a large portion of students opting out of physical activity within the school environment and how this influenced their school experience. The study aims to identify the effects of physical activity on secondary schools' students' experience through a mixed-method approach fully qualified teaching staff as the participants. This study will attempt to connect the participation of regular physical activity and improved academic performance (i.e., student learning, behaviour and assessment), while also attempting to recognise the possible barriers to regular physical activity for secondary school students.

1.2 Background to the project

A 2018 study carried out by Sport Ireland found that the number of children in post-primary education achieving the physical activity guidelines of 60 minutes daily, provided by the Health Service Executive (HSE), had decreased since there previous 2010 study (Sport Ireland, 2018). The study also found that only "23% of post primary pupils reported meeting the Department of Education and Skills' (DES) Physical Education (PE) recommended minimum of 120 minutes per week" (Sport Ireland, 2018) These statistics make for pessimistic reading and according to McMullen et al. (2022), many of the students believe that there is a limited supply of physical activities available to them in the post-primary setting compared to the primary scene and that of those physical activities available to them, most were inaccessible for a variety of reasons such as feeling too old or a lack of inclusivity (McMullen et al., 2022). When we compare the levels of vigorous exercise to that of the 1998 figures we also see a slight decrease in the number of young people participating in vigorous exercise (Költő et al., 2020). These previous studies indicate that the level of physical activity being attained by secondary level students in Ireland is decreasing and so the purpose of this study is to corroborate this trend and outline the possible implications this has for secondary level students' academic performance.

1.3 Rationale

The objective of this study is to identify whether there is a positive correlation between regular physical activity and a secondary school students' academic performance. The study will try to ascertain what level of physical activity is necessary to influence a students' academic performance, whilst also seeking to identify the possible barriers to achieving this. Therefore, the questions that will shape this research study are as follows:

- What is meant by physical activity?
- What are the benefits of physical activity on a secondary school students' learning, behaviour and assessment?
- What are the barriers to physical activity for secondary school students?
- How might a secondary school/ secondary school student overcome the barriers to physical activity?

1.4 Dissertation Layout

The following dissertation is structured into the following six chapters. Chapter one gives an insight into the research topic, identify the background to the study, the aims of the research and the general methodologies used. The second chapter serves as a detailed summary of the literature surrounding the research topic, at both national and international level. This chapter will provide the current trends set out in recent literature surrounding secondary level students' frequency to partake in physical activity and its effect on their academic performance. The third chapter will be a synopsis of the methodologies used within this study, ranging from both qualitative and quantitative approaches. The chapter will also analyse the rationale for choosing these types of methodologies, participants and any limitations that may have unfolded from using these methodologies. The data collected from these methodologies will be presented in the fourth chapter and will then be interpreted and compared to relevant past studies in chapter five.

1.5 Conclusion

Chapter six will provide the main conclusions arising from the presentation and discussion of findings from the previous chapters. Additionally, recommendations for further research in this area to improve the quality of study are discussed within chapter six.

Chapter Two: Literature Review

2.1 Introduction

A person's belief regarding their abilities has a profound effect on those abilities (Bandura, 1977). Albert Bandura was speaking about the influence one's social interactions, experiences and observations has on that person's procurement of new information. This theory became known as the Social Cognitive Theory (SCT). Physical Activity (PA) is one of the activities whereby SCT has been used to highlight the importance of PA in a student's cognitive function. According to the physical activity guidelines of Ireland (2023), England (2023) and Australia (2023), children are advised to participate in moderate to vigorous exercise for 60 minutes daily. Recent studies have shown that an increase in a student's level of PA can positively influence the students cognitive function, attention and academic performance (De Greeff et al., 2018; McPherson, 2018). Analysing the 2018 study carried out by Sport Ireland, there are clear indications that the majority of students, in the post-primary context, are not meeting the national and departmental requirements of daily PA. 90% of post-primary students reported participating in less than 60 minutes of daily PA. When it comes to school sport there was also evidence of a decrease in the number of students participating in school sports and an increase in the number of students who had never participated in school sports. The gender trend between boys and girls continued to appear from Sport Ireland's previous 2010 study, with the number of girls participating in physical activity reported as half of that compared to the boys (7% vs 14%). In response to the evidence provided by recent studies of the positive influence PA can have on student's cognitive function, attention, academic performance and many other traits, schools have began adjusting their environments to promote the participation in PA. The Active School Flag is an initiative set up in Ireland which is presented to a school that has implemented changes which encourage and enable them to achieve a physically educated and physically active school community (McMullen, 2022). There is a clear increase in the acceptance that PA has a positive effect on the overall, as well as academic, lives of students within the post-primary context. The following chapter will address a number of themes that will structure the direction of the study. The themes will be explained in relation to their existence in relevant literature and their relevance to this study. The following themes will be featured during this chapter: Physical Activity (Guidelines), Barriers to Physical Activity, Effects of Physical Activity, Effects of Physical Activity – Learning, Effects of Physical Activity – Behaviour and Effects of Physical Activity – Assessment.

2.2 Physical Activity (Guidelines)

The World Health Organisation describes physical activity (PA) as "…any bodily movement produced by skeletal muscles that requires energy expenditure". (WHO, 2023). In Ireland, the Health Service Executive (HSE) is the governing body for health related guidelines. The HSE recommends that children and young people (2-18 years old), should be partaking in a minimum of 60 minutes of PA per day (HSE, 2023). In the educational context, the Department of Education and Skills (DES) have identified the minimum requirement of PA to be obtained by students as 120 minutes per week (DES, 2023). 120 minutes of PA weekly is the equivalent of just two Physical Education (PE) classes per week, yet Sport Ireland found that less than 1 in every 4 students were reported as meeting this requirement (Sport Ireland, 2018). Although the Irish PA guidelines are in line with the majority of the other nations around the globe, the PA levels are worrying low in the pecking order. In 2012, a series of articles published by The Lancet prior to the 2012 Olympic Games ranked Ireland as the seventh worst country in the world for exercise (The Lancet, 2012). This is a list that Ireland should be aiming to distance itself from, in terms of a health perspective alone. According to The World Factbook, Ireland ranks 51st in terms of obesity with 23.6% of the population considered to be obese (The World Factbook, 2023). These are worrying statistics that have significant implications on the health of current and future generations, as well as the effect it has on the mental capacity of these people. So the question needs to be asked; "What are the barriers to physical activity for Irish people, specifically Irish students?". The proceeding chapter will analyse the general barriers to PA, alongside the barriers to PA for students specifically.

2.3 Barriers to Physical Activity

Barriers to physical activity (PA) differ from person to person, however there are some common factors that influence a number of students in the post-primary context. COVID-19 has had a profound affect on the level of PA being attained by secondary level students with 50% reporting to have participated in less PA during COVID-19 (Ng, 2020). Interestingly, 20% of the students surveyed reported participating in more PA, identifying "no school" as a key factor in their ability to do more. Several other studies corroborate the evidence provided by Ng (2020) and the decrease of PA during and post, COVID-19 (López-Valenciano, 2021; Rossi, 2021). Included in Sport Ireland's 2018 study was an area focusing on factors influencing non-participation in any sport between primary and post-primary children. The study highlighted that students with higher Family Affluence Scale (FAS) rate were more likely to participate in any sport. However, other studies have contradicted this hypothesis claiming that socioeconomic status may have an effect amongst adults but does not effect the adolescent population (O'Donoghue, 2018). Al-Hazzaa (2018) and Somerset (2018) both reported students identifying "time" as a major issue in attaining the required PA guidelines. Although these studies were not specific to school students, we can see from the earlier study of Ng (2020) that the lack of school, and therefore more time, led to a 20% increase in PA of some participants in the study. Portela-Pino (2020) also identified "lack of time" as a key factor in students not participating in the required PA levels recommended. This study looked at the motivating factors associated with participating in exercise as well as the barriers hindering the involvement in exercise. Alongside time, Portela-Pino (2020) identified fatigue, laziness and other obligations as other constraints negatively influencing the students PA levels. Keeping with the theme of school life and how this influences the levels of PA students are participating in, Allender (2006) noted three interesting factors that led to young girls decreasing their levels of PA into post-school life. These factors included: negative experiences in school, PE uniforms and boys dominating the class. Analysing the above research literature it is evident that a large amount of the school environment is majorly hindering the increase, or even maintenance, of PA levels in the majority of school students (Allender, 2006; Ng, 2020; Portela-Pino, 2020). However, we cannot say that school itself is the reason for the decreasing levels of PA participation among students but rather other factors that are taking place within the school environment. In contrast, other factors such as physical disabilities and lack of sufficient facilities are detrimental to the uptake and maintenance of PA among others (Wright, 2019; Ginis, 2021).

2.4 Effects of Physical Activity

The obvious main benefit of physical activity (PA) is it's improvement on the health of the person undertaking it. PA has been shown to improve cardiovascular fitness, decrease the risk of cardiovascular disease risk factors and strengthen the defence system of the human body (the immune system) (Swift et al., 2018; Myers et al., 2019; Nieman and Wentz, 2019). However in recent times PA has been shown to positively influence the mental health of people as well as their physical health. The introduction/increase of PA has been proven to help produce anti-depressant effects naturally within the body and fight against depression (Schuch et al., 2018; Kandola et al., 2019). The same can be said for low levels of PA with an increasing identification of poor mental health being present among people with low activity levels (Grasdalsmoen et al., 2020). The previously mentioned literature highlights the implications of high/low levels of PA on human's physical and mental health, with other studies even reporting that increased levels of PA can improve executive control (Erickson et al., 2019; Hillman et al., 2019). The former studies are most relevant to this study and how maintaining or increasing levels of PA can help people plan, organise and perform activities in an optimal manner that can carry over to the post-primary environment. The following sub-headings will analyse in more detail the relevance of PA in the post-primary context and how there may be an opportunity to introduce/increase PA within the school environment to enhance academic elements for post-primary students.

2.4.1 Effects of Physical Activity – Learning

Every student learns in a different way. From Piaget's cognitivism theory, whereby students learn by thinking and processing information, to Maslow's humanism theory, where students' needs are the focus and are guided toward their goals, knowing how a student learns can be hugely beneficial to a teacher when trying to tap into their psyche (Gilakiani, 2012). With regard to this study, we are interested in whether or not physical activity (PA) can have an influence on a student's learning performance. According to Kaneko et al. (2018), the use of physical movements was found to significantly increase the learning performance of students using a game-based approach. Many studies show that even acute bouts of exercise have shown to enhance one's cognitive function (Sibley and Etnier, 2003; Tomporowski, 2015; Bidzan-Bluma and Lipowska, 2018). There is adequate evidence from research literature that the participation in physical activity has the potential to increase the cognitive function, and therefore the processing of information, in students. More specifically, Pontifex et al. (2013) identified that even "single bouts of moderately-intensive" physical activity had the capabilities to positively influence the cognitive function of children with Attention Deficit Hyperactivity Disorder (ADHD). Researchers have noted that more extensive studies need to be carried out to confidently identify PA as a positively influential factor in the enhancing of a student's learning performance. However, the relevant literature mentioned above does suggest that PA can have a positive influence on a student's learning capabilities and cognitive function, highlighting the increasing trend of researchers looking at PA as a tool to enhance students' academic tools.

2.4.2 Effects of Physical Activity – Behaviour

According to the Oxford Learner's Dictionary, behaviour is described as "the way that somebody behaves, especially towards other people". Abraham Maslow spoke about the Hierarchy of Needs in people's lives. In this he mentions the need for motivation, mentioning both intrinsic and extrinsic (Maslow, 1943, 1987). Essentially, Maslow identified that human beings need intrinsic motivation, the want to achieve something for personal reasons, and/or extrinsic motivation, the want to achieve something due to a particular outcome/reward (Acquah et al., 2021). We see this in the post-primary context whereby, students are intrinsically motivated by interest in a subject and the want to learn and/or the reward of obtaining a satisfactory grade when it comes to exam season (Legault, 2020). When speaking about behaviour, and more importantly behaviour in the classroom, motivation is a key factor in how a student may behave. However, the mental health of the student is an equally important factor (Aldridge, 2018). The World Health Organization describes mental health as a state of mental wellbeing, enabling people to cope with stresses of life, realize their abilities, learn and work well. Physical activity (PA) has been shown to enhance students mental health, by increasing their levels of PA (Rodriguez-Ayllon et al., 2019). One of the areas PA does this is by positively influencing the person's image of themselves (Fernández-Bustos et al., 2019). Due to the reliance of technology in the modern world for everyone, specifically adolescents, it has been identified that an increase in PA not only produces clear mental health benefits but also limits the amount of screen time students are having (Meyer et al., 2020). In an Irish context, it has been found that "active students are happier students" within colleges and universities around Ireland (Murphy et al., 2018). Analysing the previous research literature it is evident that there is a positive correlation between students participating in PA and enhancing their mood, needs and motivation, subsequently improving their behaviour within an educational context.

2.4.3 Effects of Physical Activity – Assessment

In a report published by the Department of Education and the National Educational Psychological Service (NEPS) (2020), researchers found that nearly half of students felt anxious and worried about not performing well in exams while a quarter of students reported feeling "physically unwell". These types of feelings fall under the umbrella of mental health. We know from previous research on the effects of PA on mental health that PA can influence mental health positively. However, can PA lead to better academic performance around exam time? Singh et al. (2019) carried out a study specifically targeting the academic outcomes in a mathematics exam using PA as the variable. Singh et al. (2019) found that there were significant improvements in the academic outcomes of the students that participated in PA shortly before taking the exam. Other research literature identifies

PA as a possible tool for enhancing student performance through classroom-based physical activity (Donnelly, 2016; Watson et al., 2017). Some researchers have downplayed the influence of PA on academic performance, suggesting that the evidence is inconsistent (Daly-Smith et al., 2018). That being said, researchers have admitted that there is a need for further studies examining the effects of PA on academic performance noting that "…valuable discoveries about children's health have implications for educational practice…" (Castelli et al., 2014). The findings from various studies suggest that there is a growing need for further research in the relationship between PA and academic performance.

