

PUPIL AND STAFF PERCEPTIONS OF
THE INTRODUCTION AND USE OF
IPADS AND CLOUD SERVICES IN AN
INNER LONDON PRIMARY SCHOOL

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Abstract

In this research project, I carried out an ethnographic study that took place in an inner London Primary school. In this study, I explored the perceptions, feelings and thoughts that the pupils and staff held on the introduction and use of the iPads and the cloud services in the school. Further to this, I wanted to document and gain insight into how they grappled with these technologies; their successes, failures and what they felt could be done to improve the implementation of these technologies in the school. When I first started this study because I observed that whilst there was a fair bit of research on the subject matter, most of it was done in countries such as North America, Sweden, Japan, Australia and Finland. Very little was done in the United Kingdom. Further to this, most of the research done was actually done on the technology itself and the potential benefits that it offers as opposed to the feelings and perceptions of educators and pupils. More specifically, their feelings on matters such as the suitability of the technologies, is it worth the investment, how it compares to the traditional ways of doing things, is it actually effective or is it a gimmick? In my research, I am yet to find another study that offers this where a deprived inner city school is concerned. One with a very limited budget where research such as mine could aid them in determining whether at this time it is worth investing in the technologies and if they do decide to invest in it, my research will offer guidance as to what the general feelings are about it.

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1 Corinthians 15:57-58 *But thanks be to God, who gives us the victory through our Lord Jesus Christ. Therefore, my beloved brothers, be steadfast, immovable, always abounding in the work of the Lord, knowing that in the Lord your labour is not in vain.*

To my beloved parents, who have always been there to support me. Thank you.

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1. Introduction

1.1 Aim and purpose of the study

This study aims to explore the perceptions of staff and pupils regarding the introduction and use of iPads and cloud services in one inner London primary school. As a member of staff of this school, I hope that this study increased school leaders' understanding of the current issues faced by staff and pupils linked to the use of these technologies. Further, I believe that the findings of this study can assist school personnel to better understand the process involved in the introduction of new technologies at the school, as well as offer a deeper insight into the measures the school can put in place to improve its practice, thereby enhancing the experiences for both staff and pupils.

The initial aims of this study are to:

- observe how staff and pupils engage with the introduction and use of iPads and cloud services in the school with the view of generating discussions with them regarding their perceptions of its use;
- offer recommendations to school leaders and staff as to how the hurdles encountered when introducing new technologies such as iPads and cloud services can be overcome;
- contribute to the body of existing knowledge as well as offer guidance for future research in this field of study.

The school where the research was conducted was built circa 1950. There are approximately fifty members of staff including teaching staff, site staff, kitchen staff

and office staff. It caters to pupils of age range 3-11 years. The proportion of pupils who speak English as an additional language is 69%. This is higher than the national average. Additionally, 44% of the pupils are eligible for free school meals and 19% of the pupils are on the special education needs register. More than twenty different languages are spoken in the school. The most commonly spoken foreign languages in the school are Arabic, Urdu and Somali. Over the past few years, the school has had a relatively high pupil mobility rate. As a consequence of this, there are a number of pupils who are frequently absent from school. The school has recently invested in iPads and cloud services and is seeking to introduce these new technologies to the staff and pupils. School leaders have expressed concern that many neighbouring schools have already introduced these technologies and that they are keen to do the same with the belief that it should improve pupil engagement and attainment. They are also hopeful that the cloud services should allow pupils who are away from school to be more engaged in their learning.

1.2 Background and context of the study

This journey for me began many years ago. Ever since I was a young boy, I was always interested in technologies and their capabilities. This was especially true for technology in the classroom. I can still remember my excitement as a child whenever the teacher conducted lessons in the ICT suite. Throughout the years, I witnessed the introduction of several new technologies including the interactive whiteboard and laptop computers in the classroom. When I first began teaching, I quickly became interested in the ways in which teachers and pupils interact with technology. When I began this study, I was very excited about the possibility of gaining a richer and deeper understanding of how staff and pupils perceive and interact with new

technologies in the classroom. Whilst the iPad and cloud services are not particularly new, the school within which I conducted this research project were introducing these technologies for the first time.

Since the release of the original iPad in 2010, there has been a wealth of research done on the impact of the device at all levels of education, from early years through to university (Gliksman, 2012; Kucirkova, 2014). However, what I observed was that most of these research projects were done outside of England, in locations such as China, North America, Canada, Australia and the United Arab Emirates. Not very much in the way of literature was available on the impact of the use of iPads in primary education at the time of proposing this research project. Furthermore, the limited amount of literature and research that were available typically tended to focus on the impact these devices had where attainment and engagement were concerned, as opposed to pupil and staff perceptions of their use. I was unable to locate examples of ethnographic or participant observer study done within a primary school setting that attempted to gain the perceptions that the staff and pupils regarding the use of iPads and cloud services. I was also unable to locate research on the perceptions that staff and pupils hold at the very moment iPads and the cloud services are being introduced and their first year of attempting to use the device as part of the teaching and learning process. Moreover, it was difficult to find any literature that documented not only perceptions of staff and pupils, but how they grappled with the technologies, their anxieties, fears, successes and failures where the use of the technologies were concerned. Further, I was unable to locate studies conducted in a deprived Inner London primary school. This was an important issue for me, as financial deprivation

and social class can have an impact on the ways in which the pupils at the school perceive the introduction of iPads and cloud services (Disney et al, 2013).

The issue of the use of iPads and cloud services in the classroom has been a topic of much empirical research and discussion in recent times. Within this body of research, there appears to be a huge divide in opinion when it comes to the ways in which researchers, journalists, academics and official bodies such as Ofsted perceive iPads and the cloud services. In an article in the Daily Mail titled *Ofsted warns that iPads in the classroom are a huge distraction as nearly a third of secondary schools allow them in lessons* published on 12th December 2015, the Office for Standards in Education, Children's Services and Skills (Ofsted) appears to disapprove of the use of iPads in the classroom by stating that these devices can distract pupils from learning and called on headteachers to adopt a hard line on this issue. Moreover, Ross (2015) of The Telegraph newspaper reported that Tom Bennett from the Department for Education (DfE) stated that he would be conducting an inquiry on how schools could deal with disruptive behaviour by pupils and further added that secondary school pupils could be banned from taking mobile phones and iPads into the classroom. Whilst he acknowledged that smartphones and iPads are useful in some lessons, he added that oftentimes pupils were distracted by these devices. Furthermore, in a recent inspection of Mounts Bay Academy where the school received an outstanding rating from Ofsted, Ofsted reported, "*a good range of resources, particularly the provision of tablet computers can have a positive impact on students' learning*" (Ofsted, 2012, p. 4).

In recent years, many of the major newspapers in the United Kingdom (UK) have reported on the use of iPads and other similar devices in education. Just like Ofsted,

reporters too seem to be undecided regarding their perceptions of these devices. While a number of articles suggest that these devices are a distraction to pupils, others deem iPads as useful devices which have a place in the classroom, such as the Guardian Education newspaper, with articles titled, *“iPads and iPods are helping our pupils learn without realising they are doing it”* (Morris, 2011). It appears therefore that perceptions regarding the introduction of iPads and other technological devices in schools are mixed and no one can say with any degree of certainty the extent to which they are beneficial to pupils and staff in schools. Weider (2011) argues in favour of iPads as they provide an increased capacity for collaboration through screen sharing (Weider, 2011), enhanced and improved critical thinking as well as the development of creativity (Goral, 2011).

However, researchers such as Weider (2011) and Fischman and Keller (2011) found in their research that students were not particularly comfortable with the use of iPads. Weider (2011) found that many students reverted to the more traditional previously used technologies after a matter of weeks of the introduction of the iPads. Fischman and Keller (2011) found that many of the students in their study found the touch-driven interface of iPads arduous to use when it came to taking notes and typing. In addition, both researchers found that when it came to printing documents, students found it more challenging to use iPads to print wirelessly. Finally, they also argued that due to the limited ability on iPads to manage its file system, students found it significantly more problematic to share files.

1.3 Significance of the study

The introduction of technology in the education system is not a new phenomenon. It is possible to argue that this has been happening for several decades now. As a result of this, a substantial amount of literature exists on the subject matter. Further to this, there is also a lot of literature which points out the ability of technology to have an impact on the educational attainment of pupils (Falloon, 2013). This being said, there really is very little that looks into the perceptions of pupils and staff and the how they react to and grapple with the use of iPads and cloud services in their day-to-day lessons. A prerequisite to creating a theoretical rationale is that, as a researcher, I must consider the purpose behind the implementation of iPads and cloud services in the school. It is possible to argue that one of the key ideas behind the introduction of these technologies is their ability to engage pupils in the process of learning. I say this as this was one of the intentions raised in one of the many staff meetings prior to the introduction of these devices at the school. Taking this into consideration, it is therefore possible to argue that the idea of engaging pupils is not a new one and as a result of this there is a wealth of literature available on the subject matter (Gorski, 2009). Kearsley and Shnieiderman (1998) advance the Engagement Theory which sets out that the pupils using technology in lessons must be “*meaningfully engaged in learning activities through interaction with others and worthwhile tasks*” (p. 54). Wilson (1999) argues that meaningful learning is learning which is cooperative, genuine, intentional and constructive. Continuing on the point of engagement learning, Marcum (2011) argues that pupils who engage in an activity “*choose to participate because they can influence the choice of the subject and method*” (p. 1). When this idea of engagement is applied to the use of iPads and cloud services, it may

be possible to argue that iPads may work to improve pupil attainment (Godzicki et al, 2013). This was be discussed in greater depth later in this thesis.

The main objective of the research is to gain a clear idea as to how the staff and pupils perceived and engaged with the introduction and use of iPads and the cloud services. The idea was to carry out a research project that generated coherent results and findings that could offer a vivid description of the experiences of the staff and pupils. This was desired instead of generating a set of findings that could be replicated. I started collecting data the moment my ethics form was approved by my University and I had the full consent of all of the parties involved, and their parents or guardians where pupils were concerned. As a result of this, the data collection went on for one academic year. In addition to observations, I held focus groups with the staff and pupils and conduct semi-structured interviews with them.

As a result of this type of approach, I intend to use Symbolic Interactionism as a theoretical framework for this research project. As a researcher, I brought a variety of assumptions to this research project. In order to set out these assumptions, a theoretical framework was be needed. Symbolic Interactionism enabled me to take into consideration the ways in which the individuals not only interact with each other, but also the ways in which they interact with the various phenomena in their environment. Symbolic Interactionism also looks at the meanings and perceptions that the individuals within a social group create for themselves. This was discussed in greater depth in chapter three.

One of the key reasons for the introduction of iPads and cloud services in schools was

so that it would be used by staff and pupils, however taking a look into the existing body of literature on the subject matter, you may have found that there was not much in the way of the unrestricted perceptions of the staff and pupils. By unrestricted, I mean rich, thick and detailed responses instead of those received in response to questionnaires. Further to this, I argue that this research project offered both staff and pupils a voice, the chance to express their honest views without the fear of consequences of others knowing their opinions; all of this whilst maintaining anonymity. Additionally, I also argue that my unique position as a teacher and member of staff at the school along with my experience as a researcher, brings what is essentially a unique perspective to this study, which I believe, would add greater depth to this study.

I believe that a potential benefit that could arise from conducting research of this nature at this point in time is that other schools could benefit from the findings, as they would be able to gain insight into how staff and pupils might feel regarding the introduction of new technologies at their school, as well as take necessary actions to get the desired outcomes for their school. Moreover, as this study documents the issues that the staff and pupils face, I feel that it is also possible to argue that this thesis may be able to act as a guide for schools in developing countries as well as schools within the United Kingdom that still have not yet introduced iPads and the use of cloud services into their schools.

As stated previously, there is a vast wealth of opinions from the media, theorists, Ofsted, the Government, but there really is little regarding the opinions of teachers and pupils, the individuals that have to grapple with the technology in the classroom

on a daily basis. A year prior to the commencement of this research project, the QUANGO (Quasi-Autonomous Non-Governmental Organisation) BECTA (British Educational Communications and Technology Agency) was initially set up to support schools and educational institutions where it came to working with new and emerging technologies such as iPads, and other technologies. Further to this, they assisted schools in determining the best use for the devices and how to plan them in their lessons. However, since the abolishment of BECTA in 2011 due to funding cuts, it has been even more difficult for school staff to receive advice and support regarding the introduction of technologies such as the iPads into schools. As a result of this, schools now have very little in the way of support and guidance when it comes to implementing the use of iPads as part of the teaching and learning process.

From the extensive secondary research that I carried out in preparation for this research project, there seems to be very little on how pupils, teachers and staff perceive the iPads and the cloud services and their experiences with them. Beyond this, there also appears to be even less research that offers a first-hand perspective as to how staff and pupils perceive iPads and cloud services during the initial stages of its introduction into the school. There is a noticeable lack of in-depth, qualitative and thick data investigations of this matter. In an effort to address this matter, I opted to immerse myself in the group dynamics of a small Inner London primary school which was about to receive its first set of iPads for use by the staff and pupils of the school. Along with gaining an understanding of the ways in which both the staff and pupils perceived iPads and cloud services, the qualitative data should also highlight the successes and failures that staff and pupils face when using this device as well as the

impact their experiences have on their perceptions of the use of iPads and cloud services.

1.4 Research Questions

The initial research and discussions assisted me in refining the focus of the study, which led to the formulation of the research questions. The research questions are:

- 1) How do staff and pupils perceive the introduction of iPads and cloud services in the school?
- 2) How do staff and pupils engage with and interact with iPads and cloud services being used in the school?
- 3) What were the attitudes and behaviours of the pupils and staff when interacting with iPads and cloud services?
- 4) What do staff and pupils perceive as the advantages and disadvantages of the use of iPads and cloud services in the school?
- 5) What do the staff and pupils think can be done to improve or enhance the introduction of iPads and cloud services in the school?

1.5 The Researcher

I have worked at this school for approximately five years prior to beginning this research project. The first three years, I worked as a teaching assistant at the school. I then started my PGCE (Post Graduate Certificate in Education) at Brunel from 2011-2012. Immediately after completing my PGCE, I returned to the school to commence my role as a teacher. During my time as a teaching assistant, I closely followed the launch of the iPad in March 2010. At that time, the media regularly discussed the potential of the iPad to be used in education. Since then, millions of iPads were sold

to education systems around the world (Dilger, 2014). Apple launched the iPad 2 in early 2011 along with iCloud later that year. During this time, I regularly looked at research conducted on the use of iPads in education along with cloud services. I also followed the development of Google's cloud services from its limited release Beta in 2006 to the initial release of Google Drive in 2012. Whilst looking at the findings of the research carried out, it became clear to me that much of the research focused on the impact of the iPad and cloud services on pupil attainment rather than looking at how the pupils and staff perceived the technologies.

1.6 Terminology

The reason for mentioning the cloud services is that whilst iPads mainly uses apps which use data stored on iPads, it is also able to make use of data stored on cloud servers. The services offered by these cloud servers such as Google Docs, Dropbox, iCloud and so forth are referred to as cloud services from this point onwards. Furthermore, in instances where this thesis refers to iPads, it should be taken to mean iPads inclusive of the cloud services available on it. Further to this, the use of the term 'emerging technologies' in this thesis refers to iPads and the cloud services as they were emerging technologies within the context of the school within which this research project is situated.

1.7 Thesis Structure

Chapter one introduces the aims and purpose of the study and establishes the research context. It presents the research questions, which underpin the study and highlights the significance of the study to the school at this point in time. It situates the researcher, and the reasons for undertaking the study. It concludes by signposting the structure for the rest of this thesis.

Chapter two takes a critical look at the existing literature in relation to the use of iPads and cloud services within schools. This chapter first explores the strategies that were employed in the literature review. Following this, the current use of technology in education was explored, and the social and economic impact on digital divide and pupil engagement when using the iPad. Next, pupil engagement and the impact of having new technologies at home was investigated, as well as by the attitudes of staff and pupils towards new technologies. Staff engagement with the new technologies in the classroom, staff engagement and the impact of professional development and staff perceptions of the advantages and disadvantages of the use of the iPad in the classroom was then discussed. Finally, pupil perceptions of the advantages and disadvantages of the use of the iPad in the classroom were explored.

In Chapter three, I discuss my ontological and epistemological position. In addition, I take an in-depth look at how the theoretical framework underpins the methodological approach I opted to use for this thesis. Within my Interpretivist ontological position, there are a number of assumptions that are made. These include the assumptions that an individual's reality is indirectly constructed and is completely based on their own interpretation; individuals are able to interpret and create their own understanding of experiences and events; and that it is possible to have multiple perspectives on any given event. I accept that due to taking this ontological stance, the ability to generalise the findings of this research project may be limited due to the distinctive nature of each of the events and interactions recorded. Also, due to the fact that the interpretivist approach does not make use of the typical scientific verification processes and procedures that positivist approaches use, this too limits its ability to be generalised to other seemingly similar situations. The epistemological stance taken in

this research project is Constructionism. I argue that Constructionism is an appropriate stance for this study as it sets out that meaning is not a phenomenon that is discovered but instead, it is constructed by the individual. It is reasonable to argue that perceptions, just like meaning, are constructed by the individual and do not exist without the mind and the social interactions that the individual engages in. Further in this chapter I critically discuss my own reflections and thoughts concerning my choice to take an ethnographic approach to this research project. In addition to this, it also looks at the implications of the position I hold as an already accepted member of the group I was studying. By accepted, I mean that I am an insider. Beyond this, I also set out exactly how this research project was carried out and advance an apt summary of the methodological approach. This was inclusive of a discussion on the thick data that I gained from this study and the way in which I intend to report the findings.

In Chapter four, the Analysis and Findings chapter, I start off by briefly re-examining the research questions. I then discuss my ethnographic experiences with the pupils and staff members during the field research. Further to this, using the form of a narrative, I describe in great detail the perceptions, interactions, every day experiences, struggles and success both the pupils and staff have during the introductory phase of iPads and cloud services at the school. By taking such an approach, this thesis exposes the reader to stories, anxieties, experiences and the perceptions of the staff and pupils. Within this chapter, I also present excerpts of some of the conversations that I had with the staff and pupils that offer even further insight into their perceptions.

Finally, in Chapter five, I conclude this thesis by summarising the findings of this research project. I discuss the possible implications of the findings. Furthermore, the conclusion takes a retrospective view at the initial aims of this research project and then discusses the contributions to knowledge and practice that have been achieved. In addition to this, the potential for future research was be discussed along with the limitations of this research project and the methodological approach.

2. Literature Review

2.1 Introduction

The previous chapter offered an overview of the context within which this research took place. In this chapter, I intend to explore the strategies used for this literature review. After that, I discuss the current use of technology in education. Following this, the social and economic impact on the digital divide and pupil engagement is discussed. Moreover, pupil engagement and the impact of having new technologies at home was explored followed by the attitudes of staff and pupils towards new technologies and staff engagement. I then presented a discussion on the impact of staff professional development. Finally, staff and pupil perceptions on the advantages and disadvantages of iPads and cloud services in the classroom were examined. This review utilised both empirical and theoretical literature.

2.1.1 Strategies used for this literature review

The literature presented in this review was collected from a variety of sources. During the initial phases, research was done using my University's online library for texts and journals. The searches were conducted through the use of key words, which related to tablets (iPads and other similar devices) and cloud services, all in the context of education. While conducting the research, I found that most of the research that exists on these subjects was conducted in locations such as North America, Canada, China, Australia and the United Arab Emirates. I opted not to limit my search for literature and research to any particular country as I wanted to gain a thorough understanding of how these devices and applications were used, especially in the United Kingdom (UK). At the time of the commencement of this study, the existing

literature in the UK was quite limited and would not offer the depth required to effectively conduct a literature review of this size and nature.

As the research pertains to relatively new technologies, I tried my utmost to utilize only the latest research available at each stage of the research project and then update it as new literature became available. In addition to using the university's electronic library, I used Google books to access electronic journals, as they tended to be more up to date than the books available from the library. Using search engines such as Google Scholar offered results that were not available through the university's online library.

Government publications such as those from the Department for Education and official bodies such as Ofsted were also used. The references in this thesis were recorded through the use of Microsoft's Endnote application. This was a handy piece of software as it allowed me to then search through the references by using key words. This was useful as it aided me in quickly finding the references that I needed without going through the laborious task of going through each of the references. Not only was Endnote useful for references from physical books, it was extremely helpful when referencing electronic texts and journals.

2.2 The Use of Technology in Education

Introducing new technologies to the education sector is not by any means a new phenomenon. Over the years, many new technologies have been introduced successfully, as well as unsuccessfully, in the education system. During this time, the use of these new technologies has gained a number of advocates, such as Gliksman (2012) and Lirenman and Wideen (2019) who believe that its use has a positive effect

on the teaching and learning process. However, some researchers such as Paton (2012) found that a vast number of schools have invested heavily in new technologies such as the iPad, only to rarely make use of them, or to use them in a novel manner. Paton (2012) is one of a number of researchers who hold the view that the use of new and emerging technologies does not guarantee a positive effect or any effect for that matter, on the teaching and learning process. An example of this would be the use of the calculator. Guerrero et al (2004) note that some educators contend that a calculator can deprive a pupil of the opportunity to perform calculations mentally, which can in some cases improve the pupils speed and accuracy in solving mathematical problems.

However, a number of commentators, including Weston and Bain (2010) argue that the introduction of new technologies in education is unavoidable. They assert that since computers and new technologies have changed the world outside of education, it would be irrational to adopt the view that it is possible to prevent new and emerging technologies from having an impact in schools. Furthering these arguments, other researchers such as Tomei and Carbonara (2019), Warschauer and Stone (2004) and Gorski (2009) see the introduction and assimilation of new technologies in the education system as having the ability to inevitably bring a greater degree of equality to the classroom. Typically however, the success or rejection of a new technology is typically determined by the beliefs held by the educators using them, the use that they are to serve in the classroom, the professional development and support that staff are given concerning the technology, and the ways in which the technology is perceived to impact on the teaching and learning process. Further to this, because there is no standard for the introduction of technologies in the classroom, the introductory

experiences can vary significantly between schools. Further, this variation can extend beyond the introductory stage and into the usage and day-to-day experiences that staff and pupils have with the use of these new technologies. The variation of experiences can also be affected by other factors such as socioeconomic factors. One key socioeconomic factor is the ability of the school or educational institution to afford the investment in the new technology as well as the investment in the necessary infrastructure so to facilitate the use of these new technologies (Weston and Bain, 2010). It is therefore possible to argue that such variation can lead to what Attewell (2001) refers to as a “*digital divide*” (p. 253).

According to Attewell (2001), there are two key digital divisions. The first will be discussed in this paragraph, the latter will be discussed later on in this chapter. The first digital divide according to Attewell (2001) concerns the issue of access to the digital technology in question (pp 253-254). Going back a few decades to the 1970s where digital calculators were being introduced, the issue of access existed then too. This issue of access was primarily a socioeconomic matter whereby schools from deprived areas of the UK as well as schools in deprived countries would not be able to have access to the same digital technologies as those from schools that were within higher socioeconomic areas. This increase in access to digital technologies for schools with a higher socioeconomic status, according to Zakariya (1984), could work to further increase the already notable divide between the average educational attainment levels of pupils from schools which are located in lower socioeconomic areas and the educational attainment of pupils from schools in higher socioeconomic areas. It could be further argued that, in addition to access, there are many other factors, including ethnicity, gender and limited use of English, which could also have

a significant impact on the educational attainment of a pupil (Disney, et al, 2013). The aforementioned factors can also have their own effects on the introduction of new digital technologies to the teaching and learning process in a school or educational institution (Attewell, 2001; Kim and Chang, 2010).

As stated earlier, the use of technology to support education and learning in schools is not a new phenomenon. During the 1970s, 1980s and 1990s, the education system saw an explosion in the rate at which computers were being introduced. It was then rapidly becoming the norm for classrooms to not only have at least one computer, but in some schools, there was at least one computer for every two pupils. This development was further accelerated by the evolution of the internet and the new possibilities that it afforded. (Staples et al, 2005). These developments attracted the attention of the media, policymakers and the public alike. This led to a vast array of debates including the ongoing debates for and against their use in education, along with other debates related to their impact on inequality in the education system. (Van Dijk Hacker 2003 p.316).

Wenglinsky (2005) in his evaluation of history lessons in the United States found that very often, teachers and pupils were making use of these new technologies as the focus of the lessons. Instead, Wenglinsky (2005) argues that the new technologies should be used as an instrument or tool to enhance the teaching and learning experiences of pupils. In support of this argument Hunter and Storksdieck (2017) argue that teachers should aim to, “*create an environment that maximizes students’ learning opportunities*” (p.40). More specifically, teachers should encourage the pupils to engage in self-directed learning (AAMT), 2008 Sec. 3). It is this issue, the

way in which new technologies are used in the classroom, which led Attewell (2001) to the second digital divide.

The second digital divide according to Attewell (2001) goes beyond the issue of access to new technologies. The second digital divide concerns the ways in which the new technologies are utilised in the classroom. Gibbs et al (2009) elaborate on this point by arguing that attention needs to be paid to the ways in which new technologies can be used to support staff and *pupils* “*in the pursuit of teaching and learning*” (p.11). In order to effectively evaluate the aforementioned matter, it is important to therefore look at the specific ways in which new technologies can impact upon the learning of a pupil. Commentators such as Habgood and Ainsworth (2011) point out that one effective use of new technologies is to excite and engage the pupils. It is this engagement with the activity that can assist in the teaching and learning process. This is one of the reasons they argue that in recent times, there has been a steady increase in the number of educational software available to support the teaching and learning process.

In an effort to gain a broader picture of the digital divide, it is important to examine studies conducted not just within the United Kingdom, but studies conducted in other countries as well. It is important therefore, that data from some statistical bodies from around the world be examined to help gain a better understanding of the extent of the digital divide. One such body is the National Assessment of Educational Progress (NAEP), which has collected data on educational attainment in the United States for almost half a century in a variety of subjects. One of the purposes of the NAEP is to allow access of achievement data to educators, policy makers and administrators to

enable them to gain a clearer statistical picture of the educational attainment of pupils in a variety of subjects. These statistics also look at the educational attainment of pupils based on ethnicity, gender, use of English as an additional language and socioeconomic location.

Further to this, the NAEP also collects data through the use of pupil and staff surveys. These surveys seek to collect data on other factors which may have an effect on attainment. Disney et al (2013) note that some examples of these factors include the opinions that the staff and pupils hold on current teaching practices, staff views on professional development, access and use of technology in educational settings. Lubienski (2008) notes that for many years, the findings of the NAEP have highlighted gaps in educational attainment. These identified gaps, Lubienski (2008), argues have been the focus of researchers for a number of years and has raised a number of inquiries into how the attainment gap in education can be closed or narrowed. This in turn, has lead researchers to look at the effectiveness of new technologies where education attainment and the closing of the gaps are concerned. Throughout the years, a number of studies have been carried out which have found new technologies to have positive effects on the educational attainment of pupils. However, there have also been a number of studies carried out which have found new technologies to have a negative effect on learning and educational attainment (Kim and Chang, 2010).

Kim and Chang (2010) carried out a research project on a group of American 4th grade pupils using new educational games on iPads and computers. They found that there were times when the new technologies had a positive impact on the learning of

the pupils. However, they also found there were occasions where the new technologies had a negative effect on the learning of the pupils. For example, they found that if the 4th grade boys were allowed to use the new technologies to play educational games occasionally, the use of technology had a positive effect on the learning of these pupils. However, when these pupils were allowed to spend most of the lesson playing the educational games, the use of technology was found to have a negative effect on their learning. What was however noteworthy was that these findings only applied to the male pupils that spoke English as a first language. The male pupils with English as an additional language did not experience the same negative effect when they spent most of the lesson playing educational games. Looking at the data from a gender standpoint, Kim and Chang (2010) found that the use of new technologies in the classroom were more likely to have a positive effect on male pupils than female pupils. In response to studies such as these, O'Donnell and Hallam (2014) argue that different technologies serve different purposes for children and that they often fail to take into consideration all of the innate differences between the pupils. For example, whilst the above study took into account gender and language, it did not take into account the socio-economic backgrounds, ethnicity or the other relevant factors which could have an impact on the educational attainment of these pupils.

Sung and Meyer (2013) are also very critical of comparative studies such as these, as they argue that they fail to create a clear distinction between the effects the various formats have on the outcome as well as the effects that the methods themselves have on the outcome of the study. Furthermore, the nature of the interaction that the pupils are having with the new technologies can have a substantial impact on the chances of

the technologies having a positive impact on the teaching and learning process. The idea of learning through play is not a new one. This is interesting because there is a wealth of research that shows that learning can occur through play. Vygotsky, a theorist that carried out a great deal of educational research in Russia in the early 20th century, placed emphasis on the idea that children actively participate in their own learning process and that they are able to play with whatever was available to them (Vygotsky, 1980). Furthermore, Vygotsky believed that play was a crucial part of their development. It is this belief that this was a significant finding which subsequently led to his theory on The Zone of Proximal Development (ZPD). The ZPD is defined by Vygotsky as *“the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers”* (Vygotsky, 1978, p. 86). The ZPD is essentially the area or zone of possibilities which exists between the zone where pupils currently are, more specifically, what they can independently do and achieve in the present, their level of actual development and the zone where things exist that they could understand and achieve with the right amount of help.

Although Vygotsky’s theories were created and developed at a time long before the invention of the iPad and cloud services, the concepts within his theories still remain relevant today. It is possible for one to argue that the iPads can be used to aid a pupil in the grasping and understanding of new concepts in the same way an adult or a peer would have assisted a child in grasping the new concept in Vygotsky’s theory. This idea is backed up by the fact that Vygotsky (1978) was of the belief that when a child or pupil was in the ZPD for a given task, that providing the necessary assistance to the

pupil would better enable him or her to overcome the barriers to learning and achieve the given task. Personally, I believe that the ‘necessary assistance’ that Vygotsky refers to can include the use of emerging technologies such as iPads and cloud services (p.86).

The nature of the interactions between the pupils and the new technologies were examined in great depth by Cheung and Slavin (2013) who found that computer aided instruction (CAI) had the greatest impact on the levels of educational attainment in mathematics. In their study, they found that pupils who used CAI software for approximately one half hour per week experienced on average a greater improvement in their mathematical attainment than pupils who did not use CAI (Cheung and Slavin, 2013). When considering the nature of the interactions between the technologies and the pupils, the age of the pupil is also an important factor to consider. Research conducted by academics such as Slavin et al (2009) and Li and Ma (2010) found that the use of new technologies on average tended to have a greater impact on primary aged pupils (3-11) as opposed to secondary school aged pupils (11+). It is possible to argue that these findings may be linked to earlier findings by theorists such as Kulik et al (1985) who in their research of primary and secondary school pupils concluded that secondary school aged pupils *“have less need for highly structured, highly reactive instruction provided in computer drills and tutorials. They may be able to acquire basic textbook information with the cues and feedback that CAI systems provide”* (p.71). However, the validity of such a conclusion should be evaluated with consideration for other factors such as gender, ethnicity and socio-economic background when attempting to establish the impact of the use of new technologies on pupils. All of the relevant factors should be taken into consideration

before any reliable and valid conclusions can be drawn from a comparative study between the two age groups (Niemic and Walberg, 1985).

Where younger pupils are concerned, the simplicity and intuitiveness of the interface of the iPad's and similar devices means that these devices can be used with any age group and any ability group, including pupils with learning disabilities and difficulties. This may be one of the contributing reasons as to why some researchers may find new technologies to have a greater impact on younger pupils (Connell, 2012). In addition, specialist training is not required to utilize the basic features of the device and to use its touch-driven interface (The Department of Education and Training, 2012). Rigo (2013) adds that the iPads have gained popularity because they enable the user to easily grasp and manipulate content (both visual and audio) through the use of the touchscreen. The user is also able to respond to the various prompts on the screen, through the use of touch without the need for a mouse or stylus. Adding to this, Frey, Fisher and Gonzalez (2013) argue that the iPad belongs in the classroom, as the use of the touchscreen on the iPad is able to overcome the cognitive barrier that a keyboard can present. Further to this, unlike a traditional computer, they argue that the pupil does not even need to be a fluent reader or speaker of the English language in order to make effective use of an iPad. Additionally, Galligan, Loch, McDonald and Taylor (2010) highlight the usefulness of the touchscreen of an iPad in mathematics. They point out that there are a vast number of symbols that are used in mathematics that often cannot be typed on traditional desktop or laptop computer with ease; however they can be easily drawn by hand with the use of a stylus.

Building upon the this argument, Wang, Towey and Jong (2014) note that most of the studies carried out on the effectiveness of iPads in education usually look at the potential of the apps used and a great number of these studies deem the iPad to be a very engaging device which is able to capture and maintain the attention of students. However, Wang, Towey and Jong (2014) believe that whilst the iPad is seen as an engaging device, there are very few studies that actually look into what specifically makes the iPad engaging. They add that in order to determine this, the ‘tangible user interface’ or TUI must be evaluated (p. 2). According to Wang, Towey and Jong (2014), the TUI is “*one of the most significant physical features of the iPad*” (p. 2). They argue that this holds true particularly where the learning experiences of pupils are concerned. Furthermore, they believe that this TUI may in fact be one of the key reasons why other researchers such as McClanahan et al (2012) are finding that tablets such as the iPad are engaging to pupils, particularly those that are either young, have learning disabilities or simply lack experience with using a computer.

This TUI, according to researchers such as Connell (2012), is easier to engage with as compared to the traditional mouse and keyboard input of the typical laptop or desktop computer. Connell (2012) believes this to be the case and argues that “*using a keyboard or mouse requires learning a new skill, and that skill is both counter-intuitive and idiosyncratic to the domain of computer use*” (p. 124). More specifically, it is a skill that is not easily transferred to any other aspect of life. He goes on to compare this to the TUI touch interface of the iPad, which is similar to reality whereby an individual touches and image on-screen and there is an immediate reaction or consequence. This has led Wang, Towey and Jong (2014) to argue that this extent of counter-intuitivity may in fact be a barrier or hurdle which may prevent

some young pupils from fully engaging with an educational activity where the computer is used. Further, Connell (2012) points out that when a young student has to use the mouse or trackpad of a computer, fine motor skills are required in order to place the on-screen mouse pointer in the place that it needs to be in order to progress. This according to Connell (2012) not only requires fine motor skills, but also requires the pupil to coordinate the hand movement by moving horizontally across a horizontal table surface whilst looking at the screen where the cursor is moving vertically and then, precisely move the mouse cursor to hover over the option or button and then click on it to progress. This in Connell's (2012) opinion can prove to be a barrier to learning and quite a frustrating experience for some young pupils.

However, with the use of iPads, the touch driven interface according to Connell (2012) requires skills which are more in line with what the young pupils would use in real life and are easier for young pupils to interact with, resulting in more pupils being able to take part in a greater variety of learning activities independently due to the ease of use of the iPad. In support of this, Silton (2015) also believes that that iPads actually assist pupils in developing their fine motor skills by allowing them to practice using their fingers to manipulate the touch interface. Moreover, Hammond and Valentine (2015) argue that sketching apps on touch driven devices such as the Apple iPad can potentially have a great impact on the development of the fine motor skills of pupils as well as their self-regulation skills. Hammond and Valentine (2015) add to this by arguing that sketching apps on touch driven devices such as the Apple iPad can potentially have a great impact on the development of the fine motor skills of pupils as well as their self-regulation skills (p.36).

2.3 Social and economic impact on the digital divide and pupil engagement

Disney et al (2013) points out that the social and economic background of pupils can have a tremendous impact on the successful introduction of new technologies. This was found to be true in a study conducted by Wenglinsky (2005) who found that social and economic status were factors that had the greatest impact on whether the introduction of new technologies would positively or adversely affect the scores that pupils achieved in their tests. Further to this, it was found that not only did the way in which new technologies were introduced affected their chances of success, but also the successful introduction of new technologies were affected by the socioeconomic status of the school itself. According to Wenglinsky (1998), the 1996 NAEP statistics show that pupils from a lower socioeconomic background tended on average to use new technologies more frequently than their higher socioeconomic counterparts.

Wenglinsky (1998) further notes that whilst these students use the technology more frequently on average, the way they use it is what made it less likely to have a positive impact on their learning. He found that they typically tend to use the new technologies to engage in rote or repetitive learning. Other theorists such as Gorski (2009) found that using new technologies to engage in repetitive learning can have a negative effect on the levels of educational achievement gained by the pupils. Findings by Warschauer et al (2004) also support Wenglinsky's (1998) findings. In a study of ten schools with comparable technological assets in California, Warschauer (2004) found that schools located in poorer parts of California had a tendency to use new technologies to engage in repetitive learning, especially where mathematics is concerned whereas the schools in higher socioeconomic parts of California had a

more structured and varied approach to using new technologies which resulted in better results on average.

The findings of research projects such as the one conducted by Warschauer et al (2004) would lead one to possibly argue that the first aspect of the digital divide argument put forth by Attewell (2001), which sets out that a divide is caused by the lack of access to new technologies, no longer appears to be as valid. In support of this argument, Delen and Bulut (2011) in their research found that the number of computers available in a school did not have a substantial impact on the mathematics scores of pupils. However, what they found was that schools which were located in more affluent socio-economic areas had a tendency to make more effective use of new technologies by using them to provide simulations, and as tools to assist the pupils in the analysis of data. However, they found that schools that were located in more deprived communities had a tendency to use new technologies in less effective ways.

It is important to note that the differences between how the schools in higher socioeconomic areas used computers was not limited to the way in which the pupils were instructed to use the technologies. Warschauer (2001) conducted a study of two schools in Hawaii. One was located in a higher socioeconomic area whilst the other was located in a lower socioeconomic area. What both schools had in common was that they were both in the process of investing in similar new technologies. What was different however was the vision they had for the implementation and use of these new technologies. The school in the higher socioeconomic location sought to use the new technologies to aid the pupils in conducting statistical and scientific analyses.

However, the school that was located in the lower socioeconomic area sought to use the technologies in a manner that would aid the pupils in acquiring skills which could be used in the workplace. As a result of this, the new technologies were used to teach the pupils to be proficient in the use of software frequently found in the office and workplace. Warschauer (2001) concluded that whilst the usage of the school in the lower socioeconomic area was not necessarily of a poorer quality, it was notably different to the type of learning offered by the school located in the higher socioeconomic area. He felt that the type of learning and usage of new technologies was different, possibly due to the different aspirations of the staff and student populations of the different areas. Taking the above findings into consideration, it is therefore possible to argue that it may not necessarily be the socioeconomic factors that have a profound impact on the usage of new technologies in a school, but it may well be the vision of the school leaders that have an impact on the success of the implementation of new technologies in a school.

When determining the vision of a school regarding the implementation of new and emerging technologies, school leaders must take a range of factors into consideration. Some of these factors include how to meet the varying needs of the pupil population, how to effectively track their educational progress and how to ensure that every pupil achieves their best. A school in one part of the country, for example, may have a set of pupils that have a different set of needs than another school in another part of a country. As a result of this, a single approach to introducing new technologies into the classroom that caters to every possible need does not exist (Gliksman, 2014). Further to this, educational needs differ from school to school; no two schools are exactly the same. In support of this argument, Delen and Bulut (2011) carried out a research

project looking at social class and attainment among schools in Turkey by evaluating the findings of the 2009 Programme for International Student Assessment (PISA). The PISA is a series of exams which 15-year-old pupils sit to test their scholastic performance in mathematics, science and reading and provides comparable data to countries to support them in developing policies and practices to improve educational outcomes. Delen and Bulut (2011) found that the difference in levels of attainment between the various schools could more reliably be explained by looking at the differences between the individual schools rather than looking at social class. One limitation of this study however is that it exclusively used 9th grade pupils in Turkey. As a consequence of this, it may not be possible to generalise these findings to other ages or geographical locations.

Bottge et al (2010) conducted a study of 303 pupils at three schools in the Midwest in the United States. In this study, there were three main groups of pupils. The first group was given a set of coursework tasks using the Business as Usual format (BAU) where traditional methods of problem solving were used. The second and third groups were each given a form of Enhanced Anchored Instruction (EAI) where new technologies and software were used. The second group had the concepts within the task clearly defined for them. The third group however, was presented with a real world scenario where the concepts formed part of the scenario and were not explicitly pointed out. Bottge et al (2010) found that on average, both of the EAI groups outperformed the BAU group when it came to problem solving. This led Bottage et al (2010) to conclude that the pupils that used both forms of EAI where new technologies were used performed better on average than the pupils that used the traditional methods of problem solving.

One key limitation of the above study is that it does not take into consideration the differences among individual pupils and the fact that the effects of the use of new technologies can differ from pupil to pupil (Bottge et al, 2010). This study was supported by a study conducted by Nzuki (2011) on an Algebra class where scientific graphing calculators were introduced to the class. Nzuki (2011) found that the higher attaining pupils in the class had a tendency to combine their knowledge of traditional mathematical concepts and algorithms with the use of the calculator in order to solve algebraic problems. Further to this, it was found that they would take the time to make sure that they had a sound grasp of the problem and the steps that needed to be taken in order to solve the problems. However, Nzuki (2011) found that the lower attaining pupils in the classroom would often rely heavily on the calculator in an effort to solve the problem without having a sound understanding of what the problem was asking them. In addition, it was found that they would often rely on trial and error in an attempt to arrive at an answer. These findings led Nzuki (2011) to conclude that despite both sets of pupils being provided with the same introduction to the new technology, both groups interpreted how the technology could be used in totally different ways.

2.4 Pupil engagement and the impact of having new technologies at home

The majority of the literature that has been reviewed thus far focused primarily on the introduction and use of new technologies in schools and the impact. However, for many students, some of these new technologies have been available to them at home. Returning briefly to the study conducted by Delen and Bulut (2011) in schools in Turkey, it was found that the use of new technology in the classroom was not a

reliable factor in determining the educational success of a pupil or group of pupils. However, the same study found that access to the internet at home to be a more reliable predictor where pupil attainment in mathematics and science were concerned. It is therefore possible to argue that the time at which this study was conducted, that home internet access was a widespread phenomenon. As a result of this, it would be beneficial to this study to look at how home access to new technologies has evolved over the past few decades.

During the late 1980s and the beginning of the 1990s, computers in the home were becoming more and more commonplace. In contrast to Delen and Bulut's (2011) argument, Wenglinsky (1998) evaluated the 1996 NAEP statistics and found that nine to ten year olds with a computer at home had lower average mathematics scores than the pupils in the same age bracket that did not have a computer at home. However, when taking the above two contrasting conclusions into consideration, it is possible to argue that it is not just having the access to the technologies at home that make the difference, but the way in which the pupils use it at home. Giacquinta, Bauer and Levin (1993) came to a similar conclusion. They found that many of the pupils that had access to the technologies at home used it to play games as opposed to using it as a resource for learning.

However, in response to the above argument, it may also be possible to argue that the pupils that use the technology at home to play games may do so because that may be the only way they know how to use it. Attewell and Battle (1999) in their research concluded that pupils that come from more well off socioeconomic families on average experienced greater educational success as compared to pupils from poorer

socioeconomic backgrounds. In support of such a conclusion, Wenglinsky (1998) found that there was a positive correlation between having access to a computer at home and educational attainment in schools located in high socio-economic areas. This being said, socioeconomic factors are not the only factors which can have an impact on the educational attainment of a pupil. Wenglinsky (1998) found that pupils from a minority background were less likely to have access to a computer at home, and pupils from rural areas were also less likely to have a computer. Whilst Wenglinsky's findings are almost two decades old, some of the findings still apply today. In light of the rapid technological changes that have taken place since then, the issue of how the new technologies are used at home still exists today. In support of this, Warschauer and Matuchniak (2010) found that there was a positive correlation between the use of new technologies. New technologies at home appear to have more of an impact on educational attainment than the use of new technologies at school. This was found to be the case after taking into consideration factors such as economics, ethnicity and the level of education that the parents of the pupils had. These factors were controlled in order to get the above findings (Warschauer and Matuchniak, 2010).

Regarding the issue of race and its impact on the use of new technologies at home, Gorski (2009) found that ethnic minorities were more likely to use new technologies for entertainment purposes at home. Additionally, Gorski (2009) points out that in order to maximise these new technologies, a good quality internet connection is needed and this can vary substantially from location to location. Warschauer and Matuchniak (2010) in their research observed that minorities and in particular those that do not speak English as a first language were less likely to have internet access at

home. They felt that this may have been the case because of linguistic barriers. In response to such findings, Yardi and Bruckman (2012) point out that over the past few years, the rise in popularity of iPads and other such mobile devices has made the internet more easily accessible. In support of this, Walling (2014) argues that the advantages that iPads offer include easy accessibility, connected learning and can prove to be advantageous where special needs pupils are concerned and its use in the assessment process.

Building upon the point of accessibility, Walling (2014) argues that iPads are much easier to carry around due to their smaller size and lighter weight. Furthermore, due to their lower price, schools with tight budgets are more likely to be able to afford to purchase individual devices for pupils, whereas with a laptop computer, the school may only be able to afford one for every two pupils. Another form of accessibility in addition to price is the ability of the iPad to enhance the learning experiences of disabled pupils. Kucirkova, (2014) adds that in the case of the first benefit, the weight of the device is significantly less than that of a laptop or netbook, thus enabling them to be taken in places where it is not feasible to carry a laptop.

The advantage of being able to be easily carried around can also be a disadvantage. Moorefield-Lang, Meier and Miller (2014) point out that with the use of iPads, there is always the possibility that it can become damaged either by being dropped or otherwise broken as they are more fragile than laptop and desktop computers due to being handheld and having a glass screen. They add that the expense of repairing or replacing an iPad far exceeds that of replacing a damaged textbook. Henderson and Yeow (2012) emphasised this point when they argued that iPads are not specifically

designed for use by small children. More specifically, they argue that it was designed to view media and consume content as opposed to the education of children. As a result of this, the physical design of the body of the device is made to be aesthetically pleasing as opposed to being tough, durable and easy to handle for young children.

Since the introduction of the Apple iPad in 2010, millions of iPads have been sold to education systems around the world (Dilger, 2014). In the case of Android based tablets, Ingraham (2014) found that since 2014 there have been almost a billion activated Android devices. As a result of this, it is very likely that a pupil has encountered a touch driven interface in one form or another before entering the classroom. However, it is possible to argue that their encounter with these devices outside of the classroom may likely have been for entertainment purposes as opposed to educational purposes. Thus, whether the pupil has access to new technologies at home or at school, it is in no way the sole determiner of success or failure in education. As the literature has shown thus far, new technologies have the capacity to have an impact on learning but by no means are they able to act as the sole determiner of success in education. In most cases, new technologies can be seen as a supporting tool in the same way a textbook is a supporting tool, which can be used to augment learning. Nzuki (2011) notes that *“While the use of technology can augment students’ learning of mathematics, their mathematical knowledge can foster the acquisition of more knowledge of technological tools”* (p.36). Nzuki (2011) adds that when looking at new technologies as tools, the attitude with which these tools are approached is very important. This is because one of the key determiners of the successful use of these technological tools is the attitude of the staff, educators and pupils that engage with them (Nzuki, 2011).

2.4.1 The use of cloud services to learn from home

Keengwe and Onchwari (2016) point out that the use of cloud services can enable pupils to carry on learning from home or any other location that has an internet connection. They note that Google Docs allow teachers or pupils to create and edit documents. In chapter 4 of this thesis, this feature of Google Docs is explored in greater detail. George, Dreibelbis and Aumiller (2013) found that Google Docs can be used to carry out class discussions where all of the participants are in different physical locations. Keengwe and Onchwari (2016) contend that cloud services such as Google Docs can enable teachers and students to conduct lessons regardless of location.

2.4.2 EAL pupils engagement with the iPad

Flint et al (2020) found that in their research, the iPad accelerated the rate at which EAL pupils developed their understanding of the English language. Their findings also showed that the use of the iPad also gave the EAL pupils a greater degree of confidence when using high frequency words. Similarly, Erstad et al (2019) found that the use of the iPad enhanced the phonological awareness of EAL pupils. Wood (2019) puts forth that the iPad is able to assist EAL pupils because of its interactive user interface. This user interface according to Wood (2019) offers the pupil the ability to interact in a manner that does not require a sound understanding of the English language along with immediate feedback.

2.5 Attitudes of staff and pupils towards new technologies

Younie and Leask (2013) observed that there is a relationship between the attitudes and beliefs that staff hold and technology. Younie and Leask (2013) point out that the

introduction of new technologies usually necessitates that the teacher gain an understanding of the ways in which new technologies affect their current pedagogy.

Vu et al (2014) note that one of the main intentions behind the investment in new technologies in education is the hope that it can engage pupils and improve their attitudes towards learning. Researchers such as Falloon (2015) have found an improvement in attitude when new technologies such as the iPad are introduced into the classroom setting. Romney (2011) conducted a study where pupils interacted with iPads preloaded with a database of mathematical videos showing step by step instructions on how to solve problems, complete with annotations and comments. Romney (2011) found that there was a greater degree of retention amongst pupils, as well as a rise in the level of attainment when iPads were introduced. Romney (2011) found that attainment was improved because the use of the tablet enabled the pupils to actively engage in the problem solving process during mathematics lessons, as they were able to see the teacher's slides and annotations as well as make annotations of their own as they went along.

Riconscente (2013) carried out a controlled study of the use of an app for the iPad called Math Motion. Math Motion is an educational game where the objective is for the user to place the correct fraction in the correct space by tilting the iPad. For this controlled study, Riconscente (2013) used 5th grade pupils from schools located in two different areas in Los Angeles. Riconscente (2013) found that the use of the app worked well to help augment the learning of the pupils, which in turn helped the pupils to gain a more sound understanding of the concepts involved. The result of this according to Riconscente (2013) was increased self-confidence of pupils and improvement of their general attitude towards learning. In support of Riconscente's

(2013) findings, Ifenthaler and Schweinbenz (2013) also found that the attitudes of pupils were one of the biggest determining factors in the success of the introduction of new technologies. However, other major factors include the attitudes of the educator, the ways in which the new technologies were used and the expectations that were given by those introducing the new technologies into the classroom (Ifenthaler and Schweinbenz, 2013).

What is quite noteworthy, is that in the above two examples, the researchers noted an improvement in attitude towards mathematics where the new technologies were used. Mathematics is a subject which is often perceived negatively by pupils. A number of researchers, including Greene et al (2006) found that this continued to be the case, despite the multitude of initiatives that have been rolled out in an attempt to boost interest and competence in the subject.

Larkin and Jorgensen (2015) note that whilst one of the key reasons behind investing in new technologies in schools is the hope that it might somehow motivate pupils and alleviate their anxieties; they note that these anxieties and negative attitudes are usually deeply ingrained in the psyche of the pupil by the time the pupil leaves the infant stage of school. Studies conducted by researchers such as Haydon et al (2012) and Larkin and Jorgensen (2015) have found that in many instances, the negative attitude that the pupil has towards a subject can have a significant and dire effect on their educational attainment in that subject. However, they add that the use of new technologies can aid in supporting pupils that have anxieties towards any subject, including mathematics.

Larkin and Jorgensen (2015) add that even if the introduction of new technologies helps to motivate the pupils or aids the teacher in better understanding the needs of the pupils, the use of these new technologies in the classroom would have been justified. In a study conducted by Weisberg (2011), the use of electronic books or e-books was compared to the use of traditional books at university level. The study was conducted over two years and found that many of the students preferred to read an e-book as opposed to using a traditional book. This was because the e-reader was a light and portable device that enabled them to carry around all of their e-books with ease. Further to this, they found that the students found it easier to search for specific content in e-books as opposed to traditional paper books. Whilst all of the above show the use of e-books to be advantageous, Weisberg (2011) also found that the price of the e-readers along with the cost of the digital books made the initial cost more expensive than using traditional paper books. Weisberg (2011) concluded that there was no discernable impact on the learning of pupils through the use of e-books over paper books. In contrast to this, Mangen and Kuiken (2014) have found in their studies that it *“makes it more awkward to read on and harder to follow the narrative and be transported into the story.”* (pp. 154-155) Catapano (2014) also found difficulties concerning the availability of textbooks as e-books. Catapano (2014) found that the iBook store lacked some books used by schools because the textbook publishers had not yet been able to make digital versions of the books. Keengwe(2014) countered this point by arguing that whilst the iBook store may not have all of the necessary books, it is able to access the Internet which in his opinion can offer more information about the topic being studied as compared to the textbook.

It is important to note however, that Weisberg (2011) presented these findings in 2011 where e-books as well as e-readers were relatively new to the market. In support of these findings, Dundar and Akcayir (2012) carried out a comparative study where they compared the effects of reading with a paper-based book versus reading using an iPad. They focused on the speed of reading and comprehension of pupils. Interestingly enough, they found that there was no major difference between the pupils that used paper-based books and those that used e-books on the iPad. Following on from this, the *Read for My School Competition*, a survey of a thousand seven to thirteen year old students, was carried out by the School Library Association (SLA). It was found that 77% of the pupils surveyed had a preference for e-books meanwhile 68% of the pupils would enjoy a paper based book. These findings show that it is difficult to attempt to directly compare the two formats as each offer their own benefits and “*each format comes with difference affordances, corresponding to different intents*”(Kucirkova, 2014, p 2).