2.5 Focused Research Questions

Through analysing the relevant literature, the following sub-questions have merged:

- Is there a need to adjust the physical activity guidelines for post-primary students?
- What are the benefits of physical activity on post-primary students' learning, behaviour and assessment?
- What are the barriers to physical activity for post-primary school students?
- How might a post-primary school student overcome the barriers to physical activity?

2.6 Conclusion

Having reviewed the relevant literature, the requirement for further studies regarding physical activity (PA) is growing exponentially. Research carried out has shown low-medium quality evidence with certain limitations to the research including lack of data and subjectivity of date. The relevant literature shows that there is evidence of PA having significant influence on post-primary students' physical, mental and educationally wellbeing. However, within the Irish context the research is minimal and not consistent. There is a need to reevaluate the guidelines provided for Irish post-primary students regarding the levels of PA they are recommended to undertake, as well as a oversight into the potential barriers Irish post-primary students face when accessing PA (i.e time, money, resources etc.). As a result, the researcher aspires to investigate the influence PA has on Irish post-primary students' learning, behaviour and assessment, as well as identifying the possible factors hindering Irish post-primary students from accessing the relevant facilities.

Chapter Three: Methodology

3.1 Introduction

The previous chapter highlighted that there is insufficient literature on the possible effect of physical activity on student academic performance within the contemporary Irish secondary school setting. As a result, research questions emerged, identified by the researcher, that influenced the type of methods and instruments that would be used within this study. This chapter will describe the mixed-method approaches that were used to gather data for this study. Also mentioned in this chapter is the reasoning behind the selection of these methods over others. This chapter will furthermore analyse the limitations of these types of methods. The way in which the sample population was selected will be described, along with the selection process of the participants. A breakdown of how the data was analysed can also be found within this chapter. A summary of the various rigour (objectivity and validity) of the study is described within this chapter. Finally, the ethical considerations necessary for this study will be discussed.

3.2 Approach

This study was carried out using a pragmatist approach, implementing two methodologies. Pragmatism research focuses on beliefs that are directly connected to actions of humans (Morgan, 2014). Both quantitative and qualitative approaches were considered for data collection by the researcher. These methodologies were chosen to achieve the best possible study in relation to the topic in question. This case study was carried out in a mixed-multidenominational and co-educational post-primary school. The participants selected for data collection were fully qualified teachers that have thought more than one subject in the aforementioned school. As noted by Cresswell (2014), emphasis on either qualitative or quantitative research can only narrow the effectiveness of the data collected by the researcher. As a result of the evidence of the mixed method approach being most effective from relevant literature (Zohrabi, 2013; Cresswell, 2014), this style of methodology was chosen. The use of both methodologies allowed the researcher to gather a deeper analysis of the limited data set (Gorard et al, 2004; Kelle, 2006). The mixed method approach also allowed for a wider range of data representation between clinical statistics and observational viewpoints. Online surveys made up the quantitative portion of the study. The online route was selected due to the evidence of greater response rates than traditional paper surveys (Denscombe, 2009; Hohwu et al, 2013). Semi-structured interviews were applied as part of the qualitative approach. This style of interview has been shown to be most effective within data collection paradigms largely down to its flexibility and control of interview delivery (Adhabi and Anozie, 2017)

3.3 Research Methods

3.3.1 Qualitative Research

Qualitative research was collected from two short semi-structured interviews running for approximately 20 minutes. Al Shenqeeti (2014) states that the use of interviews alongside other forms of research methodologies can highlight participants personal beliefs more effectively. The use of adequately prepared semi-structured interviews can develop the trustworthiness of the qualitative data research element (Kallio et al, 2016; Merriam and Tisdell, 2016). Bussetto et al. (2020) noted the need for qualitative research where quantitative research cannot wholly supply us with the full picture. However, Alsaawi (2014) and Alshenqeeti (2014) have commented on the potential issues with interviews, namely the potential for bias and small scale style.

The two semi-structured interviews took place on separate days which best suited the participants. The interview schedule was prepared by the researcher, consisting of twenty-six pre-planned questions and accommodating for room to elaborate on certain point (Appendix A). These interview schedules were provided to the participants prior to the interviews taking place. The interview schedules consisted mainly of open-ended questions that allowed for a deeper understanding of the participants beliefs (Weller et al, 2018), coupled with a handful of close-ended questions that allowed the interviewer to probe the interviewee for further information. Participants also received a research information sheet, along with consent forms, outlining the layout and purpose of the interviews (Appendix B). Once signed and dated, these consent forms were then returned to the researcher. The main topics covered within the interview included: 1) participation and intensity of physical activity, 2) physical and mental effects of physical activity and 3) exercise and school life. Both interviews ran for approximately 20 minutes. Having gathered the participants consent the interviews were recorded and subsequently transcribed by the researcher for further coding and analysis.

The semi-structured interview format was instrumental in allowing the researcher to promote the interviewee to provide more elaborate and meaningful responses, due to the relatively informal atmosphere of the interview. These interviews contributed solely to the qualitative element of the study. In contrast to the nature of the survey, the semi-structured interview allowed for more flexible, fluent and natural responses that may have been somewhat hindered by the rigidness of the survey. The role of the researcher is to provide open-ended questions that the participant answers in turn (Cresswell, 2013). Although some research literature has highlighted the potential downfalls, such as bias, regarding interviews (Alsaawi, 2014; Alshenqeeti, 2014) many others feel the deeper understanding of participants beliefs can be a hugely beneficial element to research that quantitative data cannot provide (Almalhi, 2016). A key area where this is evidenced is the interviewee's description of their perceived physical and mental feelings post-physical activity. This summary of physical and mental emotions is something surveys cannot quantify.

3.3.2 Quantitative Research

Watson (2015) identifies experiments and surveys as being the modal quantitative research design across relevant literature. While Sukamolson (2007) argues for the array of possible quantitative methods alongside their advantages and disadvantages. The quantitative data in this study was collected using an online survey, aimed at obtaining the opinions of fully qualified teachers, selected from the post-primary school aforementioned. The online survey was chosen over the traditional (paper) survey due to economic reasons as well as evidence that non-response rates decrease through online mediums (Denscombe, 2009; Howhu et al., 2013).

Nayak and Narayan (2019) commend the use of online (web) surveys due their cost, visualisation and storage of data. The researcher developed the online survey using Google Forms. The intention with the online survey was to provide participants with a clear and concise structure that included sufficient responses that they felt they could use to answers the questions adequately. Brace (2018) alludes to the purpose of a survey as being a facilitator between the researcher and participants to provide honest and quantifiable data that can subsequently be analysed about a certain topic. The survey included a "tick the box" format where participants were encouraged to tick multiple boxes if the answers provided applied to them. Grouped answers were also included in the survey to acquire an idea of certain issues with a broad range of possible answers. The Likert scale was also used within the survey to gather data that was more “reliable and lead to more valid interpretations” (Nemoto and Beglar, 2014, p.9). The online survey is identified as Appendix C at the close of this study. The data collected from the survey was then entered and analysed using Google Forms and Microsoft Excel. Visual representation of this data was also engineered using Google Forms and Microsoft Excel.

3.4 Sampling and Participants

The approval and consent was received from the relevant school principal in relation to the carrying out of both the semi-structured interviews and the online survey. The school principal was then supplied with a copy of the interview schedule along with a link to the online survey. The online survey was posted on an email thread for teachers to access. In the following weeks the researcher provided emails, as well as face to face reminders to the principal about encouraging participants to complete the online survey. Before the inaugural question of the online survey, participants were provided with background information about the study and were reassured that the study had received ethical approval from Hibernia College. Anonymity was also emphasised throughout, describing how the data was strictly confidential and would only be accessed by the researcher and the research supervisor. An option to not participate or withdraw at any point was also detailed at the beginning of the online survey. Confirmation that consent had been received from the participants was acknowledge through clicking the “submit” button at the conclusion of the survey and this was clearly explained in the abstract of the online survey. (Appendix D)

Two semi-structured interviews took place in the school grounds, in pre-booked room permitted by the school principal. With the participants consent, the interviews were recorded and subsequently transcribed for further coding. Participants were provided with background information and consent forms prior to the interview. These participants were also provided with the interview schedules. Weller et al (2018) noted the effect of open-ended questions in making an interview more informal, and thus, more comfortable for the interview, as well as allowing the researcher to clarify any potential misunderstandings.

3.5 Pilot Study

Thabane et al (2010) describes a pilot study as a "feasibility study intended to guide the planning of a large-scale investigation". In order to identify any potential issues the online survey was piloted with five participants. Some issues that arose included undesirable responses which occurred to question phrasing. This process was conducted by sending a link to the participants who were given sufficient time to complete the survey and provide necessary feedback. Issues that arose were amended and the online survey was reevaluated.

3.6 Data Analysis

Clarke and Braun (2017, p.2) describe how thematic analysis is used to "identify patterns….across data in relation to participants' life experiences, views and perspectives". Terry et al (2017) goes on to describe the use of thematic analysis to ensure "rigorous and systematic engagement with data…". The semi-structured interviews allowed the researcher to obtain a deeper understanding of participants' views. This format of interview also made it more accessible for coding and subsequently enhanced the ability of thematic analysis. The interviews provided the researcher with relevant evidence on the effect of physical activity in post-primary students' academic performance, from the teachers' perspective. The interviews also provided the researcher with information about how the participants view the level of physical activity within the curriculum and how the magnitude of work required to complete has an effect on students physical activity levels, from the teachers' perspective. The researcher acquired this information by listening, scribing and analysing the interviews before identifying the recurring themes present throughout and coding the necessary elements. This coded data was then analysed and findings were ascertained as a result. The quantitative data from the online survey was gathered, recorded and analysed through both Google Forms and Microsoft Excel. Once analysed, the data was represented visually through graphs and charts for clearer understanding.

3.7 Objectivity and Validity

Daston and Galison (2021) describe objectivity as the "escape from all aspects of the self…". It is the avoidance of personal opinions and emotions that provides the study with this presence of objectivity required for an effective research study. A way of avoiding this personal experience was through the avoidance of "leading" questions in both the qualitative and quantitative aspects of the study. Borsboom et al. (2004) describes validity as the ability to measure something that exists and produces various outcomes dependant on the input variations. Validity is an aspect that should be present within a research study, such as this, in order to corroborate the findings and the discussions that come as a result. To ensure this study contained sufficient validity the researcher carried out both quantitative and qualitative methods of research. As described by May et al. (1996) "survey research may obtain greater external validity than qualitative approaches".

3.8 Limitations

As described by Cresswell (2014) there is a need for the use of a mixed method approach for certain research topics based on the wider range of information and interpretation the researcher can obtain. Throughout the study there has been mentions of potential issues with both the qualitative and quantitative aspects of the study. Alsaawi (2014) and Alshenqeeti (2014) have both commented on the risk the interview format presents when dealing with research. They believe that through the medium of the interviews there is potential for bias and also the small scale scope of the interviews make generalisations more difficult. The quantitative side of the study was conducted using an online survey. This was an easy way for a larger number of participants to provide feedback about the topic in question. However, Queirós et al. (2017) highlights the possible downside of surveys coming from the undesirable responses from the participants, possibly related to the format of the survey.

3.9 Ethical Considerations

Arifin (2018) highlights the importance of participant choice and participant confidentiality throughout qualitative research. While Jones (2012) argues the ethical issues with quantitative research surround the ideas of lack of "deep meaning". The researcher completed an Ethics application form and subsequently submitted this document to Hibernia College's Ethics Committee for approval. Before commencing data collection, the consent was gathered from the relevant school principal in relation to the methods that the researcher intended on carrying out. In relation to the participants, participation was 100% voluntary and participants had the option to withdraw from the process at any stage. Reassurances about the confidentiality of the study, as well as the background and purpose of the study was provided to all participants as well as the school principal. The data gathered was used with regard to the guidelines from the Data Protection Act 1998. The data collected has bee stored safely in accordance with the relevant guidelines provided by Hibernia College and shall not be used for any purpose outside of this study.

3.10 Conclusion

The researcher chose a mixed method approach to carry out this study for a number of reasons including the small scale size of participants as well as the nature of the research questions. Limitations of the data collection process were described as well as ethical considerations necessary before commencing collection of said data. The results of the data collected, along with its analyses are described in the next chapter.

Chapter Four: Findings

4.1 Introduction

Online survey and interview data was triangulated and the findings from this data is presented within this chapter. Qualitative data was collected using two semi-structured interviews involving fully-qualified teachers that had a minimum of three years of teaching experience. Transcripts for these interviews can be found in Appendix E and Appendix F. Quantitative data was collected using online surveys, through the medium of Google Forms. A total of twenty-seven (27) responses were collected from fully-qualified teachers with a minimum of three years teaching experience using the online surveys (N=27).

4.2 What trends appear in the post-primary setting in relation to the number of students participating in physical activity as they progress through post-primary, from the perspectives of the teachers?