These findings led Kucirhova (2014) to conclude that there is not an abundance of evidence or research that currently exists that shows the extent to which the introduction of iPads can “*revolutionise education*” (Ferenstein, 2011, p.1). This according to Kuchirhova (2014) is due to two ‘myths’ concerning relatively emerging technologies such as iPads and software packages used in the education system today (p.1). Kucirhova (2014) adds that these myths oftentimes work to hinder the progress of research into the introduction of these technologies. This first myth surrounds a misconception that there is somehow a rivalry or troubled relationship between the digital and the analog resources, more specifically, the misconception that digital resources such as those available on iPads pose a threat to the traditional analog

resources such as paperback books. Kuchirhova (2014) disagrees with this view and points out that instead of perceiving one as a threat to the other, they should be seen as being able to work together to support learning. The second myth that Kuchirhova (2014) identifies relates to the misconception that new technologies are the sole proponents for change in the education system without paying any recognition to the other factors that play a role in the teaching and learning process. Kucirhova (2014) further argues that these myths are being perpetuated due to the vast amount of research that attempts to compare the advantages of using iPads against the traditional paper-based solutions. She points out that this is especially true where the impact of the use of interactive e-books have been compared more favourably to the use of paper books (Kucirhova, 2014).

It may be possible to argue that at this point in time, as the iPad's use in the classroom is a relatively new phenomenon, many teachers are still unsure as to how effective it may be in the long term. Most of the feedback gained from teachers from studies conducted by researchers such as Vu et al (2014) and Ifenthaler and Schweinbenz (2013) have been largely positive. However, whilst a positive attitude is indeed necessary, professional training and support as well as a sound networking infrastructure in the school is also necessary. It is important therefore that schools address the issue of professional development when introducing the use of the iPad, cloud services and other technologies into the classroom.

2.6 Staff engagement with new technologies in the classroom

Whilst the pupil's perceptions do have an impact on the success of new technologies in the classroom, it is possible to argue that the effectiveness of the new technology

ultimately lies in the way in which the teacher utilises it in lessons (Williamson-Leadley and Ingram, 2013). There have been a number of concerns over the past few decades about the impact of teachers' use of technology in the classroom. A study over 45 years ago conducted by Young (1970) found that teachers and school leaders were deeply concerned that pupils would be able to use the computers too quickly and effortlessly calculate the slope and intercept from a linear regression without having to carry out the calculations themselves. This Young (1970) felt denies pupils the learning experience that comes from calculating the slope and intercept themselves.

This led Young (1970) to conclude that it was:

“too easy to use computers to only evaluate simplistically correct answers, it is almost as easy to write routine intrinsic programmed instruction and call it computer-assisted instruction. Indeed, it is true that no professor can teach; that is the task we set to the student, each one, on his own. But we can help our students in their work best by working harder ourselves to put imagination as well as our own right answers into the computer for our students to use. Unless we supply our own version of imaginative utility, we cannot require the student to do the same, later” (p. 759).

It is possible to argue therefore that despite the age of this study, the conclusion is still applicable today. More specifically, the conclusion highlights the issue of the way in which the teachers utilise new technologies when preparing their lessons and as part of their pedagogy. Young (1970) highlights the issue of teachers using new technologies as a replacement for the checking over of work done or as a means of skipping crucial learning experiences through mechanical calculations; this will not

work to improve the teaching and learning process. This is because the pupils must fully understand and grasp a concept and have opportunities to practise these new concepts that they have gained in order to solidify their understanding. Wenglinsky (1998) argues that if educators are not careful, the use of new technologies in the classroom can actually work to diminish the learning experience of the pupil.

Building upon this argument, Warschauer and Matuchniak (2010) found that teachers needed to focus on the use of new technologies that will enhance the learning experience during the lesson. They also found that teachers often hesitated to use new technologies in their classroom because of the already hefty time constraints placed upon them where teaching the curriculum was concerned. Additionally, they found that with the time constraints that teachers face, many of them felt that they had very little time on their hands to explore the different ways in which new technologies can be implemented in their classrooms. Williamson-Leadley and Ingram (2013) conducted a study in New Zealand involving pupils from grades two to five where the pupils used the iPad and the app Educreations in the classroom. The app Educreations works as a type of virtual whiteboard on which the pupils could write, like their paper notebooks, but they can also add recordings and animations to their work. In addition, teachers can add worksheets to the app so that the pupils can work through the worksheets via the app. Wise (2015) found that the iPad was able to help pupils remain engaged with the learning. Similarly, Williamson-Leadley and Ingram (2013) found that on average the pupils were far more engrossed and engaged with the app as compared to the use of traditional paper notebooks. Furthermore, they found that the voice-recording feature enabled the teachers to record feedback on the work and the pupils could use the voice-recording feature to record their thoughts and responses to

the verbal feedback given by the teacher. Williamson-Leadley and Ingram (2013) felt that such features enable new technologies to offer educators new means of carrying out assessment. They added that whilst in the past the teacher was confined to writing down remarks on a sheet of paper in order to assess a piece of written work carried out by a pupil, the teacher is now able to add their own verbal feedback to which the pupil can also respond via their own voice recordings. This is also helpful when offering feedback to pupils who have difficulty writing or those that use a writing implement. This offers such pupils an alternative way of communicating and responding to the teacher's feedback.

In addition to enhancing the formative assessment process, Melhuish and Falloon (2010) argue that the iPad also has the potential to add to the process of teaching and learning where evidence based learning is concerned. Carpenter et al (2013) supported this view by adding that there is an increasing number of educational apps for the iPad that offer a pupil version that pupils can easily use in the classroom and a teacher version which is dedicated to monitoring pupil performance and which offers a wealth of teacher tools. Examples of such apps include Splash Math 2nd grade and Addimal Adventure. These apps offer the teacher the ability to track the progress and performance of the pupils in the classroom. Moreover, the use of such apps on the iPad opens up a world of possibilities where the data logging feature is concerned. Educators are now able to track and log the ways in which pupils answer questions along with the mistakes they make. In the past, when a teacher stood over a pupil to see the work they were doing, this would often have the effect of making the pupil nervous and as a consequence of this, they could behave in a manner that might be different to their normal behaviour and thus answer questions differently. With the

use of the iPad, teachers are able to track and monitor the actions of pupils without having to stand over the pupil. Further to this, the use of the iPad enables school leaders to collect more data from the pupil population than previously possible through the use of data logging apps and other such educational apps that track pupils' actions (Dalton et al, 2012). Despite all of these features, the effectiveness of the use of new technologies such as the iPad and cloud services in education is also heavily dependent upon the attitudes and perceptions that the staff and pupils have towards it. Such an issue led commentators such as Attewell (2001) to argue that the training educators receive, along with their personal insecurities, perceptions and attitudes towards new technologies can be the difference between the success and failure of the introduction of a new technology in a school.

Vu et al (2014) argue that one mistake that researchers, school leaders and to an extent politicians make is that they sometimes fail to take into the account the impact that the attitudes of staff can have on the introduction of new technologies. Vu et al (2014) add that a teacher that is capable of realising the potential of new technologies and one who is sufficiently trained to fully utilise new technologies for educational purposes in their classroom is far more likely to have it positively impact the teaching and learning process as opposed to a teacher who may perceive the new technologies as an intruder or a distraction to the pupils. Ertmer (2005) adds that such a phenomena is not new and argues that any new technologies that are being introduced into a school should aim to fully address the attitudes and needs of the teachers as well as the pupils. Henderson and Yeow (2012) add that the introduction of emerging mobile technologies such as iPads may be perceived as an "*intruder*" by teachers and educators as its implementation can bring significant change to the traditional means

of teaching that they are accustomed to (p.80). This according to Henderson and Yeow (2012) may result in some teachers resisting the introduction of these technologies, thus hindering the effectiveness of their implementation in the classroom. However, Henderson and Yeow (2012) believe that proper training on how to maximize the use of iPads and their related technologies can go a long way in improving the effectiveness of these devices in the classroom.

This being said, the attitudes of teachers are not the easiest thing to change. Often times teachers have formed their belief set over years of experience and as such it may not be a simple task to change their attitudes (p.164). In response to this, Philipp (2007) adds that whilst many teachers may resist the introduction of new technologies, they often have to change their practice whenever a new curriculum, assessment scheme, teaching scheme or set of standards are imposed upon them. Philipp (2007) continues by arguing that teachers are in fact used to experiencing change all of the time. However, it would seem that those in charge of education policy making perceive the teaching profession as one where the objectives and the means to achieve these objectives are clear cut (Cochran-Smith, 2003). However Cochran-Smith (2003) points out that the reality of teaching is almost the opposite of this as there are a wide variety of approaches that can be implemented in an effort to achieve the same objective. Another factor that may make some teachers hesitant to include new technologies such as the iPad in their lessons is that now more than ever, teachers are held accountable for the performance of the pupils (UNESCO, 2017). Cochran-Smith (2003) argues that this places the teacher in a position where they must achieve a balance between spending time teaching a topic in depth which may result in lower overall scores, or teaching all of the topics in a simple and summarised

manner which may lead to artificially higher standardised test scores but may ultimately fail to fully equip the pupils for the next level of education.

A number of commentators, including Eccles and Jacobs (1986) and Cochran-Smith (2003) argue that standardised tests and their results are often an inaccurate measure of a pupil's aptitude and potential. As a result of this, when implementing assessment through the use of the iPad, it is important that school leaders and teachers take such matters into consideration. Fang (1996) adds that different teachers may prefer differing assessment approaches. Consequently, it is important to factor into consideration the fact that different teachers may hold different perceptions about the value of new technologies, their current pedagogical approach and its impact, the needs of their students in relation to this pedagogical approach and the means of assessment that they may feel best fit their pupils. Since these perceptions can vary substantially from teacher to teacher, it may be more practical to look at how these perceptions can be organised and conceptualised through the use of a variety of theoretical frameworks. Two such frameworks were espoused by Ernest (1989) and Copes (1982).

Ernest (1989) proposed a framework that explored the knowledge, attitudes and beliefs of mathematics teachers. This framework consists of three categories, which include attitudes, beliefs and knowledge. Where knowledge is concerned, Ernest (1989) argues that the teacher's knowledge base must consist of a higher level of understanding than the level being taught to the pupils. Using the example of mathematics, Ernest (1989) states that in order for a teacher to be deemed effective, they must have a secure level of subject knowledge in mathematics; be competent in

using different strategies for teaching mathematics; possess a good understanding of mathematical pedagogy; have good knowledge of the current mathematics curriculum; possess effective classroom management skills and classroom organisation skills; possess an understanding of the context of teaching mathematics, of the school and pupils, of education psychology and the education system within which they operate.

Further to this, the personal perceptions and beliefs that the teacher holds can have an impact on the way they teach a subject. Ernest (1989) uses the example of mathematics and argues that teachers can have one of three views of mathematics. The first view is the problem solving view. In this view, the teacher sees mathematics as a subject that presents problems to be solved. The second view is the platonic view whereby the teacher perceives mathematics as a set of algorithms, structures and facts. Finally, the third view is the instrumentalist view. In this view, Ernest (1989) argues that the teacher perceives mathematics as group of concepts, rules, algorithms and skills. The attitudes and perceptions that teachers have can be further sub-divided into two categories. The first according to Ernest (1989) is the attitude that the teacher has towards mathematics as a subject and the second is the attitude that the teacher holds towards the teaching of mathematics. The significance of this is that these attitudes can also be applied to the introduction and use of new technologies in the classroom. The attitude of the teacher can have an impact on whether or not they see new technologies fitting into their pedagogy and if so, the ways in which they choose to implement the use of new technologies in their lessons.

The second framework, espoused by Copes (1982), identifies four stages that a pupil may transition through in the process of gaining knowledge or a new skill. When assessing at which point to make use of new technologies in a lesson, the teacher needs to consider the stages that a pupil goes through in order to learn a concept. The first stage is dualism. In this stage, the student has a lot of questions on the subject matter that the teacher should know the answers to. In the second or multiplistic stage, it is acknowledged that a variety of views exist on the subject matter in question and that they all have the potential to be valid. The third and final stage is relativism. In this stage, it is recognised that the opinions and views that existed in the previous stage are not all equally valid. As a consequence of this, a degree of judgement must now be applied to the opinions where criteria such as validity and context are concerned. Finally, the last stage is dynamism. According to Copes (1982), it is at this stage where the individual realises the process of acquiring knowledge and skills is a solo pursuit whereby the knowledge that is available to them can be used as a guide.

Copes (1982) points out that the significance of the aforementioned stages is that it is supposed to be representative of the stages that a pupil goes through when acquiring knowledge. It is therefore the job of the teacher to determine the current position of the pupil within this framework in order to work out what the best approach might be to first meet the needs of the pupil and then move them onto the next step. When introducing new technologies into the classroom, it is possible to argue that each of the pupils might be at different stages in their learning and there may not be a single solution for the successful introduction and use of new technologies in the school. Copes (1982) adds that the aforementioned stages are often reflective of the evolution

of the subject area over time and that the four steps are taken in the opposite order from last to first where the content of textbooks are concerned (Copes, 1982).

Looking back at the arguments put forward by Ernest (1989) and Copes (1982), it may at first appear that they are unrelated and quite different. This is because at the surface, Ernest (1989) appears to be examining the attitudes and perceptions that are held by the teacher where teaching and learning is concerned. However, the model that Copes (1982) advances appears to look at the attitudes and perceptions that the pupils hold where mathematics is concerned and supports an approach to teaching and learning that takes this into account. Upon further inspection, it is possible to deduce that both arguments may be different perspectives on the same educator and pupil relationship. Copes' (1982) theory seems to be more focused on the student aspect of the relationship whereas Ernest (1989) focuses more on the teacher, their attitudes, thoughts and perceptions and how these can impact on teaching. It can therefore be argued that the model that Copes' (1982) advances potentially suffers with the same inherent weakness that many other staged models suffer from. This is that staged models are often deemed to be an overly simplistic view of the process that a pupil goes through when learning. Further to this, it may be possible to argue that Copes' (1982) model fails to fully take into account the impact that the attitudes and perceptions that a teacher possesses can have on pupils and the learning experience that they have. Ernest (1989) highlights the importance of the learning experience; he argues that the learning experience for a pupil can mean the difference between a pupil that is motivated and eager to take on new challenges and a pupil who feels intense anxiety, fears new challenges and feels that a subject is inaccessible.

What is quite noteworthy is that some teachers who teach a particular subject may have felt anxieties about the same subject when they were pupils themselves. This may hold particularly true for subjects such as mathematics. Commentators such as Beilock et al (2010) advance that anxieties and negative emotions that some female primary school teachers hold towards mathematics can have a knock-on effect on the pupils to whom they teach mathematics to and the levels of education attainment in mathematics that these pupils attain. This is quite noteworthy as, in their survey, the Department for Education (2016) found that 75% of primary school teachers in England are female (Department for Education, 2016, p.7). If the findings of Beilock et al (2010) hold true, then this means that there are potentially a large number of teachers that may be passing on their anxieties about mathematics to their pupils. In response to such a suggestion, Bonner (2006) argues that many of the teachers surveyed stated that they suffered with anxieties concerning mathematics as pupils themselves, and found that the teaching of mathematics in a problem solving manner helped them to gain a more positive perception of the subject.

Ifenthaler and Schweinbenz (2013) point out that new technologies can be unsuccessfully introduced into a school due to the negative attitude that the staff may have towards it. In a similar fashion, the teaching of mathematics in a classroom may be unsuccessful if the teacher has a negative attitude towards mathematics. Ifenthaler and Schweinbenz (2013) add that in order to find out how new technologies can be successfully introduced, it is important to first take into consideration the specific factors that have an impact upon the accepting of new technologies. If these factors can be satisfied, then the possibility of a successful introduction and integration increases.

One of the biggest factors upon attitudes and perceptions in modern times has been the media. The media has generally held a positive attitude towards the introduction and use of the Apple iPad in a variety of fields including education (Keengwe, 2014). However, there have also been negative reports on the use of the iPad in education (Vu et al, 2014). Such a divided opinion has led researchers such as Vu et al (2014) to question whether the iPad does actually have the potential to raise educational attainment as substantially as some media reports may lead you to believe. Vu et al (2014) conducted a research project of the attitudes and perceptions held by teachers of the use of the iPad in the classroom and found that the iPad was perceived as advantageous in three key ways. The first way was that many of the teachers were of the opinion that the simplicity of the apps available meant that the use of the apps and their educational content could be learned within a short space of time using the iPad. This is in comparison to computer software suites, which in the past would have taken weeks to begin to understand. The second key advantage according to Vu et al (2014) was that the iPad was not only easy to transport but it also met the kinaesthetic needs of pupils, especially the touch screen feature. This need could not be met when pupils are using laptop and desktop computers. Thirdly, the iPad has a much gentler learning curve as compared to the steeper learning curve that desktop and laptop computers have. This is the case as the user is able to use their fingers to operate the device rather than having to learn how to use human interface devices such as the keyboard and mouse.

What is notable about the above three advantages found by Vu et al (2014) is that they all compare the introduction and use of the iPad to its more traditional desktop and laptop computer counterparts. Having noted this, Vu et al (2014) also found a

number of drawbacks to the introduction and use of the iPad in the classroom. The first drawback was that the virtual onscreen keyboard was actually slower to use than a physical keyboard on a desktop or laptop computer. This meant that where typing was needed for activities such as coursework, the pupils generally took a much longer time to get their work done. The second drawback was that whilst the iPad was ideal for media consumption and interactive media, it was much more difficult to mark and annotate work that children had completed on the iPad than when it was completed on an ordinary sheet of paper. This meant that a teacher could not mark the work or make annotations whilst the pupil was working in the classroom. For many teachers, this type of marking and annotating whilst the pupils were working was a key part of their pedagogy and as a result of this, they found using the iPads in the classroom to be more of a hindrance than an enhancement. Echoing this sentiment, Henderson and Yeow (2012) argue that the iPad is really intended for the consumption of media, playing games, web browsing and the use of specific-purpose apps and does not lend itself to the creation, editing and development of content above basic video, audio and text editing. Additionally, tablets such as the iPad, in order to be useful in the classroom, need to be preloaded with specific purposed apps or through the use of the web browser. Henderson and Yeow (2012) add that the onscreen keyboard, whilst it is useful for entering a few words of text, is inadequate for typing large amounts of text and it can become quite tedious for the pupils to use for an extended period of time and if the Apple keyboard attachment is used, it reduces the portability of device and thus defeats one of the key advantages of the iPad.

Taking the aforementioned advantages and drawbacks into consideration, it is not immediately clear whether these can actually sway a teacher's decision regarding the

use of new technologies in the classroom. Research conducted by Ifenthaler and Schweinbenz (2013) found that some teachers show varying degrees of acceptance and integration of new technologies in their pedagogy and classroom. However, they point out that if the school leaders do not fully understand why their teachers may accept or decline the use of new technologies in their classroom, then the process of introducing new technologies would be a challenge for the school, since the introduction of new technologies should aim to meet the needs of the staff and pupils that are at the school. One example put forth by Ifenthaler and Schweinbenz (2013) is that of a classroom where there were pupils who were incapable of holding a pencil. They found that through the use of the iPad, the pupil was able to use the touch screen feature to type or write, which made it easier for them to function within the classroom.

The perceptions and attitudes that teachers have towards new technologies such as the iPad can also be impacted by the way in which it has been introduced in the school. Vu et al (2014) compared three types of iPad introductions. The first was where only the teacher was given an iPad, the second was where each pupil was given an iPad in the classroom and the last one was where there was one iPad per group of pupils in the classroom. Vu et al (2014) concluded that a larger number of teachers in the study were in favour of the use of the iPad in the classroom than those that were against it. Further to this, it was found that the teachers that responded negatively to the use of the iPad in the classroom were the ones that only had one iPad in their classroom.

2.7 Staff engagement and the impact of professional development

The previous section addressed the impact of the attitudes and perceptions that teachers hold regarding the introduction of new technologies in the classroom. However, as previously mentioned, there are many other factors which must be considered when looking at the introduction of new technologies in education. This section focuses on the professional development of staff regarding the introduction and use of new and emerging technologies, such as the iPad and cloud services in education. Teachers who feel confident in their knowledge of new and emerging technologies are more likely to use them. An increase in teacher usage of new and emerging technologies in the classroom has the knock-on effect of improving the proficiency of the students in the use of these new technologies (Geng et al 2017).

Wenglinsky (1998) carried out a study of American 4th grade students regarding the use of new computers and education software in the classroom and found that the way in which teachers made use of the new technologies in the classroom had a substantial impact on how successful it was in helping the pupils to achieve the learning objectives. Wenglinsky (1998) found that in some schools, teachers used the new technologies to play educational games whilst in other schools, the technologies were used as an integral part of the lesson through the use of problem solving or simulations of scientific or mathematical concepts as opposed to only playing educational games. One key reason behind this was that some of the teachers were trained extensively on how to effectively use these technologies in their classroom. However, there still remained a number of teachers who had received little or no training on how to effectively use these technologies in their lessons and as part of their pedagogy. This led Attard (2013) to ask the question, “*so we know iPads have*

the potential to enhance teaching and learning, but how should teachers be using them to teach primary mathematics?" (p.38). Attard (2013) in her research found that teachers experienced great difficulty in trying to find engaging and effective ways in which to make use of the iPads whilst teaching numeracy as compared to other subjects. She also found that the teachers that attempted to use iPads in their numeracy lessons had to use mathematics apps that would either just offer a game that lacked depth and fail to offer a sufficiently deep experience to enable the pupils to reflect upon their learning experiences or to develop their problem solving skills. Furthermore, many of the mathematics apps available only offered an activity that took the same 'drill and practice' approach that is typically found in paper based worksheets and textbooks due to the limitations of many of the mathematics apps available (Attard, 2013, p. 38).

Little (1990) and Lieberman (1995) found that teachers were less likely to attend professional development courses or make use of professional development opportunities linked to new and emerging technologies if they were dissatisfied with their working environment. This led to a lack or minimal use of these technologies by these teachers, resulting in limited learning experiences in the use of technologies for the pupils they teach. Little (1990) and Lieberman (1995) further argued that many teachers suffered from a lack of knowledge on the use of new and emerging technologies in the classroom as the training that these teachers received may not have been sufficient to cater to all of their needs. Additionally, some teachers may not have been given the opportunity to attend training as school leaders may not have made such training available to the teachers. This may be due to time constraints or that it may not be high up in the list of priorities for the school (Lieberman, 1995).

Appropriate training and other such professional development opportunities can have a direct impact on the successful use of technology in a teacher's lesson. Smerdon et al (2000) carried out research on the use of technologies in the classroom. At the time of that study it was the use of desktop and laptop computers that had internet connectivity. Smerdon et al (2000) looked at the ways in which the teachers made use of these technologies. Their observations revealed that there was a direct correlation between the level of preparedness of the teacher and the chances of the successful use of new technologies in the lesson. This in turn led them to conclude that part of being prepared was to be fully trained in the use of the technologies along with other relevant teaching skills. Smerdon et al (2000) argue that being prepared or preparedness where new technologies are concerned involves not only professional development for the teachers, but on-site technical support for them as well as changing their personal attitudes and perceptions that they hold towards the different technologies.

As a result of the above findings, it is possible to argue that the better the professional development training available to a teacher, the more likely the teacher is to be equipped to correctly and effectively use new technologies. In turn, the more equipped a teacher is to use new technologies as part of their pedagogy, the more likely pupils are to benefit from the use of effective use of new technologies in the classroom (Wenglinsky, 1998). In spite of this, Smerdon et al (2000) found that whilst teachers were likely to engage in beginner or introductory courses in the use of new technologies in the classroom, they were unlikely to take part in more advanced courses in the use of new technologies in education. This they point out was usually

due to limited funding. This, they argue, limits the abilities of the teacher to maximise the use of new technologies in the classroom to gain the best results. Wenglinsky (1998) found that most of the teachers that have had sufficient professional development opportunities in the use of new technologies in the classroom showed a greater degree of confidence when it came to implementing the use of new technologies in the classroom and as part of their pedagogy. From such findings as those put forward by Smerdon et al (2000) and Wenglinsky (1998), it may be reasonable to conclude that offering professional development opportunities to teachers may be a sure way of ensuring that the introduction and use of new technologies in a school is successful and contributes positively to the educational attainment of the pupils concerned. However, this may not always be the case. Becker (2007) argues that *“comfort with technology does not necessarily translate into the ability to integrate technology into the teaching and learning process”* (p. 29). Whilst it may be possible to argue that these studies focus on the use of laptop and desktop computers and not iPads, it is possible to counter this argument by acknowledging that those were new technologies at the time, as the iPad and cloud services are relatively new technologies now.

Vu et al (2014) conducted a study where twenty-one teachers were interviewed regarding their perceptions of the use of the iPad and the professional development opportunities that they had taken advantage of. They found that roughly one third of the teachers had not received any professional development opportunities other than the basic training provided by a representative from Apple. Instead, they revealed that they had to teach themselves how to use the iPad and independently research the ways in which they could use the iPad in their pedagogy. Another third of the teachers

interviewed came from a well-funded private educational institution. These teachers also reported that they did not receive any formal training on how to properly integrate the iPad in their lessons and as part of their pedagogy.

It is possible to argue therefore that the lack of suitable training opportunities may be one of the key reasons why some teachers may not feel sufficiently confident in using relatively new technologies such as the iPad in their lessons. As a result of this, the introduction of the iPad and cloud services in a school where there has not been any suitable professional development opportunities may fail where it might have otherwise succeeded had there been sufficient professional development opportunities. Vu et al (2014) further found that a number of teachers that only made use of the iPads in their lessons because they heard that there were researchers coming in to see how they had made use of them. Such findings led theorists such as Disney et al (2013) to conclude that the availability of professional development courses play a crucial role in determining the success of the introduction and use of a new and emerging technologies in a school.

It would appear that in addition to educating teachers, professional development courses often have a positive effect on the way in which teachers perceive their own abilities when it comes to using new technologies (Smerdon et al 2000). Further to this, Disney et al (2013) noted a direct correlation between the level of self-confidence that a teacher had and the level of relevant technology-based professional development opportunities available for them to access. It was also highlighted that teachers that lacked the relevant professional development opportunities were more likely to avoid using new technologies in the lessons altogether and conduct their

lessons in a similar manner to teachers that did not have any access to these new technologies (Disney et al, 2013). Smerdon et al (2000) found that teachers who had received professional development where the use of new technologies was concerned usually expressed a degree of certainty and confidence when making use of these technologies in their classroom and as part of their pedagogy.

It is important to note that whilst professional development training may assist in the introduction and implementation of new technologies in the classroom, it is not an automatic guarantee of a successful introduction and implementation of new technologies is concerned (Smerdon et al 2000). Even with proper training, the personal feelings and perceptions that the teacher holds still has an impact on whether or not new technologies are used in their lesson. Vu et al (2014) found that teachers who were already owners of iPads at home were more likely to engage with the iPad and use it as part of their lessons. However, Vu et al (2014) found that teachers who did not or had never owned an iPad before would approach this and other similar devices with a degree of apprehension or caution despite having received training on how to use it effectively in their lessons.

Gibbs et al (2009) conducted a research project of five schools located in Chicago, United States of America. They found that training on the use of new and emerging technologies in the classroom work to improve the level of understanding and confidence that a teacher has when using these new technologies. This in turn led to an improvement in the abilities of the students to use new technologies. However, they also found that the training that teachers received should be geared towards their specific needs. An example of this relates to teachers who are already proficient with

new technologies; they would gain little, if anything at all, from attending a training course for beginners. However, teachers with little to no experience of using the iPad and other similar devices, would also gain little from attending an advanced technical course on the use of the iPad or similar devices in education. What they also noted was that as a teacher became more and more confident at using new technologies, their perceptions of these devices are more likely to become positive as time progressed. This they found to be particularly true when the use of the new technologies in the classroom brought educational success and improvements in pupil attainment.

In support of such an idea, Wenglinsky (1998) found that schools that trained teachers in how to effectively use new technologies, allowed the teachers to attend professional development courses to deepen their knowledge and allowed a degree of autonomy to make use of the new technologies in their lesson were able to offer their pupils activities which were shown to substantially improve their educational attainment in mathematics. Despite these findings, finding ways to improve the level of attainment of pupils in mathematics is an age old and on-going problem that exists across the globe to this day despite the changes and technological advancements that have occurred since the publishing of Wenglinsky's study in 1998.

2.8 Staff perceptions of the advantages and disadvantages of the use of the iPad and in the classroom

2.8.1 Challenges faced by teachers

McConatha et al (2013) found that whilst a vast number of teachers interviewed believed that the use of the iPad was beneficial, they also highlighted a number of challenges that they faced in making use of it as part of their pedagogy. One example according to McConatha et al (2013) was that some of the teachers that took part in the study found that their pupils were captivated by the animations associated with the turning of pages on the ebooks rather than focusing on the actual content and information that the ebook provided. Further to this, McConatha et al (2013) identified five key challenges that teachers faced when attempting to integrate the iPad as part of their pedagogy. The first challenge was the issue where the students did not perceive the iPad as a tool for learning. Some teachers reported that pupils often attempted to find ways in which they could use the iPad to play when they felt that the teacher or any other adult in the classroom was unable to see them. The second challenge identified by McContha et al (2013) was the issue of availability. Not all schools were able to afford to purchase an iPad for each pupil. As a result of this, there were occasions when a teacher would plan for a lesson using the iPads only to find out that the iPads were unavailable for that particular time slot. The third key drawback is linked closely with the first one. This is the issue of monitoring what the pupils were doing on the iPad. In most of the lessons observed, McContha (2013) noted that many of the teachers struggled to keep on top of exactly what each of the pupils was doing on the iPad whilst the lesson was taking place. The fourth issue was that of internet access and the performance of the school network. Some teachers found that the when all of the iPads were in use, the network speed and internet access

slowed down substantially. Whilst this was not found to be the case in all schools, it was a major issue in a number of the schools where the research was carried out (McContha, 2013).

Further to this, Vu et al (2014) noted that a number of other challenges could arise and listed four examples of challenges faced by teachers. Firstly, there was the issue of the technology itself. They found that a noteworthy number of the teachers that took part in the research project did not have iPads or other new and emerging technologies in their school. As a result of this, they found that most of the teachers that fall into this category did not have any desire to use any form of technology as part of their pedagogy. Secondly, a number of teachers did not have access to certain aspects of the technology. Vu et al (2014) found that some of the teachers in the study did not have access to Apple's AppStore or Google Play on the devices as they did not set it up on their devices. As a result, they were limited to the apps that were already installed on the devices. Such a limitation could deter even the most technologically keen of teachers from implementing the use of these technologies as part of their pedagogy. Thirdly there was the issue of technical support. This was an issue for a number of the teachers in the study conducted by Vu et al (2014) as the schools that there were in deployed the these devices but did not offer any further support to the teachers. This meant that many of them had to figure out how they could make use of them in their classroom. Finally, the fourth issue was management. Vu et al (2014) found that the on average, the senior leadership team in private schools were more likely to expect their staff to make use of new technologies in the classroom as compared to state run schools.

The Information Resources Management Association (IRMA) conducted a study in 2018 looking at trainee teachers and their experiences regarding the use of new technologies as a part of their training and pedagogy. During the survey, the IRMA (2018) identified a number of challenges that they faced when attempting to use the iPad as part of their pedagogy. Echoing the findings of McContha (2013), IRMA (2018) found that the student teachers reported experiencing difficulties with the school network and students becoming distracted with the use of the device as two of the main challenges when using the iPad in lessons. Further, Kats (2013) found that a large number of teachers found difficulty in figuring out how to integrate the iPad into their lessons. Further to this, Kats (2013) revealed that most of the teachers interviewed felt that they did not have sufficient time to find ways in which they could make use of the iPads in all of their lessons. The identified issues of time, network infrastructure and durability was discussed in greater depth below and explored in chapter four.

In terms of time, Vu et al (2014) also had similar findings. Vu et al (2014) noted that setting up and using new technologies in the classroom can sometimes take more time than writing on paper and the whiteboard. This is because the devices have to be set up, the correct app needs to be opened, the adults need to make sure that the pupils are on the correct app and understand how they need to use the app. Vu et al (2014) found that in response to these issues, some teachers sought to use the new technologies in almost the same way they used the whiteboard and notebooks in the classroom in an effort to get the lesson moving quickly. This Vu et al (2014) found was a major deterrent for some teachers when it came to using new technologies in the classroom. Some of the teachers felt that it took away too much of the teaching and learning time

and due to the amount of content that the curriculum packed into each year group, time simply was not a resource that could be spared. In contrast to this, Henderson and Yeow (2012) argue that iPads can be very engaging to pupils as it offers them instantaneous feedback based upon their input. Building upon this point, they also argue that it is this instantaneous feedback that reduces the potential for distraction and it also means that they can use that feedback to move onto the next part of the lesson without wasting any time waiting on feedback from the teacher. This according to Henderson and Yeow (2012) is known as 'seamless learning' (p.79). More specifically, seamless learning is where the pupils are able to access information, learning environments and content whenever they become curious and they can also activate learning contexts (p.79). This seamless learning, according to Henderson and Yeow (2012), is able to save a lot of time.

In the case of network infrastructure, An (2014) argues that many of the perceived limitations and drawbacks of the use of iPads in the classroom are down to logistical issues. A poor network infrastructure was in her opinion often the cause of many of the issues which consequently led to the users of the devices believing that the iPads are ineffective. She gives an example of a school which had failed to consider whether its network was able to effectively handle the school-wide simultaneous use of iPads where issues such as bandwidth, number of access points and other technical aspects of the network were concerned. This is crucial because if there is a school-wide introduction of iPads and the school network is not able to support it nor is it upgraded to cope with the new level of demand, this can result in a number of issues such as dropped wireless connectivity, which can in turn render a vast number of the devices' features useless as it may be unable to access the resources that are stored in

the cloud or on the school's network An (2014). Audi and Gouia-Zarrad (2012) argue that the technological infrastructure of an institution, more specifically the wireless network is a major factor which can affect the effectiveness of the iPads. In contrast to this however, Şimşek and Doğru (2013) point out that there are some iPads such as the Samsung Galaxy Tab that are able to create Ad-hoc networks. This means that unlike your typical infrastructure network setup where the iPad has to go through an access point in order to be part of the network, an Ad-hoc network is one which is established between the devices without the need for additional networking hardware. Carrying on from this point, they note that an Ad-hoc network can be created between the tablets in the classroom and the teacher's desktop computer or between the tablets alone. The teacher can then use their computer or device to share information or data with the other devices. Network infrastructure is not the only logistical issue that teachers and staff can face when using new technologies. Some schools do not have sufficient iPads for all of the classes to use simultaneously. As a consequence of this, the iPads often need to be timetabled, which means that they may not be able to be used for every lesson if the teacher wishes to do so. This may pose a problem for teachers who wish to plan investigative type lessons that are to take place over several days. The iPads may be available on the first day of the lesson but unavailable on the subsequent days. This can have a severe impact on the success of the lesson. Such an example is one of the reasons why some teachers may be deterred from using them in their lessons in schools where there are only a few iPads.

The last point raised was that of durability. iPads electrical devices with glass touch screens are not as hard wearing as notebooks and as a result can easily be damaged in the classroom. Having an iPad being damaged during a lesson can cause a disruption

as those pupils that are using that iPad may need to find another iPad to use or share with another pupil. Addressing this issue can take away precious teaching and learning time away from that pupil. As previously mentioned, Moorefield-Lang, Meier and Miller (2014) noted that there is always the possibility that the iPad can become damaged either by being dropped or otherwise. They argue that the expense of repairing or replacing an iPad far exceeds that of replacing a damaged textbook. Henderson and Yeow (2012) supports this view by arguing that tablets such as the Apple iPad are not specifically designed for use by small children. More specifically, they argue that it was designed to view media and consume content as opposed to the education of children. As a result of this, the physical design of the body of the device is made to appeal to be aesthetically pleasing as opposed to being tough, durable and easy to handle for young children. The issue of durability was explored in greater depth in chapter four.

2.8.2 Challenges faced by schools

Berge and Muilenburg (2013) found that one of the key challenges that schools faced when introducing and using iPads was the issue of the availability of e-books. Berge and Miulenburg (2013) pointed out that many schools have begun looking for ways in which they could cut down on paper usage and become more eco-friendly. As a result of this, some schools have looked into ways in which they could use the iPad instead of textbooks. The challenge faced when attempting this is that many of the textbooks that schools use are still not available as e-books. Further to this, there are copyright restrictions preventing a school from attempting to digitally scan an entire text and converting it into an e-book. In addition to this, Heafner (2014) points out that financial budget constraints are a massive hurdle that schools face when introducing

relatively new technologies such as the iPad. Further to this, Heafner (2014) points out that beyond the initial outlay for the iPads, schools need to fund training, apps, upgrades to the network infrastructure and maintenance costs. This can prove to be a real challenge for schools, especially those located in impoverished areas.

2.8.3 Challenges faced by pupils at school and at home

Vu et al (2014) note that in the vast majority of lessons that they observed, the teacher often served as a deliverer of knowledge and the pupils were the recipients of this knowledge. This type of teaching style is teacher-focused, where the teacher was the primary source of information and knowledge for the pupils. As teachers saw themselves as being completely in control, Vu et al (2014) found that some teachers were not comfortable or willing to relinquish some of that control by opting for more pupil-led or pupil-focused lessons through the use of iPads and similar devices in their lessons. This can be a challenge to pupils who may be unable to move ahead with the lesson as they have to go along with the teacher's pace. Without a doubt, pupils may face many additional challenges in the use of technology both at home and at school.

2.9 Pupil perceptions of the advantages and disadvantages of the use of the iPad in the classroom

Heinrich (2015) who found that students perceived the iPad as easy to manipulate. He noted that this often had the effect of raising self-confidence. In his research, Heinrich also noted that most of the pupils surveyed felt that the iPad had a positive impact in their work. Beauchamp (2016) surveyed a group of Year 5 pupils and found that most of them perceived the iPad as an enjoyable device to use. These pupils also felt that the iPad enhanced their learning experience by enabling them to carry out a multitude

of tasks on one single device. Some of these tasks included researching, writing, editing images and reading books. Henderson and Yeow (2012) had similar findings. They found that pupils found the iPads to be interesting to use due to the touch screen. Similarly, Burden et al (2012) found that the iPad worked to inspire some pupils to work independently. This independence according to Burden et al (2012) may have been as a result of increased self-confidence due to the use of the iPad. Echoing this sentiment, Bohl and Hoult (2016) have also noted that there are a variety of apps on the iPad that have been found to help the pupil develop their confidence. In contrast, Henderson and Yeow (2012) found that some pupils felt less self-confident as they were unfamiliar with the iPad and how to use it.

Gliksman (2014) adds that physically disabled pupils saw the iPad as a device that could assist them. One example of this was when physically disabled pupils being studied by Gliksman (2014) were able to use the iPad to create music using samples of musical instruments. He noted that the pupils may not have otherwise been able to produce the music using real physical instruments due to their disabilities. Siltan (2015) had similar findings in a research project carried out using iPads and apps that replicated musical instruments. Siltan found that the pupils found the use of the iPad based musical instrument apps to be helpful in developing their musical skills.

However, Clark and Luckin (2013) found that some pupils perceived the iPad to be a distraction. Additionally, Henderson and Yeow (2012) found that some pupils felt that the iPad was not ideal for large text entries such as writing an essay or report. All of the above points were explored in greater depth in chapter four.

2.10 Conclusion

Within this chapter, the various aspects of introducing new technologies into the classroom were considered and discussed in great depth. A number of key issues were identified by the literature review. These key points include, the hurdles faced (issues with the wireless network, charging, available apps) by teachers when attempting to use the iPad as part of their pedagogy, the positive and negative impact of the use of new technologies such as the iPad in the classroom, the social and economic impact on the digital divide and pupil engagement, the impact of having new technologies at home can have on a pupil, the impact of the attitudes of staff and pupils towards new technologies, staff engagement with the new technologies in the classroom, the impact of professional development on teachers and their use of the iPad, staff perceptions of the advantages and disadvantages of the use of the iPad in the classroom, pupil perceptions of the advantages and disadvantages of the use of the iPad in the classroom (some pupils found the iPad to be a distraction whilst others found that it made lessons more interesting).

It is apparent that there are a number of hurdles and challenges which arise in the introduction of new technologies in the classroom. This being said, the consensus is that the impact of introducing new technologies into the classroom is generally positive. Moreover, it does not mean that every instance of technological introduction is a complete success. As a result of this, the introduction of a new technology in a school must be approached with both optimism and caution. New technologies such as iPads and cloud services when correctly used can be invaluable tools to the teaching and learning process. However, these tools do in fact have their limitations

and these must be taken fully into account when introducing them into the classroom. The attitudes and the needs of the teachers and pupils must be taken into account prior to investing in new technologies. As a result of this, a specific approach to introduction successfully used by one school may not be successful in another. Prior to the investment in the new technologies, the school leaders must consider a number of factors. These include the attitudes and needs of the pupils and teachers; the current infrastructure of the school, the allocation of time and opportunities for professional development in the use of these new technologies and a system of on-going support for the usage of the devices post introduction.

In the upcoming chapters of this thesis, I intend to look at many of the aforementioned factors where new technologies are being introduced in an inner London Primary School. The focus of the study was on the perceptions that the teachers and pupils hold on the introduction and usage of these new technologies in the classroom. The findings of this study was compared and contrasted with the literature that was reviewed in this chapter and presented in Chapter four. A summary of the key findings of the literature review are explored below:

Key Issues	Key Theorists	Summary of Issue
The use of technology in education	Tomei and Carbonara (2019), Warschauer and Stone (2004), Gorski (2009), Weston and Bain (2010), Gibbs et al (2009), Attewell (2001), Habgood and Ainsworth (2011), Wenglinsky (2005), Van Dijk Hacker (2003), Hunter and Storksdieck (2017), Disney et al. (2013), Lubienski (2008) Kim and Chang (2010) O'Donnell and Hallam (2014), Sung and Meyer	There are positive and negative impacts to the use of new technologies in education. Technology closing gaps in educational attainment. Technology may fail to take into account the innate differences between pupils (O'Donnell and Hallam, 2014) Comparative studies may not be effective in creating a clear distinction between the effects of the varous

	(2013)Vygotsky (1978), Vygotsky (1980), Cheung and Slavin, 2013), Slavin et al (2009), Li and Ma (2010), Kulik et al (1985),Niemic and Walberg, (1985), Connell (2012)	<p>formats on the outcomes and the effects of the methods used in the study(Sung and Meyer, 2013)</p> <p>iPads can be used to aid a pupil in the grasping and understanding of new concepts in the same way an adult or a peer (knowledgeable other)would have assisted a child in grasping the new concept in Vygotsky’s theory.(Vygotsky, 1978)</p> <p>The iPad’s simple and intuitive interface means that younger users can get to grips with it more quickly. This may be particularly true for students with disabilities (Connell, 2012)</p>
Social and economic impact on the digital divide and pupil engagement	Disney et al (2013), Wenglinsky (1998), Warschauer (2004), Delen and Bulut (2011)	<p>Pupils from lower socioeconomic backgrounds more likely to use new technologies at home in a way that was less likely to have a positive effect on their learning. (Wenglinsky, 1998)</p> <p>Schools in lower socioeconomic areas may use new technologies to engage in repetitive learning rather than adopting a more structured and varied approach which was found to result in better results on average. (Warschauer, 2004)</p> <p>Schools in more deprived areas tended to use new technologies in less effective ways (Delen and Bulut, 2011)</p>
Pupil engagement and the	Warschauer and	Having new technologies

<p>impact of having new technologies at home</p>	<p>Matuchniak (2010), Keengwe and Onchwari (2016)</p>	<p>at home alone doesn't have a profound impact on educational attainment and pupil engagement. However, having new technologies at home and using it in a manner that is effective can have a positive effect on educational attainment and pupil engagement. (Warschauer and Matuchiniak 2010) Having new technologies at home can augment students learning. (Nzuki, 2011)</p> <p>The use of new technologies such as the iPad and cloud services can enable learning from home. (Keengwe and Onchware (2016)</p>
<p>Attitudes of staff and pupils towards new technologies</p>	<p>Younie and Leask (2013), Falloon (2015), Riconscente (2013), Ifenthaler and Schweinbenz (2013), Kuchirhova (2014)</p>	<p>There is a relationship between the attitudes and beliefs that staff members hold and technology. (Younie and Leask, 2013). The introduction of new technologies necessitates that the teacher gain an understanding of the ways in which new technologies affect their current pedagogy. (Younie and Leask, 2013)</p> <p>Pupils were generally engaged with the iPads due to their intuitive interface and engaging apps. (Falloon, 2015)</p> <p>Pupils and teachers both found that some iPad apps helped to augment learning. (Riconscente, 2013).</p>

		<p>The attitudes of the pupils is one of the biggest determining factors in the success of the introduction of new technologies (Ifenthaler and Schweinbenz, 2013)</p> <p>The belief that digital resources are a threat to analog resources can work to hinder the success of digital resources on devices such as the iPad (Kuchirhova, 2014)</p>
<p>Staff engagement with the new technologies in the classroom</p>	<p>Williamson-Leadley and Ingram (2013), Warschauer and Matuchniak (2010), Henderson and Yeow (2012), Ifenthaler and Schweinbenz (2013)</p>	<p>Whilst the pupil's perceptions do have an impact on the success of new technologies in the classroom, it is possible to argue that the effectiveness of the new technology ultimately lies in the way in which the teacher utilises it in lessons (Williamson-Leadley and Ingram, 2013)</p> <p>Teachers lack the time to learn how to integrate new technologies into their pedagogies. (Warschauer and Matuchniak, 2010)</p> <p>There are a multitude of educational apps that offer a teacher version to enable the teacher to monitor and assess pupil progress. (Carpenter et al, 2013)</p> <p>A lot of research on the iPad fail to take into account the impact of teacher attitude. (Vu et al, 2014)</p> <p>A teacher that is willing and capable of realising the potential of new technologies and is fully</p>

		<p>trained to use it is more likely to have a positive impact when using new technologies in the classroom. (Vu et al, 2014)</p> <p>New technologies may be perceived as an intruder by some teachers. (Henderson and Yeow, 2012)</p> <p>Teacher accountability may make some teachers hesitant to include new technologies in their pedagogy. (UNESCO, 2017)</p> <p>New technologies can be unsuccessfully introduced into a school due to the negative attitude that the staff may have toward it. (Ifenthaler and Schweinbenz, 2013)</p>
<p>Staff engagement and the impact of professional development</p>	<p>Geng et al (2017), Vu et al (2014), Disney et al (2013)</p>	<p>An increase in teacher usage of new and emerging technologies in the classroom has the knock-on effect of improving the proficiency of the students in the use of these new technologies (Geng et al 2017).</p> <p>Professional development can impact the extent to which a staff member engages with new technologies.(Vu et al, 2014)</p> <p>Professional development can improve staff confidence when using new technologies. (Vu et al, 2014)</p> <p>The availability of professional development</p>

		<p>courses pay a crucial role in determining the success of the introduction and use of a new and emerging technologies in a school. (Disney et al, 2013)</p>
<p>Staff perceptions of the advantages and disadvantages of the use of the iPad in the classroom</p>	<p>An (2014), McConatha et al (2013), Kats (2013), Henderson and Yeow (2012), Berge and Muilenburg (2013)</p>	<p>Disadvantages included the school network lacking the required infrastructure to support the iPad (An, 2014)</p> <p>The iPad could sometimes be used by the pupils to play games instead of taking part in the lesson (McConatha et al, 2013)</p> <p>It is sometimes difficult to keep track of what all of the pupils are doing on the iPad (McConatha et al, 2013)</p> <p>Some teachers were unsure as to the ways they could integrate the iPad as part of their pedagogy. (Kats, 2013)</p> <p>Advantages included the iPads making lessons more engaging and exciting for pupils. (Henderson and Yeow, 2012)</p> <p>The use of the iPad can replace printed resources and as a result of this can enable schools to become more eco-friendly. (Berge and Muilenburg, 2013)</p>
<p>Pupil perceptions of the advantages and disadvantages of the use of the iPad in the classroom</p>	<p>Heinrich (2015), Beauchamp (2016), Burden et al (2012), Gliksman (2014), Silton (2015), Clark and Luckin (2013), Henderson and Yeow (2012).</p>	<p>Many students perceived the iPad as easy to manipulate. He noted that this often had the effect of raising self-confidence. (Heinrich, 2015)</p> <p>A large number of students surveyed found the iPad to make lessons more</p>

		<p>engaging and enjoyable. (Beauchamp, 2016)</p> <p>The iPad inspired some pupils to work independently. (Burden et al, 2012)</p> <p>The iPad made learning more accessible to physically disabled pupils. (Gliksman, 2014) (Silton, 2015)</p> <p>Some pupils found the iPad to be distracting.(Clark and Luckin, 2013)</p> <p>The iPad is not ideal for writing long essays, reports or any activities which required large text entries. (Henderson and Yeow, 2012)</p>
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Figure 2.1: Table summarising the key issues

3. Methodology

3.1 Introduction

This research project sought to explore the perceptions that staff and pupils held regarding the introduction and use of iPads and cloud services in a school setting. It was conducted in an Inner London Primary school across Key Stage 1 (pupils aged 5-7), Key Stage 2 (pupils aged 7-11) and Early Years (pupils aged 3-5). The aim was to complete the field research over the period of one academic year. One of the primary aims of this chapter was to set out the theoretical framework, methodology, methods and epistemological stance that was utilised during the study. The chapter starts by identifying what my ontological and epistemological perspectives are and how these have influenced each step of this research project. Further to this, I discussed how the ontological and epistemological perspectives acted as a lens through which the pupils and staff interact with the technologies and, with each other, as well as the ways in which they formed their perceptions. This chapter also sets out the theoretical perspective adopted as a result of the epistemological influences. This theoretical perspective guided me in establishing the methodology and the methods suitable for research of this nature. The initial preparation for the study and the ethical considerations are also discussed in this chapter.

3.2 Ontological perspective

Within this interpretivist ontological position, there are a number of assumptions made. These include the assumptions that an individual's reality is indirectly constructed and is based on their own interpretation, individuals are able to interpret and create their own understanding of experiences and events and that it is possible to have multiple perspectives on any given event (Crotty, 1998). I accepted that due to

adopting this ontological stance, the ability to generalise the findings of this research project may be limited due to the distinctive nature of each of the events and interactions recorded. Additionally, because the interpretivist approach does not make use of the typical scientific verification processes and procedures that positivist approaches use, this too limited its ability to be generalised to other seemingly similar situations.

3.3 Epistemological perspective

Epistemology, according to Crotty (1998), is the *“theory of knowledge embedded in the theoretical perspective and thereby in the methodology”* (p.3). Maynard and Purvis (2013) note that epistemology looks at *“providing a philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that they are both adequate and legitimate”* (p.10). I took this into consideration when looking at the vast array of epistemologies available. After consideration of the different epistemologies, I believe that constructionism was most closely aligned to the focus of this study, which sought to find the perceptions of staff and pupils regarding the introduction and use of iPads and cloud services at the school. Furthermore, I believe that it is appropriate for this study as it advances that meaning is not a phenomenon that is discovered but instead, it is constructed by the individual (Crotty, 1998).

It is reasonable to argue that perceptions, just like meaning, are constructed by the individual and do not exist without the mind and interactions. This construction of meaning is why other epistemologies such as objectivism were deemed not to be an appropriate fit for this research project. Objectivism, according to Rand (1990) is an epistemological perspective where things are seen to exist completely independently of experiences and consciousness. More specifically, that these things or objects have

meaning that resides within the object itself. I believe that this is not an appropriate fit for this study, as objectivism is the epistemology underpinning positivism.

Within constructionism, different individuals construct meaning in their own unique ways. In the same way, different individuals construct their own perceptions in their own unique ways. This holds true even in relation to the construction of their perceptions on the same phenomena.

Subjectivism as an epistemology looks at the meaning that the individual ascribes to a phenomenon. This at first glance may have appeared to be appropriate to this research project but upon closer inspection, subjectivism did not take into account the way in which perceptions and meaning are formed from the interaction that the individual has with the particular phenomenon. Subjectivism, according to Crotty (1998), completely denies the existence of any form of objective reality. Reality is seen as a product of the combination of cognitive and conscious views possessed by the individual. In contrast, constructionism does not reject objective reality but instead allows us to look at the cognitive elements associated with an individual forming meanings and perceptions. As a result of this, I argue that constructionism is most appropriate as an epistemological stance.

Whilst Constructionism was used as the epistemological stance, I made use of the constructivist paradigm in this research project. Ackermann (2001) argues that the combination of both constructionism and constructivism can “*enrich our understanding of how people learn and grow*” (p.1). Moreover, Ackermann (2001) notes that constructivism gives insight into children’s views and perceptions can change over time. In contrast, Constructionism looks at the process where new knowledge is constructed by the learner (Ackermann, 2001 p.1). Ackermann (2001)

in further support of the combination of both constructionism and constructivism states, *“Integrating both perspectives illuminates the processes by which individuals come to make sense of their experience, gradually optimising their interactions with the world”* (Ackermann, 2001 p.1).

Taking a moment to focus on the constructivist paradigm. It is clear that the constructivist paradigm takes an individualistic approach as it seeks to focus on how the individual makes sense of the world around them and then uses that knowledge gained to interact with the world that they exist in. In some ways it could be argued that constructivism may be a variant of interpretivism as it focuses highly on the individual and the influence or effect that sociocultural factors can have on the individual. In the case of this research project, I am chiefly concerned with the influence or effect that the introduction and use of iPads and cloud services have on the perceptions of individuals from the social group being studied.

Moving onto an epistemological perspective, it could be argued that constructivism may be relativistic in nature. This may be the case in the sense that knowledge is reflexive as it focuses on the individual or individuals that possess the knowledge. Duffy and Chenail (2008) note that a consequence of the reflexive nature of knowledge is that it offers *“maps of meaning that individuals graft onto their experiential world”* (p. 29). When looking at it from this perspective, it is clear that the key objective of this research project is to look at the ways in which the individuals being studied are able to make sense of the various events that they experience in their day-to-day lives. As a result, this perspective offers the researcher the chance to understand the views of the participants being studied. This is in stark contrast to the positivism paradigm which instead uses data collected to formulate

maps of meaning. As a result of this, constructivism is relevant to this research project as it sees the individual as the creator of his or her own knowledge. This being said, there exists within constructivism several schools of thought. One of those schools of thought, advanced by Vygotsky (1986), is the Social Development Theory. This theory suggests that the individual's consciousness and cognition exist as a consequence of the process of socialization. Further to this, it argues that the process of social interaction comes before development. In some of his work, Vygotsky's (1986) key focus was often the relationship between the socio-cultural elements of the society within which the individual exists and the individual. Furthermore, Vygotsky (1986) looked at how these relationships influence the ways that the individuals behave and how this relates to one another when sharing experiences with other individuals in the same society. More so, it explains how individuals learn through the process of discovery, which he claimed, is done by the individual inquiring about the various aspects of their environment. It is this inquiry that leads to the use of sense-making to resolve a number of problems faced whilst existing in the society.