Firstly, respondents to the online survey and semi-structured interviews strongly indicated that they perceive there to be a decrease in the number of students participating in Physical Education (PE) as students progress through their school lives (Figure 1). Only 7.4% (N=2) of the online survey respondents claimed to have not perceived any distinct trend (Figure 1), while both the interviewees also highlighted the decreasing trend in student participation from an early stage in their post-primary experience.

Interviewee 1: "From my experience, I have noticed a significant drop off in participation in PE as early as second year for some students"

Interviewee 2: "In first year, almost all students participate fully in PE. However, during second and third year a large number of students begin to start arriving to class with notes about why they cannot participate in class"

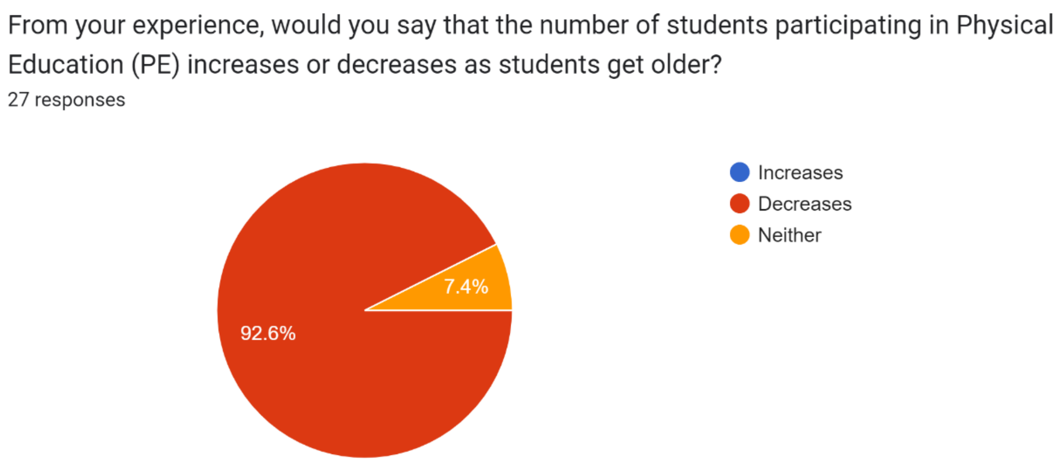

Figure 1: Teachers' perceptions of the number of students participating in Physical Education (PE) as they get older

Furthermore, 100% of the online survey respondents perceived this decreasing trend to be most dominant within the female population, with both of the interviewees also highlighting the evidence that females are in fact more inclined to decrease their participation within PE as they progress through school. (Figure 2).

Interviewee 1: "Certainly it is much more common for the girls to be coming to me with notes about why they cannot participate in class today"

Interviewee 2: "Girls are definitely more inclined to have notes exempting them from class and even of the girls that are participating in PE, I think its fair to say that the majority of them are quite disinterested in the activities"

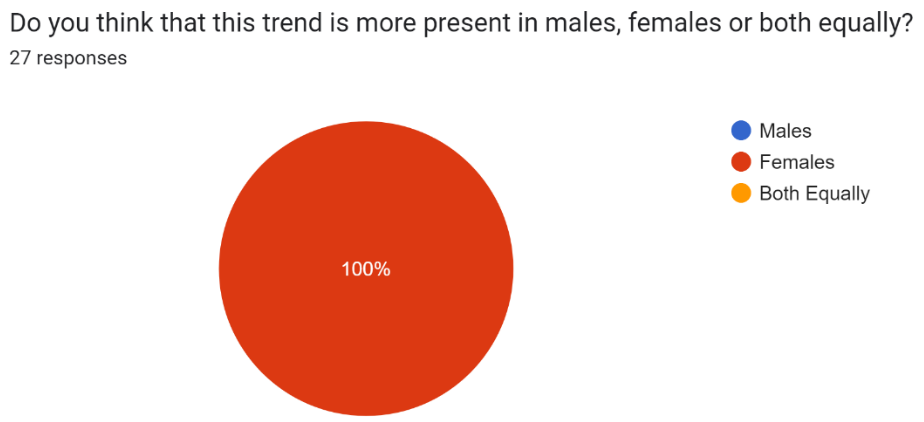

Figure 2: Teachers' perceptions of the gender specific trend that appears from figure 1.

4.3 What type of behavioural changes can be noticed by teachers, in the classes immediately after Physical Education (PE)?

Of the 27 respondents to the online survey, 81.5% (N=22) have taught classes directly after that same class had PE (Figure 3). In addition, both the interviewees acknowledged that they have also taught classes directly after that class had PE (Appendix E and Appendix F).

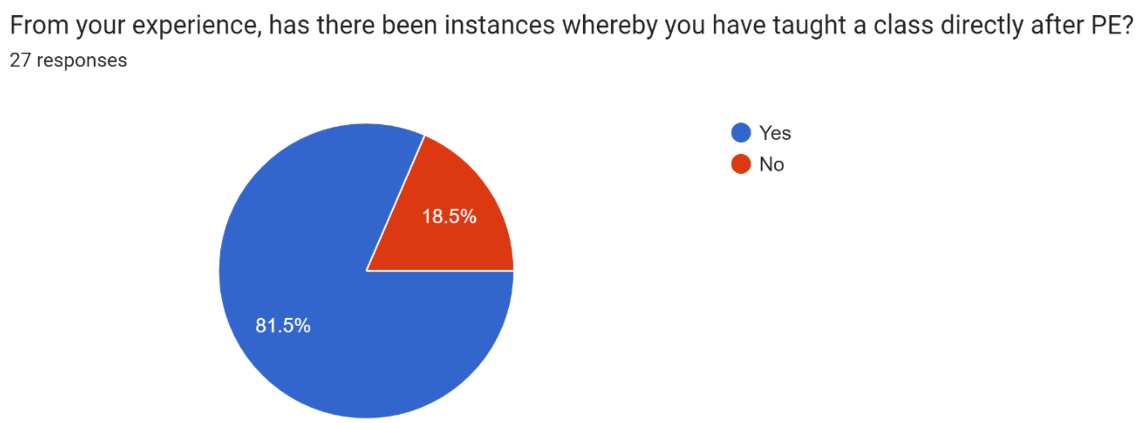

Figure 3: Number of teachers who teach classes directly after a class has had PE.

When asked to describe some of the behavioural characteristics of students in these classes, almost 60% of the online survey respondents (N=16) noted that students have more energy and were more focused directly after PE (Figure 4). During the interviews, both of the data subjects also used the phrase “more energetic” when describing students behaviour in the classes directly after PE. On the negative side of the behavioural characteristics, 22% (N=6) of the online survey respondents found that students were less focused, appeared tired and were often late to the classes immediately after PE (Figure 4). All five of the “unsure” responses came from teachers who had not taught a class directly after PE. Note: in the online questionnaire respondents were asked to describe students’ behaviour in the classes immediately after PE in their own words. Once data was collected the researcher grouped these responses into several key term categories (Figure 4).

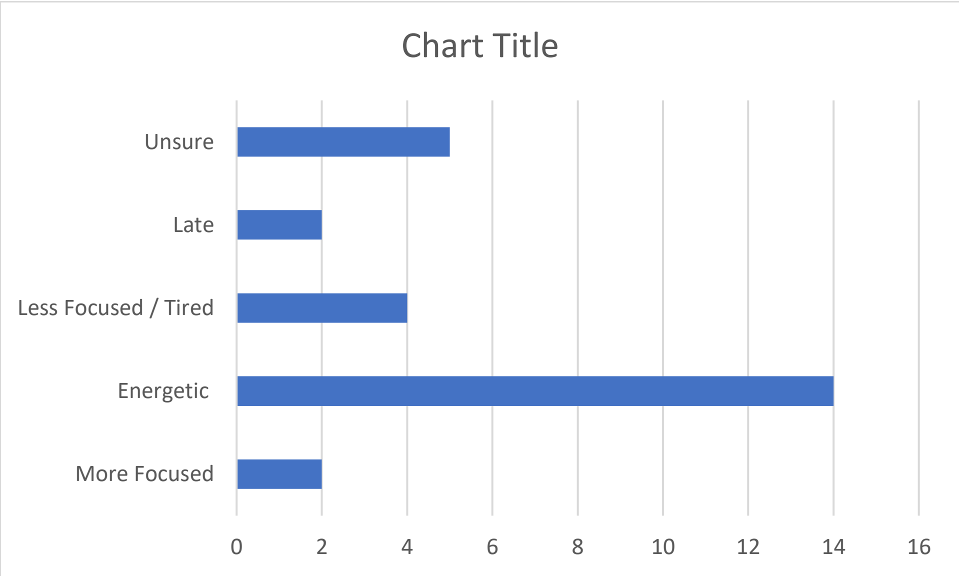

Figure 4: Teachers’ perception of student behaviour in the classes directly after PE

4.4 Do teachers’ think there is a need for physical activity in the classroom and the best methodologies for refocusing students?

When asked whether there were instances in a class where teachers’ felt that students needed to exert some energy in order to fully focus in class, 77.8% (N=21) of the online survey respondents claimed to have been in those situations (Figure 5). The remaining 22.2% (N=6) were unsure whether students needed to exert energy to fully focus or were there other factors in play (Figure 5). Both interviewees described their experiences in the classroom whereby they felt certain students would benefit from some form of physical activity in order to refocus:

Interviewee 1: "There have definitely been instances where I felt that a 3 or 4 minute walk would really benefit some students that were struggling to concentrate in the class. You would often see it with SNAs, taking certain students for a walk for a few minutes during class."

Interviewee 2: "100%. I would say it happens daily where I would see a handful of students that were struggling to concentrate in class and would often wonder if a walk or even just some sort of movement break within the classroom would help them to focus."

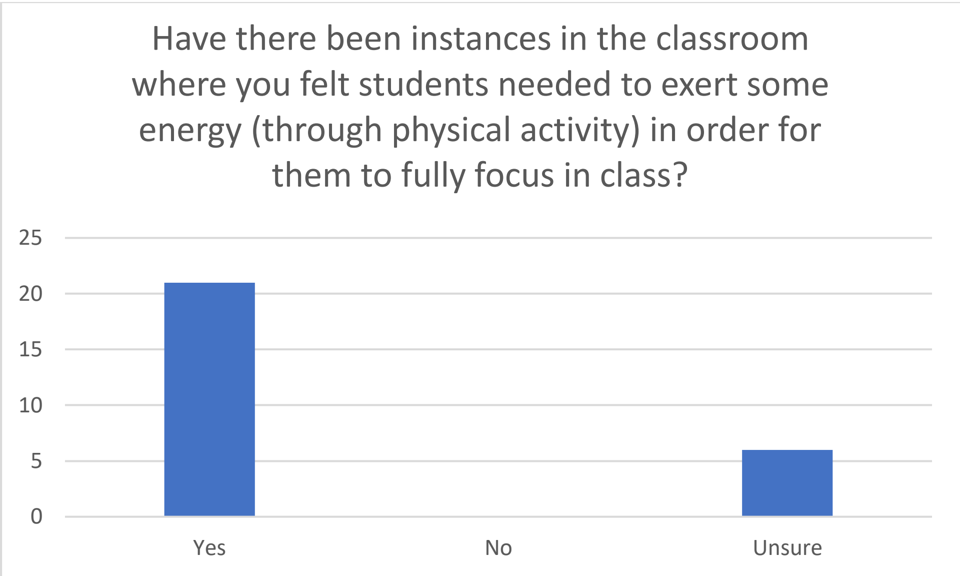

Figure 5: Teachers' perception of students' needing physical exertion to fully focus in class in certain classes.

Following on from the above quotes, taken from the two semi-structured interviews, I asked "Are there any methodologies you have used in a class in an attempt to refocus students and what was the effect that these methodologies had?" (Appendix E and Appendix F).

Interviewee 1: "I would often get students to stand up and shake their arms and legs out like you would see a sports team do in a warmup. I find this helps with students that might be feeling a bit tired towards the end of the day or first thing in the morning to almost spruce them up."

Interviewee 2: "One thing I like to use for my French class is mini whiteboards at the beginning of class. I would give them a word in French and they have to write down the English meaning. Its not exactly huge physical movement but I find students become competitive and competition inadvertently causes them to focus."

Of the 27 online survey respondents, 74% (N=20) claimed to have used some form of physical activity methodology in an attempt to refocus students within the classroom, with "walking debates" and "movement breaks" being the most popular form of methodologies (Figure 6). 70.4% (N=19) acknowledged that these methodologies were effective (Figure 7).

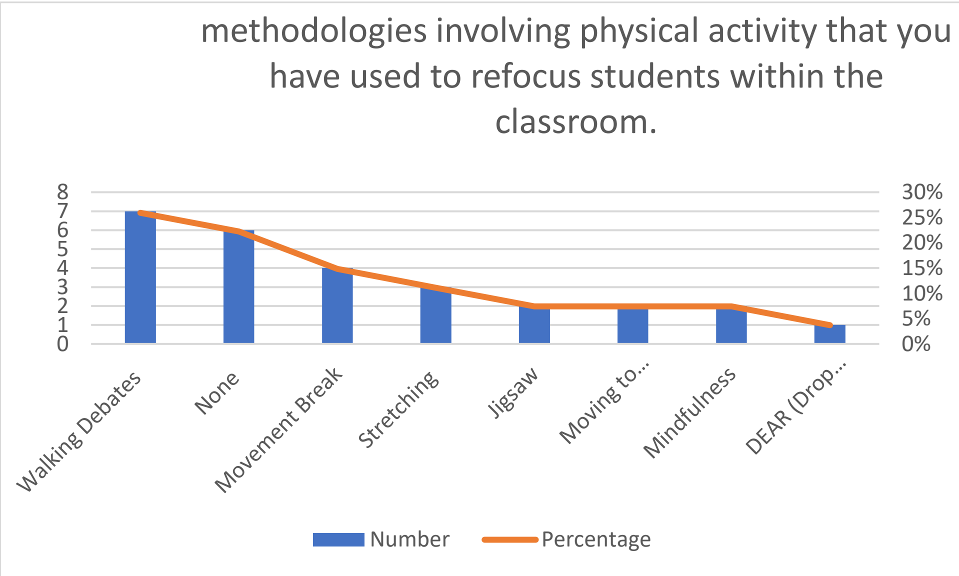

Figure 6: Methodologies used by teachers to refocus students in the classroom.