It is within these problem-solving situations, where the learner or individual has to make use of knowledge gained from previous experiences in order to learn new truths and knowledge, that the learner will adopt a new learning process which allows opportunities for new learning. Focusing even more heavily on the individual, there are other schools of thought that present even more individualistic concepts and theories. Some of these researchers include Bruner and Piaget. Papert (1999) noted that Piaget advanced the idea that children were not merely 'empty vessels', which were to be filled with facts and knowledge (p.105) but they came with their own idiosyncrasies. Papert further noted that Piaget held the idea that children were instead creators or builders of knowledge, they were "*little scientists who are constantly*

creating and testing their own theories of the world” (Papert, 1999 p.105). When this perspective was taken into account, I feel compelled to utilize a methodological approach involving interpretivism and constructivism.

3.4 Theoretical framework

When carrying out a research project, as stated previously, we bring a variety of assumptions to the research project. In order to set out these assumptions, a theoretical perspective or framework was necessary. In terms of looking at the perceptions and our attempt to gain an understanding of these perceptions, issues of language, communication and intersubjectivity arise. Therefore, the use of a theoretical perspective assists both the researcher and the reader to establish the *“view of the human world and social life within that world, wherein such assumptions are grounded”* (Crotty 1998 p.7). Symbolic interactionism met the requirements of this research project as well as it took into consideration the ways in which the individuals not only interacted with each other but also the ways in which they interacted with the various phenomena in their environment. It also looked at the meanings and perceptions that the individuals within a social group create for themselves. As Crotty (1998) puts it, it is *“the notion of being able to put ourselves in the place of others – the very notion we have already expressed in detailing our methodology and have catered for in the choice and shaping of our methods”* (p.8).

Mackenzie and Knipe (2006) argue that the theoretical framework is often referred to or seen as a paradigm. This means that it has a profound influence on both the interpretation of knowledge and the way in which it is studied. A paradigm, according to Mackenzie and Knipe (2006), is a group of assumptions, propositions or ideas that are related in some way and work to create a link between logical thought and the

research. Following on from this idea, it is therefore possible to argue that these paradigms are able to play a major role in the validation of interpretations, theories and analyses. Further to this, given that it plays such a major role, it can be argued that these paradigms whilst they can be justified, can also be criticised and challenged. As a consequence of this, it was key that I was not ignorant to the possible relevant limitations that may have existed. Some examples of limitations include the fact that symbolic interactionism fails to take into account the impact of some external factors such as class structure and the ways in which such an external factor can influence the individual's view of the world.

3.5 Methodology

Within the theoretical perspective of subjective interactionism, I argued that an ethnographic methodology was the best fit for this research project. This was because an ethnographic inquiry looks to discover and gain an understanding of the meanings and perceptions that the individuals who are participating in the research hold. Furthermore, an ethnographic methodology enables the researcher to better understand the perceptions that the individuals construct in relation to their social environment and the culture of the environment.

Keeping in mind that the key objective of this research project was to determine the perceptions of the staff and pupils regarding the introduction and use of iPads and cloud services in an inner London primary school. My primary aim when developing the research questions was to get an in-depth understanding and description of not just the perceptions, but also the experiences of the individuals, their reactions, their successes and their failures where the use of these technologies were concerned. I felt that in order to do this, a qualitative methodology was needed. Further to this, authors

such as Silverman (2001) advanced that for research that seeks to gain an in-depth understanding of a social situation and where there is very little literature available on the subject matter, a qualitative approach is most suitable as it gives rich and thick descriptions (Geertz, 1973; Thomas, 2013) which assists the researcher to gain a clearer understanding of the social situation that is being researched.

Due to the ontological position that I adopted for this research project, I used a qualitative approach. Due to this position, I also held the view that I was unlikely to experience the sort of reality that approaches such as positivism would have hoped to uncover. In light of this, I believed that many social constructions were offered by the various individuals who took part in this study (Denscombe 1998). It was within this ontological position that I noted arguments presented by Cheek (2000), who stated that reality possesses a plurality, which is difficult to effectively condense into a totalising, all-encompassing theory. I therefore accepted that an ethnographic approach may not offer a representative, complete and comprehensive picture of reality. In this research project, I wanted to understand the perceptions that staff and pupils hold on the introduction and use of iPads and cloud services in an inner London primary school. More specifically, I wanted to understand and document the social constructions, through observation and engagement with the staff and pupils participating in this research project. Researchers that opt to use a qualitative approach often do so due to the desire to gain data that is thick and descriptive (Geertz, 1973). According to Denzin and Lincoln (2003), a qualitative approach to research sets out to gain a deeper understanding of the experiences of the individuals and the most natural form of their perspectives.

Continuing on the idea of understanding, qualitative research methods offer rich and thick data which enable the researcher an opportunity to gain a deep understanding of the phenomena that they are researching. However, in order to acquire this depth of understanding, a suitable research design must first be established, which must include a variety of methods for data collection (Silverman 2001). These can include interviews, focus groups, observations and documentation. Additionally, when these approaches were used, the utmost care was taken to avoid the imposition of my own views and potential biases on the data that was collected. In other words, the utmost care was taken in order to gain an understanding of the participants' perspectives through the use of their cultural norms and language, instead of trying to use foreign concepts and approaches and imposing them on the information gained (Blaikie, 2000). It was with this in mind that I argue that I held a central role as the primary and sole data collector and as a consequence of this I was therefore a part of the social group that I studied (Hammersley and Atkinson 1995). Being a part of the social group being studied brought its own implications. This was discussed in greater depth later in this chapter.

3.5.1 Ethnography as my methodological approach

Hammersley and Atkinson (1995) define ethnography as *“a particular method or set of methods. In its most characteristic form it involves the ethnographer participating, overtly or covertly, in people’s daily lives for an extended period of time, watching what happens, listening to what is said, asking questions –in fact, collecting whatever data are available to throw light on the issues that are the focus of the research”* (p.1). Adding to this Williams (1995) argued that ethnography is not only a philosophical or theoretical framework, but it also a means of collecting data. Further,

Williams (1995) contended that ethnography takes into consideration the ways in which the individuals of a particular society interpret the various experiences that they have within that society or group. Whilst I argued that this was quite beneficial, other commentators such as Savage (2000) argue that ethnography as a methodology does not have the necessary epistemological foundation or backing and as a result of this, it lacks a definition as to what legitimate and genuine knowledge is where the development of the methodology is concerned. Savage (2000) claims that there still is not a universally accepted definition of what ethnography actually is. In light of this drawback, Savage (2000) points out that ethnography is effective as a methodology when a key part of answering the research aim involves gaining an understanding of the cultural practices, beliefs and behaviours of the social group being studied. Consequently, I argued that the use of ethnography was crucial for this research project as I sought to determine not only the perceptions of the staff and pupils on the introduction and use of iPads and cloud services, but I also sought a deeper understanding of how they engaged with the technologies, their successes, their failures, their thoughts on the advantages and disadvantages and how they felt the introductory process could be improved.

Adding to this, Hammersley and Atkinson (1995) contended that one of the key benefits of ethnography as a methodology was that it places the researcher in an advantageous position whereby they are privy to information about the inner workings of the culture of the society being studied, the various behaviours, norms and values. They add that this is achieved through a form of participant observation where the researcher then follows up their observations with a series of questions about the behaviours they observed via interviews, thus giving the researcher a rich detailed account of the behaviours in its natural setting. In addition, it offers an

opportunity to clarify some of the behaviours through formal or informal interviews. Creswell (2003) adds that the use of ethnography as a research method offers the researcher a great degree of flexibility. It is important to note that ethnographic research must occur in a naturalistic setting in order for the results to be valid. If it is conducted in an artificial laboratory-like environment, the researcher is likely to only gain somewhat contrived results, which would defeat the purpose of the study.

When I approached this study, there were also a number of limitations that I was aware of. The first key limitation was the issue of establishing validity. LeCompte and Goetz (1982) point out that scientific approaches to data collection typically follow canons of validity and reliability. However, they noted that ethnographic approaches typically do not do this. More specifically, validity according to LeCompte and Goetz (1982) establishing validity requires the researcher to “*determine the extent to which conclusions effectively represent empirical reality and whether constructs devised by researchers represent or measure the human experience that occur*”(p.32). Hammersley (2013) added to this by pointing out that it can be difficult to ascertain the extent to which ethnographic accounts can “*legitimately claim to represent a social reality*” (p. 2).

LeCompte and Goetz (1982) add that validity consists of both internal and external validity. Internal validity looks at the extent to which the observations made by the researcher are representative of reality. However, external validity looks at the extent to which the claims and representations made by the researcher can be compared across groups. In my effort to address this limitation, I conducted interviews and focus group sessions in addition to collecting data by participant observation. Despite my use of multiple methods of data collection, I cannot argue its validity based on the use

of multiple methods of data collection. I argue instead that the validity of my research finds its roots in the interviews that I conducted with the teachers, other staff and pupils, the focus groups I conducted and the participant observations that I undertook. These multiple methods worked to produce the rich, thick data and provided multiple perspectives that in turn influenced my interpretation of the data during the analysis phase. As stated previously, I chose to adopt an interpretive stance in exploring the ways in which the staff and pupils perceived the introduction and use of iPads and cloud services at the school.

3.5.2 A historical look at ethnography

Ethnography was believed to have originated from British social anthropology, American cultural anthropology and the Chicago School of Sociology. Merriam and Associates (2002) describe ethnography as an “*inductive investigative strategy*” (p.179). Malinowski (1992) who is sometimes considered one of the founding fathers of contemporary ethnography, in his early works wanted to gain a better understanding of a variety of vanishing cultures by living amongst them and sharing in their everyday social experiences. From the thick and rich data that emerged from such studies, there is now much more data available about the way in which some of these cultures lived, their various rituals that give readers a clear understanding of these cultures. In the 1914 study entitled, ‘Argonauts of the Western Pacific’, Malinowski pointed out that there were a great number of societies that could be researched as they would not be in existence for much longer. This being said, commentators such as Brewer (2000) hold that these studies were carried out and the data analysed by using the then dominant positivist paradigm. A consequence of this according to Tedlock (2003) was that the findings tended to present the findings in a

colonialistic manner. In spite of this however, the early examples of ethnography still serve as a reference which can aid current day researchers to gain a better understanding of what ethnography actually is. Malinowski put a profound example of this forth when he argued, *“One of the first conditions of acceptable ethnographic work certainly is that it should deal with the totality of all social, cultural and psychological aspects of the community, for they are so interwoven that not one can be understood without taking into consideration all the others”* (p.xvi)

Moving a few decades forward to the 1980s, we come to a study of Italian-American gangs carried out by Whyte (1981). This study was entitled, ‘Street Corner Society’. In this study, Whyte was able to gain information through a trusted informant only known as ‘Doc’. Through this informant, Whyte was able to gain a better understanding of the inner workings of the group, the cultural values and norms. Denzin and Lincoln (1998) contend that early forms of ethnography sought to research cultures and societies and gain insight into the inner workings of these cultures. Brewer (2000) therefore concluded that ethnography as a research methodology offered a means of observing the behaviours and interactions that individuals have in their most natural context. This according to Brewer (2000) is not easily achieved by using more scientific, quantitative methods of data collection.

3.5.3 Naïve Realism and Anti-Realism, finding a compromise

In the first chapter of this thesis, I briefly touched upon the concept of naïve realism and anti-realism and how I ended up utilizing Hammersley and Atkinson’s (1992) theory which I felt was a just compromise between naïve or direct realism. This

compromise was called 'subtle realism'. Subtle realism offers the researcher an opportunity to adopt an approach that according to Hammersley (2013) "*retains from naïve realism the idea that research investigates independent, knowable phenomena. But it breaks with it in denying that we have direct access to those phenomena, in accepting that we must always rely on cultural assumptions, and in denying that our aim is to reproduce social phenomena in some way that is uniquely appropriate to them. Obversely, subtle realism... [recognizes] that all knowledge is based on the assumptions and purposes and is a human construction, but it rejects [the]... abandonment of the regulative idea of independent and knowable phenomena. Perhaps most important of all, subtle realism is distinct...in its rejection of the notion that knowledge must be defined as beliefs whose validity is know with certainty.*" (Hammersley 1992 p.52, Hammersley 2013 p.17).

This means that unlike naïve realism, the ethnographer is required to be more aware and take greater consideration of the dangers that exist when using cultural assumptions. This can lead the researcher to draw inaccurate conclusions. In simpler terms, just because the researcher lived amongst the group being studied; this does not automatically mean that they are able to derive completely accurate conclusions about phenomena that they observed. Geertz (1988) points out,

"The ability of anthropologists to get us to take what they say seriously has less to do with either a factual look or an air of conceptual elegance than it has with their capacity to convince us that what they say is a result of their having actually penetrated (or, if you prefer, been penetrated by) another form of life, of having, one way or another, truly 'been there'. And that, persuading us that this offstage miracle has occurred, is where the writing comes in" (pp 4-5).

As a consequence of this, naïve realism can be argued to have a philosophical position that is neither sustainable nor is it strong (Hammersley 2013 p.52). Looking at the other end of the spectrum, anti-realism, researchers such as Banfield (2004) point out that the anti-realism approach adopts a relativistic approach and rejects the idea that the ethnographer's observations and the interpretations of those observations are valid. Hammersley (2013) compares the two and offers subtle realism as a viable alternative to both extremes by arguing,

“We can maintain a belief in the existence of phenomena independent of our claims about them, and in their knowability, without assuming that we can have unmediated contact with them and therefore that we can know with certainty whether our knowledge of them is valid or invalid. The most promising strategy for resolving the problem... is to adopt a more subtle form of realism” (Hammersley 1992 p.50).

Having considered this, I felt that the approach of subtle realism was the best fit for this research project as it enabled me to accept a position that was between naïve realism and critical realism.

In the case of this research project, I sought the perceptions of the individuals involved. Hammersley and Atkinson (1995) put forth that the primary focus of ethnographic study is the perspectives of the individuals that are part of the study and that the research of an ethnographer occurs within the everyday lives and interactions of the individuals involved in the study. Brink and Edgecombe (2003) point out that one of the main advantages of ethnography is that ethnography places the researcher in a position whereby they are able to identify the various socio-cultural norms and behaviours. This is done through the process of taking part or participating in the everyday lives of the individuals being observed and then clarifying their

understanding of all they have experienced through the process of interviewing their peers (p.1028).

3.5.4 Ethnography and Participant observation

One common misconception according to O'Reilly (2009) is to confuse the idea of fieldwork with that of ethnography or participant observation. Building upon that point, O'Reilly goes on to specify that, "*ethnography is a methodology, participant observation is a method and fieldwork refers to the period of primary data collection that is conducted out of the office or library*" (O'Reilly, 2009 p.2). However, in the case of ethnographers, the term 'field work' refers to the period of time where the ethnographer is physically situated in the field in which they are carrying out the study. This fieldwork according to O'Reilly may consist of a number of decisions where the type of approach used is concerned. This may include determining whether the research should be carried out overtly or covertly, how to gain access to the group to be studied, how to build rapport and so forth. The carrying out of research in the field may consequently involve observation, the collection of relevant documents and paperwork, interviewing individuals or groups of individuals, the participation of the researcher, the use of photography and audio or video recordings in order to collect rich data in the field. As stated previously in this chapter, I opted to carry it out overtly as I already had access to the group and I already had built up a rapport with the individuals involved.

Whilst it is possible to argue that ethnography and participant observation are very similar, commentators such as Ersser (1997) conducted an ethnographic research project whereby the perceptions of individuals on nursing were gained through the exclusive use of interviews. As a consequence of this, there was limited information

offered on the setting within which these perceptions were formed as this was done without the use of participant observation. Despite not being conducted in an education setting, I still felt what Brink and Edgecombe (2003) argued was most relevant to my research project.

They argue, "As any nurse can tell any researcher, spending time on a hospital ward observing what nurses do 24/7 and asking about what is being observed, while it is being observed, is a far more valid way to discover what nurses do than to create a focus group of nurses, or interview three of them, and ask them what they do when there are working...a culturally distinct population does not, in itself, make the research an ethnography" (pp. 1028-1029).

I concurred with the above statement and opted to be a participant observer and I asked questions about my observations in this research project.

3.5.5 This research project's ethnographic approach

As previously stated, I opted to use an ethnographic approach for this research project as it allowed me to participate in the everyday lives of the individuals I was studying and to take part in the process of collecting and analysing the information that I collected whilst participating (Aamodt, 1982). Savage (2000) adds that one of the key strengths of ethnography is that it places the researcher in a position whereby they are able to gain a first hand perspective which makes the identification of social and cultural behaviours possible via participant observation. The researcher is then able to use this first hand immersive experience to then explore the meaning and reasoning behind the behaviours that the individuals being observed exhibit. The questioning of the behaviour exhibited by individuals may be carried out via interviews: a highly

detailed means of beholding in its natural context the experiences that members of the social group being studied have (Hammersley and Atkinson 1995).

Commentators such as Savage (2000) argue that employing ethnography as a research method is most advantageous when rich and detailed information and data about the beliefs and practices of the individuals of the social group being studied is required to answer the research questions. It is such features that make ethnography most suitable to my research project. When determining the suitable ethnographic approach, Hammersley (2016) notes that three key methodological principles must be taken into consideration. These are Naturalism, Understanding and Discovery.

3.5.5.1 Naturalism

In the principle of naturalism, the perspective is taken that the research being carried out should strive to capture the essence of ‘naturally occurring’ human behaviour. Hammersley (2016) points out that this is only possible by having hands-on contact with the human behaviour in its natural environment. Further to this, he notes that the results of experiments and research carried out in artificial settings and the inferences made from the findings of these experiments do not allow for the researcher to “*capture the character of naturally occurring human behaviour*” (Hammersley 2016 p.8). This according to Hammersley (2016) is one of the key reasons why ethnographers choose to conduct their research projects in a ‘natural’ environment. In order for an environment to be deemed a ‘natural’ environment, Hammersley (2016) argues that its existence must be independent of the research and must not be an environment that was created especially to meet and cater to the needs of the research project. Further to this, Hammersley (2016) noted that prior to carrying out the research project, the researcher must make arrangements so to minimize their effects

on the actions, responses or general behaviour of the individuals that are being observed or studied. The effect that the researcher has on the parties or individuals being observed is known as the Hawthorne effect. In the case of this research project, I attempted to reduce the effect of my presence by carrying out most of the interviews as informal and casual discussions where the members of staff felt like they were just having a casual chat with me. Where the pupils were concerned, I also carried out interviews with them in a manner that was relaxed and informal. I also argue that due to the fact that I was already an accepted member of staff at the school, the staff and pupils did not perceive me as a stranger and were thus able to more easily open up to me. Further to this, where the Hawthorne theory is concerned, I argue that as both the staff and pupils were accustomed to my presence, they were unlikely to change their behaviour due to my presence. Also, when making my observations, I did not sit in a corner or make it obvious that I was observing. Instead, I opted to take advantage of my already established position in the social group and moved around and integrated with the pupils and adults as an additional helper. Despite adopting this role, I was careful not to interfere with the conducting of the lesson.

The idea behind the minimisation of the impact of the researcher on the environment and the individuals in it is so to enable the findings of the research being carried out to be applicable to other similar environments that are yet to be researched. Furthermore, the idea that an environment is natural makes the implication that all of the processes and occurrences that happen in this environment be it social or otherwise, must therefore be explained in a manner that is relevant to the context within which these events or processes happen. Going back to the point of the impact of the researcher on the environment that they are researching, whilst it may not be possible to completely remove the impact of their presence, the idea is that they should aim to reduce the

impact of their presence and behaviour on the environment as much as possible. In this manner the idea of the use of participant observation as an ethnographic method can be deemed to be quite useful. Goetz and LeCompte (1982) also echo the point that when an ethnographic study is carried out, it should be done in a setting that is natural in the sense that it is representative of the reality of the culture, life, experiences and circumstances of the participants. This can result in significantly more accurate results than a study that is carried out in an artificially created laboratory like setting. Moving onto the point of external validity, it is possible to argue that the objective behind external validity where ethnographic studies are concerned is to reveal knowledge that is of an ideographic nature.

In the case of this research project, I sought to capture the perceptions of the staff and pupils in its most natural form. More specifically, I did not want my presence or my actions to have an impact on what the responses and behaviour of the individuals that took part in this study. Admittedly, it was not actually possible to completely negate the effects of my presence. Hammersley and Atkinson (1995) also argue that it is not possible to completely negate the effects of the researcher's presence in the social group.

3.5.5.2 Understanding

In the principle of understanding, the key idea here is the argument that somehow the behaviour, actions and choices made by humans are different from that of other creatures and inanimate physical objects. More specifically, the actions and responses of humans are actually as a result of the human or humans in question interpreting the stimuli and then from that interpretation forming a response to the stimuli. This according to Hammersley (2016) is done as opposed to the idea that humans

somehow only use responses that they have previously learned exclusively as a means of responding to stimuli in their environment. Whilst it is possible that the human may use a learned or fixed response as a reaction to a given stimuli in their environment, it is also possible according to Hammersley (2016) that humans can also interpret the stimuli that they come in contact with and then generate a response which had not previously been learnt. Hammersley (2016) argues that this argument “*reflects a complete rejection of the concept of causality as inapplicable to the social world, and an insistence on the freely constructed character of human actions and institutions*” (p.8). However, the social aspect of any given society contains casual relations that are notably different from the ‘mechanical’ causality that is usually part of physical phenomena. Further to this, he notes that if we are to look at human behaviour from this perspective, it is vital that the researcher acquires a sound understanding of relevant cultural perspectives upon which the behaviour originates from. A sound understanding of the relevant cultural perspectives is crucial as without it, the researcher may find themselves frequently confused by much of what they see and hear. In summary, the theory of understanding sets out that the behaviour that is observed by the researcher and then analysed with consideration given to the cultural context within which the data was collected.

According to Bargiela-Chiappini and Gotti (2005), the researcher must attempt to gain an understanding of the culture of the social group being studied prior to attempting to explain or analyse the behaviour of the individuals within the group (p. 318). In the case of this research project, due to the fact that I was already a member of the social group, I already had an understanding of most of the cultural norms and values within the group. However, despite already being a member, what swiftly became clear to me, was that whilst I was aware of a number of these themes, I did

not actually understand them as well as I thought I did. It would appear that in my role as a teacher, I was looking at the various phenomena instead of actually looking into it. By this, I argue that I was passively aware of some of the themes, but I didn't understand them as well as I thought I did until I started operating as a participant observer and took a closer look. A great example of this was that I knew the pupils in my class liked the iPad, but I did not really understand the reasons why or how they perceived it until I started operating as a researcher. So I concur with Hammersley (2016) and state that gaining an understanding of the environment within which the study is taking place is a necessary prerequisite to successful analysis of the data acquired.

3.5.5.3 Discovery

In the principle of discovery, Hammersley (2016) argues that ethnographic research projects should be based on discovery or inductive in nature. This means that the research should become progressively more focused as the research project goes on. This is as opposed to setting out from the beginning with a specific hypothesis to be tested. In the case of my research, as stated previously, I started with a broad focus and as the data collection progressed, it became more focused as I developed a better understanding of the social group and more themes became apparent to me. As a result of the discoveries I made as I collected data, this helped me to sharpen my focus on the key themes. This is in stark comparison to the beginning of my data collection where I recorded everything and anything that I came into contact with in the environment.

Other commentators such as Van Maanen (1979) note that the core analytic purpose of an ethnographic study is to essentially expose and show the multitude of ways

individuals within an environment are able to gain an understanding of, interpret, respond and in other ways take control of their typical daily circumstances. In short, ethnography and ethnographic approaches offer the researcher a sound grasp of the ways in which the society being studied works.

This research project sought to present detailed descriptions of the perceptions and encounters students and teachers had with the introduction of iPads and cloud services in an inner London Primary School. The idea behind the research project was to attempt to immerse the reader into the life experiences of Year 2 students and school staff as they attempt to grapple with utilizing emerging technologies in order to achieve their specific goals in their everyday lives. This was possible as ethnography has the ability to offer rich and detailed accounts of the everyday social lives of small groups of individuals. These everyday lives can include the ways in which they engage with each other and objects such as emerging technologies, the covert and overt rules of the society, the interests and the activities that they engage in on a day-to-day basis. (Willig, 2003a; Wolcott, 1999; Parker, 2005; Frosh et al, 2003; Griffin, 2000). It is important to note however that the acquisition of such rich and detailed data is possible due to my active and on-going participation in the social environment that I was observing and my subsequent reports concerning all that I observed whilst being engaged. This level of immersion means that I was deemed to be an accepted member of the social group that I was observing and as such can give a first hand detailed account as to what it is like to be a member of the society being studied.

Further to this, carrying out an ethnographic study also allowed for macro analyses to take place and this in turn brings a greater understanding. Whilst it is true that social groups tend to possess particularities that are quite unique to the specific group being

studied, it is possible to argue that these societies are also constructed and socio-historically positioned. What this means is that this was an ethnographic study of the ways in which the staff and the pupils were able to make detailed descriptions of their engagement and grappling with emerging technologies in their everyday lives and also attempts to look at within a wider social context, their life experiences. Following this, the analysis of the data gained from the ethnographic research whilst not specifically looking to form a generalisation via the representativeness of the sample, was arguably relevant to other schools and pupils that exist in similar settings, be it by sharing similar social discourses or through existing in identical socio-historical contexts.

What makes ethnography unique and makes it stand out from the crowd of methodologies available is that it places a great emphasis on the idea of culture and the things that occur within a culture. This is so as ethnographic researchers typically study and observe a phenomenon or a cultural group which exists in its natural unaltered setting. Further to this, ethnographic studies mainly use observational data which is collected over an extended period of time (Pattillo-McCoy, 1999; Madison, 2005). As a result of this, ethnographic studies are able to give a report of the ongoings in a society that is significantly more nuanced than many other methods of collecting data. This data is typically rich and very detailed. Consequently, one of the key aims of this research project's approach was to acquire and analyse rich, highly descriptive and detailed data on the manners in which social meaning was portrayed (Saville Troike, 1989). Continuing on the point of ethnography. It is possible to argue that ethnography may actually be a way of generalising. As a result of this, it is quite different to the typical scientific standard models utilized by many researchers and more so in line with the type of approach used in the arts by researchers. As Peacock

(1983) notes, where an apt ethnographic research project has taken place, there will be sound literature and this results in the message being communicated not essentially via explicit statements of generalities but instead a sound portrayal or picture.

Carrying on from this point, Van Maanen (1979) noted that the core analytic purpose of an ethnographic study is to expose and show the multitude of ways individuals within an environment are able to gain an understanding of, interpret, respond and in other ways take control of their typical daily circumstances. In short, ethnography and ethnographic approaches offer the researcher a sound grasp of the ways in which the society being studied works. Carrying on from this point, Spradley (1990) argues that ethnography at its heart is really a study of tacit and explicit cultural knowledge. In the case of this research project, culture was defined as the knowledge that individuals of the society or group being studied use to make interpretations of all that they experience and then form behavioural responses which are guided by their interpretations. Returning to the point of tacit and explicit cultural knowledge, explicit cultural knowledge can be shared without great difficulty on a conscious level. However, tacit cultural knowledge is not as easily or readily shared. This is quite unfortunate as Spradley (1980) points out that a great amount of a society's culture is based upon tacit knowledge. As a result of this, it can be quite difficult for the researcher to gain tacit knowledge as the members of the society or group that is being observed and interviewed, possess this tacit knowledge but are often unable to share it or express it in a conscious manner which the researcher can then use. This forces the researcher to then listen in on responses in order to try to make educated guesses or inferences as to what an interviewee or observee knows by listening to what they say and through meticulous observation of their behaviour. In order to really gain a truly representative picture of the ongoings in the society or group being

researched, it is possible to argue that the researcher must therefore take part or participate as a member of the society as well as observe. In the case of my research, because I was the teacher of the class, I was already in an advantageous position as I was already an accepted participant. Spradley (1980) notes that one of the key benefits of participation is that it allows the researcher to experience the various events and activities in a manner that is direct.

Further to this, Spradley (1980) pointed out that it is this direct experience that allows the ethnographer to gain a real and truly representative feel as to how the group or society actually works from a first hand perspective. It is therefore possible to argue that it is this first hand experience of the culture and inner workings of the society that would enable the researcher to acquire tacit knowledge and data, which can then be used to produce research findings that are very likely to be accurate and representative of what the society or group being studied is actually like. This acquisition of tacit knowledge is what gives participant observation a huge advantage over other research methods such as focus groups, where researchers such as Morgan (1988) point out that data collection methods such as focus groups very rarely allow the researcher to tap into the wealth of knowledge that resides in non-verbal communication. Further to this, it is possible to argue that it is due to the researcher's lack of tacit knowledge that they may be limited in the amount of information they can gain from non-verbal communication. Additionally, Morgan (1988) goes on to note that the transcripts gained from focus groups as a result of this are often unable to offer anything more than the words that have been recorded.

3.6 Methods employed

Within ethnographic enquiry, the use of participant observation assisted me to see the various phenomena within the social environment from the perspective of the individual. Further to this, the use of participant observation enabled me to uncover the cognitive steps that the individuals within the social group took in order to create meaning and perceptions of the various phenomena around them. Once the data was collected through participant observation, the use of Symbolic Interactionism as a theoretical framework meant that there were a number of assumptions that I made. These assumptions were that the individual was seen to have a unique relationship with the social group that they existed in, behaviour was governed by self-concept or the way in which the individual saw themselves and that meaning was constructed through interaction and communication.

3.6.1 Strategy employed for sampling

Brewer (2000) puts forth the argument that the idea behind a sampling strategy is to gain a deep understanding. In this case, this research project was only carried out in one school where twenty-three members of staff and twenty-one pupils took part. I therefore argue that sampling should be about the richness of the data acquired as opposed to the amount of data acquired. Furthermore, as the sole researcher in this research project, having too much data from multiple sources would have made it substantially more difficult to carry out an in depth analysis of all of the data. This being said, it was noted that had I collected too little data, it would have made it difficult to spot and properly analyse the various themes that arose.

3.6.2 Implications of being an ‘insider’

As I was already a member of staff at the school within which this research project took place, there were a number of implications. Burgess (1991) notes that in participant observation, the researcher himself or herself is the key research tool for data collection. Consequently, Brewer (2000) points out that there is a need for the researcher to “*maintain a balance between ‘insider’ and ‘outsider’ status* (p.59). The outsider status is necessary according to Brewer (2000), as it enables the researcher to critically reflect on the phenomena that was observed. Further to this, I focused heavily on very specific events such as lessons and inset meetings and planning sessions with teachers which assisted me in gaining a first hand perspective of the ways in which the staff and pupils grappled with the technology for the first time within the school and their perceptions of them. As mentioned previously, I was already a member of staff and as a result of this I was already an insider prior to the commencement of this research project. Thomas (1993) notes that one of the drawbacks of already being a member of the social group is that there are some themes or phenomena that I may not notice or may take for granted. Further to this, there may be aspects of this social group that I may have become so accustomed to that I may not have noticed. However, it is possible to argue that I was not only an observer, but also a participant as I still carried on my role as a classroom teacher and a member of staff with the roles and responsibilities that came along with it.

Researchers such as Gold (1958) argue that participant observer runs the risk of forming relationships with the individuals being observed and this in turn can affect the clarity with which the researcher is able to critically evaluate their observations. This could be applied to my situation as I already have a relationship with all of the

individuals involved in this research project. This being said, other writers such as Williams (1995) argue that it is possible to have such relationships and still maintain the ability to hold onto reflexivity and critically evaluate the observations made.

Taking all of the above into consideration, I argue that regardless of whether I was already an insider or not, the length of time that the typical participant observer spends in the field, it was almost inevitable that friendships and relationships would have formed over time.

Hammersley and Atkinson (1995) argue that the participant observer should take an approach which is 'marginal' (p.112). What they meant by this was that the researcher should take up an approach which sets them in a position that is midway between close friendship and being a total stranger. Whilst I tried to do this with the staff, I found that it was in my nature to be on friendly terms with the individuals that I associated with on a daily basis. As a result of this, I must accept that there was a possibility that this may have had an impact on what I observed where the staff are concerned, the emergent themes that I noted and the ways in which I interpreted and critically evaluated the findings. Where the pupils were concerned, this was not an issue as I did not have a close relationship with them but instead that which a member of staff has with the pupils.

3.6.3 Field notes and recordings

For my field notes, I had a mixture of hand written notes, video and audio recordings. I aimed to record everything I observed regardless of whether I felt it would be interesting or relevant at the very start of the research project. As time progressed, I

became more focused with my recordings and notes as themes emerged and my focus became clearer. As I was a participant observer, I also engaged in informal discussions with staff and pupils as this helped me to gain a clearer understanding of their perceptions. This was done as it helped me to identify the key themes as they emerged.

3.6.4 The Criteria for inclusion

All of the staff members that consented to taking part in this research project were included. This included the head teacher, the deputy head teacher, the subject coordinators, most of the teachers and almost all of the teaching assistants. In an effort to obtain a variety of perceptions, I aimed to include as many staff members and pupils as possible. Of the pupils, I was able to get the consent of all of the pupils involved in this study from both the pupil themselves and their parents or guardians. Further to this, details that were unique to the individuals within this study were omitted so as to ensure that their identities remained fully confidential.

3.6.5 Methods and means of collecting data

In the case of this research project, I made use of three types of data collection. These were participant observation, informal conversations, focus groups and semi-structured interviews. Despite using four types of data collection, this research project initially started with solely participant observation as this helped in the focusing of the research project and it also helped the various themes to emerge. Once this had occurred, I was then able to perform the other three with the knowledge of the key emergent themes. As stated previously, the participant observation went on for one academic year with roughly 1092 hours of contact. Additionally, I also conducted 59

interviews and 17 focus groups. Both the interviews and the focus groups were done within the one academic year.

3.6.6 The use of participant observation in this research project

Jorgensen (1989) defines participant observation as a methodology that enables the researcher to, *“describe what goes on, who or what is involved, when and where things happen, how they occur, and why-at least from the standpoint of participants-things happen as they do in particular situations”* (p12). According to Munhall (2011), ethnographic studies typically use participant observation as their primary source of data. In this case of this research project, participant observation was the primary source of data. Further to this, as I was already a member of staff at the school for a few years prior to the commencement of this research project, I did not need to go through the process of becoming accepted by the group and taking time to become well acquainted with the culture, norms and values of the social group. Throughout this entire research project, I was always upfront with the individuals that took part. As a result of this, I argue that there was never a moment where this was a covert form of participant observation. All of the individuals involved gave their written consent and where children were concerned, I got their consent and the consent of their parents or guardians. Further to this, I made sure that they fully understood what I intended to do with the data that I collected.

As mentioned previously, I held two roles throughout this research project. I was a researcher and a member of staff. There were a few occasions where I experienced a conflict of the two roles. One prime example of this was that whenever the iPads and cloud services being used in a lesson did not function as they were supposed to or just didn't work at all. Normally, as a member of staff, I should endeavour to assist my

colleagues where possible, but as a researcher, one of the primary aims was to document the perceptions and experiences that the staff and pupils had when using these technologies. Due to the potential for my input to affect the way in which the staff and pupils would have manipulated these technologies, I was careful not to intervene and offer support whenever I saw that the staff were having problems with the iPads or the cloud services but instead I offered verbal support or claimed not to know what to do. However, this being said, there have been occasions where I have offered my own opinions in informal discussions, but I aimed to keep this to a minimum so to avoid influencing the responses offered by the staff and pupils. The ethical dilemma for me in these situations was that I had to decide between assisting a fellow staff member and collecting data for this research project. Had I opted to be of assistance to staff members during situations where they were experiencing difficulties with the iPads or the cloud services, this would impair my ability to make observations as to how they grappled with the technologies. As a result of this, I opted not to intervene whenever a member of staff or a pupil were experiencing difficulties with the technologies.

Through the use of participant observation, I was able to gain a clearer understanding of the various themes that were occurring and from there I was then able to have informal conversations with the staff and pupils. From that point, I was then able to focus the research project to the point where I was able to have focus groups and semi-structured interviews which helped me to gain a clearer picture of how the staff and pupils perceived and interfaced with the iPads and the cloud services.

The semi-structured interviews were carried out concurrently with the participant observation. The purpose of these semi-structured interviews was to further explore

emergent themes that became apparent during the process of participant observation. In other words, as emergent themes appeared during the participant observation process, I then used the semi-structured interviews to gain more information on the matter.

3.6.7 The use of semi-structured interviews in this research project

The key aim of this research project was to gain insight into the perceptions that the staff and pupils held on the introduction and use of iPads and cloud services in the school. Whilst participant observation and focus groups offered a lot of insight into this matter, it was the semi-structured interviews that really offered the staff and pupils an opportunity to give an in-depth account of their perceptions on the introduction and use of the iPads and cloud services in the school. Additionally, the use of semi-structured interviews helped me to confirm observations made as a participant observer. According to Mason (2002) semi-structured interviews allow the interviewer to gain a deeper understanding of the opinions, feelings and perceptions that the interviewee may have on complex matters.

The questions used in the semi-structured interviews were developed as with the assistance of the information gained from the participant observation. During the conducting of the interviews, I opted to record the interviews using a Dictaphone as opposed to having handwritten notes.

Brewer (2000) argues that the handwriting of notes during the interview process can be extremely helpful to the researcher. However, I felt that the handwriting of notes in the interview process was not suitable for a number of reasons. The first was that I

didn't want to make the interviewee uncomfortable and turn their focus to wondering what I was writing about them. Secondly, I wanted to focus completely on the interviewee, their body language and what they were saying. I would not have been able to do this if my attention was divided between listening to them and taking notes. Instead, I opted to use a Dictaphone and in some cases I used a camcorder. This was done with the permission of all of the individuals involved. Following the interviews, I transcribed the interviews and then analysed the data. The length of the interviews typically ranged from a few minutes to just under an hour. Prior to each interview, the interviewee was reminded that everything they said would remain completely confidential and that the recordings would be destroyed once the data was analysed and study and thesis completed. The staff interviews were all conducted in a private room in the school. The room in question had a lockable door and did not have any windows. Further to this, I tested the room to ensure that no one outside the room would be able to hear the conversations that went on inside of the room. In the case of the pupils however, I interviewed them during the morning, afternoon or lunch break in the classroom when it was empty with both the consent of their parents as well as the pupil themselves along with the consent of my head teacher.

3.6.8 The use of focus groups in this research project

Sprenkle and Piercy (2005) argue that focus groups are "*robust, flexible and qualitative procedures*" that can be used either on their own or in addition to other methods of data collection (p.96). Krueger and Casey (2014) add that focus groups need to be a set of meticulously planned discussions which must be designed in such a manner as to gain the perceptions that the participants hold. In the case of this research project, I sought to gain the perceptions that the individuals held on the

introduction and use of the iPad and cloud services in the school. Krueger and Casey (2014) add that it is important that focus groups are of a specific size and that the individuals within the group have all been selected because they possess characteristics that are relevant to the research topic. In this research project, I conducted a focus group with some of the members of staff and pupils in order to gain their perceptions on the introduction and use of iPads and cloud services in the school. These are discussed more in depth in Chapter 4.

3.6.9 The use of field notes

At the very beginning of this research project, I attempted to write down everything that I saw, heard and observed. Researchers such as Becker et al (1961) argue that this sort of approach is advisable and as the research project develops, the researcher will uncover sufficient data in order to begin to focus on observing the phenomena that is important to their research. Spradley (1980) adds that the field notes are an important part of an ethnographic record and should include detailed accounts of what the researcher observed in context. More specifically Spradley (1980) in O’Neal (2007) states, “*Field notes are the main portion of ethnography writing, and the language used to make field notes is a key to the writing of a good ethnography*” (p.188). Further to this, Spradley (1980) argues that it is absolutely necessary to keep organized and accurate records whilst conducting an ethnographic research project.

As a result of this, I used voice and video recordings along with my hand written notes. This assisted me in ensuring that I recorded absolutely everything that the individuals said. Further to this, Spradley (1980) adds that when making field notes, there is a risk of losing vital pieces of information when a researcher attempts to summarise what the individual said in their field notes. To address this concern, again

the use of voice and video recordings ensured that I always had a copy of what the individuals taking part in the study said and I could refer back to it and transcribe it whenever necessary. Furthermore, having a digital recording substantially reduces the chances of me misunderstanding what someone said.

Spradley (1980) puts forth three prerequisites for successful record keeping in an ethnographic study. These three principles are, the verbatim, the concrete and the language identification principles.

The verbatim principle sets out that the researcher must endeavour to keep a precise and exact record of what each individual said. Spradley (1980) notes that researchers are frequently tempted to summarise what was said due to time constraints, but this exposes them to the risk of misinterpreting what is being observed or said. In the case of this research project, as stated previously, I opted to make digital audio and video recordings so as to address this concern. As a result of this, the transcriptions in my Analysis and Findings chapter are in full verbatim.

In the concrete principle, Spradley (1980) notes the importance of having ‘concrete’ details in records of the ethnographer. These concrete details are descriptive details that fully describe the situation, thus giving the reader the ability to imagine what the situation was like. In the case of this research project, this was the primary focus of my handwritten field notes. Using digital audio recordings assisted me in gaining an exact record of what was said, but my hand written notes along with video recordings made it possible for me to create descriptive recounts of the events that occurred in my Analysis and Findings chapter.

The third principle is the language identification principle. In this principle, Spradley (1980) points out the importance of correctly recording which speaker is speaking, so that the researcher was aware at all times as to who was speaking. As previously stated, I used both digital audio and video recordings to assist me. However, I also made fieldnotes which were dated and timed along with the recordings. In the fieldnotes, I make notes of the timing in the recording and the pseudonym for the individual that is speaking or if multiple people are speaking, I make notes that help me to determine who was saying what and at what time they said it. To do this, I took on board the advice Spradley (1980) put forth about making condensed field notes (p.69). This is where the key words and terms are recorded along with brief summaries of important observations and events. This was an approach to recording field notes that I used to supplement the recordings. Once the school day was over, I then took the condensed notes for that day and expanded them with the assistance of the video and audio recordings. I was careful not to input my own opinions or feelings when expanding these condensed notes. In addition to taking field notes, I also kept a personal journal in which I recorded any problems or issues that arose throughout each day.

3.7 The handling of data

Due to the fact that this was an ethnographic research project, the thick data collected came from a variety of qualitative sources such as reflexive notes, digital audio recordings, field notes, my journal, video recordings, analytic notes and the transcripts from interviews. Such a vast array of sources meant that a great amount of thick, descriptive data was generated. Having this amount of data was initially

overwhelming to me until I realised that I needed to have an effective system in place to handle it.

The first step that I took was that I transcribed all of the data from the digital audio and video recordings into a word processor. Microsoft Word 2011 (Version 14.0.0) was used for this task. Once I had done this, I then, on the advice of my supervisors, used Inspiration 9 to create a mind map using the themes that I had uncovered. I used the data transcribed from both the digital audio and video recordings. In addition to these, I also used the data from my reflexivity notes, field notes, analytic notes as well as my journal when building the mind map in Inspiration 9. Once I was complete with transferring all of the data over to the mind map, I was then able to refine the themes that had emerged. Whilst it was a time consuming task that took several weeks to complete, I felt at the end of it that it was time well spent as it made it much easier to explore the themes, make codes and make relationships between the themes that had emerged. Now that I had the data collected in a more accessible format, the next section looked at how I analysed the data.

3.8 Analysis of the data

According to Hammersley and Atkinson (1995), a vital part of data analysis is the process of creating the research questions. This according to Hammersley and Atkinson (1995) is done by creating the research questions and then refining them as the researcher learns more about the particular phenomena that they are researching. As stated earlier on in this chapter, I started with collecting ideas with a general idea of what the research problems were before becoming more focused as I gained more data, a clear picture and a better understanding of the phenomena that existed in the site that I was studying. I found that the early broad and unfocused records really

helped me during the analysis process as it provided information which I may not have acquired otherwise. The analysis of the data was done simultaneously with the collection of data. I felt this to be necessary as the analysis of data allowed me to focus the research project. This approach was inspired by Mason (2002). Through the analysis of the data gained early on in the research, I was able to use the themes that emerged to guide and focus the data collection and thus it meant that each subsequent collection of data became more focused as it was informed by the last and this approach persisted throughout the entire data collection period (Brewer, 2000).

Hammersley and Atkinson (1995) point out that the process of collecting data from a natural environment can be a time consuming one and as a result of this, there may not be much time left for the in depth analysis of the data collected. In my situation, I was already a class teacher and I was collecting data during the school hours. As a result of this, I was able to then leave at the end of the working day and spend a few hours each evening analysing the data that was collected earlier that day. However, it must be noted that despite spending evenings after work looking over and analysing the data, a period of approximately one year after the research collection period was needed in order to thoroughly analyse the data that was collected. This was due to the fact that qualitative research methods such as participant observation produce such thick data, that it took me longer to analyse the data than it did to collect it. However, most of the analysis that was done during the process of collecting data was mainly focused on discovering emerging themes. I explore these themes in greater depth in the next paragraph.

I also found that returning to data that I had collected early on in the data collection process proved to be quite helpful. This was because I became more experienced as a

researcher and I gained a better understanding of the social group I was studying as time progressed. As a result of this, I was better able to spot themes that I was not able to spot earlier on in the data collection process as I was less knowledgeable about the social group and less experienced as a researcher. For this very reason, I regularly returned to data that I had previously analysed on a regular basis.

3.8.1 The validity and trustworthiness of qualitative approaches

Due to the nature of qualitative research approaches, a form of criteria upon which the qualitative data can be tested in order to determine its validity is necessary. However, researchers such as Hammersley and Atkinson (1992) point out that in the case of qualitative research, a universally agreed definition does not exist. Burnard and Naiyapatana (2004) state that in spite of the various arguments surrounding the trustworthiness of qualitative analyses, it is important to take into consideration the subjective nature of the process of analysing qualitative data and as a consequence of this, the only viable option for the researcher is to “*stand by his or her own category system*” (p.758). Continuing on the point of determining the validity, trustworthiness or truth of the qualitative analysis of data, Hammersley (1992) puts forth three arguments about this. The first is that the truth is a belief or set of beliefs in “*whose validity we are reasonably confident*” (p.50). This first argument then goes on to state that when taking into consideration beliefs that claim to be the truth, we tend to look at these beliefs in relation to our existing belief set concerning the world around us. The second argument holds that these phenomena that the beliefs are about will exist regardless of what beliefs we hold about them. This is because their existence is completely independent of our belief system. Thus Hammersley (1992) argues that

any beliefs or arguments put forth about these phenomena regardless of whether they are representative of reality or not, do not impact the reality of the phenomena in question and this consequently means that these beliefs cannot be deemed either incorrect or factual. Finally, the third argument is that qualitative social research is reflective of reality instead of reproducing reality. Further to this, Hammersley (1992) argues that the phenomena being researched can be viewed from a wide range of perspectives and perceived in a variety of ways. Taking these three arguments from Hammersley (1992) into consideration, the next logical step was to discuss the issue of validity where qualitative research is concerned.

3.8.2 The Validity of qualitative research

Hammersley (1992) offers a very apt definition of validity where qualitative research is concerned. Hammersley (1992) states, “*validity is...the truth: interpreted to the extent to which an account accurately represents the social phenomena to which it refers*” (p.57). What this means in summary is that there is not a definite unquestionable and undeniable truth when it comes to social phenomena as there are many different ways of perceiving and reporting the same phenomena. As a result of this, commentators such as Altheide and Johnson (1998) and Sandlelowski (1986) put forth that there are a number of things that can be done to greatly improve the validity of qualitative research. Some examples of these include offering rich, clear and deep descriptions of the phenomena being researched, offering an in depth explanation of the research methods used, the exact ways in which data was collected, the system utilised for categorizing and coding the information collected and explaining how the analysis of the data collected led the researcher to their conclusions. All of the above can improve the validity of the qualitative research. So from an in depth look at the

processes used to obtain the data, a third party can look at the research and determine the validity of it.

Another possible way of determining validity was also put forth by Sandelowski (1996) who argues that if a fellow researcher follows the research approach put forth in a piece of qualitative research and obtains similar results, then this can enhance the validity of it. However, for this to be possible, it would mean that the researcher must clearly state all of the methodological decisions that they made and their rationale for making such decisions. This would also apply to their decisions concerning the analysis of the data and their theoretical decisions. Whilst I understand the idea of following the methodology, I believed that due to the fact that people's perceptions are always changing, even if a fellow researcher were to follow my methodological, theoretical and analytical decisions, they still would not be able to replicate the data that I received. I argue this simply due to the fact that my research is unique to that specific time period, holds a unique position in history and time where the individuals held a specific set of perceptions which by the time another researcher attempts to replicate my research approach, the individuals may already have different perceptions of iPads and cloud services. Further to this, I am a unique individual and as a result of this, my presence in the social environment would have had a unique impact on the individuals being studied. In addition to this, I was already an accepted member of staff, so there was not a single point in time during the research project where any of the individuals would have perceived me as an outsider. It is when I take such thoughts into consideration that I argue that my conducting of this research project offers a unique set of results. Hammersley and Atkinson (1995) argue a similar point. They argue that when taking into consideration reflexivity, the idea or thought that it may somehow be possible to negate the effects of the researcher's

presence in the world that they are observing is not possible. This is the case because all researchers come to the research field with their own inherent biases, perceptions and understandings which will inevitably affect the way in which the data is interpreted.

Throughout this entire research project, I maintained a daily journal where I recorded my thoughts, feelings and observations. I found this particularly helpful when trying to focus the research. Pole and Morrison (2003) note that the diary or journal is a research tool. They add that it “*provides access to particular, parochial and time bound data*” (p. 58). By doing this, they argue that it allows the researcher access to a degree of personal detail that other methods are not able to offer. I would concur with this point as I found that making a record of my own personal feelings along with the data allowed me to uncover my own personal biases and prejudices. More specifically, it allowed me to see how my own feelings could possibly affect the research that I was carrying out. Further to this, my journal documented my own personal journey and was a means for me to bounce ideas off myself. Additionally, looking at it from the start to the end, I can see how I grew and developed as a researcher.

Returning to the issue of validity, Taft (1988) notes that validity is a measure of the quality of the conclusions drawn taking into consideration the means and processes utilised in order to arrive at those conclusions. Taft goes on to point out that to really find the precise definition and meaning of validity, the researcher must carefully consider the criterion of truth being utilised, as it is this particular criterion of truth upon which validity relies on. That being said, in the case of ethnography, Taft is of the belief that credibility is actually the best type of criterion. This is the case as the

validity of credibility can be improved upon and it depends heavily on the accuracy of the data collected and even more so on the manner in which it is presented to the target audience (Taft, 1988).

Carrying on with the point of validity, Goetz and LeCompte (1984) pointed out that where ethnographic research is concerned, the extent of internal validity is quite high. More specifically, they note that where participant observation is concerned, this type of research creates the opportunity for the researcher to continually carry out comparisons and data analysis. This is highly beneficial as it enables the researcher to continually refine the various constructs in an attempt to make sure that the reality of the situation concerning the participants and the constructed scientific categories always match. Throughout this research project, I regularly evaluated the data that I had collected and made comparisons between the various classes, pupils and staff members that I collected data from. Making comparisons helped me to observe recurring themes. My observation of these themes, in turn, assisted me to focus my data collection on these key themes.

Continuing on the point of validity, researchers such as Robson (1993) argue that having the individuals that were observed read and offer their feelings on the researcher's interpretation of the various phenomena may assist as the individuals themselves can validate the statements made by the researcher. Whilst getting the individuals to verify the statements may work for some types of qualitative research, I accept that in my research project, there existed the risk of having them offer changes in line with the image they wish to portray as opposed to their genuine perceptions. An example of this may be that a pupil or member of staff may feel that what they said or did may not be socially acceptable and as a result of this may seek to change

it. Hammersley (1992) adds that this sort of approach whilst it may be helpful in the analysis of the data, it isn't a means of validating a piece of research. In addition to the reasons set out above, another reason why this was not done in this research project was time. Due to time constraints and the number of individuals involved in this research project, I simply did not have the time to have all of the respondents validate the data I collected on them. Additionally, individuals came and left the school throughout the course of the data collection period, so as a result of this, it would not be possible to track down these individuals to get them to validate the statements. In addition to this, it would not be possible for me at this time to gain contact with the staff members and pupils that left during the course of this research project.

In an effort to address this, I used the responses, statements and thoughts put forth by respondents to guide my research. More specifically, the responses gained from individuals early on in the research project, I asked future respondents their thoughts on the subject matter. Whilst I argue that I was not hoping to get a consensus view on the various phenomena, I do feel that there is some, albeit small, degree of validation brought to the study when I can ask other respondents their thoughts on a previous respondents response. This being said, I was sure to reword it so that the previous respondent was in no way identifiable. Further to this, due to the relationship that I had with the staff and pupils, I was able to return to them several times throughout the data collection period to find out their views on other issues or even to ask them further questions on the same issue. Morse and Field (1996) argue that going back to respondents to get more information aids in the understanding of emergent themes and as a result of this, can improve the validity of the research. When talking about validity, a term that frequently comes up is that of triangulation.

Triangulation according to Beach (1997) in Stanfield II (2016) is “*the use of multiple aspects of the research process to cross-check research results instead of relying on one single aspect*” (p.276). As a result of this, researchers such as Hammersley and Atkinson (2007), Denzin (1978) and Bryman (2004), triangulation can work to increase the validity of the research as different methods of data collection are used. If these different methods give the same results or similar results, then it is reasonable to arrive at the conclusion that the likelihood of the results being valid is greater as compared to using only a single method of data collection.

Returning to the argument of subtle realism put forth by Hammersley (1992), I set out in this research project not to use just one means of data collection. Further to this, I did not set out to verify a single truth or argument, but instead I set out to determine the perceptions of the staff and pupils on the introduction and use of iPads and cloud services in the school. Regardless as to whether they negatively or positively perceived these technologies, I wanted to find out their perceptions. In the use of qualitative approaches to collecting data, triangulation is a widely accepted means of improving the validity of a piece of research in addition to being a means of acquiring an interpretive grasp, which I certainly felt applied in this research project. Upon successful completion of this research project, I intend to share the findings of the research with the individuals at the school.

3.8.3 Ethics and Ethnography

When considering the way in which ethnography works, it is not possible to do so without discussing the ethical aspect of ethnography. Hammersley and Atkinson

(1995) point out that as time progressed; each succeeding generation of ethnographers criticised their predecessors for their ethical approaches towards ethnographic research. Some examples of these criticisms included the lack of written, informed consent when covertly observing individuals. Brewer (2000) adds that many of these early ethnographers observed subjects without consideration for their privacy and without any form of compensation for the individuals being observed, instead only the researcher stood to gain in these situations. Aull Davies (1999) gave the example of an ethnographic study that was carried out in Vietnam which she argues was used by the US during the Vietnam War to aid them in determining where the most suitable locations to deploy their bombs. The result of carrying out covert research in this situation proved to be lifesaving despite being unethical. However, Hoeyer et al (2005) note that such covert research may be the only realistic way of getting the type of data needed. In the case of this research, I feel that it was of utmost importance that I was at all times upfront about my intentions and what I was doing where the members of the social group were concerned. Further to this, I argue that as a teacher, it was part of my job to collect this type of information about the pupils anyway. Where the members of staff are concerned, their perceptions are something that I may arguably pick up in staff room discussions anyway. Despite this, everyone involved in the study was be briefed and their consent acquired prior to the commencement of the data collection.

Prior to the commencement of this research project, I acquired the consent of the pupils and their parents and all of the individuals that are participating in this study. A sample of each kind of permission form was submitted along with the Brunel University ethics form. With the assistance of my supervisor, I created consent forms which made it abundantly clear that their participation and involvement in the study

was completely voluntary and that they were free to leave the study at any point in time. Further to this, they were informed and reminded that the comments that they made and any information obtained was kept completely confidential and was not revealed to anyone other than the researcher. Further to this, the staff members were reminded that none of the data collected would go to their superiors and as a result of this there was no need for them to have any fears about their employment status. All of the participants in the study were given pseudonyms in the field notes as well as the interviews and all other documentation that were created when this research project was conducted. Furthermore, although this was mentioned before, I gained the consent of both the pupils and their parents or guardians prior to the commencement of this research project. Additionally, the name of the school was changed to a pseudonym. My field notes and the documents that I worked with on a day-to-day basis was locked in my file cabinet in my room at all times. I was the only person with the keys to open this file cabinet. As a result of this, I was the only individual with access to the research data. The research data contained any and all confidential data concerning the participants at any given time. It is important to reiterate that this study was done with written permission from both the relevant authorities at Brunel University and the relevant authorities at the school. Whilst I did not have any pupils or parents who refused consent, if this were to occur, I reassured the parent or pupil that their conduct or opinions would not constitute any part of this research project. The same approach was used where the staff was concerned.

3.8.4 Anonymity and Confidentiality

One of my key aims throughout this entire research project was to maintain the anonymity of all of the participants at all costs. To achieve this, pseudonyms were

used at all times and I was always careful not to include information that would make the individuals identifiable through the analysis and reporting of the findings. All of the digital recordings and videos were stored on my home personal computer which was password protected and I was the only one who had access to it. Further to this, the entries in my journal and field notes were written using a coded system which only I understood. The digital audio recordings as well as the video recordings were simply labelled by using an alphanumeric code system which again only I understood. The documents detailing all of the information about the research project and the steps taken to maintain anonymity and confidentiality concerning any information collected and published for the participants (Appendix IV, Appendix V and Appendix VI) and the forms that were used for gaining their consent (Appendix I, Appendix II and Appendix III) were all made available to the participants prior to the commencement of this research project. In addition to this, the research project and all of my intentions for the data collected were explained to the participants of this study as well as the parents and carers of the pupils prior to gaining their signatures. Furthermore, I explained how I would go about maintaining the confidentiality of the data. I kept the written field notes, journals, digital audio recordings and video recordings as well as anything else that held sensitive data locked away in my personal lockable file cabinet at school to which only I had access to. Where the digital audio and video recordings were concerned, they were informed that this was to be done in a private room with the use of earphones so that only I would be able to hear what was said. In the case of the video recordings, these were viewed on the camcorder's small screen and with the use of headphones so to ensure that only I saw and heard the recordings. This was done for the transcribing of all of the recordings. Also, on the participant information document, the participants were informed that I

intend to properly destroy the recordings after the research project is complete and the thesis submitted.

Further to this, any future publications that make use of the data collected for this research project will be presented in a manner that also protects the identities of the individuals involved and the possibility of identifying the people involved. Moreover, the site within which this research project took place will also remain confidential.

In this research project, I used pseudonyms for all of the individuals involved. At no point in time were the actual legal names of the individuals be written down, the only places where they may existed were on the digital audio and video recordings which only I had access to. In the case where their role in the school was identified, this was done merely to assist the reader in understanding. I argue that due to the generic nature of the titles I used (Scott, headteacher, computing coordinator and Year 4 teacher), it was really not possible to identify who these individuals were or what school they worked in. The findings and the analysis of these findings were presented in such a manner, using generic titles and pseudonyms. This extended to the excerpts from the video and digital audio recordings used in the analysis and findings chapter. Throughout this entire research project, each step that I took and each decision that I made regardless of size was done with full consideration of the ethical impact that they could potentially have had. Also, given the complex nature of an ethnographic study, it is possible to argue that there is a lot of potential to make mistakes concerning the maintenance of anonymity where the individuals were concerned. This is because ethnographic studies produce highly detailed accounts of experiences which could make the individuals involved identifiable if the I was not cautious as to how I worded my findings. Also, with the vast amounts of data that an ethnographic

study produces, I applied pseudonyms and anonymity at the point of analysing the data so that none of the pieces of information that could make any of the individuals involved in this study identifiable were recorded.

The following is a table of pseudonyms. It offers information about the individuals that took part:

Class/Position	Name
Headteacher	Scott
Deputy Headteacher	Samantha
Computing Coordinator	Kay
Year 6 teacher	Sofia
Year 6 teacher (NQT)	Sarah
Year 5/6 floating teaching assistant	Jas
Year 5 teacher	Monica
Year 5 teacher	Michelle
Year 4/5 floating teaching assistant	Jem
Year 4 teacher	Hayley
Year 4 teacher	Gigi
Year 3 teacher	Amy
Year 3 teaching assistant	Jessica
Year 2 teacher	Jennifer
Year 2 teacher	Hannah
Year 2 teacher	Myself

Year 2 teaching assistant	Priya
Year 2 teaching assistant	Gemma
PPA cover teacher	Beth
Part time floating teaching assistant	Katie
Nursery teacher	Sharon
Nursery teaching assistant	Pat
Year 6 pupil	Camilla
Year 3 pupil	Jasmine
Year 3 pupil	Nour
Year 3 pupil	Nailah
Year 3 pupil	Sunil
Year 3 pupil	Imran
Year 3 pupil	Steven
Year 2 pupil	Raj
Year 2 pupil	Luke
Year 2 pupil	Tariq
Year 2 pupil	Arya
Year 2 pupil	Eric
Year 2 pupil	Alex
Year 2 pupil	Ashley
Year 2 pupil	Jamie
Year 2 pupil	Samir
Year 2 pupil	Andrea
Year 2 pupil	Mark
Year 2 pupil	Lisa

Year 2 pupil	Ahmed
Year 2 pupil	Simon
ICT Technician	Sanjay

Figure 3.1: Table of pseudonyms used

3.8.5 Site location and access

The site was an inner London primary school with roughly fifty members of staff. Of those fifty members of staff, twenty-three members of staff were used in this study. The reason for selecting this school was that it is geographically close to where I lived and also very familiar to me as I worked at this institution for many years prior to the commencement of this research project. The school was a setting which allows for the researcher access to a wide variety of perspectives and angles (Hammersley and Atkinson 1995 p.41). In the case of this research project, the phenomena I wanted to look at was the perceptions that staff and pupils had on the introduction and use of iPads and cloud services in the school. It is vitally important to note that the use of iPads and cloud services in not a new phenomena. It has existed prior to the commencement of this research project and it is likely to exist after this thesis has been completed. However, the aim of this thesis was to gain the perceptions of the staff and pupils at the point of the introduction of iPads and the cloud services and their initial experiences with it as they first begin to use it on a day-to-day basis. Further to this, I sought to research this particular phenomenon in the most natural possible state. As a result of this, great efforts were made not to interfere with the ways in which the pupils and staff interacted with the iPads and cloud services.

3.9 Research questions

Whilst the key aim of this research project was to uncover the perceptions of staff and pupils on the introduction and use of iPads and cloud services in an Inner London primary school, there are a number of factors that I took into consideration whilst coming up with the research questions. Whilst keeping Malinowski's argument in mind, I allowed the "*foreshadowed problems*" to be the starting point for the process whereby the initial set of research questions were generated (Malinowski, 1922 p.25). These initial questions were then refined and focused as the research process continued (Hammersley and Atkinson, 1995). Researchers such as Eisenhardt (1989) put forth that having a rough idea as to what the research questions are going to be is important even if they are broad questions. This was the case as starting without both a theoretical framework and research questions could lead to the researcher becoming overloaded with data.

As a result of the aforementioned theories, the following research questions were generated:

- 1) How do staff and pupils perceive the introduction of iPads and cloud services in the school?
- 2) How do staff and pupils engage with and interact with iPads and cloud services being used in the school?
- 3) What were the attitudes and behaviours of the pupils and staff when interacting with iPads and cloud services?
- 4) What do staff and pupils perceive as the advantages and disadvantages of the use of iPads and cloud services in the school?

5) What do the staff and pupils think can be done to improve or enhance the introduction of iPads and cloud services in the school?

In addition to the aforementioned theories, these research questions are the result of an academic journey.

When I first started this research project, I had a general idea as to what I wanted to find out, but it was still quite a broad research question. As a consequence of this, I needed to refine my broad research objective into more realistic and focused research aims. According to Hammersley and Atkinson (1995) the process of creating research questions and refining them is a necessary part of the research process. They continue by arguing that the actual research questions and the clarification of the research problem begin to formulate in the analytic notes. For this research project, this was the case. I started with a general idea as to what I wanted to find out, but I did not yet have a set of focused research questions. What I had was a broad question about staff, pupils, iPads and cloud services at which point was originally called ‘emerging technologies’ by myself. As Hammersley and Atkinson (1995) state, the research problem is “*informally...embodied in the ethnographer’s ideas and hunches*” (p.205). This was exactly the case for this research project, I had the ideas and gut feelings but I needed a way to take it from this point to the point where it was a fully realised research project with focused research questions. In order to do this, I started with a broad objective and I started in the field without a predefined theoretical framework. (Hammersley and Atkinson, 1995). As the research project continued and more data was collected, I had a much clearer perspective as to the various phenomena that existed within the site where the research project was taking place. As a result of this,

I was able to further focus and refine the research questions until they evolved into the questions that are presented in this thesis.

When attempting to determine the approach that I was going to use for the analysis of the data, I came across the “Heuristic approach” put forth by Moustakas (1990). The word Heuristic finds its origins in the Greek word *heuriskein* which, according to Moustakas (1990), means to find or discover. The Heuristic approach consists of six steps and they are:

- To become initially engaged with the social group
- To become immersed in the setting being observed
- To incubate the thoughts gathered
- To illuminate your awareness and understanding
- The explication of the experiences of the participants
- To creatively synthesize everything previously done

I explain each of these steps in greater detail below:

3.9.1 To become initially engaged with the social group

In this phase, Moustakas (1990) argues that the researcher must make contact with the social group that they desire to study. In the case of this research project, I was already a member of staff at the school the research was being carried out in. The implications of this was discussed later on in this chapter. As a result of already being an accepted member, I argue that I already had engagement with the social group and thus fulfilled this step.

3.9.2 To become immersed in the setting being observed

In addition to already being an accepted member of staff at the school, I contend that I was able to immerse myself in the setting to the point where my presence was not out of place, thus allowing me to observe the individuals' natural reactions to the introduction and use of iPads and cloud services.

3.9.3 To incubate the thoughts gathered

Moustakas (1990) puts forth that the researcher should take time out from the intense process of data collection to take time to reflect upon the data collected, the research questions and the direction that the research is taking. After each day of data collection, I intend to take the data home and make an initial evaluation of the data collected that day. This was done, first and foremost to identify emergent themes but it also helped me to gain a better understanding of the individuals I was studying.

3.9.4 To illuminate your awareness and understanding

Continuing from the previous point, the daily evaluations that I made of the data collected should increase my awareness and understanding of the environment I was conducting the study in and the individuals that were taking part in the study. Further to this, the more time I spent with the social group as a participant observer and the more data I collected, the more informed my own understanding and perceptions became. I argue that at the end of the research project, the way in which I thought and the perceptions I held were different from those that I started the study with. I also contend that as the study progressed, my understanding of what I studied, my ability to understand the body language of the individuals taking part in the study and their

reactions became clearer to me. Moreover, as the research project progressed, I was able to identify my own personal prejudices and put them aside so as to minimise its effect on the analysis of the data. The next section looks at some of the criticisms of the heuristic approach.

3.9.5 Limitations of the Heuristic approach

One limitation of the heuristic approach according to Moustakas (1990) is that it requires a great deal of time as it requires the researcher to commit to becoming fully immersed in the social group in which the research is taking place.

3.9.6 The explication of the experiences of the participants

This was done via clear descriptions and explanations of the data collected. These clear descriptions and explanations were presented in the Analysis and Findings chapter. I argue however, that this was only possible after following the previous three points put forth by Moustakas (1990). Moustakas (1990) suggested that this step required the researcher to take an in-depth look or examine all that came up during the research project in order to gain a better grasp of what the findings actually mean. In this research project, I took a year after the data collection was completed to evaluate all of the data. This assisted me in gaining a better understanding of the social group and the various phenomena.

3.9.7 To creatively synthesize everything previously done

Moustakas (1990) puts forth that in this step, the researcher brings all of the various strands together to form one complete picture which is coherent. For me, this was only possible once I had fully evaluated all the various strands. Once I this was done, I was then able to begin to form a coherent picture. The use of a Conceptual Framework diagram also proved to be useful. Miles and Huberman (1994) state that it is a presentation that can either be visual or written and it *“explains either graphically, or in narrative form, the main things to be studied... and the presumed relationship among them”* (p. 18).

The following is the conceptual framework that I utilized in this research project:

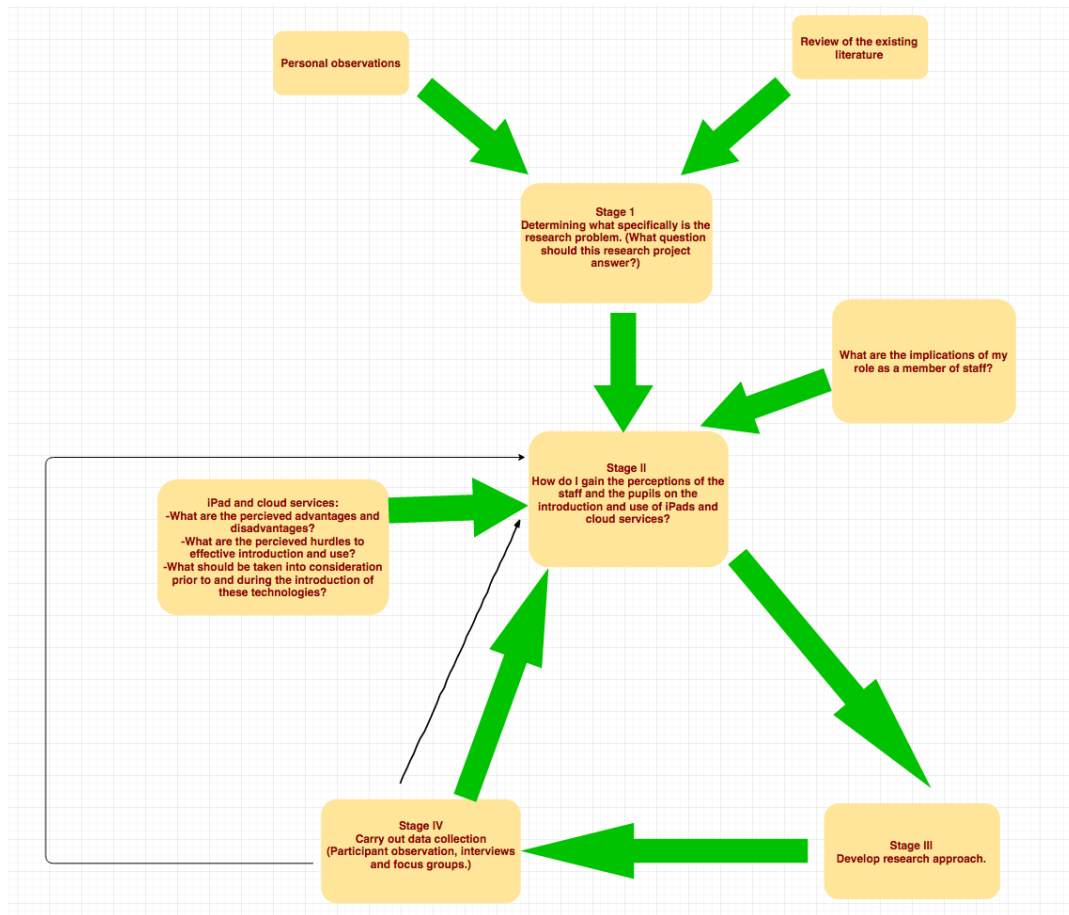


Figure 3.2: The conceptual framework utilised

Further to this, having discussions with my supervisor about his dissertation proved to be quite useful as it assisted me in working out what should go where and gave me a better understanding of how the research process worked. I spoke to my supervisor about any particular events that occurred and what the significance of these events may have been. Furthermore, it was helpful to discuss my ideas with someone that experienced what I was experiencing. Bohm (1996) puts forth the idea of collectively

talking, collective discussion and dialogue being more potent than the sole thoughts of an individual on their own as the shared dialogue and thoughts have the potential to create shared meaning and understanding.

It was this thought that brought me to think about case studies. Consider for a moment that at the heart of case studies, it is possible to argue that you have a piece of literature that is trying to have a dialogue with the reader. By this I mean the case study educates the individuals reading about a particular phenomenon or set of findings, but then invites the readers to interpret the phenomenon or findings in their own particular way. As a result of this, it is therefore possible to contend that when a study is carried out, the thing of importance is not so much that the findings of the study could be replicated, but more so the interpretation of the actual findings (Yin, 1994).

Another objective of this research project was that the results were to possibly make a contribution to the improvement of the way in which relatively new technologies were introduced in schools. Additionally, I felt that the findings of this research project could contribute greatly to the existing body of literature on the use of tablets and cloud services in education as it may give insight into the perceptions of staff and pupils.

Taking into consideration the previous chapter and the literature covered, it was clear that there isn't very much in the way of literature available on the perceptions that staff and pupils held on the introduction and use of iPads and cloud services. For such questions, it may be possible to argue that an explorative approach was needed to determine the answers (Hammersley and Atkinson, 1995). As previously stated, I wanted to gain the perceptions of the staff and pupils. More specifically, I wanted a

genuine reflection of their feelings towards iPads and cloud services in addition to an in depth understanding of the ways in which the members of this group constructed meaning. For this, I argue that only an insider perspective can really offer this. I was able to argue this as it was an insider perspective that offered me, as the researcher, an opportunity to obtain a greater understanding of the perceptions of those that inhabit the site within which this study was carried out. As a result of this, the key source of data for this research project was the staff and pupils of the school (Mason 2002). Further to this, Malinowski (1922) put the goal of an ethnographer aptly, he stated, *“This goal is, briefly, to grasp the native’s point of view, his relation to life, to realize his vision of his world”* (p.25). What Malinowski is arguing is that the ethnographer needs to tell the story of the people within the social group from the perspective of a native member of the group rather than create an account of what goes on in the group. I suggest that being a native of the social group that conducted this research project in meant that I was already in a good position to offer a story from the perspective of a native.

Whilst on one hand, my position as an insider proved to be advantageous, there were implications to being an insider. Webster and John (2010) put forth that as an insider, I already possessed a set of values and biases. More specifically, an insider has to deal with the tension between their own feelings and biases becoming intertwined with the facts.

Consequently Webster and John (2010) note that it is not particularly easy to separate personal biases and perceptions from the research in order to objectively carry out the research project. Hammersley and Atkinson (1996) comment on this dilemma. They use the term ‘over-rapport’ to describe it. It is where the researcher identifies so

closely with the group being studied that this impairs their ability to see and perceive key facts as they are taken for granted or overlooked due to the researcher possessing the norms and values of the social group that they are studying.

In my effort to address this, I attempted to adopt what Brayboy and Deyhle (2000) refer to as a 'marginal position' (p.182). Hammersley and Atkinson explain that this is a position where the researcher operates as neither a complete insider nor a complete outsider. Instead, the researcher operates in both positions.

I attempted to do this by comparing my own personal journal notes with the interview, focus group and observation notes. It was through the process of doing this and comparing my own personal perceptions to that of others within the same social group that I was able to isolate some of my own personal biases. However, it must be noted that it was not possible to completely identify and remove all of my personal biases as a researcher.

3.10 Summary and Conclusion

Within this chapter, I discussed the research approach that I intend adopt and I made an attempt to justify its use. Further to this, I looked at the ways in which I chose to collect data and the ways in which I handled the data. The primary objective of this research project is to determine the perceptions that students and staff held concerning the introduction and implementation of iPads and cloud services at the school. After much research and discussions with my supervisors, I felt that an ethnographic approach would be the best fit for this research project. My time in the field as a participant observer, the use of interviews and focus groups generated thick, descriptive data which provided a great insight into the perceptions that staff and

pupils held. Where the validity of this research project and its relevance to the wider body of literature was concerned, I argue that the findings of this thesis proved to contribute to the body of existing literature as it offered insight into how staff and pupils may perceive the introduction of iPads and cloud services to those educational bodies that are yet to introduce them. In the next chapter, Chapter 4, I provided an in depth analysis of the data collected.

4. Analysis and Findings

4.1 Introduction

This chapter presents the findings and analysis of the field research carried at one inner London primary school. The focus of the study was in the form of these research questions:

- 1) How do staff and pupils perceive the introduction of iPads and cloud services in the school?
- 2) How do staff and pupils engage with and interact with iPads and cloud services being used in the school?
- 3) What were the attitudes and behaviours of the pupils and staff when interacting with iPads and cloud services?
- 4) What do staff and pupils perceive as the advantages and disadvantages of the use of iPads and cloud services in the school?
- 5) What do the staff and pupils think can be done to improve or enhance the introduction of iPads and cloud services in the school?

A number of themes emerged throughout the field research. These identified themes are categorised as follows:

-Staff engagement with iPads and cloud services.

-Pupil engagement with iPads and cloud services.

-The attitudes and behaviour of staff towards iPads and cloud services.

- The attitudes and behaviour of pupils towards iPads and cloud services.

- The staff perceptions of the advantages and disadvantages of the introduction and use of iPads and cloud services.

- The pupil perceptions of the advantages and disadvantages of the introduction and use of iPads and cloud services.

This chapter begins by first exploring how pupils perceive the introduction and use of iPads and cloud services, followed by their thoughts regarding the pros and cons of the use of iPads and cloud services in their learning. Twenty-one pupils took part in this study. As this was an ethnographic study, the thick data is presented as a narrative so the reader is able to follow as the story unfolds. Following this, I present an in-depth ethnographic look into staffs' perceptions of the use of iPads and what they think are the pros and cons of using them for teaching and learning. Twenty-three members of staff took part in this. Next, I look at the views of pupils and staff on the use of cloud services in the school and what they think the pros and cons are of utilising them. Beyond this, I explored other themes such as the perceived legitimacy of these technologies, what the pupils and staff think can be done to make them work more effectively, attitudes towards the technologies and the effect that resistance to these technologies can have on its successful implementation.

The purpose for separating this chapter into the above key sections is to draw attention to the tensions between the differences in perceptions between the staff and pupils, the differences between how the staff and pupils engage with the technologies and the differences in attitudes between the staff and the pupils. Such tensions are not a new phenomenon. As discussed previously in the Literature Review chapter,

Prensky (2001) noted that when new technologies were initially introduced, those that were born into the time period where these technologies existed were more likely to accept and engage with the technologies. He referred to these individuals as ‘digital natives’. In contrast, he also advanced another school of thought where he argued that those individuals who were born before the technology in question was introduced were often less likely to be open to accepting or engaging with it. These individuals he referred to as ‘digital immigrants’. This division in perception often led to other tensions. In this research project, I found that the differences in perception often led to other tensions such as the issue as to whether iPads and cloud services belong in education and also that staff and pupils often held completely contrasting views as to what the process of learning should look like.

The first section of this chapter sets out an introduction to the findings of the data gathered in the field. This data was gathered through the use of participant observation and semi-structured interviews. Following this section, the findings for each of the above themes are presented, analysed and discussed in greater detail, supported by existing literature on the subject matter. Moustakas (1994) explains that the researcher must possess the ability to take into account *“many sides, angles and perspectives until a unified vision of the essences of a phenomenon or experience is achieved”* (p. 58). In order to achieve this, I adopted an ethnographic approach which as detailed earlier in Chapter 3.

4.1.1 Data Categorisation

As previously stated, the data was gathered through the use of participant observation and semi-structured interviews. The data was then transcribed and categorised. Due to the vast amount of data collected, I started by dividing the data into two main

categories. One category was for the staff and the other for the pupils. As I explored and analysed the data further, more categories and themes became apparent to me. I placed each theme in its relevant category. There were a number of themes which were common to both categories. An example of this was the issue of teacher training. A finding that I found surprising was that a number of pupils in addition to the teachers felt that the lack of teacher training had an impact on the effectiveness of the use of the iPad in the lesson. Alternatively, there were also themes that were unique to each category. Each of these themes were assigned a heading and explored in the subsequent sections of this chapter.

4.2 Context

In recent times, there have been many newspaper reports that both support and reject the use of tablets such as the Apple iPad in the classroom. One such report was published by the Daily Mail on December 12th 2015 entitled, *“Ofsted warns that iPads in the classroom are a huge distraction as nearly a third of secondary schools allow them in lessons”* and another by The Telegraph entitled *“Mobile Phones and iPads could be banned from classrooms”*. In stark contrast there are other newspaper reports such as the one entitled, *“How iPads are helping children with autism: Tablets develop communication skills because they are ‘predictable and neat’.”* Whilst the views of newspapers such as the Daily Mail may not be indicative of the views of society as a whole, I argue that it offered a perspective that made me interested in exploring the subject.

At first glance, the thick data that I collected during this research project revealed what I can only refer to as insightful narratives. As I delved into these insightful narratives, I gained a first hand experience as to what can only really be described as

thick descriptions (Geertz, 1973). It is important to note that throughout this entire research project, I was always aware of my position both as a researcher as well as a participant, and the ways in which this positionality could potentially affect the outcomes of the research. As I progressed through this research project, what became clear was that there was no such thing as a ‘simple answer’ or ‘simple truth’ or a ‘one size fits all solution’; instead what I found was that there existed many different perspectives or ‘takes’ on the same concepts and I was committed to ensuring that I brought these different perspectives to light. Finally, by making my focus the perceptions of the staff and pupils, I argue that this enabled me to gain a deep understanding as to how the pupils and staff grapple with these relatively new technologies, their feelings about them and ultimately uncover what the potential strengths and weaknesses are and how we might go about addressing the cons.

4.3 Staff engagement

The first key theme that arose from the data collected was staff engagement. This was because the twenty one members of staff continuously engaged with iPads and cloud services throughout the duration of the data collection period. Researchers such as McConatha et al (2013) found in a survey of teachers that staff usually engaged with iPads to use them for the teaching and presenting of lessons and lesson preparation.

4.3.1 Using the iPad for Presentations

As noted in the second chapter of this thesis, one of the most commonly used features of the iPad in this school was to use its ability to carry out a presentation. Prior to the use of the iPad, the presenter would either read hand held notes or read the presentation slides on the board. This is one of the points that teachers and other

members of staff raised as one its key benefits. Similarly, students who have given presentations in class have also found the iPad to be a very helpful tool. In my observations and in discussions with staff and pupils, I have also seen and heard about the use of the iPad where presentations are concerned.

According to writers such as Gliksman (2014), the Apple iPad has the ability to make presentations easier, more memorable and engaging. Further to this, he argues that the whole point of a presentation is that it is supposed to be engaging and memorable for the person or people viewing it. This is a view held by some of the pupils and staff that I spoke to. One member of staff said to me,

“At first, I used to use Keynote as it was really useful on the iPad, but now that Office for iPad came out, I find myself using Powerpoint all the time in lessons. I used to use Smart Notebook and present it using the Smartboard, but the problem with that is the same problem I had with PowerPoint on the desktop computer, I found myself either having to print out accompanying notes or having to read off the slide which the children could read themselves or having to add to the slide from the top of my head. The iPad has changed this for us. Now, I can control a presentation from my fingertips. I don’t even have to be next to the board anymore to be able to do this. Isn’t that cool? Gone were the days when we had to click on the button to go to the next slide. Also, I can edit the slides right there on the iPad with ease even when I’m not next to the computer” (Hayley’s interview 3-6-15).

From the above discussion with Hayley (one of the Year 4 teachers), it is clear that she perceived the iPad to be a useful tool where the idea of presentations are concerned. The key benefit that she brought up was the one of mobility. Unlike the

desktop computer that is fixed in its position and cannot easily be moved, the iPad is a lightweight mobile device which is able through AirPlay to wirelessly display a presentation on a projector, smartboard or other display with relative ease and minimal to no lag. However, to take advantage of this, the use of an AppleTV set top box is also required. Gliksman (2014) points out those presentations not only should be engaging or memorable, but they also have the benefit of exercising and developing the communication skills of the person or people delivering the presentation.

There were also a number of lessons that I had observed where the pupils were given the task of giving a presentation about the book that they had just completed in Year 6 and another where the pupils had to give a presentation on a nocturnal animal in Year 2. This was a point that was raised by pupils and teachers in the interviews. I expanded on these lessons below.

In the Year 6 lesson, the teacher instructed the pupils to write a book report about the last book they had read and then they were to make a presentation about it and present it to the class. They were each allowed three minutes to present their review of the book. Whilst observing this lesson, I noticed that the pupils were all very engrossed as they were listening as each pupil went up to give their presentation using the iPad. Each time a pupil was selected, the pupil would use their iPad to display and control the presentation on the board. The pupils would then give their presentations and whilst each slide was up, they would discuss each point in further depth. Generally speaking, the pupils all appeared to be very eager to show off their presentations and to talk about the books that they had reviewed. Also, overhearing some of their conversations, I heard two pupils talking about how easy they found it to make their

presentations using the iPad. After all of the pupils had presented their book reports, the teacher then held a brief plenary where she discussed the points that she liked and then gave a report on a book that she herself had read using the iPad.

In a discussion with that particular Year 6 teacher later that day, I asked her about how she felt it went and her thoughts on the iPads use in that lesson. She replied,

“So, I think it went a lot better than it did last year when I had the kids use Microsoft PowerPoint to do a presentation for their book reviews. You see, the kids actually enjoyed it this time around. Last time, a lot of them didn’t want to do it. I don’t know if it’s the novelty of the iPad or it’s just how it lets them have their little notes on the screen whilst they are presenting. Whatever it is, I’ll definitely be using the iPads again the next time I have to give the kids a presentation to do. It was super easy to set up too, we didn’t have the same problem where when I called a new child up, they’d have to put in their USB stick and search for the PowerPoint presentation file and then wait for it to load. There wasn’t any of those delays this time round, so it all went by a lot more quickly than it did last time. Did you see Camilla? She never likes talking in front of the class. Last year when I had her in Year 5, it was like drawing blood out of a stone to try to get her to give her presentation. She’s really coming out of her shell now. I was expecting her to start crying when I called on her to give her presentation to the class. I don’t think I’ve ever heard her voice so clearly. Plus she had a really wonderful book report. I really liked the way she used the pictures and she really summarised the book quite well. I think the iPad played a big role in helping her out of shell. Again, I’m not sure if it’s the novelty of the thing, as in, if it’s just because it’s all

very new to her, or whether it's how easy it makes it to do presentations. It may even be both. Regardless of that, I'll definitely be using the iPads again for presentations. I'm going to try it in other lessons too, I can see it being quite the asset to me" (Sofia's Interview 5-6-15).

Some days later, I discussed the topic with Camilla (a Year 6 pupil) who had a very similar positive experience where the iPad was able to help her overcome her fear of presenting. When asked about her experience, she said,

"Sometimes I get really nervous whenever Miss wants us to present our book reports to the class when we've done a review of a book. I used to be really nervous as I wouldn't be able to have all of the important information about the book on the board when I'm showing it to the others. Before we got to use the iPads, I used to have to write down what I was going to say on little pieces of paper and would you know it, the little pieces of paper always managed to get all mixed up or I wouldn't be able to read my handwriting and while I'm trying to figure out what I've written, there would be the most awkward silence in the room as everyone is looking at me waiting for me to give the presentation. This was me in Year 5 when I had to give a presentation on my book. Now, I got a chance to use the iPad last Tuesday and it really made it so much easier. I was less nervous as I could walk around the room and talk at the same time. I had all of my notes on the iPad and because it was all in typed up writing, I could read it easily and I was able to say everything without having awkward pauses when I spoke. This made me feel better about myself. The whole presentation was done before I realised it and I almost

wished it didn't end so soon. I really wish I had the iPad in Year 5 when I had to do my book report presentation then” (Camilla’s Interview 9-6-15).

Researchers such as Burden et al (2012) and Heinrich (2015) also found that the iPad assisted with self-confidence when they carried out their research. This was not the only time I had observed the iPad being used as a presentation tool. A few weeks after this, as previously mentioned, I saw the Year 2 pupils give a presentation on their selected nocturnal animal. In this lesson, the pupils presented in pairs. The lesson started by the teacher reminding the pupils about how to do their presentations via the iPad and the key features. The pupils then came up in their pairs and presented their reports. In a similar manner to the Year 6 class I had seen a few weeks earlier, all of the pupils were very eager to go up and show their presentation to the class. The first pair that went up did their presentation on the owl and was also able to put their ideas into bullet points on their iPad so that they would be able to talk to the class about it whilst they presented. As each pair presented, I observed that the pupils were not growing restless waiting on their turn, instead they were very focused and attentive listening to every detail of the presentation. At the end of the lesson, the teacher did a plenary where he showed his own presentation and then talked to the children about each nocturnal animal covered in the lesson.

After the lesson, I had an opportunity to speak to the teacher about what her thoughts were on the lesson. She responded,

“I really got the idea from Year 6, I had heard that they had done this for their book reviews and I thought it would be a great idea for me to try this with my little ones. It really went well. It went a lot better than I expected it to. They were very engaged in this activity and I was impressed and frankly shocked as

to how engaged the children were in this activity. A small part of me was expecting them to be messing about with the iPads while the other team presents to the class. But there was none of that. Not even the low level disruptions that I'm used to having with this class. They all wanted to present to the class and were actually disappointed when they were not the next team to be called up to give a presentation on their nocturnal animals. Also, they really didn't have a whole lot of help to get their presentations going, they had to pretty much do the research themselves and make the key points into bullet points. I was impressed to see how they were able to work on their own to make such colourful and engaging presentations. What also impressed me most was how focused they were on completing their presentations and the extent to which some of them demanded perfection, not wanting to show their presentations until it was just perfect in their opinion(Hannah's Interview 17-6-15).

From the above it is possible to argue that not only did the iPad assist in the delivering of presentations but it is also possible to argue that it also worked to give some pupils the sense of empowerment needed to complete the given task on their own. The pupils that experienced empowerment were ones that did not normally feel empowered in lessons. Researchers such as Gliksman (2014) had similar findings in their research. Gliksman (2014) found that, *"The use of technology should focus on empowering students to research, explore, discover and create"* (p.259). As a result of this, I argue that this is an example of technology empowering pupils.

4.3.2 The importance of lesson preparation in regards to the use of cloud services

According to researchers such as Butt (2008) in order for a lesson to be effective, the teacher must ensure that the student learning is at the core of the “*planning, doing, assessing and evaluating*” process (p.viii). This means that the ways in which the student is expected to learn must be taken into consideration at each stage of the planning process. During the course of this research project, I have observed a number of occasions where members of staff attempted to use cloud services to prepare in advance. In most instances, I found that the cloud services were accessed through the iPads. One particular lesson that really stands out to me was one where the teacher took great care to prepare the lesson, but experienced issues with the wireless connectivity. This lesson took place over a period of three days. In the first lesson, the teacher set up a resource and saved it in the local Cloud drive in the school. The resource was a short interactive keynote presentation that would help the pupils to recap on what they had learned about the Great Fire of London. As pupils began to access the Western Digital MyCloud drive, most of them were able to access the resources, but there were eleven iPads that were unable to connect to the wireless network and as a result of this were not able to access the resource. In an attempt to remedy this, the teacher put the resource on the Interactive SmartBoard and then went through it with the pupils. After a while, the iPads were all able to eventually connect to the wireless network with limited connectivity. This was sufficient for the pupils to access Google Docs and then they were able to create their story plans. Whilst the pupils were planning, I walked around and listened to what the pupils had to say as they were working in pairs for this activity. At table four, I overheard Simon say to Ahmed,

“This thing works when it wants to. Sometimes I can get it to work! Ahmed, why is your iPad working? How did you get it to work, I can’t get onto the Internet.”

Ahmed replied,

“ I don’t know, it’s just working. Let me see.” Ahmed proceeded to take Simon’s iPad and said, *“I don’t know why it’s not working, I can get it working on mine. Miss! We can’t get Simon’s iPad to work”* (Field recordings and notes 5-1-15).

During this time, the teacher was trying to assist other pupils with their connectivity issues. After approximately twenty minutes of spending time disconnecting and reconnecting to the network, the teacher was able to get all of the pupils onto the network and they were able to work on their story plans. When this happened, I continued observing the pupils working together on their plans. I noticed that some of the pupils who were having difficulty with the iPad started to write their ideas and jottings down onto paper. I overheard a discussion between two of the pupils, one said to the other,

“While I’m waiting for iPad to work I write my story down. I have some ideas” (Field recordings and notes 5-1-15).

It was at around this point where the teacher encouraged the pupils to use paper to record their ideas. Most of the pupils followed this instruction, but there were a few that continued using the iPads to record their work. Drawing near to the end of the lesson, the teaching assistant and the teacher collected the iPads and instructed the pupils to sit in their carpet places. The teacher put up two examples of plans that were

done by two pairs of pupils on the iPads. The class and the teacher discussed the plans and what they could do to improve them. After the lesson, I had an opportunity to ask the teacher about her feelings on the use of the iPads in the lesson. She replied by stating,

“Something needs to be done about the wireless! They expect us to use these iPads in our lessons but they don’t provide the right infrastructure for it all to work properly. It’s ridiculous. Some of the children were able to get their work done, so I was pleased about that, but it really throws a spanner in the works when you’ve got absolutely everything set up and you think it’s all going to go well and then suddenly the wireless decides that it’s not going to support all of the iPads in one go. I think it may be an issue with the wireless in this part of the school though as it works fine when I’m in the other building. Now I’ve got to figure out how tomorrow’s lesson is going to work. I’ll probably now have to book another room or test out the connectivity of the iPads before attempting tomorrow’s lesson. I’m definitely going to raise a ticket so that the technicians could have a look at this matter. You know if Ofsted came in and saw this; we would find ourselves in a whole lot of trouble. To make matters worse, I wasn’t even able to do the mini-plenaries that I had planned nor was I able to do some of the extra activities I had planned because I spent most of my time trying to fix these blasted things. If the technicians are able to sort me out for tomorrow, I’ll use the iPads, if not, we’re going back to basics with their Creative Writing Nailah books and their pencils. At least those don’t have wireless problems even though they’re wireless” (Jennifer’s interview 5-1-15).

At a later point in the day, I recorded a conversation between the technician and the above teacher.

Technician (Sanjay): This is a problem that I anticipated. Most of the tickets I get nowadays seem to be about the wireless. I really have been hearing this complaint from a number of other teachers. The problem is that the current infrastructure just simply isn't able to cope with the increased amount of network traffic. In other words, the setup is in dire need of an upgrade.

Teacher (Jennifer): So why hasn't anything been done about it yet? We've been given all of these new iPads and told to make good use of them and that we're expected to have the children make use of them in the lessons. They've done all this but have not invested in a better wireless network?

Technician (Sanjay): It's really not so straightforward or simple. From what I understand it was initially in the budget to improve the school's wireless infrastructure prior to the introduction of the tablets. However, due to budget cuts, they decided that they'd just introduce the iPads first and then put it in next year's budget to beef up the schools wireless network. We should be getting some new servers as well so it should all hopefully flow a lot more smoothly once this happens (Field recordings and notes 5-1-15).

From this conversation along with what I observed in the lesson it became clear to me that one of the key factors which could affect the performance of then emerging

technologies such as iPads and the cloud services used on them is the wireless network. As noted in Chapter 2 of this thesis, commentators such as An(2014) and Catapano (2014) of the TeachHub also identify the wireless network of a school as an area of concern when determining the chances of successfully implementing these technologies in a school. Catapano (2014) argues that the use of iPads in the classroom rely greatly upon the quality of the wireless network at the school. What this essentially means according to Catapano (2014) is that all of the devices such as the iPads, laptops, computers and so on are all fighting for a space on the wireless network. This is one possible reason why some of the devices are unable to connect to the network at times.

In the following lesson, even after the technician had attempted to assist the teacher, the same problems arose. The teacher once again attempted to use the devices all at the same time. However, the technician then plugged in another wireless access point in the classroom and the teacher instructed the teaching assistant to connect the iPads that were having difficulty getting onto the school's wireless network to connect to the new access point. Once this was done, all of the pupils were able to get onto the internet and access their work. Those that had done the activity on paper were able to begin writing using the iPad.

This brought me to another point. I noticed that for this particular activity, some of the pupils were having difficulty typing and as a result of this, it took them a longer time than it would have had they been writing to complete a sentence or a paragraph for that matter. What this led to in this lesson was that in some cases the pupil that was not using the iPad would become impatient with the pupil that was using the iPad if

they felt that they were taking too long to complete the sentence. One pair of pupils that stood out to me was Mark and Ashley. Mark said to Ashley,

“You’re taking too long, I want to type on the iPad too. Look, there’s the spacebar, it’s down there. If you hold it portrait, it’s easier to type with your thumbs than if you’re just poking the screen” (Field recordings 5-1-15).

Ashley responded by saying,

“Stop rushing me! I know what I’m doing” (Field recordings 5-1-15).

This then proceeded to erupt into an argument. At this point the teacher intervened and resolved the argument between the two pupils. In summary, a similar theme was noted in the second chapter of this thesis, Henderson and Yeow (2012) had similar findings when they concluded that the iPad is not ideal for making large text entries.

4.4 Pupil engagement

Slavin et al (2009) and Li and Ma (2010) found that the engagement with new technologies on average tended to have a greater impact on primary aged pupils (3-11) as opposed to secondary school aged pupils (11+). Slavin et al (2009) also noted that the engagement with new technologies could have an impact on the self-confidence of the pupils. This section starts by looking at pupil engagement with the iPad, the impact of the use of the iPad on their confidence, their engagement with it as an e-reader and the capturing and engaging of pupils through the use of the iPad’s apps and pupil collaboration through the use of cloud services.

I looked into the extent to which the engagement iPads had impacted the pupils. I did this because I wanted to gain insight as to whether the pupils themselves felt that the

use of iPads in any way had an impact where their understanding of what they were being taught was concerned. I have personally observed that with the EAL (English as an Additional Language) pupils, it appeared as though they found it easier to use the iPads as opposed to using their notebooks to carry out the given tasks. Not only that, but they showed a greater degree of confidence when working on the iPads as opposed to paper. Not failing to mention the fact that the language of the iPad can be changed to the pupils' native language where the iPad can understand commands via Siri (Apple's virtual assistant on the iPad in the pupils' native tongue).

In a differentiated lesson where the pupils were working on number bonds, the pupils that would otherwise have difficulty understanding the instructions due to the language barrier, were able to use the iOS app *Marbotic Smart Numbers* which through the use of colourful animations, interactive counters and instant correction and validation of their responses, these pupils were able to achieve the success criteria of being able to form number bonds to 10. Prior to the introduction of the iPad in the school, the teacher would have to produce and print out differentiated worksheets. This was more time consuming than using the differentiated settings on the *Marbotic Smart Numbers App*.

In this lesson, I observed that the pupils were focused on the task that they were given. I started at table three. There were a few EAL pupils at this table. They were engaged in the task that they had been given and were moving the virtual counters so to form the number bonds to 10. The iPad read out the number to them each time they moved a counter. This worked to assist them in counting in English. Then when they got the right number, the virtual counters would smile and wave at them letting them

know that they got it correct. They would then be required to pick up the relevant number from the table and touch the screen with it to register their answer. The app would then read the sum and the answer to them.

Whilst their abilities to express themselves in English may be limited, their body language clearly showed me that they were fully engaged and were enjoying using the iPads and learning at the same time due to the fact that they were able to achieve the given success criteria. By body language, I mean the way in which they smiled and the enthusiasm with which they gestured when trying to express themselves and explain their thoughts. When speaking to one of the lower attaining EAL pupils about their feelings about using the iPad, through the use of body language and simple words such as *"I like like"*, it was clear that they enjoyed it and again the fact that they were able to achieve the success criteria made it clear that they understood the activity (Field recordings and notes 9-11-14).

Moving onto some of the other tables in the classroom, I observed that during the lesson, some of the pupils that would normally switch off were focused on the task. Not only that, but it was apparent that even the pupils that were usually disruptive were very deeply engrossed in the activity. When I went around to the nearest table to me, they were doing the middle ability task I took some time to listen to what they were saying to each other. Lisa said to Ahmed,

"Move the dots then count them, then put your answer. It will tell you if you got it right" (Field recordings and notes 19-11-14).

Taking more time to look at the children, it became very clear that they were enjoying themselves.

The following day, I observed another lesson where the iPads were yet again used for a numeracy lesson. In this particular lesson, the pupils were using the app Math Bingo. The app enables the pupils to add, multiply, subtract and divide. This is all done in the form of a bingo game. Initially when I first saw the app, I immediately sought to figure out how it would meet the differentiated needs of the pupils of Year 2, but after having spent more time observing it in action, I found that the app has the ability to adjust the difficulty setting. As a result of this, it can be adjusted to suit the abilities of the various pupils in the classroom. After having observed it being used in this lesson, I found its ability to differentiate effective. As noted in the second chapter of this thesis, commentators such as Carpenter et al (2013) have also noted the ease of differentiation that the iPad offers.

The way in which the app works is that the pupils are presented with a question which requires them do one of the four operations (add, subtract, divide or multiply). It is then up to the pupil to look at their bingo board to see whether they have the number. Upon the successful completion of their board, the pupils are then rewarded with a pinball game that features alien-like characters.

The objective of this lesson was to recap upon and to consolidate the understanding of the use of the four operations with the pupils. As the lesson progressed; I walked from table to table listening in on the conversations between the pupils. They were very engrossed and excited about completing the bingo board. The lower difficulty task given to the pupils at table 3 required them to play a game with simpler questions and

a simpler bingo board, meanwhile, the middle difficulty task had more challenging questions with the highest difficulty task having the most complex questions. I overheard Jamie talking to Ashley saying,

“Did you get eighteen? Did you add three to fifteen?”(Field recordings and notes 9-11-14).

Soon afterwards Ashley replied,

“I did but I had to divide thirty-six by two” (Field recordings and notes 9-11-14).

From this, it is clear that the conversations that there was a degree of differentiation.

Taking it a step further, I asked a few pupils about their thoughts on the use of the iPads in this lesson. I received nothing but positive responses on how the pupils felt. Also when I asked the EAL pupils how they felt, they offered simple responses due to English not being their first language, but it was clear that they showed a greater degree of confidence in the carrying out of the tasks presented to them on the iPads. Further to this, the animations and colourful interface of the app proved to be most engaging as for the most part the pupils were keen on trying to complete the bingo board before their peers. As discussed in chapter two, researchers such as Arcaro(1995) argue that whilst competition may create friction between pupils as there are winners and losers, it ultimately makes the pupil strive to better themselves.

It was then that one potential flaw of the app became apparent to me. If the pupil does not get it right, they are able to select another number on the board. This does not stop

the pupil from pressing each number until something works thus removing the need for them to think about how they can figure out the answer to the question. I observed two of the pupils at table 1 doing this. That being said, in a later update of the app, the issue was remedied. As the lesson went on, the behaviour of the pupils really stood out to me. They were so engrossed in completing the tasks given that there was not an instance where the teacher experienced any major disruptions from the boys typically tended to be disruptive in the classroom. According to Coulby and Harper (2012), boys are three times more likely to be disruptive than girls in the classroom. Further to this, they argue that the way in which a teacher presents the lesson can have a significant impact on the chances of pupil disruption. In summary, whilst the above lesson was an example of where the pupils were fully engrossed. It is possible to argue that this may have been down to the thorough way in which it was prepared and carried out.

4.4.1 The impact of the iPad on pupil confidence

As previously mentioned in this chapter, Clark and Luckin (2012) found that iPads worked to increase the confidence of the pupil using it. This sentiment is further echoed by other commentators such as Heinrich (2015) who revealed that students found the iPad easy to manipulate, thus increasing their level of self-confidence. There have been several lessons in which I found that the pupils showed a great deal of confidence when using the iPad. More specifically, some of these pupils that I observed were pupils that would normally shy away from participating in lessons either due to linguistic barriers or that they did not feel confident that they would be able to complete the task presented to them. In a numeracy lesson on 14-10-14, the class took part in a lesson where they were required to input the correct set of

instructions in terms of 90 degree angles in order to guide to robot or Bee-bot to the correct square on the grid. The idea of the lesson was to reinforce the pupils' understanding of right angles and turns. For an extra challenge, the pupils were timed by the Bee-bot app and then awarded a 1, 2 or 3-star ranking based on how quickly and efficiently they were able to guide the Bee-bot. The activity was differentiated based on the complexity of the course. The less able pupils started on simpler courses such as this:



Figure 4A: The lowest difficulty activity.

In the above scenario, the pupils were only required to make one 90 degree turn. The app requires the pupils to input all of their instructions in the correct sequence before commencing by pressing the 'GO' button. Also, the previously mentioned timer is located on the top right hand side of the screen. I observed that the pupils with English as an additional language showed a great deal of confidence when taking part in this activity. Normally, some of them would tend to remain quiet or try to avoid the

work as much as possible due to a lack of confidence. In this lesson however, they not only showed a great deal of confidence, but also enthusiasm for the activity. I overheard Andrea say to Lisa,

“Go! Go! Go! Go up, up, turn, this way” (Field recordings and notes 14-10-14).

I found this most remarkable as Andrea usually remains quiet during lessons and very rarely speaks and is usually hesitant to openly answer questions. However, during this session, she was most vocal and showed a degree of confidence that I had not seen from her before. I proceeded to ask her how she felt about the activity and she replied,

“It’s easy, it’s easy, you go up, up, turn, go this way and go this way and you got it” (Field notes 14-10-14).

The above statement clearly shows a great degree of confidence. When I asked her how she felt about the iPad, she replied,

“I like, I like, it easy, touch it and it go” (Field recordings and notes 14-10-14).

Once again, it was clear that the iPad gave her a sense of self-confidence that she usually did not have in other lessons where the iPad was not used.

Moving onto the middle level activity, the pupils had a somewhat more challenging activity where they were faced with a similar task, but there were much more steps involved and four right angle turns instead of one. Similar to the previous group of children, these pupils also showed a great deal of confidence and enthusiasm towards

this activity. What was interesting was that the device showed the pupils through colourful animations when they made the wrong turns or inputted the incorrect directions. This instant correction meant that the pupils were able to immediately correct their approach. I observed two of the pupils Ahmed and Samir talking to each other. Ahmed said,

“You’ve got to count the number of steps including the ninety degree turns, but the turn doesn’t move you a step, it’s easy!”

Samir then replied,

“I know, if I get it wrong it’ll give me another chance to start again, I’ll get it don’t worry” (Field notes- 14-10-14).