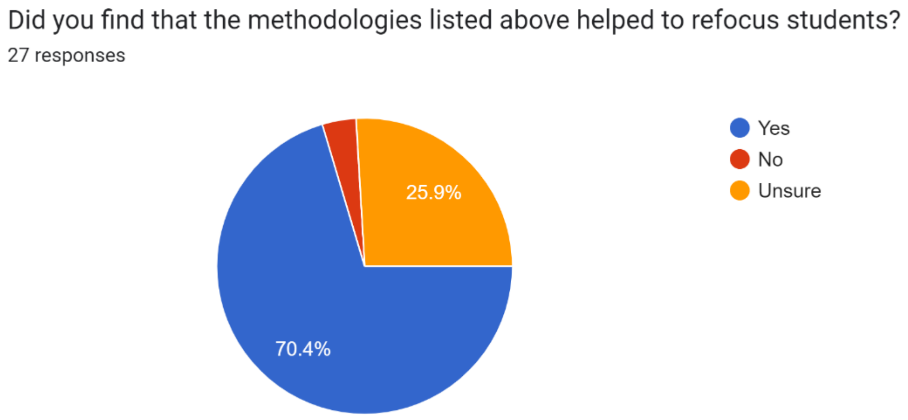

Figure 7: Teachers' perception of whether the methodologies from Figure 6 were effective or not.

4.5 Summary of teachers' perceptions of the effect of physical activity on student learning, behaviour and assessment

Both the online survey respondents and interviewees were given a series of statements and were asked to pick one of the following five options, as seen on a typical Likert Scale: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree.

Statement One: "Students that participate in school clubs, societies or sports teams tend to have a better relationship with teachers that are involved in those activities"

96.3% (N=26) of respondents agreed with this statement (81.5% Strongly Agreed and 14.8% Agreed) with just 3.7% (N=1) person answering neutral to the above statement (Figure 8). Both the interviewees provided overwhelming support for the "Strongly Agree" response to this statement:

> Interviewee 1: "Yes I would strongly agree with that because it is quite hard to break that teacher/student relationship just from the classroom experience, whereas if you have conversations with students away from the classroom you begin to form a closer bond with them."

> Interviewee 2: "Strongly Agree again. From my experience, being involved with [Gaelic] football teams over the years you definitely get to know students better and that does translate to the

classroom because they have that respect for you and understand that you're fairly normal outside of the classroom".

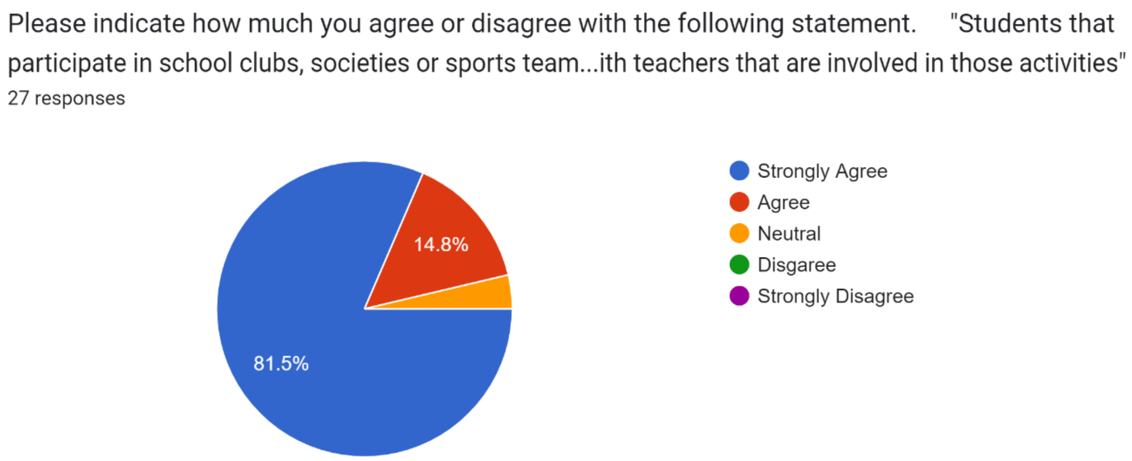

Figure 8: Likert Scale: "Students that participate in school clubs, societies or sports teams tend to have a better relationship with teachers that are involved in those activities"

Statement Two: "School sports hinders students' learning, behaviour and assessment."

Of the 27 online survey respondents, over 60% (N=17) disagreed (18.5% Strongly Disagreed and 44.4% Disagreed) with the above statement. 7.4% (N=2) respondents did however agree with the statement with 29.6% (N=8) voting neutral (Figure 9). There were also mixed feelings from the interviewees with some dividing opinions:

Interviewee 1: "I would actually probably lean on the agree side with this statement which might seem controversial. I do think that there are some cases where certain students miss a lot of key classes and even in the build up to a game they can be quite disinterested and might miss out on homework or notes the rest of the class get."

Interviewee 2: "Disagree. I think school sports is a great aspect of school life and provides students with some of their best memories. Also, the schooldays they miss out on from the school sports is quite a low percentage of the whole year so yes, disagree.

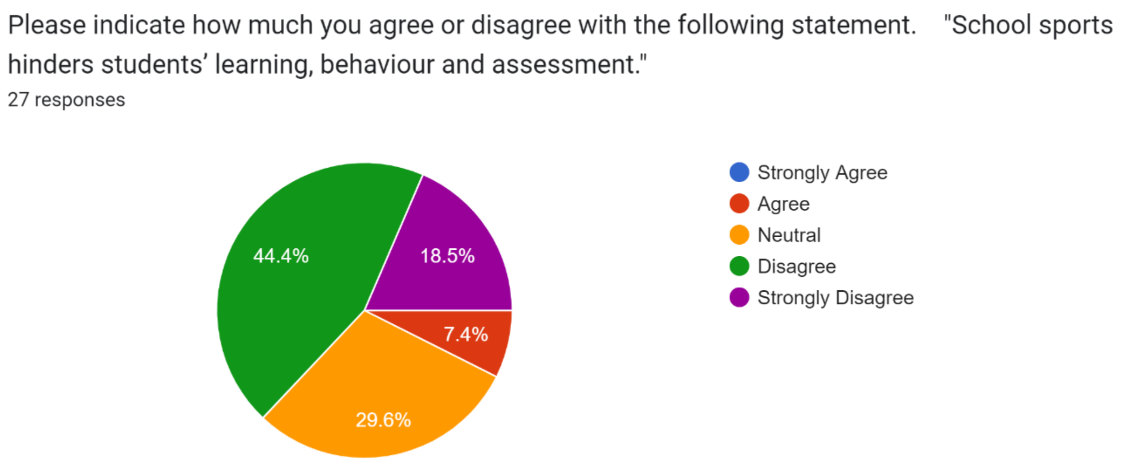

Figure 9: Likert Scale: "School sports hinders students' learning, behaviour and assessment."

Statement Three: "Students that participate in physical activity regularly, excel more in their learning, behaviour and assessment".

55.6% (N=15) of the 27 online survey respondents agreed with the above statement (3.7% Strongly Agree and 51.9% Agree). In addition, 14.8% (N=4) disagreed with the statement, while 29.6% (N=8) remained neutral (Figure 10). The interviewees were on the same page for this statement:

Interviewee 1: "I would agree with this but there is probably a number of factors at play here that kind of stem from the physical activity aspect. I think its fair to assume that if a student is exercising more regularly they are probable quite healthy and so not missing much school. But I do think that student's discipline and overall happiness is influenced by things like their physical activity participation."

Interviewee 2: "I would strongly agree with that yes. I think if a student is participating in physical activity regularly then they're probably quite disciplined in a way that helps them when it comes to schoolwork."

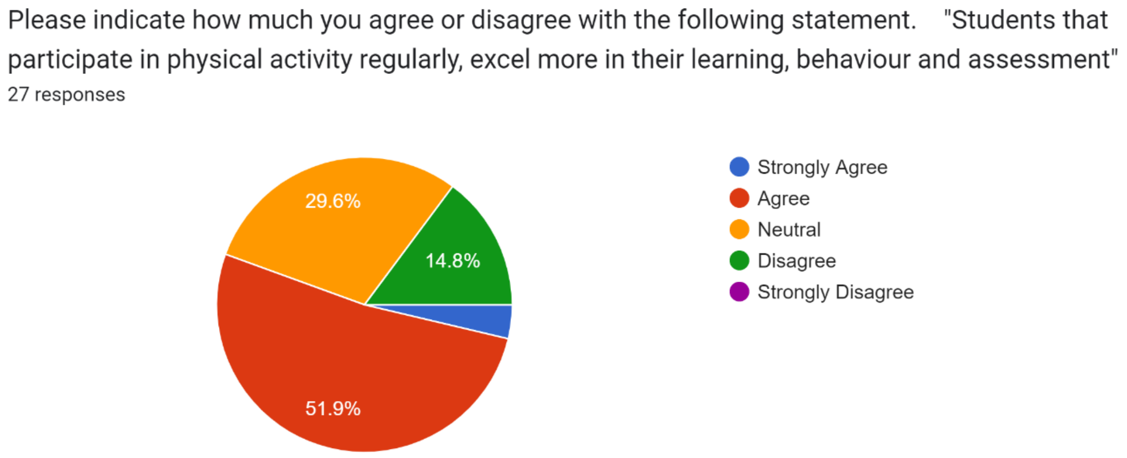

Figure 10: Likert Scale: "Students that participate in physical activity regularly, excel more in their learning, behaviour and assessment".

Statement Four: "Students seem happier after they have participated in physical activity."

The online survey respondents agreed heavily with this statement with only 3.7% (N=1) disagreeing, while the rest 96.3% (N=26) agreed with the above statement (37% Strongly Agree and 59.3% Agree) (Figure 11). Both interviewees shared the same feelings as the majority of the online survey respondents:

Interviewee 1: "Being a PE teacher I would strongly agree with that. You can see it on almost all the students faces during and after a PE class. Even though there might be controversy over a refereeing decision, they leave the class buzzing."

Interviewee 2: "Definitely strongly agree. I would say that goes for most people in general but definitely students because they are quite contained all day in a classroom and a PE class or a match is a bit of excitement for them and they seem to really enjoy it."

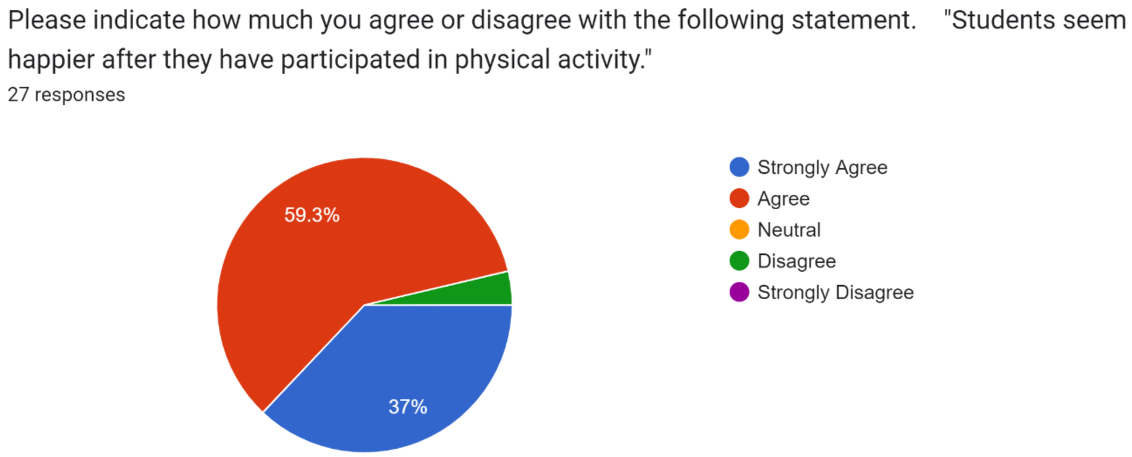

Figure 11: Likert Scale: "Students seem happier after they have participated in physical activity."

Statement Five: "Too many students are not getting enough physical activity during a standard school week."

Similarly to Statement Four, 96.3% (N=26) of the online respondents were largely in agreement with the above statement (70.4% Strongly Agree and 25.9% Agree) (Figure 12). 3.7% (N=1) disagreed with the statement while both interviewees strongly agreed with it also (Figure 12).

Interviewee 1: "Oh Strongly Agree. I've said this for a number of years that an hour of physical activity within the school week for students is not enough. It's definitely something I would like to see addressed and maybe it will be as we are seeing now with PE being recognised as an examinable subject in the last few years."