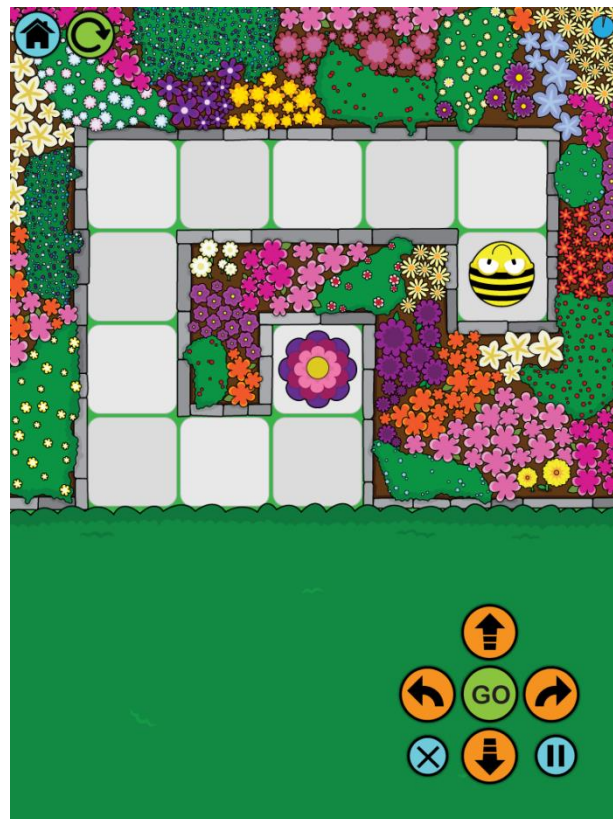


Figure 4B: the medium difficulty activity.

From this point, it was clear that they felt a great deal of courage. This was to the extent that if they make mistakes the device gave them the confidence to immediately try again without the fear of any consequences. This is something that ordinary paper based notebooks cannot do. This is in no way arguing that paper-based notebooks do not have their place in education or that they should be removed. Whilst it is possible to counter-argue that the teacher can walk around the classroom and address problems with mini-plenaries, the iPads are able to address mistakes immediately whereas the teacher and teaching assistant are not able to address the problems experienced by all of the pupils with such immediacy. This was clearly a great benefit that these iPads bring to the classroom. In an interview with one of the pupils Simon, when asked about how the iPads made them feel, they replied,

“You know yeah, the iPads yeah you find out if your answer is right straight away. I love it when I get things right on it coz its fun. I feel good when I get answers right on it. I ain’t gotta wait on it with my hands up in the air like I do with the teacher when I want to know if I got it right. Sometimes I feel a bit scared to say my answer out loud coz sometimes people laugh if you don’t got it right innit? The iPad just shows me when I got it wrong so I don’t feel silly. It makes me less scared of trying out something in case I get the wrong answer. It’s quick. That way, I can try to fix my mistake if I make one. Sometimes it’s a really silly mistake” (Interview recording and notes- 9-12-14).

From the above interview it was clear that the use of the iPad raised the confidence of that pupil as it was able to allow him to try out a variety of approaches to problem solving without fear of getting it wrong and having to wait for the teacher to verify

whether his answer was correct or not. As discussed in chapter two of this thesis, Carpenter et al (2013) also noted that there are several iPad apps that offer the pupil the opportunity to try to answer questions without feeling anxious about whether the teacher or their peers may hear their answer.

I walked around the classroom and observed that the general atmosphere was one of great confidence where all of the pupils appeared to be deeply engaged in their efforts to overcome the challenges presented to them. Moving onto table 1, which is the table that received the most difficult task according to differentiation, I observed a similar situation to the previous tables. All of the pupils there showed a great degree of confidence despite struggling to work their way through the activity.

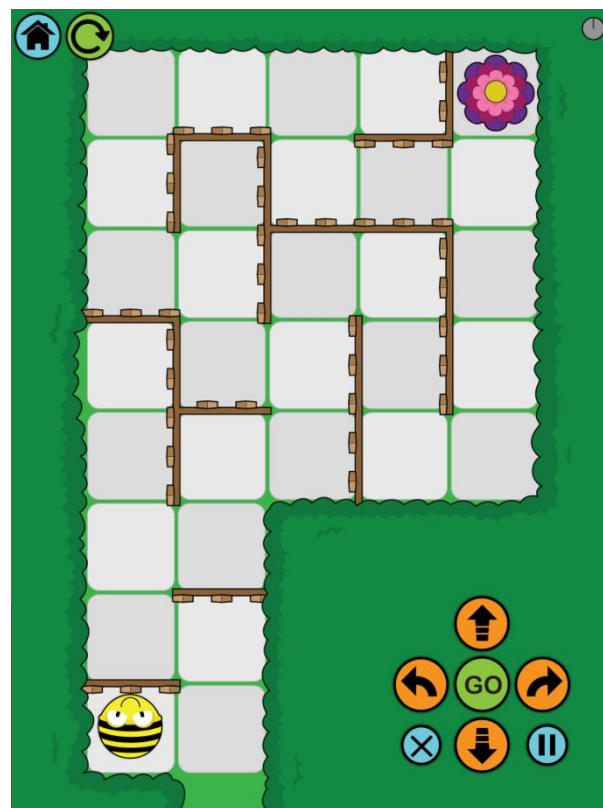


Figure 4C: The highest difficulty activity.

In their activity, they were presented with multiple routes to the goal, but also multiple dead ends. There was a great debate between the pupils on the table as a group as to which route would be the fastest as it was a timed activity. Overhearing a conversation between Alex and Mark, Alex said,

“There are so many different ninety degree turns we could take, look some of them lead to dead ends. If you look really closely, you can see that the quickest way is the one with the least amount of steps! I’m sure!”

Mark then replied,

“I’m sure too, if you take too many steps, the more steps you have to go across, the more time it takes for the Bee-bot to get there. I counted 17 steps as the shortest way” (Field recordings and notes 4-10-14).

They then proceeded to talk to their peers on the table comparing which route they felt was the quickest to get to the flower. It is this sort of heated discussion, in my opinion, shows me that these pupils were not only engaged by the activity, but they also felt confident in their answers. As noted in chapter two, Williamson-Leadley and Ingram (2013) found that on average the pupils were far more engrossed and engaged with iPad apps as compared to the use of traditional paper notebooks.

Once the main activity was completed, the teacher brought the pupils back to the carpet where she started the plenary. The idea behind the plenary was for the pupils to present their routes on the smartboard. The teacher used the lollisticks to randomly select the pupils and then they came to the front of the class to present their instructions and route. Through the use of Apple’s AirPlay, the screen on the pupils’

iPad was mirrored onto the smartboard and from there the pupils took turns explaining the instructions that they gave to the Bee-bot and why they felt it was the fastest route.

It was during this segment of the lesson that a pair of EAL pupils came up to the front of the class first. I was surprised to see Andrea as in the past whenever she was called upon to come up to the board, she had often become very upset and refuse to leave her seat. What was remarkable was that she volunteered herself and waved her arms around hoping that the teacher would choose her name from the lollisticks. What was even more impressive was that despite the language barrier, both of the pupils, who typically tend to shy away from raising their hand and explaining anything out loud to the class could not wait to go up and explain their work. Once at the front of the class, they clearly explained how they instructed the Bee-bot to get to the flower well within the time limit.

Once they were finished presenting, a pair of middle ability pupils came up and presented their work with a similar amount of confidence and enthusiasm. What became clear to me was that all of the pupils were keen to go to the front of the class and present their work. This was not something that typically happened during lessons without the iPads. As previously discussed in chapter two, Riconscente (2013) also found increased the self-confidence of pupils and improved their general attitude towards learning when pupils used the iPad.

Once the lesson was complete and the pupils went off to have their lunch, I went out to the dining hall and had my lunch with the pupils so that I could get even more feedback as to how they felt about the iPads and more specifically how it made them

feel. As I started to ask them their thoughts, it became very difficult to grasp what they were saying as they all stood up and with great enthusiasm and excitement started telling me about their experiences all at the same time. It was at this point where I had to calm them down and then speak to them one at a time. In summary, it became very clear to me that not only did they all have positive feelings towards the iPads, but that being able to carry out and present their work using the iPads gave them a sense of self-confidence.

4.4.2 Pupil engagement with e-books

During the course of this research project, I observed that most of the textbooks that the teachers relied upon were not available on the iPad either via the Kindle app or via the iBooks store app. As previously discussed in chapter two, Berge and Muilenburg (2013) also found that one of the key challenges that schools faced when introducing and using iPads was the issue of the availability of e-books. In many of the lessons that I observed, the teachers had to seek alternative means in order to use the information from a text on the iPad. In a few lessons, I observed one of the Year two teachers taking high resolution photos of the textbook pages and then allowing the pupils to annotate them on the iPad. In one particular numeracy lesson, the teacher took photos of each of the relevant pages instead of making photocopies of them. The pupils were then able to annotate the pages so to show their working and answers. During this lesson, I observed that the pupils generally understood what was required of them and were able to add both single and double digit numbers to other double digit numbers using the column method. For this lesson, the pupils were provided with a capacitive stylus although some opted to use their fingers.

There was one iPad per pupil. The pages were stored on the school's cloud drive and the pupils were able to retrieve them via the MyCloud app. What was interesting was that the teacher opted to make thirty copies and named each one of these. What this meant was that each pupil had their own copy of the work. The task was also differentiated so the pupils received their respective tasks. As I was walking around the classroom, I observed that many of the pupils despite having their own iPads were working with the person next to them. I overheard one pupil say to the other,

“This is sick! This is way easier than having to use a rubber whenever I make a mistake. Plus I can use different colour writing for each question, that way I don't get mixed up anymore” [Sick is a slang meaning great] (Field recordings and notes 6-11-14).

Overall, it appeared that the pupils were quite keen on doing the tasks that they would typically do in their textbooks on the iPad. As I walked around, I observed Andrea talking to Lisa about the different answers that they had gotten for the third question. Their body language suggested that they were deeply engrossed in the activity and they showed a keen interest in solving the problem in order to determine which one of them was correct. Moving onto table one, the pupils on this table were presented with the most difficult form of the differentiated task. These pupils were in discussion with each other as to how they could solve the problem and then check their answers by subtracting one of the numbers from the answer.

All went well until the teacher instructed the pupils to save their work. Some of the pupils were able to save their work and hand in their iPad without any issue. However, some of the pupils had great difficulty saving their work. One pupil put

their hand up and complained, *“Miss! My iPad’s stuck! I can’t save my work!”*(Field notes 6-11-14) After she said this, three other pupils made similar complaints. In an effort to remedy the issue, the teacher stopped the pupils and instructed them to save their work one at a time. At the same time, she opened the cloud drive via the desktop computer to check that their work had been saved. Once this had been done, the teacher moved onto the plenary where she went over the task with the pupils and selected a few of them to go up to the board to answer some of the extension questions. After the lesson, I spoke to some of the children and then the teacher and teaching assistant later that same day. In chapter two, An (2014) noted similar problems in their research. They argued that these issues occurred due to the network infrastructure.

I approached a group of Year two children, Mark, Lisa, Samir and Simon and I asked them about their thoughts on the use of the iPad in the lesson. They all responded to me enthusiastically, shouting over one another. As a result of this I had to ask them to speak one at a time. I first pointed to Mark who responded,

“Yes! It’s so cool how I can write on the screen and do my workings out there too. It’s just more interesting, you know” (Mark’s interview 2-2-15).

Lisa added,

“I love it, but I don’t know why it’s more interesting. I know it’s the same thing we always been doing for the past million years in our green numeracy books, but I don’t know, It’s just more fun to do it on the iPad” (Lisa’s Interview 2-2-15).

Moving onto Samir, the response was somewhat different, Samir responded,

“I don’t really know. I liked doing it on the iPad, but I didn’t like how the iPad kept freezing up whenever I wanted to save my work. I really found the work hard and it would really hurt my feelings if I had lost all of that work. So I don’t know how I feel about it. I mean, I really like using the iPad and it’s always fun to use, but I can’t lose my work in a book unless I lose the book”
(Samir’s Interview 2-2-15).

Simon added,

“But Miss saved all of our work so I guess it was alright in the end. It was minor though, I want to do all my work on the iPad, can you ask Miss to let us use the iPad in all our lessons from now on” (Simon’s Interview 2-2-15).

Later that same day, I had an opportunity to speak to the teacher and the teaching assistant to get their opinions and perceptions on the use of the iPads in the lesson along with the use of the cloud storage. The teacher replied,

“I think it went well, the children are always very keen on using the iPads for anything and everything. They just love technology. I got the idea of taking the photos of the pages when I realized just how much paper I would need to use to make the photocopies for the entire class. That’s one of the things that the really makes the iPad an asset to us. I mean it takes less time and wastes less resources simply making digital copies with their names on it and then having them pull it up on their iPads and start working on it. On paper the idea sounds really good, but when it came time for the children to save their work, some of the children really had a hard time trying to get their work saved. For

a moment I actually thought that I had lost a couple of the children's work. Thankfully, the iPad eventually unfroze and we were able to get it saved. I know that the ICT coordinator says that they're working on improving the school's wireless so that this problem doesn't keep cropping up, but it just seems like they've been saying that for ages. Coming back to the iPad though, the children all were very engrossed in the activity and even little Andrea was able to get onto the extension activity and she clearly understood what was going on. The iPad definitely holds their attention a whole lot better than I would on my own. Thinking about the cloud thingy, it doesn't really work as well as it should, but it's really useful for saving the children's work though as well as saving photographs as I can access it from pretty much anywhere. I can even use my iPhone to access it and I can download the work onto my phone and read through it without having to leave my seat. This is all well and good but it would be so much easier if all of the textbooks that we use with the children were available on the iPad. And it's not that I haven't tried looking for them! Had they been available on iBooks or Kindle, I would not have had to resort to taking photos of the pages that I needed so that it could be used in my lesson. This is a real hurdle that the iPad faces and it needs to be overcome if the iPad is to be successfully implemented in schools and to be used by teachers" (Hannah's Interview 2-2-15).

The above links back to the issues faced by one of the Year 2 teachers concerning the wireless network and its ability to handle the traffic produced by all of the iPads working simultaneously. As noted in chapter two, Audi and Gouia-Zarrad (2012) also noted that the technological infrastructure of an institution, more specifically the wireless network is a major factor that can affect the effectiveness of the iPads.

The teaching assistant for that lesson offered a similar opinion to that of the teacher, she said,

”The kids absolutely loved it. It’s amazing how even the simplest things done on the iPad seems to really capture the attention of the children. Then again, when you think about it, it’s the time in which these children were born, technology is all they know so of course it’s not surprising when they are immediately familiar with it as soon as it’s presented to them. What really stands out to me is how it really seems to without fail bring out the confidence of those children that would normally remain quiet or say very little due to lack of self confidence. Look at Andrea, she never says a word to any of the other children during the lessons or on the playground. The first time I really heard her spring to life was when we first started using the iPads. I know that for children that have English as a second or third language it can be very hard for them to feel confident in speaking openly, but with her what I’ve seen is that she just goes for it when she has an iPad. She tries different ways until she figures out what something means, it’s almost like it’s the bridge between Andrea and her self confidence. I think if not for anything else, it’s for the fact that the iPads really help some pupils to feel more confident about experimenting. Also, I think it’s the way the iPad can when you’re using an app respond to the child instantly, so they know if they need to try again or not. In this lesson there wasn’t that feature as it was just a picture of the textbook. That’s another thing, the photocopying was always a real burden for me as I would have to queue up for the photocopier each morning, make sure there was paper and toner in it. If there wasn’t then I was in for a really long morning as I’d have to chase up either the ICT coordinator or the secretary

for a new toner cartridge and then go try to change it myself if they're busy. I really like the page of work can be shown on all of the iPads, that really saves me a lot of time and hassle and also it saves paper. Good for us and good for the environment''(Gemma's Interview 2-2-15).

From the above interview with the teaching assistant, she raised several relevant points such as the preservation of paper and photocopier resources, the saving of time and the boost in confidence of some pupils. I must say that I too have seen many instances where the use of the iPad increased the confidence of a pupil that generally would not say much in the class. This links back with a point made earlier in this chapter where I argued the idea that the iPad behaves as the knowledgeable other. Therefore the iPad is able to act as the bridge between the pupil not understanding a concept where the pupil is seen to be in Vygotsky's Zone of Proximal Development and the point where the pupil fully understands the concept and is able to independently work without the need of external assistance. Despite this advantage, another point raised by the teacher was the lack of necessary textbooks being available on the iPad. The fact that the teacher had to take photos of the pages of a book meant that a lot of time and effort had to be spent preparing for this lesson. Not only have I observed this, but in many of the conversations that I have had with staff members, this was raised as an issue of concern. In response to similar concerns, Kucirhova (2014) contends that as time progresses, this should become less of an issue as electronic books are progressively becoming more widespread. In summary, whilst the potential for the use of e-books was deemed to be great both by the staff members and commentators such as Kucirhova (2014), there are a number of criteria they need to fulfil first before the potential of e-books could be fully realised. These include the widespread availability of textbooks as noted by Berge and Muilenburg

(2013) and the staff members as well as a sufficiently robust network infrastructure which can successfully facilitate the use of the iPads to access these e-books. (Audi and Gouia-Zarrad, 2012)

4.4.3 Capturing and engaging the pupils through the use of the iPad's apps.

In the first lesson, I was the teacher of the lesson. I started by recapping the various events that occurred in 1666 through the use of a video and through the use of the school's shared cloud drive, I directed the children to access a resource that I had made for them. This resource was made up of two paragraphs and a number of bullet points followed by a series of questions. This was done so to be sure that all of the pupils would be reminded of all that they had covered in the topic over the past term. The quiz aspect of it was done on the iPads and it was in the form of an interactive quiz that I made using the Socrative app.

From the atmosphere of the class, it was clear to me that the children were enjoying the quiz and competing with each other to see which one of them could get the highest score on the quiz. Moving from table to table, I walked around the classroom to get a better idea as to how the pupils were getting on with the task and to gain a clearer picture as to their perceptions of the iPad. Starting at the first table, I overheard two pupils talking to each other,

“It's my turn, it's my turn! It's the second answer, it was Samuel Pepe who wrote about it. I know the answer” (Field recordings and notes 2-7- 15).

There was a great deal of enthusiasm as the pupils discussed the answers to the various questions. The pupils were given a series of multiple-choice questions where

they were required to select the answer that they believed was correct. The pupils worked in their pairs to do this activity. Moving onto the second table, the situation was very similar to that of the first table. There was a great deal of enthusiasm and all of the pupils worked very well together. At table three, I observed that the pupils that typically do not engage in conversations such as Andrea, were in heated discussions with each other as to what they thought the right answer was. One key benefit that the app offered is that it showed the pupils immediately when they selected the wrong answer and then redirected them to the part of the text where they might find the correct answer. Further to this, I found that despite the language barrier, the EAL pupils in my class that struggled with English were just as eager as the other pupils to complete the task. I asked Andrea, an EAL pupil that rarely speaks out her opinion on the task and she replied,

“Mr Brazer, I love it! See, it tell me when I am right, I don’t have to wait on answer from anyone to see if I get it right. If it not right, I make it right no help from anyone. By myself! I don’t always know what it asking me to do but it show me where to get answer from to answer question if I don’t know”
(Field recordings and notes 2-7-15).

From her body language alone it was clear that she was very enthusiastic about the task and was enjoying it. Further to this, her response made it clear that despite not being to fully understand specifically what the question was asking that the quiz would guide her to the section that she needed to look at in order to retrieve the answer to the question. Andrea showed a degree of confidence that I do not normally get from her. She is normally very quiet and does not say much to the other children. This is even the case in the playground where she often plays on her own despite

encouragement from other children to join them in their games. However, from the above evidence, it is clear that the iPad has assisted to boost her confidence in speaking. In support of this finding, commentators such as Bohl and Hoult (2016) have also noted that there are a variety of apps on the iPad that have been found to help the pupil develop their confidence.

Following this, the Socrative app was then used to test the knowledge of the pupils. Also, I wanted to use it as a means of recapping and consolidating what the children had learned over the past few weeks. What made this quiz different from the one done on the previous day was that this quiz consisted of questions that covered the entire half term's work concerning the topic.

I found the Socrative app to be one of the easiest to use to get this set up. I was initially set up the teachers account. Once I was able to get a unique virtual room, I then added the pupils by giving them the unique room number. Once all of the pupils had joined the room, I was then presented with four options:

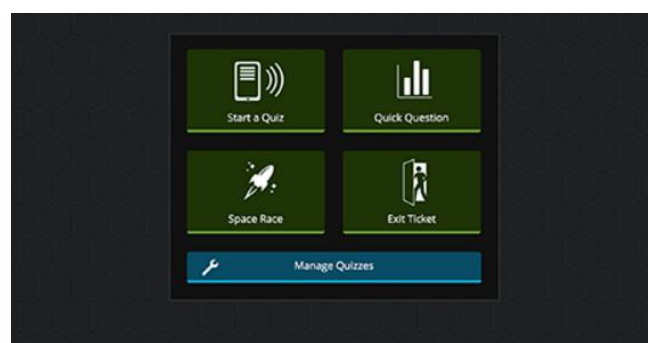


Figure 4D: The Options screen on the teacher's dashboard

The Start a Quiz option was the one I was most concerned with as I had already created my quiz beforehand. However, had I not done this and it was just an impromptu activity, the Quick Question option catered for this. Whilst the questions may not be as in depth or well thought out as if they had been prepared beforehand, the Quick Question option would let the user set the question by selecting between multiple-choice, true/false or short answer type responses. In the case of my lesson, I had already prepared a quiz with both multiple-choice and true/false answers. The Socratic app allows for the user to either give the questions orally or to have the questions displayed on their iPads. In the case of my lesson, I opted to have the questions displayed on their iPads. Once the students answered the questions, I was able to use the app to see their responses and scores. More specifically, as the pupils submit their responses, they were automatically shown in the teacher dashboard.. From this point, I had the option to either show them to the pupils or keep them to myself. I showed them to the pupils. As a result of this, each time we did a question, the votes showed on the board.

This activity proved to be quite exciting for the pupils as they could see their vote change the counter on the board. Many of the pupils shouted for joy when the answer that they chose was the most popular choice and the correct answer. In the case of my lesson, the most popular choice was always the correct answer. After this lesson, I had a conversation with four of my pupils and the teaching assistant to get a better idea as to their perceptions and feelings concerning the iPads use in this lesson.

I selected four pupils at random using the lollisticks (*Lollisticks are used to randomly select pupils*). These pupils were Simon, Lisa, Andrea and Ahmed. What I felt was

great about this selection was that it was representative of a wide range of attainment levels in my class. I sat down with the four pupils and asked them first about their feelings concerning the iPad being used in the class.

Me: *What do you think about the iPad being used in the class?*

Simon: *Can I answer first?*

Me: *Sure.*

Simon: *Well, you see, it's just a lot of fun to use in class. I still can't believe you guys let us use it in the class. That's cool!*

Ahmed: *It's like we're doing work yeah, but it's actually really fun. I loved how we got to do that test quiz!*

Lisa: *I hate tests, but that one we did on the iPad was fun, can we have all our tests on the iPad. I'm always scared when we have tests, but this time I wasn't scared at all, it was just so much fun. I want to do it again!*

Andrea: *Me too! Easy test. It was easy! Fun!*

Me: *What else did you think about the use of the iPad in the lesson? Feel free to tell me all the things you liked and disliked as well.*

Simon: *There wasn't really anything that I disliked. Well...There was one thing, lunchtime came too soon. Couldn't we skip lunch and continue working on the iPads?*

Ahmed: *Yes! Why did we have to stop? I could have easily continued all day doing quizzes. Oh, and I could have done another presentation. Can we do presentations on everything we do in History?*

Lisa: *I would like that in Geography as well. I could do a really cool presentation about my country.*

All children: *Yeah!*

Ahmed: *I could tell you loads about my country!*

Andrea: *It easy to use iPad than writing all the time.*

Simon: *Yeah! The iPad makes it super easy to do your work. What if we could do all our work on the iPad, think about how easy it would be.*

Ahmed: *The iPad is great for doing work, but there are still some things that I might still want to use my books for.*

Me: *Ahmed, can you give some examples?*

Ahmed: *Things like say maths. When I gotta do my workings out I just find it easier to use a pencil but I know that you can use the iPad for that too. It's just how I feel.*

Simon: *It's writing for me. I love the iPad and I would do everything on it, but I still have a little bit of trouble typing on the keyboard. You know, the little grey one that comes up at the bottom of the screen whenever you're typing. I think it's just me, I'm just really slow with typing when it comes to typing on that.*

Ahmed: *Me too! Yeah, It's hard to type on that keyboard sometimes. It's just so slow. I've got a cousin who can type real super quick on it though, so I mean I've seen people who can use it really quickly.*

Lisa: *Yeah, have you seen Mr Brazer type! It's wicked fast!*

Ahmed: *Yes, I've seen him too, How does he do it?*

Me: *With practice I guess. What were your thoughts on the use of the iPads when doing your presentations. Both for when you were preparing your presentations and when you were actually presenting it.*

Andrea: *I don't feel scared when using iPad in front of class.*

Me: *Why's that?*

Andrea: *It like having a friend to help me.*

Ahmed: *I see what you mean Andrea. The thing is, it feels like the iPad does a lot of the work for you. When I was showing my presentation, I didn't really have to say too much as the iPad showed what I wanted to say.*

Simon: *Yes! You got to put everything you wanted to say, plus I added a whole lot of stuff to make it much more interesting.*

Lisa: *Yeah! Like that little video, that was pretty cool. The pictures you had were cool too. I liked that, I wish I had thought of that.*

Ahmed: *Remember when we did something sort of similar to this in Year 1?*

Lisa: *We used the Toshiba laptops for that.*

Andrea: *Bleh! Boring that was.*

Me: *Was it a presentation?*

Ahmed: *Yeah, we did it on our Christmas holiday.*

Simon: *But the laptops kept dying and didn't last long enough for some of us to finish so a lot of people couldn't show their work because they didn't have any work to show.*

Lisa: *Yes, only a few kids got to show their stuff and then it wasn't really that interesting.*

Simon: *On the iPad, it just makes it really easy to make a really awesome looking presentation without having to work too hard.*

Lisa: *Yeah, it's just more complicated and harder on the computer to do the same thing. Plus you can't touch the screen.*

Lisa: *The iPad just feels more normal to use.*

Me: *What do you mean by normal?*

Simon: *I think she means it feels natural to use.*

Lisa: *Yes! Natural.*

(Pupil Focus Group 3-7-15).

From the above conversation with the pupils, several key points were raised. The first point was enjoyment. The pupils showed that one of the reasons why carrying out tasks on the iPad was more interesting for them was because they enjoyed using the device. As previously discussed in the Literature review chapter, Wise (2015) in his research project, he found that even when used with the most “*distracted and attention deficit student*”, the iPad was able to keep them engaged and they were able to enjoy the process of learning (p.5). In the case of my lesson as well as many other lessons that I have observed, I have found the iPad to be a device that the pupils enjoyed working on and due to this enjoyment, it is possible to argue that they became engaged in the learning process.

The second point that was raised was the difficulty that they had using the onscreen keyboard. According to Gliksman (2014), whilst the onscreen keyboard may be difficult at first for the pupils to use but after a while, it typically becomes easier for the user to use the keyboard. Further to this, Gliksman adds that voice commands and oral dictation may be used in conjunction with typing on the iPad. Personally, I have found this to be true. After a few months of use, I became very confident with using the onscreen keyboard. The pupils in this interview also observed this fact.

The third key point that stood out to me was the ease of use. Some of the pupils even attributed this ease of use to what kept them engaged in the activity and also what made them feel confident about presenting their work using the iPad. Some of the

pupils made a comparison with an experience that they had doing a similar task on a laptop and they felt that the touch driven interface of the iPad along with its operating system made it easier for them to get tasks done. Some theorists such as Hess(2012) argue that the iPad is easier to use than a laptop due to it is touchscreen, lightweight and portable nature (p.53).

Following up on this conversation with the pupils, I had a chance to have a chat with my teaching assistant to get her views on the use of the iPads in the lessons. She replied,

“I really liked the quizzes. The children really enjoyed doing the quizzes and I felt that it really helped to consolidate their knowledge. Above all, that was a really outstanding lesson. The children were all focused and on task, but at the same time, they weren't this way out of fear of punishment but they were this way because they were really having a good time and they were getting the work done at the same time. Not a single one of them failed to achieve everything on the success criteria. Also, when they were presenting their presentations, did you see how proud some of them were to show off their work? The iPad helped give them a sense of confidence that some of them didn't or wouldn't have had otherwise. Also, it's not bulky and hard to use like the laptops are. They're really easy and intuitive so that the children are able to get on task quickly. Everything you need is at your fingertips. I used to think that the children would just mess about or try to play games on it but I'm surprised they really just got right down to work and got their presentations done. Even the weaker pupils who normally struggle just got on with it. There is really a newfound sense of confidence when they're using the iPad. It would

appear as though it gives them a sense of security that they otherwise may not have gotten” (Gemma’s Interview 3-7-15).

In summary, it was clear from the above discussion with one of the Year 2 teaching assistants that she shared a similar view to that of the pupils in that she saw the iPad as not only engaging but as a device which helps to build the self-confidence of the user due to its ease of use. These findings are in line with the arguments of commentators such as Gliksman (2014).

4.4.4 Collaboration, the iPad and cloud services

In the case of the school that this study took place in, there were a variety of cloud services that were used. It was important to note that these cloud services were primarily used through the iPads with the exception being when the pupils were at home, some of them used their laptop or desktop computers to make use of these services.

One instance of this was particularly evident in a series of lessons that I carried out. One of the pupils in my classroom left in October to go to their home country. She spent approximately three months away from the classroom. During this time, I was able to upload the activities that I carried out in the classroom onto Google Docs along with instructions on how to carry out the tasks. On a daily basis, I would upload copies of the work and I found that usually by the next day, the tasks were completed. Whilst these tasks mainly consisted of numeracy and literacy, I also uploaded Geography, history and science tasks at least once per week. What I found was that the tasks were normally completed by the next day and usually at a high standard. Further to this, she would leave comments about the parts of the work that she had

difficulty with and I was able to add comments of my own offering a more in depth explanation as to how the particular questions can be solved. There were only three occasions where I did not receive work from her on the following day. These were usually because she was unable to access the internet due to the lack of electricity.

After the time had passed and she returned to the school, I assessed her and found that she was performing at age related expectation. What this essentially meant was that the period of time away from the school did not have a great adverse effect on her performance.

In the past, I have had pupils that have left to go to another country and when they returned, they were usually substantially worse off as they often did not attend school nor did they do any work during their time away from the classroom. Echoing this, a 2014 study carried out by the House of Commons Education Committee found that there was a direct relationship between educational attainment and school attendance. This meant that high absence from school had an adverse effect on pupil attainment.

Once she returned, I had a brief discussion with her about how she felt about the use of Google Docs. She said to me,

“It was fun to do the work, it wasn’t too hard most times. Most of the times, I was just home with my aunt, so it was something that I got to do. Sometimes, the internet wouldn’t work because there was no power in the whole village, do you believe it, the whole village, I don’t know why. I think the maths was harder to do because sometimes I’d have to do the working on paper and I didn’t always have paper. The literacy was fun, I mean, the reading stories

and answering questions was interesting. I got stuck sometimes on the inference type questions, they were the harder ones. I had trouble doing these sometimes. I know you said to me to use the my own ideas with the story, but sometimes I wasn't sure. I really liked how I could write little notes telling you how what I liked and what I really thought was too hard. The story writing was nice too, I liked how you would put the idea for the story, then I would write my ideas and then you would correct it and then it would help me write the stories. I had fun writing the stories. Did you like the story about the lost cat? That really did happen when I was in my country”
(Arya's Interview 15-1-15).

In summary, it was clear from the above conversation that not only did they thoroughly enjoy the task but the use of the cloud based service, Google Docs helped make it possible for me to set work for this pupil whilst she was out of the country which otherwise would not have been possible and as a result of this she was able to keep up with the class and go on to achieve her target levels at the end of Year 2 in the SATS tests. As discussed in Chapter 2, Keengwe and Onchwari (2016) also found that cloud services such as Google Docs was able to enable pupils and teachers to collaborate despite not being in the same location.

4.5 Attitudes and behaviour of staff

Vu et al (2014) argues that one mistake that researchers, school leaders and to an extent politicians make is that they sometimes fail to take into the account the impact that the attitudes of staff can have on the introduction of new technologies. The perceptions and attitudes that teachers have towards new technologies such as the iPad can also be impacted by the way in which it has been introduced in the school

(Vu et al, 2014). This section aims to analyse the data collected concerning the attitudes and behaviour of the staff towards the use of iPads and cloud services. The following themes will be discussed: the impact of the attitude of the staff, preparing lessons using the iPad and cloud services and what staff felt could be done to make the deployment of the iPad and cloud services more successful.

4.5.1 The impact of the attitudes of the staff

When interviewing staff and observing their attitudes and behaviours, I found that some staff members held a positive and accepting attitude towards the use of iPads and cloud services. However, other staff members held a negative attitude towards these technologies. These will be explored in greater depth below.

Some of the staff held a negative attitude towards the iPad and cloud services and behaved in a manner that resisted the implementation of the iPad. This resistance was sometimes due to reasons such as the fact that they felt that their current pedagogy and way of teaching was fine the way it was and there was also the belief that the iPad was a toy that would only act as a distraction to the pupils in the classroom. Another reason why some of the members of staff opted to reject the iPad was that they did not feel confident about using it in lessons and were concerned with how observers or outside bodies such as Ofsted may perceive its use in the classroom. As mentioned at the start of this chapter, Ofsted's perceptions of the iPad are arguably divided. On one hand, they have praised several schools for effectively using the device, but in some of their reports have expressed their concern that the device may be a distraction to the pupils that use them. Theorists such as Greenfield (2015) have also found the iPad to be distracting to pupils in her research on the device. Further to this, where existing pedagogy was concerned, Greenfield (2015) argues that a school's policy on

education should be based on tried, tested and proven pedagogy instead of what is popular at the moment. By what is popular, Greenfield is referring to the iPad, which she sees as a device that is being implemented purely due to its popularity.

Keengwe (2014) adds that one of the reasons why some may reject the iPad is because of the idea that they may experience great difficulty or challenges when it comes to reliability, operation or a lack of compatibility with other devices that they use. (p.208) Further to this, Ordonez de Pablo (2014) adds that there may exist a variety of preconceived ideas about how the iPad may not be suitable for education and as a result of this, some educators may reject the idea of using them in the classroom. Further to this, the idea that some form of training in how to effectively use the iPad in education may be a deterrent for some when it comes to using the iPad in the classroom. Keengwe (2014) may be possible to argue that one of the reasons why some may reject the iPad is because of the idea that they may experience great difficulty or challenges when it comes to reliability, operation or a lack of compatibility with other devices that they use (p.208). Further to this, Ordonez de Pablo (2014) adds that there may exist a variety of preconceived ideas about how the iPad may not be suitable for education and as a result of this, some educators may reject the idea of using them in the classroom. Further to this, the idea that some form of training in how to effectively use the iPad in education may be a deterrent for some when it comes to using the iPad in the classroom. Keengwe (2014) may be possible to argue that one of the reasons why some may reject the iPad is because of the idea that they may experience great difficulty or challenges when it comes to reliability, operation or a lack of compatibility with other devices that they use (p.208). Moreover, Ordonez de Pablo (2014) adds that there may exist a variety of preconceived ideas about how the iPad may not be suitable for education and as a

result of this, some educators may reject the idea of using them in the classroom. Further to this, the idea that some form of training in how to effectively use the iPad in education may be a deterrent for some when it comes to using the iPad in the classroom.

4.5.2 Preparing lessons using the iPad and Cloud services

The issue of trying to figure out which app should be used when was one that was frequently raised by staff as it regularly occurred when attempting to plan a lesson around the use of the iPad. More specifically, the issue of figuring out which app would best meet the needs of the lesson or best help the pupils to achieve the success criteria. Not only was this issue raised numerous times in interviews, but I have also observed several lessons where the choice of app affected not only the success of the lesson, but also how the teacher and pupils perceived the use of the iPad in that particular lesson. As discussed in chapter two, Younie and Leask (2013) pointed out that the introduction of new technologies usually necessitates that the teacher gains an understanding of how new technologies affect their current pedagogy.

Commentators such as Catapano (2014) also point out this as a point of difficulty and uncertainty for many teachers. He argues that because the Apple AppStore contains such an overwhelming number of apps, it may be difficult for the educator to try each one out to determine which one will best meet their needs. Furthermore, theorists such as Warschauer (2014) argue that even when they think that they have found a suitable app, it may not be able to meet all of their specific needs and as a result they may need to use multiple apps to achieve one objective and these apps may not all be compatible with each other.

I had a discussion with four members of staff on separate occasions on this matter. These members of staff included the headteacher, the deputy headteacher, the computing coordinator, a Year 5 teacher and the Year 2 teaching assistant about this issue.

The headteacher made the following comment on the matter:

“We’ve spent quite a bit of money investing in these iPads and these iTunes things so that we can get the apps on the iPads. I’ve been talking to a lot of the teachers and staff and hearing things too, there seems to be a problem where they’re not always able to get the right software to support the lessons that they want to teach. I appreciate that it’s quite cutting edge technology and that there probably won’t be a one stop shop app that does everything for us, but still, I think some teachers have to spend too much time trying to figure this out. I’ve spoken to the computing coordinator on the matter, but she doesn’t seem to have a solution that completely alleviates this matter. I think this is a real problem that the iPads have and that we’re facing and I’m not sure it’s one that had I known about it before I would have invested in these iPads” (Scott’s Interview 10-3-15).

As noted in chapter two, Keengwe (2014) received similar feedback in their research. Keengwe (2014) felt that it might be possible to argue that one of the reasons why some may reject the iPad is because of the idea that they may experience great difficulty or challenges when it comes to reliability, operation or a lack of compatibility with other devices that they use (p.208). Further to this, Ordonez de Pablo (2014) adds that there may exist a variety of preconceived ideas about how the iPad may not be suitable for education and as a result of this, some educators may

reject the idea of using them in the classroom. Further to this, the idea that some form of training in how to effectively use the iPad in education may be a deterrent for some when it comes to using the iPad in the classroom. Additionally, the idea that some form of training in how to effectively use the iPad in education may be a deterrent for some when it comes to using the iPad in the classroom.

Following the conversation with the headteacher, I then spoke to the computing coordinator on the matter and this is what she said,

“I know it’s a problem facing the staff at the minute. I am trying my best to get the right apps, but there isn’t an app for everything. I have tried to communicate this to staff members but some are insistent on having an app for every single occasion and every single lesson. This just isn’t possible! There are however apps for quite a number of applications. I’m also aware of the lack of textbooks on iBooks and the Kindle store, but there really isn’t much I can do on the matter! I want to say that the iPad is in its infancy, but it’s been out for almost five years now. It’s a great tool, don’t get me wrong, it’s just that people and staff need to accept that it’s not the do-everything tool that they were hoping for. It’s just that, a tool. It’s meant to be used as a tool in lessons, it’s not meant to replace the lessons! Taking into account all of what I’ve just said, I will make this admission- There are still a number of apps out there that I still haven’t found yet that may well meet the needs of the teachers and students. This is why I have encouraged the staff to do some exploring on their own and inform me when they find anything they think that could be a worthwhile investment. Beyond that, most of the staff don’t seem to realize that the iPad is not a direct replacement for the laptop. The laptops run

Windows and the iPad uses iOS which is Apple's system. They seem to expect that all the stuff that worked on the laptop would somehow just work on the iPad. That's not how it works. They're not cross-compatible with each other in that way. This is why some of the favourites such as Big Cat Phonics, Clicker 6 and others still need the use of the laptops as they are Windows applications. I've tried explaining this to the staff, but I'm not sure they get it! Then there's the thing about using their USB stick on it. Do you believe it? I've had complaints from staff members that want to plug their USB stick into the iPad. I wish they'd just take the time to understand the device and its limitations"

(Kay's Interview 10-3-15).

From the above discussion with the computing coordinator, it was clear that both the headteacher and the computing coordinator perceived the lack of apps for every application as a weakness of the iPad. Further to this, discussions with the Year 5 teacher and the Year 2 teaching assistant confirmed that this was a widely shared view held by many members of the staff. Further to this, a reasonable point is raised when the Computing Coordinator argued that the apps on the Windows based laptop cannot directly work on the iPad as they are not only using two completely different operating systems but are also not compatible with each other in this manner. Provan (2015) points out that not only are Windows applications incompatible, the iPad is lacking a USB port. This was a point raised by the computing coordinator as a drawback and a complaint that she received from staff members. One of the Year 5 teachers held an interesting perspective on the matter. She said,

“We really don’t have a lot of apps that can do all of the things that we would like the iPad to do. But, I don’t blame the iPad, I think had the school invested in a consultant or had someone trained in this matter to setup our apps for us, this would be less of an issue. I say this because look at some of the other schools, they get on just fine with their iPads. I hate the way they try to place all the blame on the iPad. I admit, the AppStore isn’t perfect, but it’s better than what the computing coordinator is trying to make it out to be. I’ve been able to find useful apps and suggest it to her, she just doesn’t listen and as a result of this the apps that I find don’t find their way on the school iPad. We really need to be able to install apps on our own”

(Monica’s Interview 10-3-15).

Whilst the Year 5 teacher agreed with the view that the lack of apps that meet the specific needs of the teachers is a weakness of the iPad, she felt that this weakness was exaggerated by the inability of staff to install apps onto the iPads themselves and the alleged hesitance of the coordinator to install the apps that are suggested to her. Adding to this, the Year 2 teaching assistant commented,

“It’s not just the apps, no one has trained us on how to use these things effectively! I mean, it’s one thing when as you asked, there are aren’t apps that cover every single thing that a teacher wants to do, but I have to also figure out how the app works whilst working with a child or group of children. This makes it doubly worse for the staff. There really needs to be some training on how to really effectively use this and I think this in turn may assist the app problem that we are also having” (Gemma’s Interview 10-3-15).

Despite being almost twenty years old now, Attewell (2001) contended that the training educators receive, along with their own insecurities, perceptions and attitudes towards new technologies can be the difference between the success and failure of the introduction of a new technology in a school. I argue that the above responses from the members of staff echo Attewell's (2001) findings on the introduction of new technologies.

4.5.3 What do staff think can be done to improve the introduction of iPads and cloud services in the school?

The previous discussions with the various members of staff raised several concerns about the iPad. These concerns looked at the perceived limitations of the use of the iPad in the school. In an effort to gain a better idea as to what they thought could be done to make the deployment and use of the iPad in the school more successful, I carried out a focus group with four members of staff. - the headteacher, deputy headteacher, computing coordinator and one of the year 4 teachers.

***Me:** What do you think can be done, has been done or should have been done to make the deployment of the iPads in the school more effective or successful?*

***Headteacher (Scott):** It's all very new, so of course there are going to be minor hiccups as the new technology is rolled out into the school. I'm sure after a while they'll iron themselves out. But for the moment, I think a more open mind to the tech and what it can do would greatly aid in it establishing itself as a tool for learning.*

***Deputy Headteacher (Samantha):** I agree, but I also think that there needs to be an understanding that some teachers would already have a set pedagogy*

that works for them and has worked for them for many years prior to the introduction of the iPad. As a result of this, it isn't fair to expect that these teachers would just drop their established, tried, tested and proven pedagogy just to adopt these new technologies because we say so.

Computing Coordinator (Kay): *You see, it doesn't have to interfere with their existing pedagogy. Look at it this way, they already use laptops don't they? All members of staff use laptops, interactive white boards and so on. It's just another tool. There's this common misconception that it somehow has to replace the whole lesson, that it's this all singing and dancing device. Whilst it can be that all singing and dancing device from time to time, that was never the purpose of it's implementation in the school. It really is just a device that supports the process of learning, in the same way the laptop supported the process of learning. It's when you try to have it replace the entire process of learning, as if it's a pedagogy all on its own, this is where the problems arise! On the other hand, I've noticed that some teachers just don't get on with the iPads and don't want them anywhere near their lessons!*

Year 4 teacher (Hayley): *I agree with what you were saying about the expectations, I think that the expectations of the iPad need to be realistic. Also, the school's wireless network needs to be revamped to deal with the all the new network traffic caused by all the new iPads being used all at the same time. I spoke to the technicians the other day about it and they mentioned it as something that needed to be done.*

Computing Coordinator(Kay): *Yes, that is something that we're working on at the moment and I'm sorry if it has caused any inconvenience to you all. Coming back to the point of what could be done to make it more successful, I*

really think that the some of the staff really need to take the time to better understand the device and it's limitations. A better understanding of the iPad would lead to less disappointment as the teachers would then know what it can and can't do. Also, taking more time to understand how they can incorporate it into their planning instead of just dropping it in the lesson any old how and expecting it to somehow magically meet their needs.

Deputy Headteacher (Samantha): *E-books is another thing. Too many of the key books that we use in the school are still not available as e-books. I have been keeping tabs on this and the iBook app still doesn't have them. This is another thing that is holding back the iPad in my opinion.*

Headteacher (Scott): *It doesn't have a USB slot or anything of the sort where you can plug in your camera or usb stick. I've seen that some tablets have that in PC World, but the iPad doesn't have this. This really means that the iPad still needs a PC for moving content doesn't it?*

Computing Coordinator (Kay): *Well, yes and no. Yes as in you can use a computer to transfer work and content. On the other hand, No, in that we have a cloud drive on our network so that files can be moved from the cloud drive to the iPad and back.*

Year 4 teacher (Hayley): *What about training? I think we need to have a few insets or some sort of training on how to use these iPads in our lessons. Or, if it's possible, could we have someone from Apple or a consultant come in and show us a number of apps we can use and how we could use them to enhance our lessons? I'm sure this would be beneficial to the entire staff. I say this as one of the biggest hurdles most of us face is figuring out how we could use the iPad as a tool to enhance our lessons.*

Headteacher (Scott): *That's definitely worth considering. I'm more inclined to support the idea of having an inset as opposed to bringing in a professional, mostly due to our limited budget. Do you think we could make this happen? I mean, do you have time in your schedule to possibly do an inset on this sometime this term maybe?*

(Headteacher looks to Computing Coordinator)

Computing Coordinator (Kay): *I'll have to check my diary, but I'm sure we could work out a date soon-ish. It's worth doing. I see that, but you're going to have to give me some time to get my homework done and look into what new apps are available and how the staff could use them. I'll also have to make sure that the technician installs them on all of the iPads prior to this inset.*

Headteacher (Scott): *That's much appreciated, thank you.*

(Staff Focus Group 8-4-15).

From the above discussion with the headteacher, deputy headteacher, the computing coordinator and one of the Year 4 teachers, it was clear that there were several ways in which the introduction of the iPads into the school could have been better or improved. Whilst these may not be applicable to every single situation in every single school, it is possible to argue that some other schools may face very similar issues. The issues raised included the lack of proper training on how to use the devices, the lack of the necessary text books in the form of e-books in the iBooks or Kindle app on the iPad, the inability of the schools existing wireless network to handle all of the wireless traffic caused by the introduction of the new iPads, the willingness of some staff to include the iPad in their existing pedagogy and the lack of compatibility of the

iPad with the existing Windows based software that the school already owns and uses. These issues will now be explored in greater detail below.

4.5.4 The impact of staff and pupil training.

The lack of proper training was the first point raised. As noted in chapter two, commentators such as Gliksman (2014) found training of staff and pupils to be one of the key factors that stopped teachers and educators from maximizing the use of the iPad in education. It is possible to argue that if the teachers do not know how to use the iPad in their lessons that it is unreasonable to expect them to be able to make the most of it. As a result of this, training is necessary. However, a counter point raised in the discussion was that the teachers have quite busy schedules and it would be very difficult to attempt to fit a training session or several training sessions as the case may be in order to give the staff a better understanding as to how the device can be used to support their lessons. However, this being said, the fact that the iPads have already been implemented, it is also possible to argue that it may be advantageous for the school to make time for training sessions in order to ensure that the staff are able to use the iPad to the fullest of its potential. This point was raised by several staff members,

“How can I possibly be expected to just drop what I’m doing and use the cloud things and the iPad in my teaching if no one has shown me how to use it? It’s ridiculous really. My day is already packed as it is, I don’t have time to figure out how to do it. Maybe if we had insets on how to use it, I might be more willing to give it a try. I think so. Don’t you?” (Hayley’s Interview 12-3-15).

The above interview with a Year 4 teacher makes it clear that some of the negative attitudes held towards the iPad and cloud services can be attributed to the lack of training and being shown clear ways in which they can be implemented in existing pedagogy. Ertmer (2005) argues that any new technologies that are being introduced in a school should seek to address the attitudes and needs that teachers and staff members may have.

4.5.5 The impact of the school's wireless network

The second point raised was the issue of the school's wireless network being incapable of handling the network traffic caused by all of the new iPads in addition to the existing traffic. As discussed in chapter two, An (2014) also found this to be a major issue when introducing iPads to a school. This was an issue that I personally witnessed and documented on several occasions when using the iPad and cloud services I discussed one of those occasions with a teacher and a teaching assistant,

"I don't know whether it's that having too many of these tablets on the network at the same time causes a strain. Everything just grinds to a halt when you've got too many of them on at the same time. Is it a Wi-Fi thing? Whatever it is, it's really frustrating at times. It's hard enough to book the iPads, take them out, set them up, make sure that the content you want to use is accessible to all on Google cloud. Then when you think you've got everything ready, you start and it all just comes to a grinding halt. This is exactly why I just feel like sticking to the tried and true methods of teaching. If this wasn't such a bother, I might actually want to use it more. I can see how it can make lessons more exciting" (Amy's interview 13-11-14).

I spoke to the teaching assistant who aided in the preparation of the above lesson, she said,

“The children love to do work on the iPad, when I tested it out before the lesson, everything worked well. What I couldn’t test was 30 children using the iPad at the same time, that really seemed to slow things down. The iPads seemed to become less responsive. I hear it’s because of the old Wi-Fi that we have” (Jessica’s interview 13-11-14).

An (2014) found this to be an issue in the school that she carried out her research in as well. The issue seems to be that once all of the iPads are trying to access the wireless network at the same time, more specifically the same resource at the same time, it cuts some of the iPads off the network in order to allow the others to access the resource. In discussions with both the technician and the computing coordinator, this issue has been brought to their attention by several members of staff but it appears that due to budget constraints, this is a matter that cannot be rectified immediately. It is possible to argue that this is a crucial issue that must be rectified if the iPads are to be successfully used all at the same time. This being said, in the case of the school that I carried out this research project in, the wireless network only caused a problem when they were all trying to access the same resource at the same time. I found that accessing the resource or having the pupils save their work table by table in a staggered manner aided in preventing the network from dropping out.

4.5.6 The impact of the lack of available e-books

The third issue raised was that of the lack of the necessary textbooks being available on the iPad. As noted in chapter two, education bloggers such as Catapano (2014) of

the TeachHub found that many of the textbook publishers simply have not yet been able to make digital version of the physical textbooks that they offer available to users on the iBook store. This issue was raised by a few members of staff. One teacher said to me,

“There are loads of great books available on iBooks. However, none of the main books that we use for teaching are available on there. I’m talking about the Abacus maths books, the reading comprehension books and the lot. It would be great if we had interactive versions of these books on there. That would really make me want to use the iPad in my lesson. I know I can use Google Docs to share parts of the book that I’ve scanned myself. That’s really helpful sometimes to have all of the pages I need in the cloud, but it just requires a lot of work on my part. I just don’t always have time to do this each time I want to use the iPad in lessons. I just wish the books were just there and ready” (Hannah’s interview 10-12-14).

Throughout this research project, I have found this to be an issue but not as big an issue as the previous two listed above. This is because it is still possible to use the textbooks that are already in the classrooms in conjunction with the iPad. Further to this, I have observed lessons where the teacher was able to use the camera on the iPad to take high resolution stills of the textbook pages and then have the pupils access the pages. From there, the pupils would be able to annotate it in the same way as they would a digital textbook page.

As a result of this, whilst I understand why this may be seen as a drawback, it is possible to argue that it may not be nearly as pressing as the above two. Further to this, theorists such as Keengwe (2014) point out that the issue of the lack of textbooks

available on iBooks can be countered by the fact that the iPad is able to access the internet where there are a wealth of other resources which may on some occasions be able to offer the same or in some cases more information on the topic being studied.

4.5.7 Software compatibility

The fourth issue raised was that many of the staff members felt that the iPad lacked compatibility with the existing software and tools that the school already possessed and were already familiar with using. In my own discussions with staff, they felt that the lack of familiarity with the software used on iPad made some of them feel uneasy about using it in their lessons.

As one member of staff stated to me,

“I’m used to having a start button, I press start, programs and all the stuff I need is in there. I can see how it might be easier to use a touch screen, but I don’t see my Pupil Asset tracking program on the iPad, I don’t see my Word Shark and Number Shark on there either. There are all these new programs that I’m going to have to learn. I just don’t have the time to try and learn all of these new things. I still can’t even print pictures from the iPad directly! I know it’s possible, but it’s just not a simple click like with the computer. Maybe our photocopiers need upgrading too? Anyway, I find the iPad too different and the layout of the programs will take some real getting used to” (Amy’s interview 4-12-14).

In summary, it was noted in chapter two, commentators such as Keengwe (2014) have had similar findings in their research. Keengwe (2014) found that the student teachers

that he had interviewed felt that the iPad lacked compatibility with the existing technological ecosystem that existed within the school. Continuing on this point, I found that many of the staff members approached the iPad with the expectation that they would be able to do everything that they were accustomed to doing on their desktop and laptop computers on the iPad. In other words, the iPad would be the single device that replaces all that currently existed in the classroom. Due to software and hardware incompatibilities, this simply is not the case at this very point in time. Whether or not this may change in the future cannot be determined now.

4.6 Attitudes and behaviour of pupils

When conducting this research project, I felt it was necessary to include the attitudes and behaviour of the pupils as it would offer a clearer picture as to how the pupils felt about the introduction of the iPad and cloud services. Further to this, I found that most of the literature concerning the introduction of new technologies in education focused heavily on the teacher and the performance of the pupils as opposed to the attitudes and behaviours exhibited by the pupils.

As previously discussed in chapter two, Ifenthaler and Schweinbenz (2013) argue that it is important to consider all of the individuals and factors surrounding the introduction of a new technology in order to maximize success. I argue that the attitudes and behaviour of the pupils is a factor affecting the introduction of the iPad and cloud services. As a result of this, I intend to explore the findings in greater depth below. When carrying out this research project, I made a number of observations. One numeracy lesson in particular comes to mind. In this lesson, the children were required to solve worded problems on the iPads. What really stood out to me in this lesson was that there was a group of children at table 3 that are usually quite difficult

to engage in traditional lessons. However, in this lesson, they appeared to be fully engaged. I overheard two of the children having a debate over what they thought the answer to a particular worded problem might be. One pupil said to the other with great excitement,

“I bet it’s three, just watch and see, it’s three” (Field recordings and notes 7-10-14).

Soon afterwards, he touched the tick on the screen which then revealed the answer to him. Both pupils were quite excited by this. When I spoke to him and asked him his thoughts, he replied,

“It’s exciting because you get to play games if you get enough of them right. I don’t got to wait on Miss to find out if I got the answer right. Yeah, yeah, I don’t got to use a pencil either! Check this out” (Field recordings and notes 7-10-14).

He then excitedly showed me the games that he was able to unlock by correctly working out the worded problems that he was given. As discussed in chapter two, Habgood and Ainsworth (2011) also noted that new technologies had the effect of exciting and engaging pupils. Not too long after this, I observed that there were a few arguments between pupils in the lesson. One of the pupils, Lisa began to argue with Ahmed about who was turn it was to use the iPad. The idea at the beginning of the lesson was that the pupils were to work in pairs to solve the worded problems. Looking into the idea of whether the iPads had any effect on how the pupils understood what they were learning was explored because I wanted to gain insight as to whether the pupils themselves felt that the use of iPads in any way helped them to

understand what they were being taught. I have personally observed that with EAL (English as an Additional Language) pupils, it appeared as though they found it easier to use the iPad as opposed to using their notebooks to carry out the given tasks. Not only that, but they as a whole they showed a greater degree of confidence when working on the iPads as opposed to paper. Not failing to mention the fact that the language of the iPad can be changed to the pupils' native language where the iPad can understand commands via Siri in the pupils' native tongue. In addition to Siri, the pupils also had access to Google Translate. This is an online tool that allowed pupils to type a question in their native language and have it translated to English.

I observed one EAL pupil, Andrea using Google Translate during the lesson. She used the iPad to take photos of the worksheet that was in front of her. She then swiped her fingers across the English statements in the photo taken. This then enabled her to get the Romanian translation of the questions. She showed a great deal of enthusiasm when doing this. In the past, she would often sit in the lessons and choose not to take part. This was even the case when the work presented to her was in her native language.

I asked Andrea after the lesson about what she thought about the iPad, she replied,

“It fun, I like, I like” (Andrea, 7-10-14).

Despite the brief response, it was clear from the way she smiled and expressed herself that her attitude towards the iPad was very positive.

In a differentiated lesson where the pupils were working on number bonds, the pupils that would otherwise have difficulty understanding the instructions due to the language barrier, were able to use the iOS app *Marbotic Smart Numbers* which

through the use of colourful animations, interactive counters and instant correction and validation of their responses, these pupils were able to achieve the success criteria of being able to form number bonds to 10. In this lesson, I observed that the pupils were very focused on the task that they were given. I started at table three. There were a few EAL pupils on this table. They were engaged in the task that they had been given and were moving the virtual counters so to form the number bonds to 10. The iPad read out the number to them each time they moved a counter. This worked to assist them in counting in English. Then when they got the right number, the virtual counters would smile and wave at them letting them know that they got it correct. They would then be required to pick up the relevant number from the table and touch the screen with it to register their answer. The app would then read the sum and the answer to them.

Whilst their abilities to express themselves in English may be limited, their body language clearly showed me that they were fully engaged and were enjoying using the iPads and learning at the same time because they were able to achieve the given success criteria. By body language, I mean how they smiled and the enthusiasm with which they gestured when trying to express themselves and explain their thoughts. When speaking to one of my lower attaining EAL pupils about their feelings about using the iPad, through the use of body language and simple words such as “*I like like*”, it was clear that they enjoyed it and again the fact that they were able to achieve the success criteria made it clear that they understood the activity.

Moving onto some of the other tables in the classroom, I observed that during the lesson, some of the pupils that would normally switch off were extremely focused on the task at hand. Not only that, but it was apparent that even the pupils that were

usually disruptive were very deeply engrossed in the activity. When I went around to the nearest table to me, they were doing the medium difficulty task I took some time to listen to what they were saying to each other. Lisa said to Ahmed,

“Move the dots then count them, then put your answer. It will tell you if you got it right” (Field recordings and notes 19-11-14).

Taking more time to look at the children, it became very clear that they were enjoying themselves. The following day, I observed another lesson where the iPads were yet again used for a numeracy lesson. In this particular lesson, the pupils were using the app Math Bingo. The app enables the pupils to add, multiply, subtract and divide. This is all done in the form of a bingo game. Initially, when I first saw the app, I immediately sought to figure out how it would meet the differentiated needs of the pupils of Year 2, but after having spent more time observing it in action, I found that the app has the ability to adjust the difficulty setting. As a result of this, it can be adjusted to suit the abilities of the various pupils in the classroom. In practice, I found its ability to differentiate surprisingly effective.

How the app works is that the pupils is presented with a question that will require them do one of the four operations (add, subtract, divide or multiply). It is then up to the pupil to look at their bingo board to see whether they have the number. Upon the successful completion of their board, the pupils are then rewarded with a pinball game that features alien-like characters. The objective of this lesson was to recap upon and to consolidate the understanding of the use of the four operations with the pupils. As the lesson progressed, I walked from table to table listening in on the conversations

between the pupils. They were very engrossed and excited about completing the bingo board. The lower difficulty task given to the pupils at table 3 required them to play a game with simpler questions and a simpler bingo board, meanwhile the middle difficulty task had more challenging questions with the highest difficulty task having the most complex questions. I overheard Jamie talking to Ashley saying,

“Did you get eighteen? Did you add three to fifteen?”(Field recordings and notes 9-11-14),

Ashley replied,

“I did but I had to divide thirty-six by two” (Field recordings and notes 9-11-14).

From this, it is clear that the conversations that there was a degree of differentiation.

Taking it a step further, I asked a few pupils about their thoughts on the use of the iPads in this lesson. I received nothing but positive responses on how the pupils felt. Also when I asked the EAL pupils how they felt, they offered simple responses due to English not being their first language, but it was clear that they showed a greater degree of confidence in the carrying out of the tasks presented to them on the iPad. Echoing such findings, Riconscente (2013) also found that the use of the iPad increased the self-confidence of pupils. Further to this, the animations and colourful interface of the app proved to be most engaging as for the most part the pupils were keen on trying to complete the bingo board before their peers. Theorists such as Arcaro (1995) argue that whilst competition may create friction between pupils as there are winners and losers, it ultimately makes the pupil strive to better themselves.

Prior to the introduction of the iPads in the school, laptop computers were used in lessons. Whilst I have observed that they are still being used, it is clear that the iPads are now being used more frequently than the laptops in lessons. Further to this, I have observed lessons where both the laptops and the iPads were used together. One example of this was a geography lesson that I observed where the Year 3 teacher was teaching the children about France and had the children use Google Earth to get a better idea as to the physical features of France and how it differed as you went from region to region. There were twenty-eight pupils in this lesson and all of the pupils were placed in groups of two. Within each pair, one pupil was given a laptop and the other was given an iPad.

The pupils were then given an opportunity to spend some time with the Google Earth app looking around France. They were then provided with a list of features that they had to find. These included the names of the neighbouring countries, the names of the water features such as rivers and lakes and the names of the mountains. As the pupils started to familiarize themselves with France, I observed that one of the pupils started arguing with their peer. They said, *“It’s not fair that you get the iPad and I’m stuck with the Toshiba laptop”* (Field notes 6-1-15).

Soon after the argument erupted, the teacher spoke to the pair and they got back to work. Most of the pupils were engrossed in the activities, but I still noticed that there was a degree of resentment among some of the pupils that received a laptop instead of an iPad to carry out this task. After approximately fifteen minutes had past, the teacher did a mini-plenary where she explained once again what she was looking for and then had some of the pupils come up to the Smartboard and show the class some of the water features that they had located as well as the neighbouring countries.

After this, the pupils returned to work where they continued writing down on their sheets of paper the features that they had found. Most of the pupils worked well together to complete the task. Roughly five minutes after this, the teacher asked the pupils to exchange their devices with each other within their pairs. What this meant was that the pupils that were using the laptops would now get an opportunity to use the iPad and vice versa. At the end of the lesson, the teacher showed a map of France on the board and then discussed the neighbouring countries with the pupils and the pupils checked off the ones that they had found. The same was done for the mountains and water features.

At the end of the lesson, I had a discussion with a group of six pupils on how they felt the iPad compared to the laptop in their experiences. These pupils were, Steven, Imran, Sunil, Nailah, Nour and Jasmine.

Me: *What do you think about the use of iPads and laptops in lessons. What do you think about the both of them?*

Steven: *The laptops are really boring. You can't even touch the screen!*

Children all laugh

Steven: *I mean, it's just not that interesting, I mean sure you can do some of the stuff that you can do on an iPad, but it's just boring sir!*

Imran: *Like, you can't pinch the screen, swipe and stuff like that.*

Sunil: *But you have a trackpad for that!*

Imran: *Yeah, but it's just not the same, I mean why would you want to use that little touchpad mouse thing when you can touch the screen and see it*

move the second you touch it?

Jasmine: *The iPad doesn't freeze up and do it's own thing like the Toshiba laptops do. It's really rude.*

Me: *What's really rude?*

Jasmine: *The way the laptop would just freeze up and stop listening to you when you're trying to do your work or save it. Sometimes, yeah, when we're doing scratch and I'm making a really cool program, the laptop would just stop doing anything I asked it to.*

Nailah: *Yeah! That happens all the time, the laptop always lets you down when you really want it to work. The iPad don't do that though.*

Nour: *Plus, you can hold the iPad in your hands and take it anywhere, remember when we went outside and were filming ourselves doing PE? Can you do that with a laptop? No!*

Sunil: *Yeah, I get that the iPad has the two cameras and that, but it's way easier to type on the laptop. I find it really hard to type on the iPad and plus you can plug your USB into a laptop, can you do that on an iPad? No!*

Nour: *What about the battery? The laptop always needs to be charged. My own iPad at home can be used for days or sometimes weeks without needing to be plugged into the wall.*

Jasmine: *Plus the iPad is really more fun to use. It's just so much more interesting. Why can't we use iPads for all our lessons?*

All children together agree.

Sunil: *I would like to use iPads for our lessons. I like the laptop too, but the iPad is really interesting. Plus the apps on the iPad are just so much more interesting than the laptop.*

Me: *What were your thoughts on the use of the iPad and the laptop in your Geography lesson?*

Nailah: *At first, I really didn't like being stuck with the laptop. It was being slow and taking ages just to open Google Earth. I think it was stuck. It's not fair that Nour got the iPad first.*

Nour: *Yeah that's why you started to argue with me trying to take the iPad off me and Miss had to tell you off.*

Nailah: *It was just that I wanted to do the work but the laptop was being slow and you didn't want to share with me.*

Nour: *Yeah, I probably should have shared with you, the Toshiba laptop is really rubbish.*

Jasmine: *The touch screen on the iPad just makes it so much easier to use the map and figure out where everything is, with the laptop, it's not so easy to move the map around.*

(Pupil Focus group 6-1-15)

From the above discussion with the pupils, it was clear that they mostly preferred the iPad and went as far as to list a number of advantages that they felt that it had over the more traditionally used laptop. They listed advantages such as greater battery life, portability, the touch driven interface and so forth. Further to this, they all felt that it was a more interesting and engaging device than the laptop. As discussed in chapter two, Vu et al (2014) also noted each of the above sentiments.

That being said, one pupil did mention their preference for the keyboard of the laptop as opposed to the virtual keyboard on the iPad. Also, from their body language, it was

clear that the iPad excites them and they even went as far as to ask if they could use it in all of their lessons. This supports the argument put forward by Vu et al (2014) who argued that pupils find iPads engaging. In summary, the pupils generally showed a very positive attitude towards the iPad. This was in line with the findings of other researchers such as Keengwe (2014).

4.6.1 What do pupils think can be done to improve the introduction of iPads and cloud services in the school?

The previous observations and discussions with the various pupils raised a number of concerns about the iPad and cloud services. I conducted a focus group with four year two pupils and two year three pupils on their thoughts on what could be done to improve the introduction of the iPad and cloud services in the school. Mark, Jamie, Lisa, Samir, Nailah and Imran. When presented with the aforementioned question, they responded,

***Nailah:** I think teachers should be using it more in lessons. Like, it's really interesting and makes learning fun. That would make it better, if we used it more and we used it for different things like Maths, English, Geography, Science and that.*

***Samir:** Yeah, I want to use it for more things too. We don't use it enough.*

***Imran:** Not trying to be rude yeah, but I think that's because Miss doesn't know how to use it for everything.*

***Lisa:** Why do you think so? I think it's because of the time it takes to just get everything ready. Maybe she doesn't have enough time?*

Imran: Miss has loads of time. I've seen her with her coffee just sitting down in the morning. It's not that. Miss sometimes has to call for help when she doesn't know what's happening with the iPad. If she knew all about the iPad, she would use it more. I'm sure. I mean, why wouldn't she? Everyone enjoys going on the iPad.

Jamie: I reckon the teachers just need to learn things with the iPad and then they can teach new things with the iPad. Probably...Yeah that's it. The slow internet needs to be fixed too.

Imran: Yeah, did you guys get that internet at Poundland? That's some bad internet man. Always breaking.

Mark: I think it's the Wi-Fi. It's something with the Wi-Fi. I think it gets broken if too many people are using it. It can't handle too many people using iPads.

Samir: I want like to use the iPad in more lessons to learn different things. I think that would make things better.

Nailah: More iPad time in class. Get better internet. Let us use the iPad for different things in our learning.

Samir: Can't we get like bigger cases for the iPad? My mum has this case for hers that you can drive a car over.

Mr Brazer: Why do you want bigger cases?

Samir: So that the iPad don't break as easy. If you had big cases, teachers wouldn't be so scared to let you walk around all the time with the iPad.

Lisa: You just need to be careful with it. Stronger cases might make it good for taking it outside or protect it from water.

Mark: Yeah. (Focus group 13-1-15)

From the above focus group, the pupils raised a number of areas of improvement. These included, the network infrastructure, teacher training on using the iPad as part of their pedagogy and durability. These are all points that were also raised by members of staff. In summary, in a similar manner to the staff, the pupils found the network infrastructure to be an issue. These findings were in line with the findings of other commentators such as An (2014).

4.6.2 The wireless network

In a similar fashion to the staff members, a number of pupils also identified the wireless network as a cause for concern. Ahmed and Simon recalled the lesson they had about the Great Fire of London. This was a lesson that I had previously observed and spoke to them about. The pupils had to use Google Docs to create and edit their story plans. In my field notes and recordings, I observed that Simon said to Ahmed,

“This thing works when it wants to. Sometimes I can get it to work! Ahmed, why is your iPad working? How did you get it to work, I can't get onto the Internet.”

Ahmed replied,

“ I don’t know, it’s just working. Let me see.” Ahmed proceeded to take Simon’s iPad and said, *“I don’t know why it’s not working, I can get it working on mine. Miss! We can’t get Simon’s iPad to work”* (Field recordings and notes 5-1-15).

I spoke to the boys after the lesson about what they thought could be done to improve the introduction and use of the iPad and the cloud services in the school. They were quite eager to offer their opinions. Ahmed said,

“I think it’s the internet. Maybe we need a bigger internet! It’s really slow and kinda takes away the fun from being on the iPad. It’s neat how someone else can see the things you’re doing on Google Docs. Well, sort of. When it works properly. It was working good. Then more people started using iPads and it started to become slow. Like when Simon tried to use it, it wasn’t working anymore. Mine was still working, but it was now really really really slow! I think a bigger and faster internet could fix this problem. That’s what you need!” (Ahmed’s Interview 5-1-15).

Simon had a similar opinion on the matter,

“I didn’t even get a chance to properly go on the iPad! I’m so mad! Why do you guys have some broken internet? I think the internet in the school might just be too weak. Sometimes when I’m home, I can’t go too far outside with the iPad otherwise I lose internet. I just got a brand new iPad for Christmas. It’s black. It’s so sick! Maybe you need to bring the internet closer to the class? You lot need to fix the internet, or get new internet. I like the iPads yeah, I like

that Google thing. I can see what other people are doing too. When the internet is working!” (Simon’s Interview 5-1-15)

From the above two interviews, it was clear that the pupils felt that the network infrastructure needed to be addressed in order to improve the introduction of the iPads and cloud services in the school. In summary, as noted in the previous section, the pupils again found that the network infrastructure had an impact on their experience of using the iPad in lessons.

4.6.3 Teacher training on using the iPad as part of their pedagogy

As noted in the literature review chapter, commentators such as Younie and Leask (2013) and Gliksman (2014) also found that teacher training had a large impact on the way in which teachers used the iPad as part of their pedagogy. Further to this, Gliksman (2014) found that teachers who had received training on how to use the iPad were more likely to use them proficiently in their pedagogy. Echoing this point Geng et al (2017) also found that teachers’ proficiency in the use of the iPad in lessons improved the more they used it. From the focus group with the pupils, they also held a similar attitude towards the use of the iPad in lessons. This was the view that if the teacher possesses more knowledge on how to use the iPad in their pedagogy, they were more likely to use it in more lessons.

4.6.4 Durability

The final point raised by the pupils was that of durability. They felt that the iPad needed to be more durable so that they could use it outside of the classroom without the fear of it becoming damaged. As discussed in the literature review chapter, Moorefield-Lang, Meier and Miller (2014) found that it can be damaged when dropped.

In summary, the pupils generally perceived the iPad in a positive manner. However, they identified the issues of durability, network infrastructure and teacher training as the main issues that hindered the iPad from successfully being used in some lessons.

4.7 Staff perceptions of the advantages and disadvantages of the iPad and cloud services

In the literature review chapter the ‘*iPads in Scotland*’ research project by Burden et al (2012) was explored in greater depth. In this project it was found that the teaching staff were generally of the belief that the iPads could be used in a manner that could aid and support the process of teaching and learning in the classroom. Further to this, Burden et al note that many of the teachers also felt that the iPads worked *to “enhance the learning experience and transform their teaching practice”* (p.21).

However, in this research project, I have found that there are also teachers who believed that the iPads could not be used to aid the teaching and learning process.

Engagement was one key theme that consistently arose throughout not only my observations but also my participation as a teacher or facilitator of learning and my interviews and focus groups with the staff. In my interviews with the staff, I found

that there were generally two main perceptions when it came to engagement. Most of the staff interviewed felt that the iPads captured and maintained the attention of the pupils and that they were fully engaged in the task whenever they used them as part of their lesson. However, six members of staff were of the view that they were a distraction and two of them went as far as to say that they felt in their opinions that they did not belong in a school. When pressed as to why they felt it did not belong in the school, they both responded very similarly, the first replied,

“They’re toys, of course the children are going to like playing with them, they’re children. You can’t possibly expect to get any real work done on it. What is Ofsted going to think when they walk in and see a class of children playing on iPads, it’ll be a disaster that’s for sure.” (Beth’s Interview 26-9-14).

What I found particularly noteworthy was that the other member of staff responded quite similarly, they said,

“With the new National Curriculum 2014 upon us, what do they really expect us to do with these iPads. They’re for watching movies and playing games, that’s why the pupils are so keen on them. You can’t possibly expect them to get any actual work done on them can you? What about the evidence? Having to go through the hassle of printing off and sticking in evidence in their books for Ofsted. It’s just too much hassle and work for what? The second you turn your back the pupils are still going to try it on and play games or do something irrelevant on the iPads. Imagine if we had an Ofsted, what do you think they’ll think about doing work on the iPads? They’ll fail the lesson immediately” (Michelle’s Interview 2-10-14).

Evaluating the above two responses, one of the things that I found most apparent was that neither of the two members of staff questioned the legitimacy of the iPad as a platform for learning to take place. In other words, it was not part of the picture that they had in their minds as to what a learning environment should look like. One other member of staff that felt that the iPads were a distraction put forth the argument that young people already spend a large portion of their lives staring at digital screens, by bringing iPads into the classroom; it can have long term detrimental effects on the pupils. They replied,

“The children already have iPads and tablets at home which they spend most of their free time using anyway, why should we be adding to that by making them stare at a screen in school too? How are we helping them by doing this? What ever happened to the great outdoors? You and I both know that these children don’t spend time outside at home. They don’t spend time socializing with others either. All they’re doing is spending time on their tablets. Also, with the graphics and colourful games on the tablets, how are we stimulating the imaginations of the children? If you ask me we’re doing them a disservice by making them use iPads in the classroom knowing fully well that they already spend the all of their time outside of school staring at these small screens” (Gigi’s Interview 22-10-14).

The sentiment of this interviewee was shared by the commentators Greenfield (2015). As discussed in the literature review chapter, Greenfield (2015) argues that the use of iPads takes away time from other necessary activities such as social interactions with their peers and spending time outdoors. Additionally, Greenfield (2015) notes that recent studies such as the one carried out by Rosen et al (2014) found that the average

child is already experiencing up to 18 hours a day of technology. In another interview with a member of staff that was in favour of the use of iPads in the classroom, they put forward the point that technology such as the Apple iPad is used in the real world in many workplaces. As a result of this they felt that exposing the pupils to it at an early age helped them to become proficient with using it. They said,

“iPads are the future, they’re everywhere and they’re used in almost all jobs, I see them being used by the gym instructors at the gym, I see them being used by teachers in some of the other schools that I’ve visited, I’ve seen them everywhere. Given that this is the rate at which the working world is adopting these iPads, it’s a must that we teach the children how to be proficient when using these iPads to maximize their chances of gaining successful careers in the future and in their adult lives. Not only this, but they clearly prefer reading their books on the iPads which offer a greater level of interactivity with their books” (Sharon’s Interview 22-10-14).

Looking at the two above points, it is clear that they are quite opposite views. This being said, they are in fact both relevant and valid perspectives as echoed by theorists such as Greenfield (2015) who acknowledge the importance of teaching children the right technological skills for living in the 21st century. Another point raised in the above interview was that of the use of the iPad as an interactive e-reader. More specifically, the device was praised for the interactivity that it brings to reading. It was noted that some of the respondents were especially impressed with the iPads ability to offer hyperlinks which the pupils could touch and find out more information or see a short clip about what they were reading. One respondent said,

“I think it’s really great. I mean the children; the children love using the iPads to read. It’s so much more engaging and colourful than regular paper books. When they don’t know the meaning of a word, they can quickly find out the meaning without having to get up and search for a dictionary. It’s easy for me to allocate books for them and then I’m able to see how they’re progressing with their reading. The iPad can also read along with the child and some of the books even allow them to touch the picture or word and see an animation or an explanation of what it is. This is really good especially for our EAL children that struggle with English. It helps them by reading out the words that they are struggling with as well as reading along with them. They can also pause and go back and have a sentence re-read to them if they don’t understand it. That feature is one of the most helpful as in the past with paper books I’d have to read to the child directly and if there were more than one child having difficulty, their reading would be held up until I was finished with the first child, then I could go to the next to help them. Now, the iPad can help them with most things when reading. It really makes both my life and the lives of the children easier” (Monica’s Interview 12-01-15).

As noted in the literature review chapter, the above perspective was shared by the Leiden group in Smeets and Bus (2013) where the Leiden group pointed out that in their research it was found that the animations presented by e-books as well as the ability of the e-books to orally present the story proved to be beneficial, especially to those with English as a second language where they were able to hear the story along with seeing the animated pictures on screen. This they argue aided with comprehension. Further to this, they note that animations tended to attract the reader’s attention which in turn they argue promotes *“congruity between oral text and*

illustration; that is corresponding text is pronounced simultaneously with animated details in the illustration” (Smeets and Bus, p.179).

4.7.1 Observation of two reading sessions

I observed a Year 2 reading session where the pupils during the silent reading period first thing in the morning, between 9:15AM and 9:30AM. As I walked around the class, all of the pupils were engrossed in reading their various e-books. Many of them, in particular the EAL pupils had headphones on where the iPad was reading the book to them. For the entire duration of the session, there was not a single time where any of the pupils asked to leave the room to go to the toilet or did anything disruptive. They were all very focused on the task of reading. I walked around and as I looked at each of their screens, there was not a single child that appeared to notice that I was there nor was there any behaviour that showed a child quickly trying to hide the fact that they were not on task or trying to use the iPad for anything else than what they were instructed to use it for. Taking a closer look at the EAL pupils at table 3, I saw that they were trying to pronounce the words as it was being read to them. In my own personal opinion, I felt that the iPad aided the EAL pupils to overcome the language barrier. I can also see how the use of the Google Translate app where the pupil can put the word that they wish to understand into the app and then have the word translated to their own native language can definitely be helpful as the app can also read the translated word back to them (Field notes 12-1-15).

A bit later in the morning, I decided to have a look at some of the books that they had been reading. I had a look at where they left off and read the last two pages so to get

an idea as to what they read. I selected an EAL pupil that had a sufficient command of English to have a conversation with me and another pupil at random. I wanted to get an idea as to the extent of the information that they absorbed from their reading session. I started with Andrea, an EAL pupil. Having asked her about the book she had read, surprisingly through the use of simple English words she was able to tell me about what she had read as well as how she felt about the book. The second pupil I chose was Tariq. He was also able to accurately explain to me what they had read earlier in the morning. In my opinion, I felt that it was clear that these pupils on this occasion were able to absorb the information that they read using the iPad. Furthermore, the detail offered and the enthusiasm with which they put forth to me, I found it most remarkable.

Some time after that silent reading session, I had an opportunity to speak to the teacher and get their thoughts on the session. More specifically, I wanted to know about their perceptions and feelings where the effectiveness of the device as compared to paper books is concerned. They responded,

“Did you see them? There could have been a thunderstorm outside and they would not have been bothered. They were so caught up in their reading! Even the likes of Mark and Lisa were really into it. I admit, I was expecting them to be trying it on with me by playing games or using the internet when they thought I wasn’t looking. The thing is right, it’s actually quite good. None of them ran out of battery and I really just love that reading function. It just reads the story to them. It’s great as they can follow along and they learn how to read and pronounce difficult words at the same time” (Jennifer’s interview 2-2-15).

Whilst the above reading session was successful, there have been other instances where the use of the iPad was less than successful. There was a guided reading session that I observed which started at 1:00pm and went until 1:30pm in the afternoon. This was the first session right after lunch. As I walked into the room, I could see that the pupils were somewhat restless as the iPads were being handed out. The classroom was generally noisy as the pupils were still talking to each other. After the teacher handed out the iPads, the teacher then went on to direct the pupils as to do. Most of the pupils followed the instructions but there were still a few at tables 1 and 5 that were still talking to each other. There was a problem where 24 out of the 30 iPads were not connected to the school's wireless network. What this meant was that the iPads were unable to access the internet and as a result of this were unable to access the text that the teacher was using for the guided reading session.

I walked around the room as the children as the teacher attempted to rectify the problem I could see that many of the pupils. Some other pupils were whispering to each other showing each other what they had found online as their particular iPad was able to connect to the internet. However many of them were showing each other what app they were using on the iPad. After roughly fifteen minutes of this, the teacher addressed the class and attempted to bring them back to task. This process also involved three pupils being reprimanded for being disruptive. After a few unsuccessful minutes, the teacher then instructed the teaching assistant to call the computing coordinator who also failed to solve the problem.

The teacher then resorted to telling the pupils to select a book from the iBooks app

and to start reading it. I noticed that the pupils were generally trying to stay on task, but every few moments, they would ask to go to the toilet or to go get water.

Moving down to the end of the session, the teacher then instructed the pupils to put their iPads to sleep and wrap their headphones neatly. During this process I observed that the pupils were up and about and walking around the room. Some were talking to each other and one of the iPads fell and the screen was damaged. The teacher then spoke to the pupils again and then sent the teaching assistant off to take the damaged iPad to the Computing Coordinator. Finally, the iPads were packed away and the teacher moved onto the art lesson.

I had a chance to speak to the teacher after the lesson to get her thoughts on how she felt the reading session went. She responded,

“Ah well, you know how children are on a Friday afternoon, they’re really restless and easily distracted. I don’t know why these things don’t just work. That’s technology for you, It’ll let you down when you really need it most. I couldn’t share the ebook that I had on the MyBook Cloud because the iPads just didn’t seem to want to connect to the network. At least there were some books in iBooks for them to read. It’s not like they prepare us for how to deal with these issues before dropping the iPads on us and expect us to use it with a level of mastery! It’s quite ridiculous really. What really annoyed me though was when that Mark dropped and cracked the iPad on the floor. The children know that they are not supposed to walk around the classroom holding the iPad! They’re so fragile! It’s not like the laptop which stays on the table and isn’t likely to break if dropped. Most of them seemed to be reading, it’s just the

usual suspects that tried it on during silent reading” (Hannah’s interview 6-2-15).

The above was arguably an instance where the lack of proper staff training showed itself to be a real hindrance in the effective use of the iPads and to an extent the cloud services in lessons. As reviewed in the literature review chapter, researchers such as Heinrich (2015); Henderson and Yeow (2012) echo this argument by pointing out that proper training is a necessary prerequisite if any kind of effective integration of the iPads into the classroom and the school’s curriculum as a whole is to be expected. Furthermore, they point out that the training should address the key aspects of the device that includes the technical, pedagogic, social and economic aspects. Also, the issue of durability was raised in the above interview with Jennifer. As discussed in Chapter two, Moorefield-Lang, Meier and Miller (2014), point out that with the use of iPads, there is always the possibility that it can become damaged by being dropped.

Whilst Jennifer held a positive view of the iPad, I encountered a member of staff that held the opposite view and expressed that the ebooks in her opinion were actually a distraction as opposed to engaging the pupils. She said,

“The only reason they look engaged is because it looks like a toy, it’s like one of those video game things to them! It’s really a distraction, they’re really engaged in a distraction. It’s really hard on their little eyes. You know what else it does, it takes away the learning of really crucial life skills. The search function of the iPad means that the child no longer has to scan through the text to find a particular word or sentence. That’s a really important life skill. But it’s not just that! Normally the child has to use a dictionary to find the meaning of a word that they don’t know the meaning of, or use the context of

the word used to try to make an educated guess as to what the word might mean. Now all they have to do is ask the iPad what the word means and the meaning will be given to them. We're cheating the children out of learning some very crucial life skills if we fully replace print with these iPads. Sometimes you just find the child listening to the story and looking at the pictures instead of actually trying to read the words to improve their reading. Some of these iPad stories are just pictures with sound, there isn't enough worded material to make them conducive to the development of the child's learning" (Beth's interview 22-6-15).

As discussed in the literature review, similar drawbacks were also found by Smeets and Bus (2013) where they point out that books with too many illustrations may actually work to confuse the child as they may struggle to correlate the relevant illustration to what they were reading. This according to a study recently done by Smeets, van Dijken and Bus, (2012) is also true for ebooks which use music along with the story. In this study, they found that children with severe language impairments (SLI), that instead of setting the mood, the addition of music may actually work to confuse the children as it affects their perception of what they were reading and seeing.

Another point that was raised in the above interview was the idea of the iPad being a distraction instead of actually engaging the pupils when it comes to being an e-reader. Greenfield (2015) echoes this point by arguing that the nature of the iPad is a distractive one and as a result of this she points out that theorists such as Mangen and Kuiken (2014) have found in their studies that it "*makes it more awkward to read on and harder to follow the narrative and be transported into the story*"(pp. 154-155).

As previously explored in the literature review, Baron (2015) goes a step further and argues that the reading of a book on a screen is not the same as reading a regular book that is made out of paper. Baron (2015) argues that with regular books, the reader is able to move back and forth between pages in a manner which enables them to absorb the information that they are reading more readily. However, Baron (2015) argues that when reading digital books on a screen, the reader is able via the search function to find the parts or pieces of information that they want instantly without the need to skim and look through the text carefully. In other words, they are able to find out what they want without having to deeply read the text. It is this deep reading that regular books offer to the reader is what allows the reader to effectively absorb the information. As previously discussed in the literature review, Mangen and Kuiken (2014) put forth an argument that supports the above member of staff's opinion whereby they state that the iPad due to its somewhat distractive nature can actually make it more difficult for a pupil to follow a story as opposed to a traditional paper book.

Later on that day, I spoke to the teacher of the lesson to find out how she felt about the lesson and the impact that the use of the iPad had on the pupils' learning and confidence. What I found most interesting was that she immediately pointed out several things that I noted myself whilst observing. First, she raised the point about Andrea,

“Did you see her? I’ve never heard her voice before! Not once, she was so quick to get up and answer, I didn’t even call on her and she wanted to do it. That’s definitely a first” (Hannah’s interview- 7-10-14).

Another point she raised was the speed at which the pupils came to grips with the interface of the iPad. There was not a single pupil in the lesson that experienced any difficulties in using the iPad to complete the task given to them. She said,

“Children these days know how to use these things better than we do, they play with them on a daily basis, so of course it’s going to be easy for them to use it in the lesson to complete the work given to them. It’s all very familiar to them. It’s like they’re in their comfort zone when using it” (Hannah’s interview 7-10-14).

The next section will explore the how the staff believed the iPad compares to the laptop?

4.7.2 How do staff think iPads compare to laptops?

I had a discussion with the class teacher about the use of iPads as compared to laptops in this lesson. She said,

“Many years ago, or even up until last year, it used to be that the kids would get really excited about using the laptops. They would shout for joy when they saw the laptop trolley being rolled into the classroom. Now, they sigh and ask for the iPads. Some even go as far as to get upset if they’re not using the iPads. I don’t mind using the iPads, but there are some really compulsory apps that just aren’t available on the iPad. Take Scratch for example, that’s a really important app that is used for computing lessons. It’s used for coding and there isn’t really an exact substitute on the AppStore for it. Also, stuff like Microsoft Excel and so on, there are some things that there just aren’t substitutes or replacements for on the iPad. This is why I feel that the laptops

still have some importance. Even though I talk about the importance of the laptop, when you're talking about engaging the kids, the iPad takes the crown. In every well-planned lesson that I use the iPad for, the kids are always excited and they are always fully engaged with the task to the point where they sometimes don't want to stop working. I've even had kids ask me if they could work throughout the lunch time. We're really onto something here with the iPad. It does a lot well, but there's still some ways to go before it can really replace the laptop. Also, it might be really engaging and that, but when it comes down to the actual learning or understanding of the kids, I'm still a little undecided about the iPad ” (Hayley's Interview 6-1-15).

From the above discussion with the teacher, it is clear that she holds a similar view to the children in that they both see the iPad as engaging and interesting but accept that the iPad has limitations that will need to be addressed and overcome before it can really be a replacement for the laptop and other traditional means of computing in a school. In the literature review chapter, An (2014) had similar findings where she found in her research that many of the teachers that she interviewed were unsure of the impact the iPad had on the level of understanding or ability of the pupil to better understand the concept being taught to them (p.270).

4.7.3 Using the iPad as a tool for observation

In my conversations with the headteacher, the idea that the iPad could be used as an observational device came up. The headteacher had the idea that it may be possible to record outstanding lessons for the other teachers to refer to as a reference and also to record lessons done by NQTs (Newly Qualified Teachers) in order to assist them in improving their practice. Normally, whenever a teacher is being observed, the

observers will either take a laptop and make notes or just write notes on a sheet of paper. What the headteacher has started doing is using the iPad to record the lessons in the form of a video so that very specific parts of the lesson can be discussed or shared. In the literature review chapter, commentators such as Polly (2014) found the iPad to be in their opinion, the ideal tool for classroom observation because it *“allowed us to capture in more detail what was happening during each observed lesson”* (p. 376). Speaking to a recently observed NQT teacher about their thoughts on the iPad being used in their observation by the observer, they said,

“Whether it’s paper, the laptop, the iPad or whatever they choose to use, I still find all observations very stressful. I guess the nice thing about the iPad is that it doesn’t have a noisy keyboard like the laptop does. But I don’t think it makes much of a difference to me when it comes to how stressful observations are for me” (Sarah’s Interview 6-4-15).

From the above, it would appear that where observations are concerned, whilst the iPad offers the advantage of being mobile and the ability to allow its user to make notes and recordings with relative ease, it would appear that it may not have much of an impact on the way the teachers being observed see it. Polly (2014) found in their study that the student teacher they interviewed found the iPad to be less intimidating than paper or the use of a laptop when it came to being observed. Whilst the iPad has been seen as a device that offers its user a vast wealth of knowledge and information at their fingertips, a drawback that frequently arose during this research project was that of battery charge. There were occasions where a teacher would fully prepare their lessons around the use of the iPads only to find that the batteries were not charged.

What was interesting about this was that there were some members of staff that praised the iPad for its battery capacity and others that criticised it for the same thing. The following was an example of this. There was a literacy lesson that observed where the teacher carefully demonstrated how she wanted the pupils to film themselves reading their reports. The idea was that they were going to create a mock BBC report. The pupils had already created their reports in the previous lessons and it was time for them to film their reports. She instructed them that after this was done that they were to use the app iMovie on the iPad to edit the footage and then on the following day they should be able to present their reports to the class. As soon as the teacher had finished explaining, she began to hand out the iPads with the assistance of the teaching assistant and some of the pupils left the room with the teaching assistant so that they would have a quieter environment in which to record. Within five minutes of this happening the pupils returned with the teaching assistant to inform the teacher that the iPads did not have any charge. Four of the iPads had less than five percent charge and were about to die. As a result of this, the teacher then instructed the pupils to practice acting out their roles with each other. Many of the pupils were upset at this as they were quite keen on using the iPads to both film and edit their reports. I overheard one saying to the other,

“Aww, I really wanted to do my report, I would have been just like a proper BBC reporter, couldn’t Miss have charged the iPads before we had the lesson” (Field recordings and notes 5-1-15).

After the lesson, I was able to have a discussion with the teacher and the teaching assistant as to their feelings on the use of iPads. I first spoke with the teacher who replied,

“I really took my time to plan that lesson. I was also really pleased with myself when I got everything set up. Someone else must have used the iPads in the morning without putting it back to charge. That’s the problem with relying on technology. It’ll let you down when you need it most. Isn’t it interesting how when using what you might call the traditional means of teaching, that is the use of books, pencil and paper, they’re always there when you need them as they don’t need to be recharged like these iPads. Now I’m not saying that iPads don’t have a place in the education system, they definitely do have a place. Their place simply is not to replace the traditional way of doing things, their place is to act as a tool. A tool which adds to the existing experience of learning. In other words, what I really mean is that they can really add to a lesson. This is in the same way tangible resources such as counters make it easier for some pupils to count, in this same way, the iPads are like resources which can be used to make a lesson more interesting for the pupils. In the case of my own lesson, I wanted the pupils to record themselves as if they were actual BBC reporters. I really took great care in planning this too. The children had already planned and completed their written reports. The idea was that they were going to record themselves reading their reports and then edit it in the Computing lesson the following day. It would have been quite exciting for the children to see and hear themselves and also it would have given all of the children a chance to share their hard work with each other. But I guess, to be fair, I really can’t blame the iPads for this. Clearly someone used them between the time I checked them and the start of the lesson. I should have checked them as soon as I got into school this morning” (Amy’s Interview 15-1-15).

From the above interview, it was clear that whilst the teacher acknowledges that the issue of charging could be a potential drawback to the use of iPads, she also sees that it is one that could be avoided through more thorough lesson preparation. As previously discussed in the literature review chapter, commentators such as Catapano (2014) adds to the argument by pointing out that if an iPad runs out of power, the student is unable to use it and their work may be temporarily unavailable until the iPad has been recharged. However, books do not have this issue and the work that the pupil has done in the book is always available.

The teaching assistant offered me a somewhat different perspective on the matter, she said,

“I never really liked the idea of using iPads in the classroom and what happened earlier today just proves my point. What did we spend the lesson doing? We wasted it trying to get this ridiculous thing to work. Precious time wasted. Time that could have been better spent getting actual work done. I appreciate how the iPad excites the children, but it’s just a novelty, one that we don’t actually need. I’ve been a teaching assistant for almost thirty years now and for all of those years I’ve seen children become educated and succeed without the use of these toys. They’re toys, that’s what they are. What’s worrying is that the school and to an extent the government seems to be pushing these toys onto the education system and look how the iPads let us down today. I mean, I appreciate how you can say that had they been charged the lesson would have gone through successfully, but by who’s measure of success? The children would have recorded themselves doing a report and then what. I guarantee you had the iPads had charge, the children would have

been messing about with the iPads and no proper work would have actually taken place. You see, this is the problem. I appreciate how they can use the iPad as a tool for learning but it just comes with all of these other features for play. I mean, whenever the children see the iPad, they see an opportunity to go onto the internet, to play games and things that just aren't for work. But going back to the issue of charge. I should be fair in saying that this is a problem that plagued the laptops for years. It's not just the iPads that have the problem of needing their batteries to be charged in order to be used" (Katie's Interview 15-1-15).

4.7.4 Staff perceptions of the advantages of cloud services

As previously explored in the literature review, Keengwe and Onchwari (2016) point out that the use of cloud services can enable teachers and students to carry on the teaching and learning process from any location that has an internet connection. In particular, they noted that Google Docs allowed teachers and pupils to create and edit documents. Similarly, as referenced in the literature review, George, Dreibelbis and Aumiller (2013) found that Google Docs can be used to carry out class discussions where all of the participants are in different physical locations. The following is an interview about a lesson that took place using Google classroom. The teacher discusses her perception of cloud services. She stated,

"I felt it went well, the starter with the Socrative app went fine, I mean the children really enjoyed it, especially Eric. You know how hard it is to keep him entertained! As far as the main teaching lesson went, you know, it was fine with the HA and MA, but I'm not too sure about the LA. It really took

them a long time to understand what went on in the lesson. Maybe I should have had examples on their desk to start, or maybe pieces of worded problems that they could have put together. I'm not sure. They did get it in the end though. I think the iPads really help to keep them motivated. Some of them aren't normally this enthusiastic when we're using their numeracy books, or even laptops for that matter. It really helped them to persevere, to keep trying until they got it. It's not just them though, they all really enjoyed using the iPads, it's a shame we don't have an app for every type of lesson! Talking about the class as a whole, did you notice how they were all so deeply engrossed in their work? I didn't have to tell off not a single child for the whole lesson. They worked really well together during this lesson. And Google docs was really good, I want to use Google Classroom in the future though, I've been having a look at it, I think I really can use it. The nice thing about Google docs is that we can all work on the document together, which is quite nice. Not only that, but it eliminates the saving issue completely! I can't tell you how many times we've lost children's work because the damn thing just didn't save when we thought it did, but having it save in the cloud means that even if the battery dies, it's all still there. That's reassuring for me as it means I'll always have evidence of their work saved somewhere in the cloud. Being easy to get to means that I can find it when it's time to print it out and stick it into their books. Do you know how many times I've had children say that they've saved their work only to be unable to find it anywhere on the system. It's all conveniently saved on the cloud where I can get access to it from anywhere. This means that I can mark the work from home, on the train, basically anywhere that I have a wireless connection.

Coming back to the point about their work, I can see what they children are doing and I can leave them little notes which can contain hints or questions for them to answer. It helps in dialogue marking, sorta like what Ofsted is always looking for.”

I then asked her what she thought could have been better, she replied,

“Better? There needs to be more apps available that are directly geared for the lessons. Right now, I’m just seeing a handful of apps which are useful, but nothing that is truly tailor made to suit the needs of a numeracy lesson, or any other type of lesson taught in the school for that matter. A stylus pen may be a good idea too, great for their jottings. I think we’re getting there though, just not quickly enough” (Jennifer’s interview 26-4-15).

From the above conversation, it became clear that when the teacher has the knowledge as to how to use the technology in their lessons, it is possible to successfully use them in the lessons. More specifically, not just the know-how, but having an open mind to it as it is a technology that is relatively new. It is possible to argue that it may be as a result of taking the time to factor in and understand the current limitations of the hardware and software when planning and preparing lessons. As noted in chapter two, Attard (2013) also felt that when teachers fully planned lessons, the iPad had the potential to enhance lessons.

This stands in stark contrast to the experience I had in the lesson prior to this one where the teacher was unable to get the iPad to support the teaching and learning process in her classroom. This consequently led to the pupils going off task and a

large percentage of the pupils failing to achieve the success criteria. Again, Attard (2013) also found that teachers who were not trained or did not plan with the limitations of the iPad in mind were likely to be unsuccessful in making effective use of them in lessons. Taking the above two examples into consideration, not only did the preparation for the lesson play a key role in determining the success of the lesson, but also it was the way in which the technology was used within the lesson that also had a huge impact on the success of the lesson; success was measured in this case by the number of pupils that were able to achieve the success criteria.

4.7.5 The use of the iPad and the fine motor skills of children

As reviewed in the literature review, Siltan (2015) argues that tablets such as the Apple iPad assist pupils in developing their fine motor skills. Another commentator, Rigo (2013) argues that the iPad has gained popularity primarily because of its ability to allow the user of the device to grapple with and manipulate content (both visual and audio) through the use of the touchscreen and then they are able to respond to the various prompts on the screen through the use of touch rather than the need for a mouse or stylus.

In a lesson that I observed in one of the Nursery classes, the teacher used a whiteboard app and instructed the pupils to try to write their name. Using her hand on the SmartBoard, she started with the alphabet and had the pupils copy the motion of her fingers to form the given letter on the iPad's screen using the stylus. Some of the pupils struggled to hold the stylus. For these pupils she instructed them to use their fingers. I noticed that the pupils who were struggling with the stylus found it significantly easier to use their fingers to draw the letter on the screen. Whilst there were still inaccuracies where the formation of the letter was concerned, it was notably

more accurate than when they attempted to use the stylus pen. Whilst walking around the room, I observed that the pupils seemed to be quite engrossed in the activity. The teaching assistant walked around the room and assisted the pupils that were having trouble forming the given letter. As I was walking, I overheard two pupils talking to each other. One said to the other, *“Look! Look! You do it like this!”* The pupil was showing the other how to form the letter ‘d’. Overall, the pupils showed a great deal of enthusiasm towards the activity and in the end they were all able to form at least six letters.

After the lesson, I spoke to the teacher about the lesson and she said,

“I think it went well. Nowadays children are born in the technological age, so that you find it’s more natural for them to use something like an iPad than it is for them to use pencil and paper. What the iPad does is act as a vehicle for the children to use to get from the point of not being quite able to form letters to where they are able to begin to correctly form letters. Also with the screen shot feature, we can capture the various steps that they take on their journey to becoming more competent mark makers. I’m sure you noticed that a lot of the pupils first found it difficult to hold a pencil. This is quite normal at this age. What I’m sure you noticed was that even if they couldn’t hold a pencil, they were still able to with practice begin to form letters with their fingers. This is really important as it helps to develop their fine motor skills. What it also allows us to do is to begin to work on the alphabet even sooner”
(Sharon’s Interview 12-12-14).

Silton (2015) had similar findings which were explored in greater depth in the literature review. Silton (2015) conducted a research project using iPads and apps that

replicated musical instruments. Silton (2015) found that the use of the iPad based musical instrument apps assisted the pupils in the development of their fine motor skills (p.303). Silton (2015) further pointed out that this was because the app gives the pupil the opportunity to virtually play the harp inclusive of the *“finger picking, tapping or plucking movements similar to those used in the actual instrument”* (p.303).

As discussed in the literature review, Hammond and Valentine (2015) add to this by arguing that sketching apps on touch driven devices such as the Apple iPad can potentially have a great impact on the development of the fine motor skills of pupils as well as their self-regulation skills (p.36). More specifically, Hammond and Valentine give the example of the app, *“Create and Learn”* by Fisher Price (p.36). This iOS app runs on the Apple iPad and what it does is that it shows the user how to draw a letter and then gives the user the opportunity to practice drawing the given letter. In the research project carried out by Hammond and Valentine, they found that the use of this app helped to develop the fine motor skills of pre-schoolers.

When I had a conversation with the teaching assistant she shared her thoughts and perceptions of the device with me, she said,

“At this age, children love to explore. Everything is really new to them and touching and feeling things is really important to them. When we’re talking about the iPad, it’s really a game changer if you think about it. It’s not just limited to the developing of their motor skills. We’ve used it for so many other lessons. The children have taken photos of their environment, they’ve played games with helped with the development of their numerical skills too. But one thing that really worked well for the pupils and I really liked was that Piano

app, Virtuoso Piano I think it was called. Anyway, it allowed the children to play the piano and the sounds were quite accurate too. Not only are the children developing their touch and motor skills, but it also allows them to have experiences that they otherwise may not be able to have. Another real plus for me was that in the past I used to have to either take a photograph of the boards to show the work that the children have done and then go on the computer and print them off and annotate them. Alternatively, I would sometimes stop the child, take their board and go photocopy their work. This was really a pain as it was very time consuming and sometimes in the photocopier some of the work would rub off. Now, if you hit the home and power button at the same time, you can take as many screencaps as you like of the work. We can now even collect evidence of the steps the child took before finally forming the letter or completing whatever task we set them. It's quite handy. Take a screen cap of each of them and then it's automatically saved onto the iPad. I can then at a later point print off the screen caps" (Pat's Interview 12-12-14).

From the above interview, Pat identified numerous advantages of the iPad. These advantages included the saving of time and resources, as she did not have to photocopy the evidence of learning. Other advantages identified were the development of motor skills and the ways in which it engaged pupils.

In summary, the teachers identified a number of advantages to using the iPad as part of their pedagogy. Some of the advantages identified included the ability to use and annotate interactive e-books, ease of use, its intuitive interface, its ability to use cloud services for distance teaching and learning and the ability of the iPad to help develop

the fine motor skills of young children. These advantages were also noted by commentators such as Silton (2015), Keengwe and Onchwari (2016). However, there were disadvantages such as the lack of time to learn how to include the iPad in their pedagogy, the potential to distract the pupils from learning and the fact that it needs to be charged in order to be used.

4.8 Pupil perceptions of advantages and disadvantages of the iPad and cloud services

In the case of learning, I have found that the act of touching the screen of the iPad and the use of its touch driven interface has been quite engaging for the pupils that I have worked with. Also, there is an immediacy with the iPad that did not exist when using laptops or desktop computers. This sentiment is echoed by researchers such as Henderson and Yeow (2012) in the literature review. As discussed in the literature review chapter, they found in their study of iPad use in New Zealand found that the use of the fingers to drive the iPad kept the pupils interested for longer periods of time than traditional ICT devices such as the desktop and laptop computer. One key example of this was a lesson where the pupils and myself were writing a report about Whitegate in Geography. The pupils were able to use Google Earth to virtually visit Whitegate and go to the street view where they were then able to virtually walk around the various parts of Whitegate so to give them a better idea as to its features. This was very useful as we were not able to physically take the pupils there on a field trip. A large number of the pupils in this class have never left the city that they were in and for them it was a surprise to see just how different Whitegate is to their own local area. Walking around from table to table, I could tell that the pupils were fully

engaged in the activity. Starting at the table closest to me, I listened to the conversation that Mark and Tariq were having,

“There is so much grass! The, the houses are so big. Where are the flats?”

Mark responded,

“It kinda looks a bit boring, I mean there isn’t anything really going on here. There are hardly any shops, do you think they have shops here? It kinda looks like a ghost town!”

Tariq then replied,

“Maybe all of the people are inside, let’s look around some more and see what we find! Go left over there, I think that’s how we get to the town centre. Is there a town centre?” (Field recordings and notes 26-5-15).

The above excerpt from my field recordings made it clear that the level of interactivity offered by the iPad allowed these pupils to have an experience that they otherwise would not have been able to have. Further to this, it allowed them to learn about a different part of England which is geographically quite different from the city that they currently live in.

4.8.1 What do the pupils see as the pros and cons of using the iPad in the classroom?

I had a discussion with Mark and Lisa after the geography lesson. I asked the pupils what they felt was great about the iPad and what they felt could be better. Lisa was the first to reply.

“I like how I can touch the screen to make things happen, it’s like real life. You can touch stuff in real life and make stuff happen. Say, if I have a map, I can use my hands to move the map. It’s just like on iPad, I can move around the map with my fingers” (Lisa’s interview 26-5-15).

As seen in the literature review, Vu et al (2014) also noted the touchscreen of the iPad as advantageous. When asked about what could be better, she replied,

“Umm, I don’t know. Probably it could be that you have to hold the iPad really carefully otherwise it might break?” (Lisa’s interview 26-5-15)

Similarly, Moorefield-Lang, Meier and Miller (2014) echoed this point in the literature review. They contend that there is always the possibility that iPads can become damaged if dropped.

Afterward, Mark replied,

“I like how I can touch the screen and everything is controlled with my hands. I don’t need a keyboard and I don’t need to plug it in to use it. I wish it was like my computer at home. I know how to use that real easy. The iPad is a little bit different. I’m kinda new to it. I am still learning how it works. I’m getting better and better at using the iPad though” (Mark’s interview 26-5-15).

From the above conversation with Mark, it is possible to argue that some pupils may not feel confident. More specifically, they may feel that they lack the technological skills to effectively use the technology (Henderson and Yeow, 2012). As suggested in the literature review chapter, it is important according to Clark and Luckin (2013) to

keep in mind that findings such as these are substantially lower in number than found by researchers such as Burden et al (2012). Burden et al (2012) found that the use of these technologies in the classroom more often than not worked to motivate, spark and maintain interest, raise self-confidence, engross, create an environment within which the pupil can take control of their learning and become independent learners and overall their productivity is increased (NMC, 2012; Burden et al, 2012).