Interviewee 2: "I'd Strongly Agree with that yes. Now in fairness, a large amount of students are participating in sports teams and other individual fitness activities outside of school but definitely I think the amount of "subscribed" physical activity in the school week is not enough."

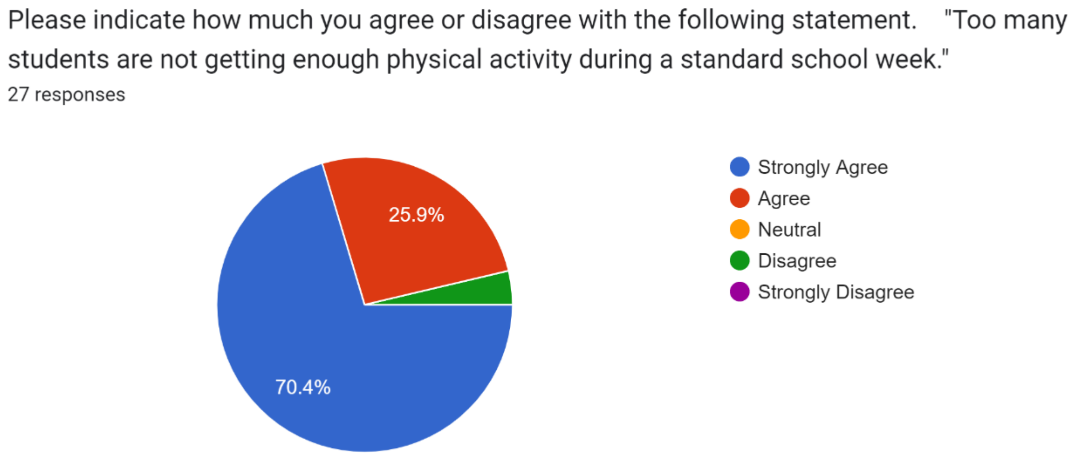

Figure 12: Likert Scale: "Too many students are not getting enough physical activity during a standard school week."

Statement Six: "The amount of schoolwork a student is required to complete, hinders the amount of physical activity they can achieve"

Of the 27 online survey respondents, 66.7% (N=18) agreed that the amount of work students get is hindering the amount of physical activity they can achieve (7.4% Strongly Agree and 59.3% Agree) (Figure 13). However, 14.8% (N=4) disagreed with the statement and a further 18.5% (N=5) remained neutral (Figure 13). Both the interviewees also expressed their feelings about the above statement:

Interviewee 1: "I'd be fairly on the fence with this one. I think at certain periods with certain year groups I would agree with the statement but in general I would probably disagree. I think when people think about physical activity they think about an hour long workout when a 15/20 minute walk would be plenty at times."

Interviewee 2: "I would lean to disagreeing with that one just because I don't think students are so bogged down in school work that a short walk/jog is unachievable."

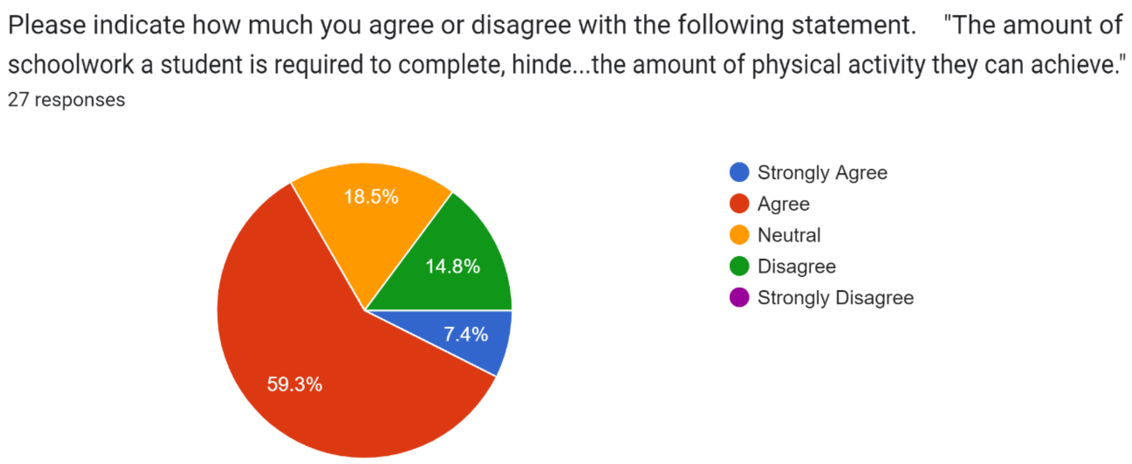

Figure 13: Likert Scale: "The amount of schoolwork a student is required to complete, hinders the amount of physical activity they can achieve"

4.6 Conclusion

The qualitative and quantitative data collected in this study identified three main themes. Firstly, the data indicated that teachers recognise that the number of students participating in physical education/physical activity, as they progress through the post-primary setting, is decreasing significantly. This theme particularly focused on, but not limited to, the reduction of female participants in physical education/physical activity. Secondly, teachers identified the use/need for physical activity methodologies within the classroom in order to aid students to be able to focus their attention on class material. Lastly, the data collected through the Likert Scale, highlighted the benefits of physical activity, from the perspective of teachers', in aiding student behaviour, learning and assessment. The data and research findings in this chapter will be discussed further in chapter 5 in relation to the relevant research literature in this area.

Chapter Five: Discussion

5.1 Introduction

This chapter will discuss the outcomes of the findings stemming from the previous chapter. These findings were acquired through qualitative (semi-structured interviews) and quantitative (online surveys) methodologies. Analysis of these findings highlighted a number of themes that correspond to the research questions that were initially presented in Chapter 1:

- What are the benefits of physical activity on a secondary school students' learning, behaviour and assessment?
- What are the barriers to physical activity for secondary school students?
- How might a secondary school/ secondary school student overcome the barriers to physical activity?

This chapter will demonstrate links between the data collected in this study and research already carried out in this field. At the end of this chapter, recommendations will be suggested based on the findings and how these could influence future practice in the post-primary setting in relation to the development of participation in physical activity within the school environment.

5.2 Benefits of physical activity on a secondary school students' learning, behaviour and assessment

The data subjects (teachers) identified different examples highlighting the benefits of physical activity on students' learning, behaviour and assessment, through both the online surveys and the semi-structured interviews. Teachers that responded to the online survey highlighted a number of different methodologies they have used in order to focus students, and consequentially improve their learning abilities, such as: walking debates, movements breaks, stretching and mindfulness. These findings correspond with those from the semi-structured interviews where teachers explained how the use of stretching and competitive games at the beginning of class benefitted students ability to focus and learn within the classroom. Interviewee 1 described their methodology to refocus students through physical activity at the beginning of a lesson: "*I would often get students to stand up and shake their arms and legs out…".* While interviewee 2 mentioned the use of "…mini whiteboards at the beginning of a class" to encourage *"competition"* in the classroom that *"…inadvertently cause them [students] to focus."*

These findings focus on the positive impact of physical activity on students' learning within the classroom, which is consistent with that of the research carried out by Kaneko et al. (2018) and Tomporowski (2015). Kaneko et al (2018) highlighted the significant increase in student learning performance using a game-based approach, such as that highlighted from Interviewee 2 in the previous chapter (Mini Whiteboards). Similarly to the responses from the online surveys and semi-structured interviews, noting movement breaks as a key methodology to focus students, Tomporowski (2015) suggested that even acute bouts of exercise have shown to enhance one's cognitive function. The findings from the previous chapter coupled with research already carried out indicates there is strong evidence that an increase in physical activity can lead to increased cognitive function within students and subsequently, increased learning ability.

Teachers that responded to the online survey noted students being more focused and having more energy in the classes that proceeded Physical Education (PE). These findings are consistent with the semi-structured interviews, whereby teachers acknowledge the increase in energy and enthusiasm levels from the students in the classes after PE. Interviewee 1 explained that, from their experience, students were "more energetic" arriving to class after PE. Interviewee 2 also noted an increase in students energy that led to "students seem[ing] more enthusiastic about the class".

These findings focus on the positive impact of physical activity on students' behaviour within the classroom, which correlates directly with research carried out by Murphy et al. (2018) in Irish colleges and universities. Murphy et al. (2018) noted that "active students are happier students" within the third-level population of Irish students which is consistent with the findings from both the online survey and semi-structured interviews. 96.3% (N=26) of the online survey respondents agreed that students "seem happier after they have participated in physical activity" while both interviewees expressed a similar opinion, acknowledging a positive behavioural change in students post-physical activity. Interviewee 1 stated that students "…leave the class buzzing", while interviewee 2 "strongly agree[d]" with the statement, highlighting that students are "…quite contained…" throughout the school day and PE class "…is a bit of excitement for them[students]…" These findings, along with research previously carried out, suggest that there is powerful evidence that an increase in physical activity can lead to positive trends in student behaviour.

The online survey respondents indicated strongly that they believe participation in physical activity has a positive impact on student academic performance (i.e assessment). Similarly, the interviewees expressed their opinions on the positive effect of physical activity around the topic of assessment. Interviewee 1 reported that, although there are a number of factors contributing to academic performance, "…*student's discipline and overall happiness is influenced by things like their physical activity participation."* Interviewee 2 shared a similar opinion, stating that physical activity can help students be *"…quite disciplined in a way that helps them when it comes to schoolwork."*

These findings focus on the positive impact of physical activity on students' assessment in the post-primary setting. This corresponds directly with the work of Singh et al. (2019) and Donnelly (2016). Singh et al. (2019) found that there was a significant increase in academic outcomes in students that participated in physical activity shortly before taking an exam, compared to those that did not. While Donnelly (2016) suggests that academic performance can be enhanced through classroom-based physical activity. Of the online survey respondents, over half (N=15) agreed that students whom participated in regular physical activity excel more in areas such as assessment. These findings, in conjunction with previous research caried out, demonstrates the potential for physical activity to increase students' assessment skills. However, I would highlight the need for further investigation in this area, as evidence has been shown to be inconsistent in some studies (Daly-Smith et al., 2018).

5.3 Barriers to physical activity for post-primary students.

Through both the qualitative (semi-structured interviews) and quantitative (online surveys), teachers reported that there were a number of challenges (barriers) for students to get a sufficient amount of physical activity. These challenges included a lack of subscribed physical activity within the school week and the amount of assigned school work within a standard school week.

Of the online survey respondents, an incredible 96.3% (N=26) agreed that students are not getting enough physical activity during a standard school week. This statistic, paired with the fact that only 23% of post-primary pupils reported meeting the Department of Education and Skills' (DES) physical education recommended minimum of 120 minutes per week, as reported by Sport Ireland (2018), underlines the issue that the majority of post-primary students are not participating in enough physical activity on a weekly basis. Both of the interviewees during this study, whom happen to be PE teachers, also expressed their worry about the lack of physical activity most students within the post-primary setting are getting. Interviewee 1 shared that they have expressed the opinion for "…*a number of years that an hour of physical activity within the school week for students is not enough."* Although interviewee 2 mentioned that many students were participating in physical activity outside the school environment, they felt that "…*the amount of "subscribed" physical activity in the school week is not enough."* The interviewees also reported that the decrease in participation in PE was most evident in senior cycle classes, corresponding to the research carried out by McMullen et al. (2022) that students noted “feeling too old” to participate in physical activity within the post-primary setting. Interviewee 2 noted that “Once students get into 5th year, there is often half the class not participating in PE class.” These findings, when analysed alongside previous research in this area, displays the worrying trend of students not meeting the minimum required amount of physical activity within the school week.

Continuing on from the idea of lack of subscribed physical activity in the post-primary school setting, teachers also highlighted the degree of schoolwork being assigned to students as a key factor in students not meeting the recommended physical activity requirements, as set out by Department of Education and Skills (DES). 66.7% (N=18) of the online survey respondents agreed that the amount of schoolwork students are required to complete is hindering the level of physical activity they can achieve. Although both interviews were less convinced by the amount of schoolwork having such a profound effect on students physical activity levels, they noted that students may see physical activity as “*…an hour long workout when a 15/20 minute walk would be plenty at times*.” The findings from the online survey respondents corresponds with the work of Al-Hazzaa (2018) and Somerset (2018). In both these studies students identified a lack of time as a major factor in the level of physical activity that they could achieve during the week. Ng (2020) also carried out a study on students physical activity during COVID-19. Interestingly, 20% of students in this study found that there levels of physical activity increased, citing “no school” as a key factor to this. Albeit, the reality of there being no school is virtually impossible, this study displays the effect school work can have on students and the levels of physical activity they can achieve. Having analysed both the quantitative data and previous research carried out, it is fair to suggest that the amount of schoolwork students are required to complete in a standard school week can have a negative impact on the amount of physical activity they can achieve.

5.4 Overcoming the barriers to physical activity for post-primary students

Having analysed both the qualitative and quantitative data, teachers have reported several different methodologies that they currently implement and/or could implement in the future, in an effort to increase the amount of physical activity for post-primary students and improve their learning, behaviour and assessment. These methodologies include: walking debates, movement breaks, stretching, jigsaw methodology, mindfulness, mini whiteboards and drop everything and read (DEAR). As previously mentioned, interviewee 1 and 2 both currently implement physical movement methodologies such as “*…shake[ing] their arms and legs out…” and competitive “…mini whiteboard…”* activities that they believe help to reenergise and refocus students at the beginning of a class.