During the conversation with Lisa and Mark, I asked the pupils about what they felt may not have been great about the iPad. Lisa replied,

“Umm...Erm...I don’t know... I know we have to use the iPad to do learning, but I really want to play games.” (Lisa’s interview 26-5-15)

Then Mark replied,

“Yeah, like Temple Run! No one can beat my score! If the iPads had Temple Run on it, or Subway Surfers, I’d be playing that all day!” (Mark’s interview 26-5-15)

The above responses show that some pupils perceive that the iPad has the potential be a distraction from learning. As previously discussed in the literature review chapter, Clark and Luckin (2013) had similar findings in their research. They found that iPads in the classroom to have the ability to be distracting (Saenz, 2011), the ability to be misused by the pupils (Clarke, 2012).

4.8.2 What do pupils see as the advantages and disadvantages of using cloud services in the school?

In the school, there were a number of cloud services used including the school's own internal Western Digital MyCloud cloud storage system. Some of the cloud services used include iCloud, Google Services (Docs, Classroom, etc.) and Dropbox. Many of these cloud services are free and in the case of this research project, these cloud services were used on and accessed with the iPad. Whilst observing another numeracy lesson during the following week, this lesson made use of Google docs. The learning intention in the lesson was for the pupils to create a bank of worded problems which all resulted in the answer 28. It was a problem solving lesson. The pupils at the start of the lesson were instructed that they would be using Google Docs to write their worded problems in a shared document. The idea behind this was that the pupils would all work together to create a worded problem book whereby other pupils could later access them and work them out. At the start of the lesson, the teacher through the use of the iPad mirrored the work onto the SmartBoard using Airplay and then as a class modelled an example of a worded problem. The higher ability pupils were required as part of their success criteria to create at least 5 worded problems which used at least two operations, one of which had to be division. The middle ability pupils were required to use at least two operations as well, but there was no restriction as to which pair of operations they could use to create the worded problem. Finally, the low ability pupils were to create a worded problem which gave the answer 8.

Once the pupils were briefed, the teacher carried out a five minute mental starter where the pupils were to use the app Socrative teacher. This app works in a similar fashion to a voting clicker. It enables the teacher to start a quiz and then the pupils are

able to respond to the questions in the quiz by selecting the correct answer on their own iPads. This app also aids in formative assessment as it enables the teacher to set up quizzes from which the responses are automatically verified by the software and then an assessment of the pupil's performance is automatically generated by the app. Further to this, the app was able to create quick question polls that make use of multiple-choice answers as well as open ended questions whereby the pupils can vote on the responses.

The Socratic Teacher app was used to have a times tables quiz with the pupils where they were given 5 seconds to answer each of the 2,3 and 4 times tables questions. The pupils showed a great deal of enthusiasm as they tried to answer the given question within the 5-second period. Whilst this was going on, I walked around the classroom to see if I could gain more insight to exactly how the pupils felt about the experience. I could clearly see that the pupils were fully engaged in the activity. Further to this, the EAL pupils that typically struggle to understand the tasks were able to quickly engage with the task due to its numerical nature. After the quiz was complete, the pupils were able to see their scores on their screens and the teacher was immediately presented with all of the scores of the pupils in the classroom.

Once this was completed, the teacher moved onto the main lesson. The pupils worked alongside the teacher on the carpet to model the first worded problem. The pupils left their iPads at their desks but the teacher using her iPad was able to model a worded problem using the ideas of the pupils. After this, the pupils were given the differentiated success criteria where they were reminded that they had to make a worded problem that gave the answer 28. The pupils started by discussing their worded problems in their talk partners. Following this, they typed their worded

problems using Google Docs. Walking around the classroom, it was clear that the pupils were very enthusiastic about the idea of making a digital worded problem book. At table 1, these pupils had the most challenging differentiated task. They had to make worded problems that gave the answer 48 and were required to use at least two operations, one of which had to be division. I overheard Tariq saying to Samir,

“If we’re going to divide, we have to start with a much bigger number! Press the triangle looking button with the x to erase it and put one hundred, we’ll take away four and then half it to get our answer” (Pupil Field recordings and notes 26-4-15).

When I asked the pupils’ their thoughts, Samir replied,

“I don’t got to waste time rubbing out my mistakes, I can just erase and continue. It’s really fast. Plus I can see what the other’s are doing without having to go over to them, it’s awesome” (Pupil Field notes and recordings 26-4-15).

Tariq added,

“We can see other people’s ideas and then use it to help us make up our own problems if we’re stuck. Sometimes, we put unimportant information in the question to try and trick other people, it’s good fun” (Pupil Field recordings and notes 26-4-15).

Asking Samir about his thoughts on Google Docs, he replied,

“It’s sorta like, umm, like Word Office, but it’s cool like everyone can look at it, I can leave little notes and I can do drawings. It’s good for workings too.

It's easier to use than the laptop Word office because it lets you write down your workings and other drawings, I just gotta touch the screen and its there! The laptop don't let me do my workings out! I can't touch the screen and I can't write with it, all it lets you do is type and sometimes I can't get it to type in the right place” (Field recordings and notes 26-4-15).

From the above recording, it is possible to argue that one key advantage that cloud services offered the pupils was the ability to share their work with each other and work together on the same document even if they were not next to each other. Moving onto the other tables, I found that they were also engrossed in creating worded problems for their peers and found it most enjoyable. As I approached table 2, Raj called me and said,

“Check this out yeah, I can see other people solving my questions! How ace is that? They leave their working outs and I can see if they got it right. They should know anyway. Some of these questions are hard though” (Field recordings and notes 26-4-15).

(Pointing to a question done by one of the table 1 pupils which requires an answer of 48.) His paired partner also commented,

“Some of these problems are very tricky, there are things and numbers in here that I don t really know what to do with. I think it's here to trip us up, but sometimes it's useful. It makes it harder to solve but I feel good when I get it right” (Field recordings and notes 26-4-15).

Following on from the tables with medium difficulty activities, I turned my attention to the table with the lowest difficulty activities. I observed a somewhat different

situation on this table, due to the way in which the questions were written, a lot of the pupils on table 3 were really struggling to understand what was being asked of them. Initially the teacher struggled to explain the task to some of the EAL pupils on this table. This being said, it was clear that this did not deter them from trying to create worded problems of their own once they saw what the other pupils were doing. The teacher attempted to make their task clearer by saying,

“You need to make up a story where you make the answer eight by adding or taking away. Look at this example, let’s do this one together, Luke has six apples and his mother gives him two more apples, how many apples does Luke have now? You need to make up worded problems like that”(Field recordings and notes 26-4-15).

After a few moments of struggling, these pupils began to write their own worded problems. Further to this, the iPad automatically corrected the words that they spelt incorrectly, which also made it easier for the others to understand what they wrote. Listening to the pupils talk to each other, I overheard one say to the other,

“Four plus four, put that on the iPad. That makes eight. If we write down all kinds of ways of doing eight, we can after make up a story for them” (Field recordings and notes 26-4-15).

After having a conversation with the teacher, the pupils started to attempt the problem in a systematic manner. They were recording the possibilities on their iPads and then they would work through them one by one creating worded problems.

I then asked one of the pupils what she thought of the task and she replied,

“It’s like writing a story and with numbers. You make up the story, like, like if you want to add you say one person and then make somebody else give something to them and then its your story, but with numbers. Miss say we have to get eight. I have to make up numbers that add up to eight. I can also take away numbers to make eight. Look the iPad help me to spell words that I forget how to spell. I can see what other people are writing too. They have good idea too. If I make mistake, I can fix and I don’t need a rubber to do it. It makes my work easy” (Field recordings and notes 26-4-15).

From this conversation, it was clear that the grammar and spelling correction feature of the iPad gave her more confidence to write worded problems for her peers. Furthermore, the ability for her to see what the others were doing also aided in making it clearer for her to understand what she needed to do in order to create her own worded problems and achieve the success criteria.

At the end of the lesson, the teacher brought the pupils back to the carpet and then went through some examples of pupils’ work. The pupils showed a great deal of enthusiasm as they were called up at random via the lollisticks (a cup of lollisticks which have the names of all of the pupils) to present their worded problem. They would then select another pupil to come up to solve the problem that they created. What was great about Google docs was that it allowed for drawings and jottings, thus taking full advantage of the iPad’s multi-touch screen.

Having gone around to the various tables, it became clear to me that with the exception of two pupils at table 3, all of the other pupils showed a sound understanding of the task that they were given and were able to achieve the success

criteria. After the lesson, I had a conversation with two of the pupils and then the teacher. The first pupil I spoke to was Raj. I wanted to get his thoughts on the use of cloud services in the lesson. He said,

“I ain’t gonna lie, it’s cool how everybody can do the same work. I mean, you know, work on the same thing. I can see what other people are doing. I used ideas that I saw to make my own problems for others to solve. It’s much more interesting than just writing it down on paper. Plus, the iPad is really neat when you make mistakes. You know, when you have to rub off your mistakes, you get all these black marks all over your work and Miss gets cross because your work is dirty and untidy and stuff. On the iPad, you rub off clean. No marks at all. I just wish the screen was bigger though. Sometimes though, when you make too many changes, Google docs may freeze for a few seconds, so you gotta wait for it to finish before you can continue.” (Raj’s Interview 26-4-15)

From the above conversation with one of the pupils, he highlighted the ability to share work with others as one of the advantages of the cloud service Google docs. In contrast, he points out that sometimes the app freezes when making too many changes in succession. This is most likely down to the fact that the cloud services use the school’s network and internet connection in order to register the changes. The more network traffic there is, the more likely that the users may have the inconvenience of waiting for changes to occur. Similarly, in the literature review An (2014) echoed this point by arguing the importance of the school’s wireless network in dealing with wireless traffic. The use of cloud services in the school relied heavily on the wireless network of the school in order to function.

Next, I spoke to another pupil in the class. When asked about their thoughts on the use of cloud services such as the service offered by Google Docs, they replied,

“It’s okay I guess, I really like how I don’t have to keep saving my work every few minutes like we used to have to on the laptops. But it’s really slow sometimes. You know on the normal laptop, you just type and it comes up. Google is like that sometimes, but sometimes, it just does it slowly, like it’s gotta think about what you’re writing before it decides to type it on the screen. Most times it’s great though. It’s kinda nice that I could open the document on any iPad or computer and it’ll just be there”(Lisa’s Interview 26-4-15).

The above pupil echoed a similar set of perceptions as the first one I spoke to from the lesson. Whilst he praised it for its ability to be accessed from any device with an internet connection, he also noted the slowdown that was experienced.

4.8.3 Having knowledge at your fingertips

Whilst the lack of available textbooks has been raised as a genuine issue, many of the staff and pupils praise the iPad for its ability to assist them in being able to instantly find the answer to a question or to quickly find information about the topic that they are covering in the class. There were several lessons that I observed throughout the course of my data collection period where both the pupils and the teachers used the iPad as a research tool in and out of lessons. In the literature review chapter, Keengwe (2014) pointed out that one of the key benefits of the Apple iPad was its ability to offer its user instant access to the internet and the wealth of information that the internet has to offer. This was a benefit that I saw being used in a variety of lessons.

One example of this that really stood out to me was a lesson where the Year 2 pupils were researching nocturnal animals. The pupils were placed in mixed ability pairs and then required to use the iPads to visit specified sites in order to find out information about nocturnal animals and then use that information to write non-chronological reports.

The teacher introduced the topic and then demonstrated to the pupils how to use the iPad to find the information that they needed and which websites they were allowed to visit. This was followed by a brief e-safety quiz so to ensure that the children fully understood why they had to follow the e-safety rules. Once this was done, the teacher gave the pupils the headings that they needed to use for the non-chronological reports and provided them with a sheet of paper with the headings so that they can fill them out as they found out the information. The pupils were given a selection of nocturnal animals to choose from and then they started their research. Most of the pupils were able to input the given website and locate the nocturnal animal of their choice. There was one pair of pupils that initially had difficulty finding the Safari app on the iPad, but the teaching assistant quickly assisted them and they started finding information about their chosen nocturnal animal.

As I walked around the room, I could see that the pupils were very focused on the task at hand and were discussing a number of key facts that they had found and under which heading they felt it should go. However, one issue arose. I observed that some of the pupils were simply copying out the website without considering whether what they were writing was relevant or was written under the correct heading.

After roughly fifteen minutes, the teacher stopped the lesson and carried out a mini-plenary where she placed emphasis on the fact that the pupils needed to read the information from the website and then use their powers of deduction to work out where and under which heading the information should be placed. She then called up two pupils and worked together with them to show how information is to be retrieved from the website and then how it is to be written under each heading. Once this was done, the teacher instructed the pupils to continue working on their reports.

It would appear that the pupils had gained a clearer picture from the mini-plenary as to what they needed to do as they were now on task and writing their reports. As I walked from table to table, I observed that the pupils were engrossed in discussions about their various nocturnal animals and were even looking at video clips of their selected nocturnal animals on the iPad. Approaching the end of the lesson, most of the pupils still had not completed their reports so the teacher called them back to the carpet for a plenary and informed them that they should be continuing this report on the following day. During the plenary, the teacher took the report of one of the pairs that had finished the report and took a photo of it using the iPad and then using AirPlay, displayed it on the SmartBoard so that the other pupils could see it. She then proceeded to allow the pair of children whose report she had selected to present their report to the class. At the end of the lesson, I was able to speak to two of the pupils to find out their feelings on the use of the iPad in this lesson. The first pupil I spoke to replied to me,

“I like the colourful pictures and the video of the owl. I didn’t know there were different kinds of owls. I didn’t know that owls were nocturnal animals

before this. I really like how I could see videos of owls moving and hunting. That's really cool" (Ashley's Interview 19-2-15).

The other pupil added,

"You know what I proper love, the iPads touch screen. Like how you can touch things and boom, it's just there. It's almost like you're there when you touch the play button and the owl starts moving" (Simon's Interview 19-2-15).

From their body language and their description, it was clear that not only did they enjoy using the iPads, but they had also learned a lot about their chosen nocturnal animal. I approached the teacher soon afterward and asked her for her opinion on her thoughts on the use of the iPad in that lesson. She replied,

"For a moment there I thought I'd totally lost the children when they started copying out everything that they saw on the iPad. Thankfully I caught it just in time. Unfortunately the lesson will need to be continued tomorrow. I was really hoping to complete it today. The iPads were quite good; you could tell that the children were really eager to use them. Not only that, but it allowed them to see little clips of the nocturnal animals in high definition. You must admit, that really adds a totally new level of immersion to lessons that otherwise didn't exist before. I mean, sure the laptops could do it to, but it's the whole idea of touching it and boom, there it is. It's not just that, it's being able to just look up anything at a moment's notice, the second you think of it, you can look it up and there it is. Now that I've cleared up the issue with what needs to go under what heading, I think the children should be able to finish

their reports, then I'll mark them, get them to re-write them without the mistakes and then put them up, I reckon they'll make a lovely display. What I'd really like to do is to get them to do the report on the iPad itself in addition to carrying out the research on the iPad. Ideally, I would have really liked them to have done this, but time constraints just didn't allow for it to happen. I couldn't find an app that I felt really fit the bill. Also, the multitasking on the iPad is good, but I think I'll need to cover it in the computing lesson before having them multitask between the Safari app for their information and whatever app I eventually choose for them to write their report" (Jennifer's Interview 19-2-15).

From the above interview, it was clear that the teacher felt that the iPad contributed positively to the lesson that she carried out. Further to this, she identified a feature of the iPad. Its ability to allow the user to immediately find information or media with very little effort. As discussed in the literature review Glikson (2014) puts it, "*The iPad puts multimedia at your fingertips and allows it to become an integral part of the learning process*" (p.410). In the case of the above lesson, it was clear that it was an integral part of the learning process.

Later that day, I had an opportunity to speak to the teaching assistant to get her feelings on the use of the iPad in the above lesson where it was used as a device to research and retrieve information. She replied,

"The tablets proved to be quite handy today. I was slightly worried at first that we might have some problems with the wireless, but it all went smoothly. The children really liked the little videos of the owls, hedgehogs and foxes. I think it really contributed to the success of the lesson. I mean, I know they all didn't

have a chance to finish, but still it make it easy for them to get the information they needed to finish. The iPad is more interactive than a book so that's why you find that the children quickly became engaged with the work and just got on with it. The videos also helped the children to better understand what the words were trying to explain. Like, the habitat of the owl, not only did it tell them about it and describe it, but it also showed a video of the owls and where they live, their habitat. I think that really helps not only to engage the minds of the children but also helps them to better understand what they're reading. I really think that the touchscreen adds that extra dimension that the laptops just couldn't offer as far as the learning experience of the child is concerned" (Priya's Interview 19-2-15).

From the above statement, the idea that the iPad is a device that grants its user the ability to have a vast wealth of information at their fingertips or allows the children to easily access information has been expressed by these members of staff. I also found interesting is that one of the above members of staff made a comparison with the existing accepted technologies such as laptop computers and the iPad which was recently introduced to the school.

In summary, the pupils identified a number of advantages of using the iPad and cloud services. These advantages included the ability to research information immediately, the ability to independently find out information, the touch screen interface made the iPad easy to use, the ability to use cloud services such as Google docs to write without worrying about having to erase their mistakes, to use cloud services to share their work with others, the ability of cloud services to store your work without needing to constantly save and backup and the ability of the iPad to view pictures and videos of

the subject being researched. However, some pupils noted that there were disadvantages of the iPad. These disadvantages included the temptation to use the iPad to play games and its heavy reliance on the network infrastructure of the school.

4.9 Conclusion

In this chapter, I focused on analysing the ways in which staff and pupils engaged with the technologies, their perceptions of both the advantages and disadvantages when it came to the use of the iPad and the cloud services used on the iPad. Throughout my observations of the staff and pupils using the iPads, I made several key observations. The first was that most of the staff generally held a positive view of the device but may not have been sure as to how to properly use it to the fullest of its potential or lacked the confidence to use it. The remainder of the staff were not keen on the device or the cloud services because they felt that they were not sure how it would fit in their pedagogy or that it would be a distraction to the pupils that they were teaching.

Where the issue of self-confidence or not being able to use it are concerned, it is possible to argue that through training and insets on how to properly or effectively use the device may assist in going some ways to alleviate this problem. I argue this as there are instances where I have observed others where the iPad and the use of cloud services on the iPad proved to be an invaluable tool when it came to delivering the lesson. It is possible to argue that this was because many of my colleagues, as well as myself, observed not only carefully planned how the device was going to be used in the lesson, but also understood how the device could be used and the limitations of the device.

However, this being said, throughout my observations, some factors were genuinely out of the hands of the teacher. One example of this was the issue with the school's wireless network. To be fair, no amount of planning or preparation could prepare a teacher for problems with the school's network as the network is out of their hands. I have experienced lessons where the teacher made every effort to ensure that they were fully prepared to use the iPads only to have the lesson hindered by an unresponsive wireless network. Further to this, I could see why issues like this could work to demotivate staff from using the iPad and made them perceive it as a device that was more trouble than it was worth. Further to this, it was not only the teachers that would perceive the device in the manner, but the pupils also as they were sometimes unable to save their work due to issues with the wireless network.

The second key observation was that the success of use of the iPad in a lesson depended heavily upon the planning and preparation done before the use of the device in the lesson. In other words, the iPad was more likely to be successful if the teacher included it in their planning and carefully planned exactly how they were going to use it in the lesson and knew beforehand what specifically they needed it to do. Carrying on from this point, the next key observation was that the expectations of the iPad needed to be realistic. Several staff members expressed to me that they felt restricted by the fact that the software that they had become accustomed to using on their Windows based desktop and laptop computers and felt that a key limitation of the iPad was that it was not compatible with and unable to run the software that they already had.

Where the pupils were concerned, I observed that the pupils were quite comfortable with the device and enjoyed working with it. Further to this, there were lessons where I observed the device arguably assist some pupils in building their self-confidence. This observation was backed up by the discussions I had with the teachers and teaching assistants who made the same observation that I did. This was also the case with some of the EAL pupils that generally spoke very little arguably due to their lack of confidence in themselves when it comes to speaking English. This is not to say that all EAL pupils lack confidence, but in the case of some of the EAL pupils it was observed both by myself, teachers and teaching assistants that the iPad seemed to have the effect of boosting the self-confidence of some of these pupils. This was to the point where I observed an EAL pupil that typically did not speak in class or on the playground put her hand up to present the work she did on the iPad. My experience of this was documented earlier in this chapter.

I argue that what is possibly the largest perceived benefit that the iPad brought was that it often engaged the pupils in the task and in most cases made the lesson more enjoyable for the pupils. One key instance of this was the geography lesson about Whitegate where the pupils were able to use the iPad to take a virtual 3D tour of Whitegate. When taken into consideration that most of these pupils have not yet had the opportunity to see places outside of London or their home country, the experience provided by the iPad proved to be a memorable and engaging one for them. They were in awe at the differences between Whitegate and their own local community. However, this is but one of many examples of times where I observed the iPad and the use of cloud services enhance the learning experience.

Whilst on the point of the learning experience, I documented an instance where due to the cloud services such as Google Docs, I was able to share work with a pupil that had temporarily left the school and gone to her home country. In the past, when the pupil returned, they would usually be behind where the work is concerned. However, in this case, I was able to send work to her and then mark it. There was also the facility for me to leave comments and see her comments. This proved to be most beneficial as the pupil was able to achieve her target level despite missing nearly a term of school.

In closing, despite the drawbacks of the use of the iPad and cloud services in education, students and teachers generally held a positive attitude towards the iPad where the process of teaching and learning was concerned (Younie and Leask, 2013; Brand et al, 2011; Kinash, Brand and Mathew, 2012; Perez, Gonzalez, Pitcher and Golding, 2011). Some of these drawbacks include the incompatibility of the iPad with the school's existing suite of software, the need for a fast internet connection to effectively use the cloud services, the need for a robust network to handle the traffic generated by the use of the iPads, the need to plan lessons around the limitations of the iPad and cloud services and so forth. I have observed several benefits that I felt the iPad brought to the staff and pupils including engagement, adding a new dimension to the lessons that they were planned for and included in. To summarise these observations, a summary table comparing the literature to the findings was created.

Issues identified in the Literature Review	Issues emerging from the data
The use of new technologies such as the iPad and cloud services can enable learning from home. (Keengwe and Onchware (2016)	<p>4.4.4 Collaboration, the iPad and cloud services</p> <p>This section details the experience of a pupil that was able to use cloud services</p>

	<p>whilst in a foreign country in order to continue taking part in the teaching and learning process. This echoes the findings that Keengwe and Onchware (2016) had.</p>
<p>The school network lacking the required infrastructure to support the iPad can make it difficult to use the iPad as part of the pedagogy (An, 2014)</p>	<p>4.3.2 The importance of lesson preparation in regards to the use of cloud services</p> <p>In Field recordings and notes 5-1-15, staff member Jennifer and pupils Ahmed and Simon all comment on how the school network impacted their experience when using the iPad. This supports the argument put forward by An (2014).</p> <p>A staff member Amy also commented, <i>“I don’t know whether it’s that having too many of these tablets on the network at the same time causes a strain. Everything just grinds to a halt when you’ve got too many of them on at the same time.”</i> (Amy’s Interview 13-11-14)</p> <p>4.5.5 The impact of the school’s wireless network</p> <p>The above findings are similar to the findings that An (2014) had where she found that the school network can have a massive impact on the iPad’s performance thus affecting its ability to be used as part of a pedagogy.</p> <p>4.4.2 Pupil engagement with e-books</p> <p>In Field recordings and notes 6-11-14, there is another example of where the network connectivity adversely affected the performance of the iPad.</p> <p>4.6.2 The wireless network</p> <p><i>“...I think it’s the internet. Maybe we need a bigger internet! IT’s really slow and kinda takes away the fun from being on the iPad...”</i> (Ahmed’s Interview 5-1-</p>

	<p>15)</p> <p>“...I didn’t even get a chance to properly go on the iPad! I’m so mad! Why do you guys have some broken internet? I think the internet in the school might just be too weak...” (Simon’s Interview 5-1-15)</p> <p>From the above two responses, it is clear that the pupils perceive the school’s network as the reason for the iPad’s poor performance. This is in line with the argument put forth by An (2014).</p>
<p>iPads can be used to aid a pupil in the grasping and understanding of new concepts in the same way an adult or a peer (knowledgeable other) would have assisted a child in grasping the new concept in Vygotsky’s theory.(Vygotsky, 1978)</p>	<p><i>“Did you see her? I’ve never heard her voice before! Not once, she was so quick to get up and answer, I didn’t even call on her and she wanted to do it. That’s definitely a first”</i> (Hannah’s interview- 7-10-14).</p> <p>From the above interview along with my own observations, it was clear that the iPad was able to operate in the same way the ‘knowledgeable other’ would have operated in Vygotsky’s theory.</p>
<p>There is a relationship between the attitudes and beliefs that staff members hold and technology. (Younie and Leask, 2013).</p>	<p>From the focus groups and interviews conducted in section 4.6.5, it was clear that teacher attitude along with teacher training had an impact on their use of new technologies in the classroom.</p>
<p>The introduction of new technologies necessitates that the teacher gain an understanding of the ways in which new technologies affect their current pedagogy. (Younie and Leask, 2013)</p>	<p>4.5.2 Preparing lessons using the iPad and Cloud services</p> <p>One of the teaching assistants expressed that whilst there are limitations of the iPad and the AppStore, these limitations are exaggerated by the fact that the teachers and teaching staff were not formally trained prior to the introduction of the iPad. (Gemma’s Interview 10-3-15) These findings support the findings of Younie and Leask (2013) who found that the introduction of new technologies necessitates that the teacher gain and understanding of the new technology.</p>

<p>Pupils were generally engaged with the iPads due to their intuitive interface and engaging apps. (Falloon, 2015)</p>	<p>4.4.2 Pupil engagement with e-books In Mark’s Interview 2-2-15 and Lisa’s Interview 2-2-15, these pupils all express how the interface of the iPad felt more enjoyable and engaging. In opposition to this, Samir’s Interview 2-2-15 shows a pupil who felt less engagement with the iPad due to the possibility of losing work. Samir felt that working in a book was preferable due to the fact that the work will still be there</p>
<p>The attitudes of the pupils is one of the biggest determining factors in the success of the introduction of new technologies (Ifenthaler and Schweinbenz, 2013)</p>	<p>4.6 Attitudes and behaviour of pupils The pupils had a positive attitude towards the iPad and achieved success in their lessons. This supports the argument put forth by Ifenthaler and Schweinbenz. (2013)</p> <p><i>“I think teachers should be using it more in lessons. Like, it’s really interesting and makes learning fun. That would make it better if we used it more and we used it for different things like Maths, English, Geography, Science and that.” (Nailah, Focus group 13-1-15)</i></p>
<p>The belief that digital resources are a threat to analog resources can work to hinder the success of digital resources on devices such as the iPad (Kuchirhova, 2014)</p>	<p><i>“...! Normally the child has to use a dictionary to find the meaning of a word that they don’t know the meaning of, or use the context of the word used to try to make an educated guess as to what the word might mean. Now all they have to do is ask the iPad what the word means and the meaning will be given to them. We’re cheating the children out of learning some very crucial life skills if we fully replace print with these iPads...” (Beth’s Interview 22-6-15)</i></p> <p>The above extract from Beth’s interview is similar to the findings of Kuchirhova (2014) where it was found that some teachers deemed the iPad to be a threat to traditional resources.</p>
<p>The effectiveness of the new technology ultimately lies in the way in which the teacher utilises it in lessons (Williamson-Leadley and Ingram, 2013)</p>	<p><i>“taking more time to understand how they can incorporate it into their planning instead of just dropping it in the lesson any old how and expecting it to somehow magically meet their needs.” (Staff focus group 8-4-15)</i> The computing coordinator recognised the importance of taking the time to understand how to make use of</p>

	the iPad in the lesson. Williamson-Leadley and Ingram (2013) had similar findings.
<p>Teachers lack the time to learn how to integrate new technologies into their pedagogies. (Warschauer and Matuchniak, 2010)</p> <p>Ertmer (2005) argues that any new technologies that are being introduced in a school should seek to address the attitudes and needs that teachers and staff members may have.</p>	<p><i>“How can I possibly be expected to just drop what I’m doing and use the cloud things and the iPad in my teaching if no one has shown me how to use it? It’s ridiculous really. My day is already packed as it is, I don’t have time to figure out how to do it. Maybe if we had insets on how to use it, I might be more willing to give it a try. I think so. Don’t you?” (Hayley’s Interview 12-3-15)</i></p> <p>The above mirrors the argument put forth by Warschauer and Matuchniak (2010)</p>
<p>There are a multitude of educational apps that offer a teacher version to enable the teacher to monitor and assess pupil progress. (Carpenter et al, 2013)</p>	<p>4.8.2 What do pupils see as the advantages and disadvantages of using cloud services in the school?</p> <p>The teacher was able to use the Socrative app to conduct the lesson with the pupils, monitor and assess their progress. This was in line with the findings of Carpenter et al (2013)</p>
<p>A teacher that is willing and capable of realising the potential of new technologies and is fully trained to use it is more likely to have a positive impact when using new technologies in the classroom. (Vu et al, 2014)</p>	<p><i>“ I think a more open mind to the tech and what it can do would greatly aid in it establishing itself as a tool for learning.”(Headteacher p.197)</i></p>
<p>New technologies may be perceived as an intruder by some teachers. (Henderson and Yeow, 2012)</p>	<p><i>“They’re toys, of course the children are going to like playing with them, they’re children. You can’t possibly expect to get any real work done on it. What is Ofsted going to think when they walk in and see a class of children playing on iPads ,it’ll be a disaster that’s for sure.” (Beth’s Interview 26-9-14)</i></p> <p><i>“With the new National Curriculum 2014 upon us, what do they really expect us to do with these iPads. They’re for watching movies and playing games, that’s why the pupils are so keen on them. You can’t possibly expect them to get any actual work done on them can you? What about the evidence? Having to go through the hassle of printing off and sticking in evidence in their books for Ofsted. It’s just too much hassle and work for what?”</i></p>

	<p><i>The second you turn your back the pupils are still going to try it on and play games or do something irrelevant on the iPads. Imagine if we had an Ofsted, what do you think they'll think about doing work on the iPads? They'll fail the lesson immediately” (Michelle’s Interview 2-10-14).</i></p>
<p>Teacher accountability may make some teachers hesitant to include new technologies in their pedagogy. (UNESCO, 2017)</p>	<p><i>“What about the evidence? Having to go through the hassle of printing off and sticking in evidence in their books for Ofsted. It’s just too much hassle and work for what? The second you turn your back the pupils are still going to try it on and play games or do something irrelevant on the iPads. Imagine if we had an Ofsted, what do you think they’ll think about doing work on the iPads? They’ll fail the lesson immediately” (Michelle’s Interview 2-10-14 p.221)</i></p> <p>The above interview is similar to the findings of a 2017 UNESCO study which found that teacher accountability can influence their use of technology in the classroom.</p> <p><i>“...Coming back to the point about their work, I can see what they children are doing and I can leave them little notes which can contain hints or questions for them to answer. It helps in dialogue marking, sorta like what Ofsted is always looking for.” (Jennifer’s interview 26-4-15)</i></p>
<p>Some teachers were unsure as to the ways they could integrate the iPad as part of their pedagogy. (Kats, 2013)</p>	<p><i>“I also think that there needs to be an understanding that some teachers would already have a set pedagogy that works for them and has worked for them for many years prior to the introduction of the iPad. As a result of this, it isn’t fair to expect that these teachers would just drop their established, tried, tested and proven pedagogy just to adopt these new technologies because we say so.” (Deputy Headteacher p.197)</i></p>

<p>iPads making lessons more engaging and exciting for pupils. (Henderson and Yeow, 2012) Slavin et al(2009) and Li and Ma (2010)</p>	<p>4.4 Pupil engagement Pupils Jamie, Ashley, Lisa, Ahmed and Andrea (Field recordings and notes 9-11-14) showed a great degree of engagement and enthusiasm when using the iPad. This is in line with the arguments put forth by Henderson and Yeow.</p>
<p>The use of the iPad can replace printed resources and as a result of this can enable schools to become more eco-friendly. (Berge and Muilenburg, 2013)</p>	<p>4.4.2 Pupil engagement with e-books Both a teacher Hannah and a teaching assistant Gemma praised the ability of the iPad to save on printing costs and the time it took to prepare resources.</p>
<p>Many students perceived the iPad as easy to manipulate. He noted that this often had the effect of raising self-confidence. (Heinrich, 2015)</p> <p>Riconscente (2013) also found increased the self-confidence of pupils and improved their general attitude towards learning when pupils used the iPad</p> <p>Clark and Luckin (2012), Carpenter et al. (2013)</p>	<p>4.3.1 Using the iPad for Presentations Pupil Camilla found that the iPad helped her when presenting her work.</p> <p>4.4.1 The impact of the iPad on pupil confidence Pupils such as Lisa, Mark, Alex, Andrea and Samir showed a greater deal of self-confidence. Pupil Simon explained why he felt more confident when using the iPad (Interview recordings and notes 9-12-14)</p> <p>4.7.1 Observation of two reading sessions <i>“Did you see her? I’ve never heard her voice before! Not once, she was so quick to get up and answer, I didn’t even call on her and she wanted to do it. That’s definitely a first”</i> (Hannah’s interview- 7-10-14).</p> <p>The above interview supports the point made by Riconscente (2013) who found that the iPad increased a pupil’s self confidence.</p> <p>4.8.1 What do the pupils see as the pros and cons of using the iPad in the classroom? <i>“It’s like writing a story and with numbers. You make up the story, like, like if you want to add you say one person and then make somebody else give something to them and then its your story, but with numbers. Miss say we have to get eight. I have to make up numbers that add up to</i></p>

	<p><i>eight. I can also take away numbers to make eight. Look the iPad help me to spell words that I forget how to spell. I can see what other people are writing too. They have good idea too. If I make mistake, I can fix and I don't need a rubber to do it. It makes my work easy"</i> (Field recordings and notes 26-4-15).</p> <p>The above conversation, it was clear that the grammar and spelling correction feature of the iPad gave her more confidence to write worded problems for her peers.</p>
<p>A large number of students surveyed found the iPad to make lessons more engaging and enjoyable. (Beauchamp, 2016)</p> <p>Wise (2015) found that the iPad was able to help pupils to remain engaged with the learning</p>	<p>4.4.3 Capturing and engaging the pupils through the use of the iPad's apps.</p> <p>These pupils showed a great deal of enthusiasm when using the iPads through their words and body language. (Field recordings and notes 2-7-15)</p> <p>Pupils Lisa, Andrea, Ahmed and Simon all found that the iPad made the lesson more enjoyable. (3-7-15)</p>
<p>The iPad inspired some pupils to work independently. (Burden et al, 2012)</p>	<p>4.8.1 What do pupils see as the pros and cons of using the iPad in the classroom?</p> <p><i>"I like how I can touch the screen and everything is controlled with my hands. I don't need a keyboard and I don't need to plug it in to use it. I wish it was like my computer at home. I know how to use that real easy. The iPad is a little bit different. I'm kinda new to it. I am still learning how it works. I'm getting better and better at using the iPad though"</i> (Mark's interview 26-5-15).</p> <p>The above interview shows Mark's increasing confidence to work on his own. This is comparable to the findings of Burden et al (2012).</p>

<p>Some pupils found the iPad to be distracting.(Clark and Luckin, 2013)</p>	<p>4.7.1 Observation of two reading sessions In contrast to the findings of Clark and Luckin (2013)</p>
<p>The iPad is not ideal for writing long essays, reports or any activities which required large text entries. (Henderson and Yeow, 2012)</p>	<p>4.3.2 The importance of lesson preparation in regards to the use of cloud services</p> <p>In field recordings 5-1-15, two pupils Mark and Ashley were arguing over the length of time it took to enter text into the iPad. This supports Henderson and Yeow’s findings.</p>
<p>Gliksman (2013), the iPad has the ability to make presentations easier, more memorable and engaging.</p>	<p>4.3.1 Using the iPad for Presentations</p> <p>Hayley, a staff member found that the iPad made it easier for her to carry out presentations. Sofia, a year 6 teacher and Camilla a Year 6 pupil both commented on the ways the iPad assisted them in presenting.</p>
<p>In order for a lesson to be effective, the teacher must ensure that the student learning is at the core of the “<i>planning, doing assessing and evaluating</i>” process (Butt 2008 p.viii)</p>	<p>4.7.3 Using the iPad as a tool for observation</p> <p><i>“I really took my time to plan that lesson. I was also really pleased with myself when I got everything set up. Someone else must have used the iPads in the morning without putting it back to charge. That’s the problem with relying on technology. It’ll let you down when you need it most. Isn’t it interesting how when using what you might call the traditional means of teaching, that is the use of books, pencil and paper, they’re always there when you need them as they don’t need to be recharged like these iPads. Now I’m not saying that iPads don’t have a place in the education system, they definitely do have a place. Their place simply is not to replace the traditional way of doing things, their place is to act as a tool. A tool which adds to the existing experience of learning. In other words, what I really mean is that they can really add to a lesson. This is in the same</i></p>

	<p><i>way tangible resources such as counters make it easier for some pupils to count, in this same way, the iPads are like resources which can be used to make a lesson more interesting for the pupils. In the case of my own lesson, I wanted the pupils to record themselves as if they were actual BBC reporters. I really took great care in planning this too. The children had already planned and completed their written reports. The idea was that they were going to record themselves reading their reports and then edit it in the Computing lesson the following day. It would have been quite exciting for the children to see and hear themselves and also it would have given all of the children a chance to share their hard work with each other. But I guess, to be fair, I really can't blame the iPads for this. Clearly someone used them between the time I checked them and the start of the lesson. I should have checked them as soon as I got into school this morning" (Amy's Interview 15-1-15).</i></p> <p>In contrast to the findings of Butt (2008), the above interview shows that in spite of careful planning and preparation, technology is capable of failing unexpectedly</p>
<p>Berge and Muilenburg (2013) also found that one of the key challenges that schools faced when introducing and using iPads was the issue of the availability of e-books.</p> <p>Smeets and Bus (2013) found that e-books proved to be beneficial to pupils as they offer a greater level of interactivity. Also, pupils were able to hear the books and see animations whilst reading the books. They also found this to be helpful to pupils with English as a second language.</p> <p>In contrast Smeets, van Dijiken and Bus (2012) found that children with severe</p>	<p>4.4.2 Pupil engagement with e-books It was found that whilst the necessary e-books were not available to the school, teachers found ways of scanning and taking pictures of pages to make their own e-books. Many of the pupils found the e-books to be more engaging as they could interact with it in more ways. (Field recordings and notes 6-11-14)</p> <p>4.7 Staff perceptions of the advantages and disadvantages of the iPad and cloud services.</p> <p><i>"I think it's really great. I mean the children; the children love using the iPads to read. It's so much more</i></p>

language impairments (SLI) may find the addition of sound and music to ebooks confusing as it may affect their perception of what they're seeing and hearing.

Mangen and Kuiken (2014) have found in their studies that it "*makes it more awkward to read on and harder to follow the narrative and be transported into the story*"(pp. 154-155).

Baron (2015) argues that the search function of an ebook takes away the need to read a text deeply to fully understand it. Baron (2015) contends that it is this deep reading that enables the reader to successfully absorb the information.

engaging and colourful than regular paper books. When they don't know the meaning of a word, they can quickly find out the meaning without having to get up and search for a dictionary. It's easy for me to allocate books for them and then I'm able to see how they're progressing with their reading. The iPad can also read along with the child and some of the books even allow them to touch the picture or word and see an animation or an explanation of what it is. This is really good especially for our EAL children that struggle with English. It helps them by reading out the words that they are struggling with as well as reading along with them. They can also pause and go back and have a sentence re-read to them if they don't understand it. That feature is one of the most helpful as in the past with paper books I'd have to read to the child directly and if there were more than one child having difficulty, their reading would be held up until I was finished with the first child, then I could go to the next to help them. Now, the iPad can help them with most things when reading. It really makes both my life and the lives of the children easier" (Monica's Interview 12-01-15).

The above interview echoes the findings of Smeets and Bus where they found the iPad to be beneficial to pupils when reading e-books.

In contrast however, Smeets, van Dijken and Bus (2012) and Mangen and Kuiken (2014) found that the sound and music that accompany some ebooks can be distracting for pupils. Sharing a similar view, Beth stated,
"*... We're cheating the children out of learning some very crucial life skills if we fully replace print with these iPads. Sometimes you just find the child listening to the story and looking at the pictures instead of actually trying to read the words to improve their reading. Some of*

	<p><i>these iPad stories are just pictures with sound, there isn't enough worded material to make them conducive to the development of the child's learning"</i> (Beth's interview 22-6-15)</p> <p>Additionally, the above interview supports the findings of Baron (2015) where it was argued that the search function can be detrimental to the child's ability to full understand the text and absorb information.</p>
<p>Catapano (2014) notes that due to the large number of apps available, it is often difficult to find an app that fulfils the exact requirements of the teacher.</p>	<p>4.5.2 Preparing lessons using the iPad and Cloud services</p> <p>An interview with the headteacher (Scott's Interview 10-3-15) showed that a number of teachers expressed their concerns about finding the right app to fulfil the requirements of the teacher. Also, there was the concern that a lot of time may be wasted searching for the necessary apps in order to maximise the use of the iPad.</p> <p>Following this interview, another interview with the Computing Coordinator yielded similar concerns. The computing coordinator said, <i>"I am trying my best to get the right apps, but there isn't an app for everything."</i> (Kay's Interview 1-3-15) (p.195)</p>
<p>Catapano (2014) found that the iBook store lacked some books used by schools because the textbook publishers had not yet been able to make digital versions of the books.</p> <p>Keengwe(2014) countered this point by arguing that whilst the iBook store may not have all of the necessary books, it is able to access the Internet which in his opinion can offer more information about the topic being studied as compared to the textbook.</p>	<p>4.5.6 The impact of the lack of available e-books</p> <p>"There are loads of great books available on iBooks. However none of the main books for teaching are available there..." (Hannah's Interview 10-12-14 p.204)</p> <p>The above extract from Hannah's interview shows a similar situation to the one described by Catapano (2014)</p>

<p>Keengwe (2014) interviewed student teachers and found that they felt that the iPad lacked compatibility with the existing technological ecosystem in the school</p>	<p>4.7 Software compatibility <i>"I'm used to having a start button, I press start, programs and all the stuff I need is in there. I can see how it might be easier to use a touch screen but I don't see my Pupil Asset tracking program on the iPad, I don't see my Word Shark and Number Shark on there either. There are all these new programs that I'm going to have to learn. I just don't have the time to try and learn all of these new things. I still can't even print pictures from the iPad directly! I know it's possible, but it's just not a simple click like with the computer. Maybe our photocopiers need upgrading too? Anyway, I find the iPad too different and the layout of the programs will take some real getting used to."</i> (Amy's interview 4-12-14 p.205)</p>
<p>Greenfield (2015) argues that the use of iPads takes away from other important activities such as social interactions with peers and spending time outdoors.</p>	<p><i>"The children already have iPads and tablets at home which they spend most of their free time using anyway, why should we be adding to that by making them stare at a screen in school too? How are we helping them by doing this? What ever happened to the great outdoors? You and I both know that these children don't spend time outside at home. They don't spend time socializing with others either. All they're doing is spending time on their tablets. Also, with the graphics and colourful games on the tablets, how are we stimulating the imaginations of the children? If you ask me we're doing them a disservice by making them use iPads in the classroom knowing fully well that they already spend the all of their time outside of school staring at these small screens"</i> (Gigi's Interview 22-10-14).</p>
<p>Silton (2015) found that the use of iPad based musical instruments assisted in the development of their fine motor skills.</p> <p>Hammond and Valentine (2015) add to this by arguing that sketching apps on touch driven devices such as the Apple iPad can potentially have a great impact on the development of the fine motor</p>	<p><i>"...I'm sure you noticed that a lot of the pupils first found it difficult to hold a pencil. This is quite normal at this age. What I'm sure you noticed was that even if they couldn't hold a pencil, they were still able to with practice begin to form letters with their fingers. This is really important as it helps to develop their fine motor skills. What it also allows us to do</i></p>

<p>skills of pupils as well as their self-regulation skills (p.36).</p>	<p><i>is to begin to work on the alphabet even sooner” (Sharon’s Interview 12-12-14).</i></p> <p>The findings from the above interview are similar to those of Siltan (2015) and Hammond and Valentine (2015).</p>
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Figure 4E: Table summarising and comparing the literature to the findings.

5. Conclusion

5.1 Introduction

In the previous chapter, I offered a detailed analysis of the data collected in this research project. The background to this research project was learning took place in a number of lessons due to the use of the iPad. I will begin this chapter by reviewing the purpose of this study and the methods used to carry out this research project, which answered the following research questions:

- 1) How do staff and pupils perceive the introduction of iPads and cloud services in the school?
- 2) How do staff and pupils engage with and interact with iPads and cloud services being used in the school?
- 3) What were the attitudes and behaviours of the pupils and staff when interacting with iPads and cloud services?
- 4) What do staff and pupils perceive as the advantages and disadvantages of the use of iPads and cloud services in the school?
- 5) What do the staff and pupils think can be done to improve or enhance the introduction of iPads and cloud services in the school?

After exploring these, I discuss the limitations of this research project and the potential implications for research in the future in relation to the existing literature on staff and pupil perceptions on the introduction and use of new technologies such as the iPad and cloud services in education. Following this, I offer recommendations to school leaders, followed by possible future follow-up research. Lastly, I set out the main findings with conclusions taken from the research project and my closing thoughts on this ever-evolving area of research.

5.2 Purpose of this research project and methodology

Having adopted an ethnographic methodology, this research project sought to explore staff and pupil perceptions on the introduction and use of the iPad and cloud services. At the time of conducting this research project, these technologies were introduced for the first time at this school. I adopted an ethnographic approach where I immersed myself in the social setting of the school; I used participant observation, semi-structured interviews and focus groups to collect data. As noted from the review of the existing body of literature, I was not able to locate studies of this type within the United Kingdom. More specifically, I was unable to locate a study that was conducted within the context of an inner London primary school. In spite of the wealth of opinions and findings put forward by educational bodies, the media and researchers about the effects of new technologies such as the iPad and cloud services in education, there appeared to be very little which focused on the perceptions, attitudes, engagement and behaviours of the pupils and staff when these new technologies were introduced for the first time.

One of the key objectives of this research project as outlined in chapter one, was to assist school leaders in gaining a better understanding of the ways in which the introduction of new technologies such as the iPad and cloud services were perceived by pupils and staff and the impact that these perceptions could have on the success of the introduction. Another objective was to explore how the introduction of new technologies could be improved in order to maximise the chances of a successful introduction.

5.3 Ontological perspective, epistemological perspective and the theoretical framework

An Interpretivist ontological perspective was adopted as discussed in chapter three as it allowed me to make the assumption that an individual's reality was indirectly constructed and completely based on their own interpretation. The individual was then able to form perceptions based on these interpretations. Seeing that one of the main objectives of this research project was to gain an understanding of the perceptions held by staff and pupils, I found this ontological perspective to be most appropriate for this study.

Within this ontological stance, I opted for Constructionism as my epistemological stance. As discussed in greater depth in chapter three, I found that Constructionism was appropriate as it set out that meaning was not a phenomenon that was discovered but instead it was constructed by the individual. It is reasonable to argue that perceptions, just like meaning are constructed by the individual and do not exist without the mind and interactions.

As discussed in chapter three, when carrying out a research project, the researcher brings a variety of assumptions to the research project. In order to set out these assumptions, a theoretical perspective or framework is necessary. In terms of looking at the perceptions of staff and pupils in an attempt to gain an understanding of these perceptions, issues of language, communication and intersubjectivity arise. Therefore, the use of a theoretical perspective assists both the researcher and the reader to establish the *“view of the human world and social life within that world, wherein such assumptions are grounded”* (Crotty 1998, p.7). Symbolic interactionism meets the requirements of this research project as well as it takes into consideration how the individuals not only interact with each other but also how they interact with the

various phenomena in their environment. It also looks at the meanings and perceptions that the individuals within a social group create for themselves.

5.4 Assumptions, Limitations and Scope

There were numerous limitations to this research project. First, this research project only included a select number of staff and pupils. (Twenty-three staff members and twenty-one pupils) A consequence of this is that members of staff or pupils may have been left out who could offer a richer alternative perspective on the topics being researched. Second, this research project captured the perceptions, attitudes and interactions of the staff and pupils at a specific point in time and did not take into account the possibility that individual views could change over time. Lastly, I was a member of staff at the school. The attempts I made to mitigate this was documented in chapter three. Being a member of staff meant that some of the staff and pupils might have offered responses based on what they felt should be said as opposed to what they actually felt. As a result of this, it is possible to argue that the findings might have been skewed by this. There were also other limitations to the scope of this research project. Participant numbers were limited due to the size of the research project and the time constraints imposed by the university. Further to this, the location of the school was selected because I was a member of staff there. Moreover, the research project was conducted in one school. This limited the generalisability of the findings and suggested that the findings might not be able to be directly applied to another population. Atkinson et al (2001) argue that due to the unique nature of the experience documented by the ethnographer, it is nearly impossible to exactly replicate the research and get the same results. As a consequence of this, it is possible to argue that it is difficult to generalise or directly apply the findings of this research project to a broader audience.

In stark contrast, theorists such as Mitchell (1983) proposed the theory of ‘*Logical Inference*’. The theory of Logical inference contends that theoretical relationships could be formed between the phenomena which existed in the single research site and phenomena which existed in other similar sites which had not been researched. This according to Hammersley (1992) is done through the process of inference. More specifically Mitchell (1983) stated, “*We infer that the features present in the case study will be related in a wider population not because the case is representative but because our analysis is unassailable. The emphasis is on case studies used to relate theoretically relevant characteristics reflected in the case to one another in a logically coherent way*” (Mitchell 1983:200). This meant that in some circumstances, it might be possible through inference to generalise specific findings of this research project to other sites which were very similar to the one within which this research project was conducted.

5.5 Findings

As discussed in chapter three, this research project consisted of participant observation, semi-structured interviews and focus groups. All of these methods of data collection sought to gain the insight on the attitudes, perceptions, behaviours and engagement of the staff and pupils with the iPad and cloud services. The findings were then analysed in chapter four.

I found that the feedback I received about the iPad and cloud services was generally positive. However, there were a few negative perceptions of the introduction of the iPad and cloud services. Staff members reported that they did not receive training on the ways they could include it in their pedagogy. They also reported that they faced

challenges with the wireless network, they stated that they did not always have the desired apps or e-books installed or available for some lessons. They also lamented about issues arising from the accidental breaking of the device. Each of these will be explored in greater depth below.

5.5.1 Insufficient staff training

In the school where the research project was conducted, there was no form of training carried out prior to the implementation of the use of iPads and cloud services. The staff members in their discussions with me expressed this as a matter of great concern and many of them felt that they did not know how to best use the device, as they did not know what it could or could not do. In addition to this, they also felt that due to time constraints, they did not have sufficient time to familiarize themselves with the vast array of apps and cloud services available for use on the iPad. In support of this finding, Gliksman (2014) found in his research that the lack of training severely affected the ability of the educator to use the iPad as part of their pedagogy.

From the findings of this research project, it was determined that staff were more likely to approach new technologies with a positive attitude if they received training on how to effectively include it in their pedagogy prior to its introduction. This ability to effectively include it in their pedagogy could have the potential to improve pupil engagement. Pupils also positively engaged with the iPad and cloud services in all of the instances where they were effectively incorporated into lessons. Also, the pupils responded positively to lessons where the iPad or cloud services were effectively incorporated into the pedagogy.

5.5.2 Challenges with the wireless network

Both staff and pupils faced issues with the inability of the wireless network to support all of the network traffic generated by the use of the iPads and the cloud services, both of which required an internet connection to get the most out of them. At the site where the research was conducted, there were many instances where the staff and pupils observed that the school's wireless network was incapable of handling the network traffic caused by the use of the iPads. An (2014) made a similar observation in her research where she found that the strength or robustness of the wireless network had a big impact on how well the iPads performed. This issue seemed to arise when all of the iPads were attempting to access the same resource at the same time. This would cause either all of the iPads that were in use to become temporarily unresponsive or in some cases, only a few of the iPads would be able to access the network whilst the others would lose connectivity with wireless network entirely. One temporary solution that was used in an effort to address this issue was to have the pupils take turns accessing the resources, one small group at a time. Whilst this might work, it also took more time from the already limited time allocated to the lesson. Having had discussions with the computing coordinator and the technician about this matter, they appear to be aware of the situation but due to financial constraints, they were unable to remedy the issue at the time. Where cloud services were concerned, if the device such as the iPad was unable to access the network, then in turn, they were not able to access cloud services. Staff and pupils felt that this was an issue that affected the successful introduction and use of the iPad and cloud services in the classroom.

5.5.3 Apps and e-books

The lack of the relevant textbooks on both the iBook and Kindle e-stores was a point that was frequently raised during the course of this research project. More specifically, the issue that many of the staff raised was that the textbooks that they wished to use in their lessons were unavailable for use of the iPad. They felt that as a result of this, they could not integrate the iPad in their lessons to the extent that they wanted to. However, it is important to note that this is a matter that is progressively being addressed. However, staff members noted that the use of the iPad and cloud services instead of paper helped to preserve resources such as paper, pens and erasers. Pupils were able to positively engage with the iPad apps and successfully used the iPad to read e-books.

5.5.4 The iPad and cloud services belonging in the classroom setting

Pupils generally held a positive view of the iPad and cloud services. This was particularly true for pupils that frequently moved between countries and frequently missed school but were able to take part in the teaching and learning process because of the cloud services and the iPad. The staff also praised the ability of the iPad and cloud services to enable them to conduct lessons, mark and annotate work and give feedback when both the staff and pupils were in different locations. There were a few members of staff who felt that the iPad and cloud services did not belong in the classroom as they felt that it was a media consumption device.

5.6 Implications of this research project and contribution to knowledge

This research project has revealed a wealth of valuable information that could be used to assist schools investing in new technologies. New technologies are introduced to the market at an ever-increasing rate. I believe that the information from the findings

of this research project could assist school leaders, stakeholders and educators in understanding what steps could be taken to increase the chances of success when introducing new technologies to the classroom. Moreover, the findings of this research project could enable a change from speculative thought to a more informed perspective on this subject matter. A more informed perspective will in turn, lead to the introduction of new technologies with a greater chance of success for all parties involved. I argue that this study could find relevance for other educational bodies that wish to invest in new and emerging technologies and could offer them greater insight into the challenges that could be faced and the ways in which staff and pupils might perceive the introduction of new technologies.

Researchers such as Hammersley (1998) contended that it was important that the data produced by a research project satisfied two main requirements to be considered valuable. The first requirement was that the phenomena being researched must be one of importance. The second requirement set out that the findings of the research project contributed to the existing body of knowledge. I believe that this research project fulfilled both of these requirements. First, this research project looked at a matter that had been featured in several newspaper reports, Ofsted reports as well as many other educational publications. As a result of this, I believe that this research project is of significant importance to this field of education. Secondly, after having analysed the data, I argue that there were key contributions made by this research project:

- The findings of this thesis could act as a guide for educational establishments both within the UK and outside of the UK regarding the implementing of iPads and cloud services or new technologies as part of an educational institution's pedagogy.

- The findings of the research have revealed that iPads have the potential to boost the self-confidence of EAL pupils as well as assisting in overcoming language barriers.
- The use of the iPad can support the development of the fine motor skills of young children.
- The research revealed a new understanding of the ability of the iPad to act as the knowledgeable other as identified in Vygotsky's theory on the Zone of Proximal Development (ZPD).
- The new understanding of the impact of cloud services on transient pupils. These are pupils who frequently move between countries and as a result, are often absent from school.

5.7 Recommendations

5.7.1 Further possible studies

As I was reviewing the literature for this research project, I observed that although a lot of attention was paid to the impact of the introduction of the iPad and cloud services in education, very little research was conducted on the pupil and staff perceptions of the introduction of the iPad and cloud services in an environment where these technologies had not been introduced before. Moreover, this study highlights the impact of staff and pupil perception on the success of the introduction of new technologies such as the iPad and cloud services in the classroom. I believe that if the perceptions of the staff and the pupils were taken into account and addressed prior to their full introduction, the chances of success would increase tremendously. I believe that this is a possible area for future study. Other areas for future study could include the impact of social class, race or gender on staff or pupil

perceptions of the introduction of new technologies in the classroom. In this research project, it was found that the iPad assisted at least one EAL child with her self-confidence. A possible area for future study would be to explore whether this was true for all EAL pupils. It was also noted throughout this research project that there were members of staff who felt that the iPad and the use of cloud services did not fit into their idea as to what learning should look like. This is an area that could be explored further to determine if allowing these individuals to see successful lessons where the success criteria were met due to the effective use of the iPad and cloud services could have an impact on their perceptions. Another possible area of research could include looking at how the perceptions of pupils change as they become accustomed to the use of the iPad and cloud services. For example it would be interesting to explore whether iPads still have the same engaging effect on pupils as it initially did.

5.7.2 The School

Looking back, the responses from the individuals who took part in this research project were generally positive. Most of the individuals saw the potential of iPads to enhance the teaching and learning experience. This would suggest that once the perceived issues were addressed, the introduction of new technologies had the potential to have a very successful introduction for both pupils and staff. From the data collected, it was clear that most staff and pupils wanted to positively engage with the iPad and cloud services. I believe that future introductions new technologies in the school could be improved if:

- A pilot study is done where the school leaders seek out the perceptions of the staff and pupils. From this, the school leaders could then put a plan in place to meet the needs of the staff and pupils.

- The school could liaise with other schools that are introducing or have already introduced the new technologies to see what aspects of their introduction were successful.
- Investment in a network infrastructure, which is capable of handling the increased network traffic. As discussed in chapter two, commentators such as An (2014) also noted that schools should improve their network infrastructure prior to introducing new technologies that rely on the network.
- The school could invest in training and professional development for the staff and training sessions for pupils prior to the introduction of new technologies in the classroom. This should assist in offering a clear sense of why these new technologies were being introduced and how they could enhance the teaching and learning process. Fullan (1992) noted that one of the key problems with making changes in education was that the individuals involved did not always know or understand why the change was taking place and the impact of the change on their lives. Whilst the study was over 27 years old now, I argue that the findings concerning attitudes towards change still hold true today. Fullan (1992) found that the individual who opposed the introduction of new technologies did so because they might not have been given enough time to understand the implications of the new technologies and sufficient support to embrace the new technologies. This led Fullan (1992) to propose that school leaders should engage in a democratic whole-school approach when proposing a change.

5.8 Conclusions

This research project looked at participants' perceptions of the introduction and use of the iPad and cloud services. At the time of conducting this research project, these were new technologies to the school, staff, and pupils. This study was of significance

to the school as it was able to offer school leaders greater insight into the perceptions and hurdles that hindered the successful introduction of iPads and cloud services. The findings of this research project also highlight the need for school leaders, staff and pupils to work together in order to ensure that all of the individuals involved experienced success when new technologies were introduced. Due to the differences in perceptions between each individual staff member and pupil, it should be recognised that merely introducing new technologies without first enquiring into the needs of staff and pupils was insufficient for success. Both staff and pupils should be seen as individuals with their own specific needs, perceptions and anxieties. As a result of this, school leaders should aim to include both staff and pupils in the decision making process when introducing new technologies. Staff and pupil perceptions could offer school leaders great insight into understanding what needed to be done to ensure that the effectiveness of the introduction of new technologies was maximised.

5.9 Final Thoughts

It must be noted that being a staff member at the school meant that I was an inside researcher. The implications of this were discussed in greater depth in chapter three. As I conducted this research project, I saw myself grow both in my professional role and as a researcher. I was able to acquire great insights by engaging with the participants and the literature; insight into the ways in which perceptions were formed, insights into my own personal biases, insights which ultimately assisted me to offer a contribution to the development of the school and insights into potential future research areas. I have made a great effort to highlight the importance of staff and pupil perceptions when introducing new technologies. Their perceptions can have a great impact on the success of new technologies in a school and have made a

substantial contribution to better understanding this subject matter. I hope that this will in turn, encourage policy makers and school leaders to have an open and honest dialogue with staff and pupils prior to introducing new technologies. It was a privilege for me to conduct this research project. I am appreciative of the experiences that I gained throughout the process of conducting this research project. I might not have had the chance to engage with the participants to such a degree had it not been for this research project. I had some of the most memorable experiences. I would like to recount the times where I observed that Andrea (an EAL pupil) who typically would not speak out in lessons or on the playground. She became so confident with the use of the iPad that she had used for the first time at the school, that she volunteered to share the presentation that she had created in front of the whole class. In addition to this, there were the times when I witnessed the iPad act as a vehicle for pupils to have experiences that they would not otherwise have, such as the one where the app Google Earth allowed the pupils to virtually visit Whitegate and explore it in 3D; this was an experience which visibly excited the pupils as they commented to each other about how different Whitegate was to their local area in inner London. Some even went as far as to question whether Whitegate was a real place due to how starkly it contrasted with their local area which some of them have never gone outside of in their lives. In summary, it was clear that the iPad had the effect of improving the learning experiences that the pupils had. Furthermore, from all of the lesson observations, it was clear that the iPad when used correctly enhanced the learning experiences that the pupils had.

This research project provided much reflective time for me. I frequently reflected on the way in which it was being carried out and regularly reflected on whether my

chosen path of researching was the most suitable for the outcomes that I sought. I came to the conclusion that my chosen path was one of many possible paths. However, I selected this path because of the reasons set out earlier in this thesis. I believe that all children should experience success in learning and as a teacher I feel that it is my duty to ensure the pupils receive the best teaching and learning experiences possible. One way of doing this is to take into account their perceptions and feelings along with the perceptions of the staff members when decisions about the introduction new technologies were being made.

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Appendices

Appendix 1-Staff Consent Form

REQUEST FOR PERMISSION TO PARTICIPATE IN RESEARCH

Dear Sir/Madam,

My name is Mr Brent Brazer, you know me as the Year 2 teacher and a fellow member of staff. However I am also a Doctoral student at Brunel University The research I wish to conduct for my doctoral thesis will be conducted under the supervision of Dr Nic Crowe, School of Sport and Education, Brunel University.

In recent times, there has been a lot of interest in the impact that emerging technologies such as iPads and cloud computing can have when introduced in a school. I am interested in this work and I intend to study it further in my PhD. I intend to observe the pupils and staff using these emerging technologies in order to gain a better understanding as to how these emerging technologies impact the process of teaching and learning and how the staff and pupils perceive their use in the school.

All responses will be confidential and I will use pseudonyms so you will not be identifiable at any time. I will be taking field notes whilst observing staff and pupils and I will interview some of them in groups. Information from this research will be used solely for the purpose of this study and any publications that may result from this study. Anonymity and confidentiality of the data will be ensured at all stages according to the Brunel University research ethics guidelines and the British Educational Research Association (BERA) ethical guidelines.

I hope you will provide your consent to participate in this study, which is completely voluntary and you have the right to withdraw from the research at any stage.

Upon completion of the study, I undertake to provide the school with a bound copy of the full research report and an abbreviated summary. If you require any further information or wish to ask any questions, please do not hesitate to contact me at edpbgab@brunel.ac.uk or catch me after school any evening this week.

Alternatively, you may contact my supervisor at nic.crowe@brunel.ac.uk.

Please read and sign the attached slip below and return to be at the soonest possible time.

Yours sincerely,

Brent Brazer

Consent:

By signing this consent form, I confirm that I have read and understood the information and have had the opportunity to ask questions. I understand that my participation is voluntary and I am free to withdraw at any time, without giving a reason.

Your name: _____

Signature _____ Date _____

Appendix II-Parent Consent form

REQUEST FOR PERMISSION TO PARTICIPATE IN RESEARCH

Dear Sir/Madam,

My name is Mr Brent Brazer, you know me as the Year 2 teacher, however I am also a Doctoral student at Brunel University The research I wish to conduct for my doctoral thesis will be conducted under the supervision of Dr Nic Crowe, School of Sport and Education, Brunel University.

In recent times, there has been a lot of interest in the impact that emerging technologies such as iPads and cloud computing can have when introduced in a school. I am interested in this work and I intend to study it further in my PhD. I intend to observe the pupils and staff using these emerging technologies in order to gain a better understanding as to how these emerging technologies impact the process of teaching and learning and how the staff and pupils perceive their use in the school. All responses will be confidential and I will use pseudonyms so your child will not be identifiable at any time. I will be taking field notes whilst observing pupils and I will interview some of them in groups. Information from this research will be used solely for the purpose of this study and any publications that may result from this study. Anonymity and confidentiality of the data will be ensured at all stages according to the Brunel University research ethics guidelines and the British Educational Research Association (BERA) ethical guidelines.

I hope you will provide consent for your child to participate in this study, which is completely voluntary and the pupils have the right to withdraw from the research at any stage.

Upon completion of the study, I undertake to provide the school with a bound copy of the full research report and an abbreviated summary. If you require any further information or wish to ask any questions, please do not hesitate to contact me at edpbgab@brunel.ac.uk or catch me after school any evening this week. Alternatively, you may contact my supervisor at nic.crowe@brunel.ac.uk.

Please read and sign the attached slip below and return to be at the soonest possible time.

Yours sincerely,

Brent Brazer

Consent:

By signing this consent form, I confirm that I have read and understood the information and have had the opportunity to ask questions. I understand that my

child's participation is voluntary and that s/he is free to withdraw at any time, without giving a reason.

Child's name: _____

Parent's name: _____

Signature _____ Date _____

Appendix III-Child Friendly version of the consent form

Dear children,

As some of you may have already seen, the school has gotten new iPads.

I've written this letter to you as I'd need your help.

I'm carrying out a project where I would like to observe you using iPads and find out how you feel about using them in lessons. I'd like to know if you're okay with this. If you have any questions please feel free to ask me at any time. It is also important to remember that if at any time you don't feel comfortable, you're free to stop taking part at any time.

Kind Regards,

Mr Brazer

Please sign your name on the line below if you would like to take part.

Appendix IV-Information sheet for parents

Section I

1) The title of the study.

Pupil and staff perceptions of the introduction and use of iPads and cloud services in an inner London Primary School.

2) Invitation to take part in this study.

My name is Mr. Brent Brazer and I am a Year 2 teacher at the school. I am about to embark upon a research project for my Ph.D and I would like to invite your child or children to take part in the study. Before you make a decision as to whether your child should take part, I would like to take a moment to explain why this research project is being done and if you and your child consent, what role they would play in this research project. In addition to the consent form, you also received this information sheet as it is vital that you and your child understand the importance of what role your child would play in the research if you and your child decide to take part. A child friendly copy of this information sheet will also be provided to your child.

The Section I of this information sheet will detail the purpose of this study and what will happen if you and your child both offer your consent. Section II of this information sheet will then offer a detailed explanation of what the research project is about.

If you have any questions or queries, please feel free to get in touch and I'll be more than happy to explain it to you.

3) What is the purpose of this research project?

This research project aims to find out the perceptions, that is the feelings and thoughts that the pupils and staff members at the school have towards the introduction and use of the iPads and cloud services in the school. At this time, you may already know that these technologies are about to be introduced to the school. By gaining the perceptions that the pupils and staff hold on the use of these technologies, I will then be able to document what the staff and pupils feel are the advantages or positives of using these technologies and what they feel are the drawbacks or what can be done to make it work more effectively within the school.

4) Why have you selected my child to take part?

Your child has been invited to take part because they are a part of the school and will be experiencing both the introduction and the use of these technologies in the school. As a result of this, their perceptions, opinions, feelings and thoughts on both the introduction and use of these technologies will prove to be helpful in offering a clear picture as to how the pupils and staff generally feel about the iPads and the cloud services and how the pupils feel about the way they impact their learning.

5) Does my child have to take part?

It is entirely up to you and your child whether consent is given or not. Your child will in no way be treated differently if they decide not to take part. They will still be able to make use of the iPads and cloud services that are being introduced in the school even if you and your child decline to take part in the study.

6) What will my child have to do if consent is granted?

By both you and your child offering consent, this will enable me to observe and make detailed notes and recordings of the reactions as well as the comments that your child makes whilst using the iPad and cloud services as well. Further to this, there will be focus groups where I will have a discussion with a group of pupils and record their thoughts, perceptions and feelings on the technologies. Whilst this will be video and audio recorded, I will be the only person that has any access to these recordings. Further to this, your child will in no way be identifiable when the results of this study are published. Additionally, your child may take part in interviews where I will have an in-depth discussion with them on the introduction and use of the iPads and cloud services in the school. These interviews and focus groups will typically last between 5-10 minutes.

7) How long will my child be involved in this research project?

The study will go on for approximately one academic year. It will commence in September 2014 and will go to July 2015. Most of the time, I will be observing the ways in which your child reacts to the use of these technologies in the classroom and the comments that they make. As stated above, I may select your child to take part in focus groups and interviews to get their perceptions on the introduction and use of the iPad and cloud services in the school.

8) Are there any disadvantages to taking part in this research project?

As this will all be done during the school day, your child will not at any point in time be required to stay back after school, nor will they be required to miss any parts of any lessons that they have during the school day.

9)What are the advantages to taking part in this research project?

Whilst I cannot offer any direct advantage to your child or yourself for taking part in the study, I can say that by taking part, you will be helping to contribute to the existing body of knowledge on the introduction and use of the iPad and cloud services in schools. Further to this, once the results of this study are published, other schools and educational institutions will be able to use this as a guide to help them when deciding on investing in these new technologies. Additionally, the school that your child is in now will be able to use the findings of this research project to help them better adapt the iPad and the use of the cloud services to the needs of the pupils and staff.

10)Expenses

Neither you nor your child will incur any expenses by consenting to take part in this research project.

11)What are my options if a problem or issue arises during the study?

You are always welcome to come see me personally where we can discuss the issue that you or your child are experiencing. Alternatively you can send me an e-mail at edpgbab@brunel.ac.uk. Also, you and your child are free to withdraw from the study at any point in time and there will be no consequences to doing this.

12)How do I know that my child's personal information is safe?

Although video and audio recordings will be made, I am the only person that will listen to them or view them. Further to this, when publishing the findings, none of the

names of the children or staff will be used. In addition to this, nothing that could possibly make you or your child identifiable will be published.

SECTION II

What can I do if I choose to no longer be a part of this research project?

As stated in Section I, you are free to withdraw from this research project at any time.

There will be no consequence to you or your child if you decide to withdraw. Any data that was previously collected from your child will be ethically destroyed and your child's opinions will no longer be recorded.

Will my child's personal information be published?

Your child's personal information will not be published at any time during this study.

Nothing that could possibly identify them will be published. All of the data collected in this study will be kept confidential and the procedures for processing, handling, storing and destroying this data will conform to the Brunel University guidelines.

-I will take the utmost care to anonymise the data collected at the earliest possible time so to ensure that neither you nor your child are identifiable.

-Data on paper will be stored in sealed envelopes which will be locked in a lockable cabinet which only I have access to.

-Recordings will be stored on encrypted usb sticks and memory cards to which only I have the password to. Further to this, these will also be locked away when not in use.

-Only I will have access to the video and audio recordings.

-All of the recordings and notes will be completely destroyed once this research project has been completed.

-It is important to note that I may wish to quote your child in this research project. To do this, I will not use their real name nor will I write it in such a way that they or any other child are identifiable.

-Any data collected in the form of recordings or notes during the conducting of this research project will be destroyed at the end of this research project and will not be reused in any future research projects.

What happens when the research project is complete?

Once I have completed collecting the data, I will then write up the thesis. This written up thesis will then be presented to a board at Brunel University. The presented final thesis will not contain anything that can make you or your child identifiable. Not even the school that this research project was conducted in will be identifiable.

Contact details:

If you have any questions, queries or concerns, please feel free to contact me either in person or via email at edpgbab@brunel.ac.uk.

Alternatively, you may contact my academic supervisor, Dr Nic Crowe at nic.crowe@brunel.ac.uk.

Appendix V-Information sheet for staff

Section I

1) The title of the study.

Pupil and staff perceptions of the introduction and use of iPads and cloud services in an inner London Primary School.

2) Invitation to take part in this study.

My name is Mr. Brent Brazer and I am a Year 2 teacher at the school and one of your colleagues.

I am about to embark upon a research project for my Ph.D. and I would like to invite you to take part in the study. Before you make a decision as to whether you should take part, I would like to take a moment to explain why this research project is being done and if you consent, what role you would play in this research project.

In addition to the consent form, you also received this information sheet as it is vital that you understand the importance of what role you would play in the research if you decide to take part.

The Section I of this information sheet will detail the purpose of this study and what will happen if you offer your consent. Section II of this information sheet will then offer a detailed explanation of what the research project is about.

If you have any questions or queries, please feel free to get in touch and I'll be more than happy to explain it to you.

3) What is the purpose of this research project?

This research project aims to find out the perceptions, that is the feelings and thoughts that the pupils and staff members at the school have towards the introduction and use of the iPads and cloud services in the school. At this time, you may already know that these technologies are about to be introduced to the school. By gaining the perceptions that the pupils and staff hold on the use of these technologies, I will then be able to document what the staff and pupils feel are the advantages or positives of using these technologies and what they feel are the drawbacks or what can be done to make it work more effectively within the school.

4) Why have you selected me to take part?

You have been invited to take part because you are a part of the school staff and will be experiencing both the introduction and the use of these technologies in the school. As a result of this, your perceptions, opinions, feelings and thoughts on both the introduction and use of these technologies will prove to be helpful in offering a clear picture as to how the staff generally feel about the iPads and the cloud services and how the staff feel about the way they impact their learning.

5) Do I have to take part?

It is entirely up to you whether consent is given or not. There are no consequences to opting not to take part in this study.

6) What will I have to do if consent is granted?

By offering your consent, this will enable me to observe and make detailed notes and recordings of some of the lessons that you conduct using these technologies. Further to this, I will be also be documenting the events that occur in your lessons, the consenting pupils including their reactions as well as the comments that your pupils make whilst using the iPad and cloud services. Further to this, there will be focus groups were I will have a discussion with a group of staff members and record their thoughts, perceptions and feelings on the technologies. Whilst this will be video and audio recorded, I will be the only person that has any access to these recordings. Further to this, you will in no way be identifiable when the results of this study are published.

Additionally, you may be asked to take part in interviews where I will have an in-depth discussion with you on the introduction and use of the iPads and cloud services in the school.

7) How long will I be involved in this research project?

The study will go on for approximately one academic year. It will commence in Autumn 2014 and will go to July 2015. Most of the time, I will be observing the ways in which you use and react to the use of these technologies in the classroom and the comments that you make make.

8) Are there any disadvantages to taking part in this research project?

If I have asked you for an interview and you consent, I will endeavor to do it at a time that is most convenient to you. Other than taking a few moments of your time, you should in no way face any disadvantages for taking part in this research project.

9)What are the advantages to taking part in this research project?

Whilst I cannot offer any direct advantage to you for taking part in the study, I can say that by taking part, you will be helping to contribute to the existing body of knowledge on the introduction and use of the iPad and cloud services in schools. Further to this, once the results of this study are published, other schools and educational institutions will be able to use this as a guide to help them when deciding on investing in these new technologies. Additionally, the school that you currently work in will be able to use the findings of this research project to help them better adapt the iPad and the use of the cloud services to the needs of the pupils and staff.

10) Expenses

You will not incur any expenses by consenting to take part in this research project.

11)What are my options if a problem or issue arises during the study?

You are always welcome to come see me personally where we can discuss the issue that you are experiencing. Alternatively you can send me an e-mail at edpgbab@brunel.ac.uk. Also, you are free to withdraw from the study at any point in time and there will be no consequences to doing this.

12)How do I know that my child's personal information is safe?

Although video and audio recordings will be made, I am the only person that will listen to them or view them. Further to this, when publishing the findings, none of the names of the staff or children will be used. In addition to this, nothing that could possibly make you identifiable will be published.

SECTION II

What can I do if I choose to no longer be a part of this research project?

As stated in Section I, you are free to withdraw from this research project at any time. There will be no consequence to you if you decide to withdraw. Any data that was previously collected from you will be ethically destroyed and your opinions will no longer be recorded.

Will my personal information be published?

Your personal information will not be published at any time during this study.

Nothing that could possibly identify you will be published. All of the data collected in this study will be kept confidential and the procedures for processing, handling, storing and destroying this data will conform to the Brunel University guidelines.

-I will take the utmost care to anonymise the data collected at the earliest possible time so to ensure that you are not identifiable.

-Data on paper will be stored in sealed envelopes which will be locked in a lockable cabinet which only I have access to.

-Recordings will be stored on encrypted usb sticks and memory cards to which only I have the password to. Further to this, these will also be locked away when not in use.

-Only I will have access to the video and audio recordings.

-All of the recordings and notes will be completely destroyed once this research project has been completed.

-It is important to note that I may wish to quote you in this research project. To do this, I will not use your real name nor will I write it in such a way that you are identifiable.

-Any data collected in the form of recordings or notes during the conducting of this research project will be destroyed at the end of this research project and will not be reused in any future research projects.

What happens when the research project is complete?

Once I have completed collecting the data, I will then write up the thesis. This written up thesis will then be presented to a board at Brunel University. The presented final thesis will not contain anything that can make you identifiable. Not even the school that this research project was conducted in will be identifiable.

Contact details:

If you have any questions, queries or concerns, please feel free to contact me either in person or via email at edpgbab@brunel.ac.uk.

Alternatively, you may contact my academic supervisor, Dr Nic Crowe at nic.crowe@brunel.ac.uk.

Appendix VI-Information sheet for pupils

Dear pupils,

My name is Mr. Brazer and I would like to find out your feelings about the new iPads that are about to introduce to the school. I am doing a project on this because I would like to better understand your feelings and thoughts about the iPads that are about to be introduced. If you are okay with taking part in this project, I will be asking you about your feelings on the iPad and the apps that you use on it.

Do I have to take part?

It is entirely up to you whether you take part or not. If you want to take part, I will also be getting permission from your parents to allow you to take part. Once you and your parents are okay with you taking part, I will be observing you using the iPad in the classroom and recording your reactions, thoughts, discussions and feelings. I will also be having talks with you about your thoughts on the iPad and the apps used.

Some of these talks will be done in groups with other children. These talks will not take longer than 5 to 10 minutes. I will be doing this project for one year.

What if I decide I no longer want to take part?

You are free to stop taking part at any time. If you decide that you no longer wish to take part, please let me know immediately.

Appendix VII- Synthesis of the findings

1.0 Structured Abstract

In this research project, I carried out an ethnographic study that took place in an inner London Primary school. I explored the perceptions, feelings and thoughts that the pupils and staff held on the introduction and use of the iPads and the cloud services in the school. I wanted to document and gain insight into how they grappled with these technologies; their successes, failures and what they felt could be done to improve the implementation of these technologies in the school. Further to this, most of the research done was actually done on the technology itself and the potential benefits that it offers as opposed to the feelings and perceptions of educators and pupils. More specifically, my research focused on the school's feelings on matters such as the suitability of the technologies, is it worth the investment, how it compares to the tradition ways of doing things, is it actually effective or is it a gimmick?

Prior to my research, there were no other studies that explored perceptions of the staff and pupils about the introduction of iPads and cloud services in a deprived inner city school.

The key findings of this research project were:

- That iPads have the potential to boost the self-confidence of EAL pupils as well as assisting in overcoming language barriers.
- The use of the iPad can support the development of the fine motor skills of young children.
- The research revealed a new understanding of the ability of the iPad to act as the knowledgeable other as identified in Vygotsky's theory on the Zone of Proximal Development (ZPD).

- The new understanding of the impact of cloud services on transient pupils. These are pupils who frequently move between countries and as a result, are often absent from school.

2.0 Introduction

This study aimed to understand the ways in which pupils and staff perceived the introduction and use of the iPad and cloud services in an inner London Primary School.

Since the release of the original iPad in 2010, there has been a wealth of research done on the impact of the device at all levels of education, from early years through to university (Flint et al 2020; Wood, 2019). However, what I observed was that most of these research projects were done outside of England, in locations such as China, North America, Canada, Australia and the United Arab Emirates. Not very much in the way of literature was available on the impact of the use of iPads in primary education at the time of proposing this research project. Furthermore, the limited amount of literature and research that were available typically tended to focus on the impact these devices had where attainment and engagement were concerned, as opposed to pupil and staff perceptions of their use. I was unable to locate examples of ethnographic or participant observer study done within a primary school setting that attempted to gain the perceptions that the staff and pupils regarding the use of iPads and cloud services. I was also unable to locate research on the perceptions that staff and pupils hold at the very moment iPads and the cloud services are being introduced and their first year of attempting to use the device as part of the teaching and learning process. Moreover, it was difficult to find any literature that documented not only

perceptions of staff and pupils, but how they grappled with the technologies, their anxieties, fears, successes and failures where the use of the technologies were concerned. Further, I was unable to locate studies conducted in a deprived Inner London primary school. This was an important issue for me, as financial deprivation and social class can have an impact on the ways in which the pupils at the school perceive the introduction of iPads and cloud services (Disney et al, 2013).

3.0 Research Design

This study commenced in June 2014 and was completed in July 2019. From the main aim of this research project, a number of research questions were generated:

- 1) How do staff and pupils perceive the introduction of iPads and cloud services in the school?
- 2) How do staff and pupils engage with and interact with iPads and cloud services being used in the school?
- 3) What were the attitudes and behaviours of the pupils and staff when interacting with iPads and cloud services?
- 4) What do staff and pupils perceive as the advantages and disadvantages of the use of iPads and cloud services in the school?
- 5) What do the staff and pupils think can be done to improve or enhance the introduction of iPads and cloud services in the school?

In this study 44 participants took part. This sample included 23 staff members and 21 pupils.

This research project sought to explore the perceptions that staff and pupils held regarding the introduction and use of iPads and cloud services in a school setting. It was conducted in an Inner London Primary school across Key Stage 1 (pupils aged 5-7), Key Stage 2 (pupils aged 7-11) and Early Years (pupils aged 3-5).

3.1 Methodology

An ethnographic approach for this research project was used as it allowed me to participate in the everyday lives of the individuals I was studying and to take part in the process of collecting and analysing the information that I collected whilst participating (Aamodt, 1982). Savage (2000) suggests that one of the key strengths of ethnography is that it places the researcher in a position whereby they are able to gain a first hand perspective which makes the identification of social and cultural behaviours possible via participant observation. The researcher is able to use this first hand immersive experience to explore the meaning and reasoning behind the behaviours that the individuals being observed exhibit. The questioning of the behaviour exhibited by individuals may be carried out via interviews: a highly detailed means of beholding in its natural context the experiences that members of the social group being studied have (Hammersley and Atkinson 1995).

3.2 Participants

Prior to my research, there were no other studies that explored perceptions of the staff and pupils about the introduction of iPads and cloud services in a deprived inner city school population from which the sample was drawn.

From the school, twenty-one children and twenty-three adults took part in this study.

The pupils and staff were informed about the study and they were asked whether they would like to take part. A consent form was created along with an information sheet for parents, pupils and staff members. The parents, pupils and staff members were informed that participation was completely optional. Ethical considerations (BERA, 2018) were adhered to and pseudonyms will be used throughout.

3.3 Data Collection

In this research project, qualitative data was collected through the use of semi-structured interviews, focus groups and participant observation.

3.3.1 Participant observation

Jorgensen (1989) defines participant observation as a methodology that enables the researcher to, *“describe what goes on, who or what is involved, when and where things happen, how they occur, and why-at least from the standpoint of participants-things happen as they do in particular situations”* (Jorgensen 1989:12). According to Munhall (2011), ethnographic studies typically use participant observation as their

primary source of data. Participant observation was the primary source of data. As I was a long standing member of staff at the school, I did not need to go through the process of becoming accepted by the group. I was already well acquainted with the culture, norms and values of the social group. All of the individuals involved gave their written consent and where children were concerned, I got their consent and the consent of their parents or guardians. I also made sure that they fully understood what I intended to do with the data that I collected.

As mentioned previously, I held two roles throughout this research project. I was a researcher and a member of staff. There were a few occasions where I experienced a conflict of the two roles. Normally, as a member of staff, I would endeavour to assist my colleagues where possible, but as a researcher, one of the primary aims was to document the perceptions and experiences that the staff and pupils had when using these technologies. Due to the potential for my input to affect the way in which the staff and pupils would have manipulated these technologies, I was careful not to intervene and offer support whenever I saw that the staff were having problems with the iPads or the cloud services. Instead I offered verbal support on some occasions. However, there were occasions where I offered my own opinions in informal discussions, but I aimed to keep this to a minimum to avoid influencing the responses offered by the staff and pupils. The ethical dilemma for me in these situations was that I had to decide between assisting a fellow staff member and collecting data for this research project. Had I opted to be of assistance to staff members during situations where they were experiencing difficulties with the iPads or the cloud services, this would impair my ability to make observations as to how they grappled with the technologies. As a result of this, I opted not to intervene whenever members of staff or pupils were experiencing difficulties with the technologies.

3.3.2 Semi-structured interviews

The semi-structured interviews were carried out concurrently with the participant observations. The purpose of these semi-structured interviews was to explore emergent themes that became apparent during the process of participant observation.

4.0 Results

The twenty-three adults and twenty-one pupils in this study were drawn from the school where the study took place. The school was built circa 1950. There are approximately fifty members of staff including teaching staff, site staff, kitchen staff and office staff. It caters to pupils of age range 3-11 years. The proportion of pupils who speak English as an additional language is 69%. This is higher than the national average. Additionally, 44% of the pupils are eligible for free school meals and 19% of the pupils are on the special education needs register. More than twenty different languages are spoken in the school. The most commonly spoken foreign languages in the school are Arabic, Urdu and Somali. Over the past few years, the school has had a relatively high pupil mobility rate. As a consequence of this, there are a number of pupils who are frequently absent from school. The school had recently invested in iPads and cloud services and this study sought to gather the perceptions of staff and pupils as these were introduced.

The following themes arose when analysing the data:

-Staff engagement

-Pupil engagement

-Attitudes and behaviour of staff

-Attitudes and behaviour of pupils

-Staff perceptions of the advantages and disadvantages of the iPad and cloud services.

-Pupil perceptions of the advantages and disadvantages of the iPad and cloud services.

4.1 Staff engagement

Staff members generally engaged with the iPads and cloud services to use them for the teaching and presenting of lessons and lesson preparation. McConatha et al (2013) had similar findings. Some of the staff members found that the iPad was useful to present lessons to the class. One teacher said,

“I used to use Smart Notebook and present it using the Smartboard, but the problem with that is the same problem I had with PowerPoint on the desktop computer, I found myself either having to print out accompanying notes or having to read off the slide which the children could read themselves or having to add to the slide from the top of my head. The iPad has changed this for us. Now, I can control a presentation from my fingertips. I don't even have to be next to the board anymore to be able to do this. Isn't that cool? Gone

were the days when we had to click on the button to go to the next slide. Also, I can edit the slides right there on the iPad with ease even when I'm not next to the computer" (Hayley's interview).

From the above discussion with Hayley (one of the Year 4 teachers), it was clear that she perceived the iPad to be a useful tool where the idea of presentations are concerned. The key benefit that she brought up was the one of mobility.

4.2 Pupil engagement

In addition to getting the perceptions of the pupils on the introduction and use of the iPads and cloud services, I looked into the extent to which the engagement iPads had impacted the pupils. I did this because I wanted to gain insight as to whether the pupils themselves felt that the use of iPads in any way had an impact on their understanding of what they were being taught.

I found that the pupils generally held a positive view of the iPad. These will be explored below. Further to this, there were instances where it worked to boost pupil confidence, increase pupil engagement, make collaboration easier and enhance the learning experiences of the pupils. In particular, it was found that EAL pupils benefitted substantially from the use of the iPad as a tool for learning.

The Zone of Proximal Development (ZPD) is defined by Vygotsky as *"the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers"* (Vygotsky, 1978,

p. 86). The ZDP is the area or zone of possibilities which exists between the zone where pupils currently are, more specifically, what they can independently do and achieve in the present, their level of actual development and the zone where things exist that they could understand and achieve with the right amount of help.

Although Vygotsky's theories were created and developed at a time long before the invention of the iPad and cloud services, the concepts within his theories still remain relevant today. It is possible for one to argue that the iPads can be used to aid a pupil in the grasping and understanding of new concepts in the same way an adult or a peer would have assisted a child in grasping the new concept in Vygotsky's theory. This idea is backed up by the fact that Vygotsky (1978) was of the belief that when a child or pupil was in the ZPD for a given task, that providing the necessary assistance to the pupil would better enable him or her to overcome the barriers to learning and achieve the given task. Personally, I believe that the 'necessary assistance' that Vygotsky refers to can include the use of emerging technologies such as iPads and cloud services (p.86).

I observed one EAL pupil, Andrea using Google Translate during the lesson. She used the iPad to take photos of the worksheet that was in front of her. She then swiped her fingers across the English statements in the photo taken. This then enabled her to get the Romanian translation of the questions. She showed a great deal of enthusiasm when doing this. In the past, she would often sit in the lessons and choose not to take part. This was even the case when the work presented to her was in her native language.

I asked Andrea after the lesson about what she thought about the iPad, she replied,

“It fun, I like, I like” (Andrea-Year 2 pupil).

Despite the brief response, it was clear from the way she smiled and expressed herself that her attitude towards the iPad was very positive. I argue that this is one example of where the iPad operated as the ‘knowledgeable other’ in Vygotsky’s ZPD theory.

In terms of fine motor skills, Siltan (2015) argues that tablets such as the Apple iPad assist pupils in developing their fine motor skills. Another commentator, Rigo (2013) argues that the iPad has gained popularity primarily because of its ability to allow the user of the device to grapple with and manipulate content (both visual and audio) through the use of the touchscreen and then they are able to respond to the various prompts on the screen through the use of touch rather than the need for a mouse or stylus.

In a lesson that I observed in one of the Nursery classes, the teacher used a whiteboard app and instructed the pupils to try to write their name. Using her hand on the SmartBoard, she started with the alphabet and had the pupils copy the motion of her fingers to form the given letter on the iPad’s screen using the stylus. Some of the pupils struggled to hold the stylus. For these pupils she instructed them to use their fingers. I noticed that the pupils who were struggling with the stylus found it significantly easier to use their fingers to draw the letter on the screen. Whilst there were still inaccuracies where the formation of the letter was concerned, it was notably more accurate than when they attempted to use the stylus pen.

4.3 Pupil confidence

There were a number of lessons I observed where the iPad worked to increase pupil confidence by allowing them an opportunity to input their answers into the iPad without the fear of others knowing whether they got the answer correct or incorrect. In support of such findings Clark and Luckin (2012) found that iPads worked to increase the confidence of the pupil using it. This sentiment is further echoed by other commentators such as Heinrich (2015) who revealed that students found the iPad easy to manipulate, thus increasing their level of self-confidence.

Also in support of this finding, some of the pupils commented,

“I know, if I get it wrong it’ll give me another chance to start again, I’ll get it don’t worry” (Samir-Year 2 pupil).

“You know yeah, the iPads yeah you find out if your answer is right straight away. I love it when I get things right on it coz it’s fun. I feel good when I get answers right on it. I ain’t gotta wait on it with my hands up in the air like I do with the teacher when I want to know if I got it right. Sometimes I feel a bit scared to say my answer out loud coz sometimes people laugh if you don’t got it right innit? The iPad just shows me when I got it wrong so I don’t feel silly. It makes me less scared of trying out something in case I get the wrong answer. It’s quick. That way, I can try to fix my mistake if I make one. Sometimes it’s a really silly mistake” (Simon- Year 2 pupil)

From the above interview it was clear that the use of the iPad raised Simon’s confidence as it allowed him to try out a variety of approaches to problem solving

without fear of getting it wrong and having to wait for the teacher to verify whether his answer was correct or not. This in turn boosted his self-confidence.

4.4 Pupil collaboration

One example of this was where a pupil left the classroom for approximately three months, to go to another country. During this time, I was able to upload the activities that I carried out in the classroom onto Google Docs along with instructions on how to carry out the tasks. On a daily basis, I would upload copies of the work and I found that usually by the next day, the tasks were completed. Whilst these tasks mainly consisted of numeracy and literacy, I also uploaded Geography, history and science tasks at least once per week. I found that the tasks were normally completed by the next day and usually at a high standard. Further to this, she would leave comments about the parts of the work that she had difficulty with and I was able to add comments of my own offering a more in-depth explanation as to how the particular questions can be solved. There were only three occasions where I did not receive work from her on the following day. These were usually because she was unable to access the internet due to the lack of electricity.

After the time had passed and she returned to the school, I assessed her and found that she was performing at age related expectation. This meant that the period of time away from the school did not have an adverse effect on her performance.

Once she returned, I had a brief discussion with her about how she felt about the use of Google Docs. She said to me,

“It was fun to do the work, it wasn’t too hard most times. Most of the times, I was just home with my aunt, so it was something that I got to do. Sometimes, the internet wouldn’t work because there was no power in the whole village, do you believe it, the whole village, I don’t know why. I think the maths was harder to do because sometimes I’d have to do the working on paper and I didn’t always have paper. The literacy was fun, I mean, the reading stories and answering questions was interesting. I got stuck sometimes on the inference type questions, they were the harder ones. I had trouble doing these sometimes. I know you said to me to use the my own ideas with the story, but sometimes I wasn’t sure. I really liked how I could write little notes telling you how what I liked and what I really thought was too hard. The story writing was nice too, I liked how you would put the idea for the story, then I would write my ideas and then you would correct it and then it would help me write the stories. I had fun writing the stories. Did you like the story about the lost cat? That really did happen when I was in my country”

(Arya’s Interview).

It was clear from the above conversation that not only did she thoroughly enjoy the task but the use of the cloud based service, Google Docs helped make it possible for me to set work for this pupil whilst she was out of the country which otherwise would not have been possible and as a result of this she was able to keep up with the class and go on to achieve her target levels at the end of Year 2 in the SATS tests.

4.5 Attitudes and behaviour of staff

Vu et al (2014) argues that one mistake that researchers, school leaders and to an extent politicians make is that they sometimes fail to take into the account the impact

that the attitudes of staff can have on the introduction of new technologies. The perceptions and attitudes that teachers have towards new technologies such as the iPad can also be impacted by the way in which it has been introduced in the school (Vu et al, 2014).

When interviewing staff and observing their attitudes and behaviours, I found that some staff members held a positive and accepting attitude towards the use of iPads and cloud services. However, other staff members held a negative attitude towards these technologies. These will be explored in greater depth below.

Some of the staff held a negative attitude towards the iPad and cloud services and behaved in a manner that resisted the implementation of the iPad. This resistance was sometimes due to the fact that they felt that their current pedagogy and way of teaching was fine the way it was and there was also the belief that the iPad was a toy that would only act as a distraction to the pupils. Another reason why some of the members of staff opted to reject the iPad was that they did not feel confident about using it in lessons and were concerned with how observers or outside bodies such as Ofsted may perceive its use in the classroom.

Furthermore, many of the teachers found that lesson preparation with the iPad was a tedious and sometimes difficult task because they were unsure as to which apps would best meet their requirements. Catapano (2014) also suggests this as a point of difficulty and uncertainty for many teachers. He argues that because the Apple AppStore contains such an overwhelming number of apps, it may be difficult for the educator to try each one out to determine which one will best meet their needs. In an interview with a teacher, she said the following,

“We really don’t have a lot of apps that can do all of the things that we would like the iPad to do. But, I don’t blame the iPad, I think had the school invested in a consultant or had someone trained in this matter to setup our apps for us, this would be less of an issue. I say this because look at some of the other schools, they get on just fine with their iPads. I hate the way they try to place all the blame on the iPad. I admit, the AppStore isn’t perfect, but it’s better than what the computing coordinator is trying to make it out to be. I’ve been able to find useful apps and suggest it to her, she just doesn’t listen and as a result of this the apps that I find don’t find their way on the school iPad. We really need to be able to install apps on our own”

(Monica’s Interview).

Another member of staff commented,

“It’s not just the apps, no one has trained us on how to use these things effectively! I mean, it’s one thing when as you asked, there are aren’t apps that cover every single thing that a teacher wants to do, but I have to also figure out how the app works whilst working with a child or group of children. This makes it doubly worse for the staff. There really needs to be some training on how to really effectively use this and I think this in turn may assist the app problem that we are also having” (Gemma’s Interview).

Another issue raised was that of training. Most of the teachers mentioned their concerns surrounding the lack of training. Younie and Leask (2013) pointed out that the introduction of new technologies usually necessitates that the teacher gains an

understanding of how new technologies affect their current pedagogy. From the discussions and observations that took place, I concluded that many of the fears and anxieties that staff held concerning the introduction and use of the iPad and cloud services were around the idea that they may not have received sufficient training and may not know how to effectively include it as part of their pedagogy.

4.6 Attitudes and behaviour of pupils

When conducting this research project, I felt it was necessary to include the attitudes and behaviour of the pupils as it would offer a clearer picture as to how the pupils felt about the introduction of the iPad and cloud services. Further to this, I found that most of the literature concerning the introduction of new technologies in education focused heavily on the teacher and the performance of the pupils as opposed to the attitudes and behaviours exhibited by the pupils.

Ifenthaler and Schweinbenz (2013) argue that it is important to consider all of the individuals and factors surrounding the introduction of a new technology in order to maximise success. To explore the attitudes and behaviour of pupils, I observed a numeracy lesson in a Year 2 classroom. The pupils were asked to solve worded problems on the iPad. In traditional lessons, some of pupils would struggle with such a task. However, in this lesson, these pupils appeared to be fully engaged and having debates over what they thought the answer might be. One pupil said to the other with great excitement,

“I bet it’s three, just watch and see, it’s three” (Lisa-Year 2 pupil).

Soon afterwards, he touched the tick on the screen which then revealed the answer to him. Both pupils were quite excited by this. When I spoke to him and asked him his thoughts, he replied,

“It’s exciting because you get to play games if you get enough of them right. I don’t got to wait on Miss to find out if I got the answer right. Yeah, yeah, I don’t got to use a pencil either! Check this out” (Ahmed-Year 2 pupil).

He then excitedly showed me the games that he was able to unlock by correctly working out the worded problems that he was given. Habgood and Ainsworth (2011) also noted that new technologies had the effect of exciting and engaging pupils.

In a later lesson, I observed one EAL pupil, Andrea using Google Translate during the lesson. She used the iPad to take photos of the worksheet that was in front of her. She then swiped her fingers across the English statements in the photo taken. This then enabled her to get the Romanian translation of the questions. She showed a great deal of enthusiasm when doing this. In the past, she would often sit in the lessons and choose not to take part. This was even the case when the work presented to her was in her native language.

I asked Andrea after the lesson about what she thought about the iPad, she replied,

“It fun, I like, I like” (Andrea-Year 2 pupil).

Despite the brief response, it was clear from the way she smiled and expressed herself that her attitude towards the iPad was very positive.

In summary, the pupils generally perceived the iPad in a positive manner. However, they identified the issues of durability, network infrastructure and teacher training as the main issues that hindered the iPad from successfully being used in some lessons.

4.7 Staff Perceptions of the advantages and disadvantages

Having observed staff using the iPads and cloud services in lessons and having had discussions with them about them, I found that staff perceptions were quite divided. I found that there were generally two main perceptions when it came to engagement. Most of the staff interviewed felt that the iPads captured and maintained the attention of the pupils and that they were fully engaged in the task whenever they used them as part of their lesson. However, six members of staff were of the view that they were a distraction and two of them went as far as to say that they felt in their opinions that they did not belong in a school. When pressed as to why they felt it did not belong in the school, they both responded very similarly, the first replied,

“They’re toys, of course the children are going to like playing with them, they’re children. You can’t possibly expect to get any real work done on it. What is Ofsted going to think when they walk in and see a class of children playing on iPads, it’ll be a disaster that’s for sure.” (Beth’s Interview 26-9-14).

Evaluating the above response, one of the things that I found most apparent was that they did not question the legitimacy of the iPad as a platform for learning to take place. In other words, it was not part of the picture that they had in their minds as to what a learning environment should look like.

In another interview with a member of staff that was in favour of the use of iPads in the classroom, they put forward the point that technology such as the Apple iPad is used in the real world in many workplaces. As a result of this they felt that exposing the pupils to it at an early age helped them to become proficient with using it. They said,

“iPads are the future, they’re everywhere and they’re used in almost all jobs, I see them being used by the gym instructors at the gym, I see them being used by teachers in some of the other schools that I’ve visited, I’ve seen them everywhere. Given that this is the rate at which the working world is adopting these iPads, it’s a must that we teach the children how to be proficient when using these iPads to maximize their chances of gaining successful careers in the future and in their adult lives. Not only this, but they clearly prefer reading their books on the iPads which offer a greater level of interactivity with their books” (Sharon’s Interview).

Looking at the above points, it is clear that they are quite opposite views. This being said, they are in fact both relevant and valid perspectives as echoed by researchers such as Greenfield (2015) who acknowledge the importance of teaching children the right technological skills for living in the 21st century.

In summary, the teachers identified a number of advantages to using the iPad as part of their pedagogy. Some of the advantages identified included the ability to use and annotate interactive e-books, ease of use, its intuitive interface, its ability to use cloud services for distance teaching and learning and the ability of the iPad to help develop

the fine motor skills of young children. These advantages were also noted by commentators such as Silton (2015), Keengwe and Onchwari (2016). However, there were disadvantages such as the lack of time to learn how to include the iPad in their pedagogy, the potential to distract the pupils from learning and the fact that it needs to be charged in order to be used.

4.8 Pupil perceptions of the advantages and disadvantages of the iPad and cloud services.

In the case of learning, I have found that the act of touching the screen of the iPad and the use of its touch driven interface has been quite engaging for the pupils. Also, there is immediacy with the iPad that did not exist when using laptops or desktop computers. This sentiment is echoed by researchers such as Henderson and Yeow (2012). They found in their study of iPad use in New Zealand found that the use of the fingers to drive the iPad kept the pupils interested for longer periods of time than traditional ICT devices such as the desktop and laptop computer. One key example of this was a lesson where the pupils and myself were writing a report about Whitegate in Geography. The pupils were able to use Google Earth to virtually visit Whitegate and go to the street view where they were then able to virtually walk around the various parts of Whitegate so to give them a better idea as to its features. This was very useful as we were not able to physically take the pupils there on a field trip. A large number of the pupils in this class have never left the city that they were in and for them it was a surprise to see just how different Whitegate is to their own local area. Walking around from table to table, I could tell that the pupils were fully engaged in the activity. Starting at the table closest to me, I listened to the conversation that Mark and Tariq were having,

“There is so much grass! The, the houses are so big. Where are the flats?”

Mark responded,

“It kinda looks a bit boring, I mean there isn’t anything really going on here. There are hardly any shops, do you think they have shops here? It kinda looks like a ghost town!”

Tariq then replied,

“Maybe all of the people are inside, let’s look around some more and see what we find! Go left over there, I think that’s how we get to the town centre. Is there a town centre?” (Field recordings and notes 26-5-15).

The above excerpt from my field recordings made it clear that the level of interactivity offered by the iPad allowed these pupils to have an experience that they otherwise would not have been able to have. Further to this, it allowed them to learn about a different part of England which is geographically quite different from the city that they currently live in.

Having had several discussions with the pupils, they raised a number of perceived advantages and disadvantages. In the case of advantages, they felt that the touch interface made the iPad much easier to use. One pupil said,

“I like how I can touch the screen to make things happen, it’s like real life. You can touch stuff in real life and make stuff happen. Say, if I have a map, I can use my hands to move the map. It’s just like on iPad, I can move around the map with my fingers” (Lisa-Year 2 pupil).

In summary, the pupils identified a number of advantages of using the iPad and cloud services. These advantages included the ability to research information immediately, the ability to independently find out information, the touch screen interface made the iPad easy to use, the ability to use cloud services such as Google docs to write without worrying about having to erase their mistakes, to use cloud services to share their work with others, the ability of cloud services to store your work without needing to constantly save and backup and the ability of the iPad to view pictures and videos of the subject being researched. However, some pupils noted that there were disadvantages of the iPad. These disadvantages included the temptation to use the iPad to play games and its heavy reliance on the network infrastructure of the school.

In closing, despite the drawbacks of the use of the iPad and cloud services in education, students and teachers generally held a positive attitude towards the iPad where the process of teaching and learning was concerned (Younie and Leask, 2013; Brand et al, 2011; Kinash, Brand and Mathew, 2012; Perez, Gonzalez, Pitcher and Golding, 2011). Some of these drawbacks include the incompatibility of the iPad with the school's existing suite of software, the need for a fast internet connection to effectively use the cloud services, the need for a robust network to handle the traffic generated by the use of the iPads, the need to plan lessons around the limitations of the iPad and cloud services and so forth. I have observed several benefits that I felt the iPad brought to the staff and pupils including engagement, adding a new dimension to the lessons that they were planned for and included in.

5.0 Conclusion

Both staff and pupils held mostly positive perceptions of the introduction and use of the iPads and cloud services in the school. Some of the issues raised by staff included insufficient staff training, an inadequate wireless network, not knowing which apps and e-books would best meet their pedagogical needs and some felt that the iPad did not belong in an educational setting.

Most of the staff praised the iPad for its ease of use, the way it engaged the pupils, its ability to access cloud services to enable them to conduct lessons, mark and annotate work and give feedback when both the staff and pupils were in different locations.

In terms of contribution to knowledge, this research project has revealed a wealth of valuable information that could be used to assist schools investing in new technologies. New technologies are introduced to the market at an ever-increasing rate. The findings of this research project could assist school leaders, stakeholders and educators in understanding what steps could be taken to increase the chances of success when introducing new technologies to the classroom. Moreover, the findings of this research project could enable a change from speculative thought to a more informed perspective on this subject matter. A more informed perspective will in turn, lead to the introduction of new technologies with a greater chance of success for all parties involved. I argue that this study could find relevance for other educational bodies who wish to invest in new and emerging technologies and could offer them greater insight into the challenges that could be faced and the ways in which staff and pupils might perceive the introduction of new technologies. In summary, I argue that these are some of the key contributions made by this research project:

- The findings of this research project could act as a guide for educational establishments both within the UK and outside of the UK regarding the implementing of iPads and cloud services or new technologies as part of an educational institution's pedagogy.
- The findings of the research have revealed that iPads have the potential to boost the self-confidence of EAL pupils as well as assisting in overcoming language barriers.
- The use of the iPad can support the development of the fine motor skills of young children.
- The research revealed a new understanding of the ability of the iPad to act as the knowledgeable other as identified in Vygotsky's theory on the Zone of Proximal Development (ZPD).
- The new understanding of the impact of cloud services on transient pupils. These are pupils who frequently move between countries and as a result, are often absent from school.

At the time of conducting this research project, these were new technologies to the school, staff, and pupils. This study was of significance to the school as it was able to offer school leaders greater insight into the perceptions and hurdles that hindered the successful introduction of iPads and cloud services. The findings of this research project also highlight the need for school leaders, staff and pupils to work together in order to ensure that all of the individuals involved experienced success when new technologies were introduced. Due to the differences in perceptions between each individual staff members and pupils, it should be recognised that merely introducing new technologies without first enquiring into the needs of staff and pupils was insufficient for success. Both staff and pupils should be seen as individuals with their

own specific needs, perceptions and anxieties. As a result of this, school leaders should aim to include both staff and pupils in the decision making process when introducing new technologies. Staff and pupil perceptions could offer school leaders great insight into understanding what needed to be done to ensure that the effectiveness of the introduction of new technologies was maximised.

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