Of the 27 online survey respondents over 74% (N=20) claimed to have used some form of physical movement methodology in order to increase students physical activity and subsequently allow them to fully focus their attention to the class material. The interviewees also shared their experiences of using physical movement activities to reengage students to the class material. These findings are consistent with research already carried out in this area, as noted by Sibley and Etnier (2003). Sibley and Etnier (2003) showed that even a small quantity of physical activity can improve a person's cognitive function. Similarly, Watson et al. (2017) showed that physical activity can be used as a tool to improve student performance through the medium of classroom-based physical activity. The findings collected from the qualitative data, quantitative data and previous research carried out exhibit the potential for classroom-based physical activity to be used as a tool to firstly, increase students' level of physical activity within the school week and secondly, improve student learning, behaviour and assessment.

5.5 Conclusion

This chapter discussed the main findings of this study in which teachers highlighted several benefits to participation in regular physical activity for students within the post-primary setting in relation to their learning, behaviour and assessment. Teachers expressed that they felt students were more focused, attentive and disciplined in class after participating in physical activity, as well as reporting that students seemed happier in themselves post-physical activity. Teachers also described the challenges that students face in achieving a satisfactory amount of physical activity. Teachers mentioned that there was not enough subscribed physical activity on the school curriculum for students to benefit from the effects oh physical activity. Other teachers highlighted that students do not possess the required time to achieve a healthy amount of physical activity within the school week, which was largely influenced by the amount of assigned school work students are required to complete. Although challenges were reported, teachers did express their solutions to these challenges. Classroom-based physical activity was a main theme across this study with some teachers already implementing this into their classrooms, while others are planning on implementing these methodologies in the future. Chapter six will now consider the strengths and limitations of the research conducted in this study and provide further recommendations for research in relation to this topic.

Chapter Six: Conclusion

6.1 Introduction

This study allowed the researcher to obtain an understanding of the effects of physical activity on student learning, behaviour and assessment from the perspective of the teacher. Relevant literature in relation to the above topic was discussed in chapter two of this study. Qualitative (semi-structured interviews) and quantitative (online survey) methodologies were used to collect data from the subject school teacher (N=29). The data collected was analysed and interpreted to exhibit the positive and negative effects of physical activity on student learning, behaviour and assessment, as well as the barriers that students face in obtaining a sufficient level of physical activity. Improved focus, mood and cognitive function were among the significant benefits that teachers highlighted in relation to the affect of physical activity on students. A lack of time, subscribed physical activity and substantial workload were identified as significant barriers to students achieving an adequate amount of physical activity weekly.

6.2 Summary of findings

Data from the qualitative and quantitative methodologies enabled the researcher to collect findings that would be coupled with relevant literature to create a more comprehensive conclusion as to the effects of physical activity on student learning, behaviour and assessment. Findings from the data analysis highlighted the perceived increase in student focus, mood and cognitive function, as seen in the work of Kaneko et al. (2018), Murphy et al. (2018) and Singh et al. (2019), respectively. The findings also identified a number of barriers to a satisfactory amount of physical activity for students. Teachers reported a lack of subscribed physical activity in the school curriculum as a considerable barrier to students' physical activity, in keeping with the work of Guthold et al. (2020) who claimed that the majority of adolescents worldwide were insufficiently physically active. Teachers also identified lack of time and a substantial workload as other key factors in their ability to achieve sufficient physical activity, as seen also in Ng (2020) and Rossi (2021). Teachers provided various solutions to the insufficient physical activity among students, identifying classroom-based physical activity as a significant methodology that could improve post-primary students' physical activity levels.

6.3 Limitations

The use of a mixed-method approach provided the researcher with a deeper understanding of the effect of physical activity on students' learning, behaviour and assessment from a teachers' perspective. Personal views, opinions and experiences were obtained from the semi-structured interviews alongside greater numerical data collected from online surveys which allowed the researcher to gather a more comprehensive picture (Al Shenqeeti, 2014). However, as Al Saawi (2014) mentions, there is a potential for bias through interviews. In this study both interviewees were Physical Education (PE) teachers, and so they're views and experiences may be more biased then that of another subject teacher. In relation to the quantitative data, the use of the Likert scale could be deemed problematic due to the intervals between the options being regard as not equal (Bell, 2005). The study was limited to one, rural school that is comprised of a number of different socioeconomic backgrounds. This location and demographic provides limitations to the findings as students may have other factors affecting their physical activity.

6.4 Recommendations

Findings indicated that teachers believe there is a need to implement procedures to increase the level of physical activity that students achieve in a standard school week. Teachers highlighted classroom-based methodologies that could be used as a potential procedure to accommodate this increase. Examination of PE as a subject was also mentioned that would require students to reach certain metrics of fitness to pass and more subscribed physical activity in the everyday life of a school student also provided a possible solution to the issue. Further collaboration with schools would be beneficial to develop the extent of research within this field. A possible study carried out in a similar school setting with before and after results having implemented one of the above studies would be beneficial for research purposes. In relation to my own practice, the findings gathered will influence how I can implement physical activity within the classroom but also encourage physical activity outside of the classroom.

6.5 Conclusion

The decrease in physical activity among Irish adolescents between 2010 and 2018 has been highlighted in an extensive study carried out by Sport Ireland (2018). The study also reported that nearly 1 in 4 post-primary students are not achieving the required physical activity guidelines as set out by the Department of Education and Skills (DES) (Sport Ireland, 2018). This case study identified the decreasing trend of students participating in physical activity, as they progress through school, from the perspective of the teacher. The study also described the benefits of, and challenges to, achieving an adequate amount of physical activity for post-primary students as well as the possible solutions of classroom-based methodologies and more subscribed physical activity for students. Additionally, this study may provide a catalyst for further research in this area by stimulating discussion of the subject among readers.

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Appendices

Appendix A – Interview Schedule

Interview Questions

1. For the purpose of the interview, can you please state how many years you have been teaching and what subjects you teach?
2. What year groups do you currently teach?
3. Do you think it is important for students to participate in physical activity?
4. Since you've started teaching, have you noticed or been made aware of a trend (increase or decrease) in the number of students that participate in Physical Education (PE) as they get older? (chance to elaborate here – Why do you think this trend exists?)
5. Is this trend more apparent in a specific gender? Why do you think that is?
6. Have you been or are you currently involved in any sporting teams within the school environment?
7. Would you say that students involved in sport within the school are more inclined to show better behaviour, learning and assessment to teachers involved in sport within the school rather than those teachers that are not?
8. Of the students that you are aware do not participate in sporting activities within the school, do you notice any differences in their behaviour, learning and assessment compared to the students that do participate in sporting activities?
9. Why do you think this is?
10. Is there many classes you have that come directly after those students had PE?
11. In these classes, do you notice a change in the classroom management efficiency compared to other classes with the same students?
12. Do you think that having just participated in physical activity could be a factor in this change?
13. Have you ever had an instance in a classroom where you felt some students needed to exert some energy (e.g walk, run, exercise in general) in order for them to be fully focused in class?
14. Continuing on from the previous question have you ever tried to implement "movement breaks" into your classes? And if so, did you feel they were effective?
15. The next section of the interview involves me giving a statement and you giving a response that you think most accurately describes your feelings towards that statement from the following list: Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree. *Participating in physical activity helps students to be more focused in class.*
16. *Students that participate in school clubs, societies or sports teams tend to have a better relationship with teachers that are involved in those activities*.
17. *Immediately after physical activity, students are more interested in school work.*
18. *School sports hinders student learning, behaviour and assessment.*
19. *Students that participate in physical activity regularly, excel more in their learning, behaviour and assessment.*
20. *Students seem happier after they have participated in physical activity.*
21. *Physical activity makes students more disciplined with their schoolwork.*
22. *Too many students are not getting enough physical activity during a standard school week.*

23. *The amount of schoolwork a student is required to complete, hinders the amount of physical activity they can achieve.*
24. Is there anything you'd change about the school curriculum or school environment that would help promote the participation in physical activity?
25. How do you feel about the statement, "Participation in physical activity has a positive effect on classroom behaviour, learning and assessment in the post-primary setting"?

Appendix B – Research Information Sheet

Research Information Sheet	
Researcher:	Darragh Ranahan
Organisation: (name and contact details)	Hibernia College Dublin
Title of study:	An investigation into the effects of physical activity on classroom management in post-primary schools

Outline of research study:

A 2018 study carried out by Sport Ireland found that the number of children in post-primary education achieving the physical activity guidelines of 60 minutes daily, provided by the Health Service Executive (HSE), had decreased since there previous 2010 study (Sport Ireland, 2018). The study also found that only "23% of post primary pupils reported meeting the Department of Education and Skills' (DES) Physical Education recommended minimum of 120 minutes per week" (Sport Ireland, 2018). These statistics make for pessimistic reading and according to McMullen et al. (2022), many of the students believe that there is a limited supply of physical activities available to them in the post-primary setting compared to the primary scene and that, of those physical activities available to them, most were inaccessible for a variety of reasons such as feeling too old or a lack of inclusivity (McMullen et al., 2022). When we compare the levels of vigorous exercise to that of the 1998 figures we also see a slight decrease in the number of young people participating in vigorous exercise (Költő et al., 2020). These previous studies indicate that the level of physical activity being attained by secondary level students in Ireland is decreasing and so the purpose of this study is to corroborate this trend and outline the possible implications this has for secondary level students' and the efficiency of classroom management within the post-primary setting.

Objectives of the project:

The objective of this study is to identify whether there is a positive correlation between regular physical activity and the classroom management efficiency within the post-primary setting. The study will try to ascertain what level of physical activity is required to influence the classroom management efficiency within the post-primary setting, whilst also seeking to identify the possible barriers to achieving this.

What would I need you to do?

Your participation in this research project is greatly appreciated. This research project has received ethical approval from Hibernia College Dublin. If you agree to participate, you will participate in a short semi-structured interview with the researcher and/or an online questionnaire. Any information you provide about your own identity or that of the school will be anonymous and confidential. Quotes from the interview may be used and may also be published in the research however your name and the name of the school will not published. The interview will be audio recorded and transcribed, and a copy of the transcript will be made available to you on request. Any information gathered from the online questionnaire will be confidential and will be only be used for the purpose of this study before being destroyed safely and securely in line with GDPR. This research will be used in a publication of a thesis for Hibernia College Dublin. It may also be used in conference proceedings or used in academic articles. You are free to withdraw from the study at any time.

What is the purpose of this research?

The purpose of the research is to complete small-scale study which forms part of the final year of the Professional Masters of Education (Post-Primary) with Hibernia College Dublin.

Appendix C – Online Survey

Effects of physical activity on student learning, behaviour and assessment - Questionnaire.

The following survey will be used to gather information from the perspective of fully qualified teachers on the "effects of physical activity on student learning, behaviour and assessment".

The questionnaire should take 2-3 minutes to complete and you must provide a response for every question.

All responses are anonymous and are collected solely for the purposes of this study. Once the data is collected and its purpose has been fulfilled, the data will be destroyed in accordance with the General Data Protection Regulation (GDPR) and Hibernia College data safety guidelines.

By clicking "submit" at the end of the questionnaire you will be giving your consent for your responses to be used for the study specified above.

* Indicates required question

1. What year group(s) do you currently teach? Select all that apply. *

Check all that apply.

- 1st Year
- 2nd Year
- 3rd Year
- 4th Year (Transition Year)
- 5th Year
- 6th Year

2. From your experience, would you say that the number of students participating in Physical Education (PE) increases or decreases as students get older? *

Mark only one oval.

- Increases
- Decreases
- Neither

3. Do you think that this trend is more present in males, females or both equally? *

Mark only one oval.

- Males
- Females
- Both Equally

4. From your experience, has there been instances whereby you have taught a class directly after PE? *

Mark only one oval.

- Yes
- No

5. How would you describe student's behaviour in the classes immediately after PE? (e.g more focused, more energetic, tired, etc.) *

6. Have there been instances in the classroom where you felt students needed to exert some energy (through physical activity) in order for them to fully focus in class? *

Mark only one oval.

- Yes
- No
- Unsure

7. Can you list any methodologies involving physical activity that you have used to refocus students within the classroom. *

8. Did you find that the methodologies listed above helped to refocus students? *

Mark only one oval.

- Yes
- No
- Unsure

9. Please indicate how much you agree or disagree with the following statement. *

"Participating in physical activity helps students to be more focused in class"

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

10. Please indicate how much you agree or disagree with the following statement. *

"Students that participate in school clubs, societies or sports teams tend to have a better relationship with teachers that are involved in those activities"

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

11. Please indicate how much you agree or disagree with the following statement. *

"Immediately after physical activity, students are more interested in school work."

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

12. Please indicate how much you agree or disagree with the following statement. *

"School sports hinders students' learning, behaviour and assessment."

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

13. Please indicate how much you agree or disagree with the following statement. *

"Students that participate in physical activity regularly, excel more in their learning, behaviour and assessment"

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

14. Please indicate how much you agree or disagree with the following statement. *

"Students seem happier after they have participated in physical activity."

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

15. Please indicate how much you agree or disagree with the following statement. *

"Physical activity makes students more disciplined with their schoolwork"

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

16. Please indicate how much you agree or disagree with the following statement. *

"Too many students are not getting enough physical activity during a standard school week."

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

17. Please indicate how much you agree or disagree with the following statement. *

"The amount of schoolwork a student is required to complete, hinders the amount of physical activity they can achieve."

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Appendix D – Consent confirmation details contained in online survey abstract

Effects of physical activity on student learning, behaviour and assessment - Questionnaire.

The following survey will be used to gather information from the perspective of fully qualified teachers on the "effects of physical activity on student learning, behaviour and assessment".

The questionnaire should take 2-3 minutes to complete and you must provide a response for every question.

All responses are anonymous and are collected solely for the purposes of this study. Once the data is collected and its purpose has been fulfilled, the data will be destroyed in accordance with the General Data Protection Regulation (GDPR) and Hibernia College data safety guidelines.

By clicking "submit" at the end of the questionnaire you will be giving your consent for your responses to be used for the study specified above.

* Indicates required question

Appendix E – Interview 1 Transcripts

<u>Interview 1:</u>

Researcher – Just for the purpose of the interview, can you state how many years you have been teaching and what subjects you teach?

Interviewee 1 – Yeah, so in total I've been teaching for 8 years but I've been fully qualified for the last 5 years and I teach PE and Geography.

Researcher – And at the minute, what year groups do you teach?

Interviewee 1 – So I have 1st years, 5th Years, TY's and 6th years for PE. Then for French I have a class in every year except for TY's.

Researcher – Lovely. So first of all, do you think it is important for students to participate in physical activity?

Interviewee 1 – Yeah certainly I think its very important for people of all ages, not just students, for psychological reasons as well as physical reasons. There's obviously huge benefits physically but lately there seems to be a lot of emphasis on the effect it can have on people's mental health as well

Researcher – And being a PE teacher would you say that there is any trend in the number of students participating in PE as they progress through the years?

Interviewee 1 – From my experience, I have noticed a significant drop off in participation in PE as early as second year for some students. Generally most students would do PE regularly in first year but then from second year on students start bringing more and more notes with reasons why they can't do PE, particularly with girls which is a shame.

Researcher – That was actually going to be my follow up question, do you notice this trend more so in boys or girls?

Interviewee 1 – Certainly it is much more common for the girls to be coming to me with notes about why they cannot participate in class today, yeah

Researcher – And why do you think that is?

Interviewee 1 – Theres probably a number of reasons but I'd say a lot of it, for girls anyway, is being worried about how they look and getting sweaty and things like that that they don't care about in first year but as they get older they get a bit more self conscious about those things.

Researcher – Yeah, I think that's probably fairly accurate. And tell me, are you involved in any sports teams within the school this year or in previous years?

Interviewee 1 – So not this year but almost every other year I would've been involved with some sort of GAA team in the school.

Researcher – And if you can think back to those years you were involved in those GAA teams did you find that you had a better relationship with students because you were involved in sports teams?

Interviewee 1 – I would probably say I did have a better relationship with students because of that yeah. It just helps meeting students in a less formal setting and getting to know them that bit better.

Researcher – And of the students that you are aware do not participate in sporting activities within the school, do you notice any differences in their behaviour, learning and assessment compared to the students that do participate in sporting activities?

Interviewee 1 – umm, I'd probably just say that those students are a bit quieter in class generally. Probably because they're only used to seeing teachers in the classroom setting.

Researcher – Yeah definitely. Right, so the next question is are there any classes you have directly after those students had PE?

Interviewee 1 – Yes there's been a number of times I've had that alright and I even have it this year with a 2nd year group.

Researcher – And in these classes, do you notice a change in the students' behaviour compared to other classes with the same students?

Interviewee 1 – Yeah students are definitely more energetic in class straight after PE. That can be a good thing and a bad thing but more often then not it turns out to be a good thing once they've settled. One negative about those classes though is that students are often late getting to class cause they have to change their clothes and all that.

Researcher – And do you think that having just participated in physical activity could be a factor in this change?

Interviewee 1 – Oh ya 100%, i'd say it's the main reason cause you have students with high adrenaline after running around for a while and then if there is any controversial calls in a game or something happened students are debating and giving out to each other so the energy levels are much higher than a standard class.

Researcher – With that in mind, has there ever been an instance in a class where you thought that students needed to exert some energy to get their full attention?

Interviewee 1 – Yeah, there have definitely been instances where I felt that a 3 or 4 minute walk would really benefit some students that were struggling to concentrate in the class. You would often see it with SNAs, taking certain students for a walk for a few minutes during class. Or even something as simple as getting out of their seats and jogging on the spot or shaking out there body just to get the blood flowing a bit because in fairness students spend an awful lot of the day sitting down.

Researcher – Continuing on from that, have you ever tired to implement something like the movement breaks you just mentioned?

Interviewee 1 - Yeah so I would often get students to stand up and shake their arms and legs out like you would see a sports team do in a warmup. I find this helps with students that might be feeling a bit tired towards the end of the day or first thing in the morning to almost spruce them up. Other times I've tried meditation but that can be fairly hit and miss depending on the class in front of you.

Researcher – Excellent, so the next section of the interview involves me giving you a statement and you giving a response that you think most accurately describes your feelings towards that statement from the following list: Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree. Makes sense? Lovely, so the first statement is: *"Participating in physical activity helps students to be more focused in class."*

Interviewee 1 – Agree.

Researcher – Can you elaborate on why you agree?

Interviewee 1 – Yeah sorry I thought you were just looking for one of the options haha. Yeah I'd agree with that because I do see the difference in most students after PE class in the other classes they go into but then there are definitely some instances where it takes some students a lot longer than others to settle back down after that spike of energy.

Researcher – Perfect, next one so. "*Students that participate in school clubs, societies or sports teams tend to have a better relationship with teachers that are involved in those activities"* and we've kind of already touched on this.

Interviewee 1 - Yes I would strongly agree with that because it is quite hard to break that teacher/student relationship just from the classroom experience, whereas if you have conversations with students away from the classroom you begin to form a closer bond with them.

Researcher – And in fairness, I think that can be said for any clubs in the school, not just sporting ones.

Interviewee 1 – Yeah definitely. You'd see it even this year there's a computer club and the teacher that runs it here gets on a lot better with the students in that club and its not that they don't get on with other teachers its just they get to be with that teacher outside of the classroom and it's a lot more relaxed.

Researcher – Yeah. Right next statement so is "*Immediately after physical activity, students are more interested in school work.*"

Interviewee 1 – Agree. Yeah we kind of spoke about this already but in general I think that it definitely helps students to be more focused in class once they have settled down but I suppose the problem you might run into there is that they don't settle down for a long time.

Researcher – Yeah perfect. Right what about this one: "*School sports hinders student learning, behaviour and assessment.*"

Interviewee 1 – I would actually probably lean on the agree side with this statement which might seem controversial. I do think that there are some cases where certain students miss a lot of key classes and even in the build up to a game they can be quite disinterested and might miss out on homework or notes the rest of the class get. But in fairness that isn't always the case and I think that school sports are brilliant for students and they get some great memories out of them but yeah, I think it can hinder them a bit.

Researcher – That's a controversial take from a big GAA person haha

Interviewee 1 – Yeah I'm probably a hypocrite because I'm often the one involved in these teams haha

Researcher – Moving on, "*Students that participate in physical activity regularly, excel more in their learning, behaviour and assessment.*"

Interviewee 1 – I would agree with this yeah but I do think there are probably a number of factors at play here that come with being physically active. I would say generally that if a student is exercising more regularly they are probably quite healthy and so not missing much school. But I do think being physically active affects student's discipline and overall happiness.

Researcher – Yeah fair. "*Students seem happier after they have participated in physical activity",* actually fits nicely into what you just mentioned.

Interviewee 1 – Yeah definitely, being a PE teacher I would strongly agree with that. You can see it on almost all the students faces during and after a PE class. Even though there might be controversy over a refereeing decision, they leave the class buzzing.

Researcher – Yeah even going back to my own days in school, the excitement around PE class was unreal, couldn't wait to go into the hall and play something.

Interviewee 1 – That’s it yeah, kids love it, well the majority of kids anyway.

Researcher – Yeah. “*Physical activity makes students more disciplined with their schoolwork.”*

Interviewee 1 – Yeah I’d agree with that. I suppose if students are participating in physical activity regularly they have that outlet away from schoolwork and studying, so when it is time to study they don’t feel like schoolwork is all they do if that makes sense?

Researcher – Yeah I get what you’re saying. The physical activity or sports is nearly their reward for being disciplined with their schoolwork.

Interviewee 1 – Yeah exactly.

Researcher – Lovely. So, *“Too many students are not getting enough physical activity during a standard school week.”*

Interviewee 1 - Oh Strongly Agree. I’ve said this for a number of years that an hour of physical activity within the school week for students is not enough. It’s definitely something I would like to see addressed and maybe it will be as we are seeing now with PE being recognised as an examinable subject in the last few years.

Researcher – Yeah hopefully. Right last one of these statements so: “*The amount of schoolwork a student is required to complete, hinders the amount of physical activity they can achieve.”*

Interviewee 1 - Oh, I’d be fairly on the fence with this one. I think at certain periods with certain year groups I would agree with the statement but in general I would probably disagree. I think when people think about physical activity they think about an hour long workout when a 15/20 minute walk would be plenty at times. I’d probably lean more on the disagree side but can understand why people would agree with it.

Researcher – Lovely, so there’s only two more questions and I hope you read the questions before today or else I might be putting you on the spot a bit here but is there anything you’d change about the school curriculum or school environment that would help promote the participation in physical activity?

Interviewee 1 – I did actually have a quick look through the questions and I was thinking about an answer for this one. What I’d like to see happen is, first thing in the morning, is some form of physical movement activity. Something as simple as standing up and shaking your body out to get the blood flowing a bit because students can be like zombies in the morning and its not their fault really, they’re probably just out of bed, may or may not have had a breakfast and then straight into school and expected to be ready to learn. I think something along those lines would really benefit everyone, students and staff.

Researcher – Right, that’s interesting yeah I was thinking about this one too and I was thinking about having a 5 minute meditation in the class straight after lunch, as in the whole school would do it in their classes.

Interviewee 1 – Yeah that would be great, its just with meditation it takes one person to be disruptive and the whole thing is ruined.

Researcher – Yeah that's a fair point. Ok lastly, I have one more statement for you and you can answer this is whatever way you like, doesn't have to be strongly agree. Agree etc: "*Participation in physical activity has a positive effect on classroom behaviour, learning and assessment in the post-primary setting."*

Interviewee 1 – I'd agree with that statement. Of course you're going to have your outliers where that isn't the case but in the vast majority of students, physical activity will definitely benefit their moods, their ability to focus and their overall school experience, in my opinion.

Researcher – Thank you so much for doing this interview, really appreciate it.

Interviewee 1 – No problem at all, thanks.

Appendix F – Interview 2 Transcripts

Interview 2:

Researcher - OK, so just for the purpose of the interview, can you please state how many years you have been teaching and the subjects that you teach?

Interviewee 2 - Yep, no problem. So I have been teaching for the last five years. And the subjects I teach PE and French.

Researcher - Lovely and so this year at the minute. What year groups do you have?

Interviewee 2 - So this year for PE I have all the years and then for geography I have first, second, third and 5th.

Researcher - Excellent. So just needed a bit of background there. But first of all, do you think it is important for students to participate in physical activity.

Interviewee 2 - Yeah, absolutely. I think it's very important for students to participate in physical activity. I think there is the physical benefits for physical activity, but also there's massive mental benefits and with regular exercise as well.

Researcher - And would you say that there is any trend in secondary schools in the number of students participating in physical activity., I suppose as they progress through school?

Interviewee 2 - Yeah, definitely, as students get older, they tend to not take part in PE as much or even some sports teams, so there's definitely a negative trend there and that's probably most evident in I would say if the girls more so than the boys.

Researcher - Yeah so even in my research there's been more evidence in girls not participating in PE Is there any reason as to what you think that is?

Interviewee 2 - Yeah, it's a funny one, I suppose, more so in girls than boys, they'd be a bit more self-conscious about maybe the way they look as they start getting older and even I've heard some girls complaining about the uniform and putting back on the uniform after running her own for a while so there's probably a number of factors, but I would say maybe how they look would be one of the main ones.

Researcher - Yeah. Are you involved in any sports teams this year?

Interviewee 2 - Yeah, so I'm actually involved with the senior. football team so you're talking lads from TY to 6th year really would make up that team.

Researcher - And is this your first time being involved in the sports team or have you been involved in the last few years as well?

Interviewee 2 - No, so it's not my first time I generally try to get involved with some sort of GAA, generally football.

Researcher – And, do you think that being involved with sports teams allows you to have a better relationship with the students in the classroom as a result?

Interviewee 2 - Yeah, 100% it definitely helps in the classroom as well as outside the classroom. And I think students just have a bit more respect for you and you get to talk about things that aren't necessarily school related and that helps to build a better rapport with them. I think it's a good way to kind of break the barrier there between the teacher/student relationship.

Researcher - Right. So would you notice the difference between how you interact with those students that are participating in a sports team that you're involved in compared to those that are not?

Interviewee 2 - I'm probably just a bit more chatty with those that are involved in sports teams, naturally, because I am more familiar with them. And it's even more so from the kids point of view. I find that they're more comfortable speaking to me. about things rather than me being more comfortable speaking to them.

Researcher – Perfect. So the next question is, basically, have you had classes where the students you are teaching just came from a PE class?

Interviewee 2 - Yeah, so I've had that situation a few times, alright.

Researcher - And would you notice any difference in their behavior in those classes compared to their behaviour in the classes where they don't come straight from Pe?

Interviewee 2 - they're definitely more energetic after PE, that's for certain, haha. And to be honest, I actually prefer that compared to when they come into class and they're just tired and they're not interested at all. I prefer when they're a bit energetic and even if I have to calm them down a small bit, I would prefer that.

Researcher - And would you say that having just come from PE is a major factor in why their behaviour has changed?

Interviewee 2 - Yeah, absolutely. I mean, students are kind of on a high after PE, whether it's from the running around or just having that bit of fun with their classmates, they are definitely more energetic. And it might take them a few minutes to settle down but once they're settled, they're a lot more focused I find.

Researcher – Excellent, and so with that in mind, has there ever been instances in a class where you taught that the students needed some physical movement or needed to exert some energy in order for them to fully focus on the class material?

Interviewee 2 - Yes, there's definitely been times where students were very antsy and fidgety, and I felt like if they could get up and do a bit of movement or go for a quick walk and then come back, they'd be a lot better at focusing on material and it would make the class a lot smoother.

Researcher - And have you yourself ever tried to implement something in the class, that allowed for students to move a bit?

Interviewee 2 – Yeah, so one thing I like to use for my French class is mini whiteboards at the beginning of class. I would give them a word in French and they have to write down the English meaning. Its not exactly huge physical movement but I find students become competitive and competition inadvertently causes them to focus.

Researcher - Lovely. So the next section of the interview, I'm basically going to give you a statement and I want you to reply with one of the following options and reasoning behind it so you'll either reply: Strongly Agree, Agree, Neutral, Disagree or Strongly Disagree, ok?

Interviewee 2 - Sounds good.

Researcher - So the first statement is: *"Participating in physical activity helps students to be more focused in class"*

Interviewee 2 - Agree.

Researcher - Any reasoning?

Interviewee 2 - Yeah, I suppose I can see the difference in students in the classes after PE, they're that bit more tuned in once they've settled down.

Researcher - Lovely. So the next statement is: *"Students that participate in school clubs, societies or sports teams tend to have a better relationship with teachers that are involved in those activities"*

Interviewee 2 - Strongly Agree again. From my experience, being involved with [Gaelic] football teams over the years you definitely get to know students better and that does translate to the classroom because they have that respect for you and understand that you're fairly normal outside of the classroom.

Researcher - Lovely. So next one: "*Immediately after physical activity, students are more interested in school work".*

Interviewee 2 - Yeah. So we kind of talked about that one a bit already. I would agree with that. Now there is certain students that it does take that bit longer to settle back down after PE, but in general, I do think that after physical activity or after PE, students are a lot more interested in schoolwork once they have settled down.

Researcher - OK. I think I know what you're gonna say for the next. So., *"School sports hinders student learning behavior and assessment".*

Interviewee 2 - Disagree. I think school sports is a great aspect of school life and provides students with great experiences. Also, the schooldays they miss out on from the school sports is quite a low percentage of the whole year so yes, disagree.

Researcher - Interesting, I actually thought you were gonna strongly disagree.?

Interviewee 2 - To be fair, I probably do strongly disagree, but I can see why some people might think it. You know, sometimes students do miss a lot of classes where they miss notes and they miss project work orc the experiments or things like that, but in general, I don't think it's that much Of a hindrance.

Researcher - Fair. So next one. *"Students that participate in physical activity regularly, excel more in their learning, behavior and assessment".*

Interviewee 2 - I would strongly agree with that yes. I think if a student is participating in physical activity regularly then they're probably quite disciplined in a way that helps them when it comes to schoolwork.

Researcher – Yeah. This one will be interesting considering you're a PE teacher. So, *"students seem happier after they have participated in physical activity."*

Interviewee 2 – Definitely strongly agree. I would say that goes for most people in general but definitely students because they are quite contained all day in a classroom and a PE class or a match is a bit of excitement for them and they seem to really enjoy it.

Researcher - Definitely. You've kind of spoke about this one already but, *"Physical activity makes students more disciplined with their schoolwork."*

Interviewee 2 - Yeah I'd agree there. Like I said before I think if someone is participating in physical activity regularly they're quite a disciplined person and that can only help for things like their schoolwork and study plans and stuff like that.

Researcher - Lovely. Next one: *"Too many students are not getting enough physical activity during a standard school week."*

Interviewee 2 - I'd Strongly Agree with that yes. Now in fairness, a large amount of students are participating in sports teams and other individual fitness activities outside of school but definitely I think the amount of "subscribed" physical activity in the school week is not enough.

Researcher - Yeah. OK, last one of these statements so: *"The amount of schoolwork a student is required to complete hinders the amount of physical activity they can achieve."*

Interviewee 2 - I would probably disagreeing with that one just because I don't think students are so bogged down in school work that a short walk/jog is unachievable. Like if you look in today's age, the amount of time students spend on their phone, if they took half an hour of that time away and put it towards physical activity, they'd be a lot healthier.

Researcher - OK. So second last question of the interview: So is there anything that you would change about the school curriculum or school environments that would help to promote the participation in physical activity?

Interviewee 2 – Haha, so this might sound a bit controversial, but I do honestly think that this would be very beneficial for all students. So what I would propose is that PE is an examinable subject for the junior cycle, so there be such certain metrics that students have to hit in terms of running or push-ups or sit-ups or something like that. Nothing too strenuous, but a certain level that students have to be able to hit in order to pass the PE exam. Like you see people make a bit of fun of the Gardaí exam and how the physical test isn't actually that tough. It's something similar. I'm not talking massive numbers in terms of push-ups or anything like that, but just really realistic metrics that students should be hitting. I think it would make the part the overall population of students a lot healthier and also a lot happier.

Researcher – Right. I actually think that's a great idea. Like you said, it doesn't have to be anything drastic. You're not trying to break World Records here in anything but just that base level of fitness that I think all people should have and would be a lot more grateful for having.

Interviewee 2 - And of course you're going to have people that excel better than others, but that's the case in every single subject we have. Some students do better than others but especially for something like physical activity, to be able to have that base level of fitness is so, so important.

Researcher - Yeah. So last question or statement and you can answer this whatever way you want. *"Participation in physical activity has a positive effect on classroom behavior, learning, and assessment in the post primary setting."*

Interviewee 2 - Yeah, I think it definitely does have a positive effect on classroom behavior, learning and assessment. I think students would be a lot happier if they were more physically active and that would only mean that their behavior would be better in the classroom, which means you can do more teaching and people can learn more and as a result, people would do better in assessments. So yeah, 100% I think physical activity has positive effects on all those aspects.

Researcher - Thanks a million for your time and thanks a million for taking part in this interview.

Interviewee 2 - Thanks for having me, all the best.

Appendix G – Thematic Analysis Example

Interviewee 1 – Yeah certainly I think its very important for people of all ages, not just students, for psychological reasons as well as physical reasons. There's obviously huge benefits physically but lately there seems to be a lot of emphasis on the effect it can have on people's mental health as well

Researcher – And being a PE teacher would you say that there is any trend in the number of students participating in PE as they progress through the years?

Interviewee 1 – From my experience, I have noticed a significant drop off in participation in PE as early as second year for some students. Generally most students would do PE regularly in first year but then from second year on students start bringing more and more notes with reasons why they can't do PE, particularly with girls which is a shame.

Researcher – That was actually going to be my follow up question, do you notice this trend more so in boys or girls?

Interviewee 1 – Certainly it is much more common for the girls to be coming to me with notes about why they cannot participate in class today, yeah

Researcher – And why do you think that is?

Interviewee 1 – Theres probably a number of reasons but I'd say a lot of it, for girls anyway, is being worried about how they look and getting sweaty and things like that that they don't care about in first year but as they get older they get a bit more self conscious about those things.

Researcher – Yeah, I think that's probably fairly accurate. And tell me, are you involved in any sports teams within the school this year or in previous years?

Interviewee 1 – So not this year but almost every other year I would've been involved with some sort of GAA team in the school.

Researcher – And if you can think back to those years you were involved in those GAA teams did you find that you had a better relationship with students because you were involved in sports teams?

Interviewee 1 – I would probably say I did have a better relationship with students because of that yeah. It just helps meeting students in a less formal setting and getting to know them that bit better.

Researcher – And of the students that you are aware do not participate in sporting activities within the school, do you notice any differences in their behaviour, learning and assessment compared to the students that do participate in sporting activities?

Interviewee 1 – umm, I'd probably just say that those students are a bit quieter in class generally. Probably because they're only used to seeing teachers in the classroom setting.

Researcher – Yeah definitely. Right, so the next question is are there any classes you have directly after those students had PE?

Interviewee 1 – Yes there's been a number of times I've had that alright and I even have it this year with a 2nd year group.

Researcher – And in these classes, do you notice a change in the students' behaviour compared to other classes with the same students?

Interviewee 1 – Yeah students are definitely more energetic in class straight after PE. That can be a good thing and a bad thing but more often then not it turns out to be a good thing once they've settled. One negative about those classes though is that students are often late getting to class cause they have to change their clothes and all that.

Researcher – And do you think that having just participated in physical activity could be a factor in this change?

Interviewee 1 – Oh ya 100%, i'd say it's the main reason cause you have students with high adrenaline after running around for a while and then if there is any controversial calls in a game or something happened students are debating and giving out to each other so the energy levels are much higher than a standard class.

Researcher – With that in mind, has there ever been an instance in a class where you thought that students needed to exert some energy to get their full attention?

Interviewee 1 – Yeah, there have definitely been instances where I felt that a 3 or 4 minute walk would really benefit some students that were struggling to concentrate in the class. You would often see it with SNAs, taking certain students for a walk for a few minutes during class. Or even something as simple as getting out of their seats and jogging on the spot or shaking out there body just to get the blood flowing a bit because in fairness students spend an awful lot of the day sitting down.

Researcher – Continuing on from that, have you ever tired to implement something like the movement breaks you just mentioned?

Interviewee 1 - Yeah so I would often get students to stand up and shake their arms and legs out like you would see a sports team do in a warmup. I find this helps with students that might be feeling a bit tired towards the end of the day or first thing in the morning to almost spruce them up. Other times I've tried meditation but that can be fairly hit and miss depending on the class in front of you.

Researcher – Excellent, so the next section of the interview involves me giving you a statement and you giving a response that you think most accurately describes your feelings towards that statement from the following list: Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree. Makes sense? Lovely, so the first statement is: *"Participating in physical activity helps students to be more focused in class."*

Interviewee 1 – Agree.

Researcher – Can you elaborate on why you agree?

Interviewee 1 – Yeah sorry I thought you were just looking for one of the options haha. Yeah I'd agree with that because I do see the difference in most students after PE class in the other classes they go into but then there are definitely some instances where it takes some students a lot longer than others to settle back down after that spike of energy.

Researcher – Perfect, next one so. "*Students that participate in school clubs, societies or sports teams tend to have a better relationship with teachers that are involved in those activities"* and we've kind of already touched on this.

Interviewee 1 - Yes I would strongly agree with that because it is quite hard to break that teacher/student relationship just from the classroom experience, whereas if you have conversations with students away from the classroom you begin to form a closer bond with them.

Researcher – And in fairness, I think that can be said for any clubs in the school, not just sporting ones.

Interviewee 1 – Yeah definitely. You'd see it even this year there's a computer club and the teacher that runs it here gets on a lot better with the students in that club and its not that they don't get on with other teachers its just they get to be with that teacher outside of the classroom and it's a lot more relaxed.

Researcher – Yeah. Right next statement so is "*Immediately after physical activity, students are more interested in school work."*

Interviewee 1 – Agree. Yeah we kind of spoke about this already but in general I think that it definitely helps students to be more focused in class once they have settled down but I suppose the problem you might run into there is that they don't settle down for a long time.

Researcher – Yeah perfect. Right what about this one: "*School sports hinders student learning, behaviour and assessment.*"

Interviewee 1 – I would actually probably lean on the agree side with this statement which might seem controversial. I do think that there are some cases where certain students miss a lot of key classes and even in the build up to a game they can be quite disinterested and might miss out on homework or notes the rest of the class get. But in fairness that isn't always the case and I think that school sports are brilliant for students and they get some great memories out of them but yeah, I think it can hinder them a bit.

Researcher – That's a controversial take from a big GAA person haha

Interviewee 1 – Yeah I'm probably a hypocrite because I'm often the one involved in these teams haha

Researcher – Moving on, "*Students that participate in physical activity regularly, excel more in their learning, behaviour and assessment.*"

Interviewee 1 – I would agree with this yeah but I do think there are probably a number of factors at play here that come with being physically active. I would say generally that if a student is exercising more regularly they are probably quite healthy and so not missing much school. But I do think being physically active affects student's discipline and overall happiness.

Researcher – Yeah fair. "*Students seem happier after they have participated in physical activity*", actually fits nicely into what you just mentioned.

Interviewee 1 – Yeah definitely, being a PE teacher I would strongly agree with that. You can see it on almost all the students faces during and after a PE class. Even though there might be controversy over a refereeing decision, they leave the class buzzing.

Researcher – Yeah even going back to my own days in school, the excitement around PE class was unreal, couldn't wait to go into the hall and play something.

Interviewee 1 – That's it yeah, kids love it, well the majority of kids anyway.

Researcher – Yeah. "*Physical activity makes students more disciplined with their schoolwork.*"

Interviewee 1 – Yeah I'd agree with that. I suppose if students are participating in physical activity regularly they have that outlet away from schoolwork and studying, so when it is time to study they don't feel like schoolwork is all they do if that makes sense?

Some key themes identified throughout thematic analysis:

- *Benefits of physical activity (learning, behaviour, assessment)*
- *Methodologies to encourage physical activity (inside and outside of classroom)*
- *Behavioural changes in students, during and after physical activity (Good and bad)*