Teachers' perspectives on iPad usage for learners with dyslexia in the Intermediate Phase

Megan Dawn de Bruyn

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Teachers' perspectives on iPad usage for learners with dyslexia in the Intermediate Phase

by

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Submitted in partial fulfilment of the requirements for the degree

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(Learning Support, Guidance and Counselling)

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Faculty of Education
University of Pretoria

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PRETORIA

April 2017

DECLARATION OF ORIGINALITY

I, Megan Dawn de Bruyn, declare that the dissertation, **"Teachers' perspectives on iPad usage for learners with dyslexia in the Intermediate Phase"** which I hereby submit for the degree MEd (Learning Support Guidance and Counselling) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

Signature…… Date……..

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DECLARATION BY LANGUAGE EDITOR

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TO WHOM IT MAY CONCERN

I, the undersigned, hereby declare that the master's dissertation titled **Teachers' Perspectives on iPad Usage for Learners with Dyslexia** by Megan Dawn de Bruyn has been edited for grammar errors. It remains the responsibility of the candidate to effect the recommended changes.

Prof. Tinus Kühn

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ETHICAL CLEARANCE CERTIFICATE

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Faculty of Education

RESEARCH ETHICS COMMITTEE

CLEARANCE CERTIFICATE	CLEARANCE NUMBER: EP 15/10/04
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Please note:
For Master's application, Ethics Clearance is valid for 2 years.
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- Compliance with approved research protocol,
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ABSTRACT

This study contributes to existing research on the perspectives of teachers' with regards to the use of the iPad for learners with dyslexia. The purpose of this case study was to explore and describe teachers' perspectives on iPad usage for learners with dyslexia in the Intermediate Phase. The primary research question that guided this study was: "What are teachers' perspectives on iPad usage for learners with dyslexia?"

A qualitative research design was used to collect rich data using Intermediate Phase teachers. Eleven teachers from three schools in Johannesburg participated in the study. The data collection tools that were used included focus group discussions, semi-structured interviews and observations. By exploring how these teachers perceived iPad usage, specifically for learners with dyslexia, this study contributed to an existing body of knowledge providing insight into the use of iPads in the classroom and as a learning support tool.

The themes that emerged from this study answer the question of what teachers' perspectives on iPad usage for learners with dyslexia are. Findings indicate that teachers' perceive the iPad as a useful support tool but that it comes with many challenges that need to be addressed. The findings indicate that the iPad creates interactive learning and increases the confidence of learners with dyslexia. It is recommended that research be conducted with a larger sample size and also for challenges to be addressed so that the iPad can be utilised to its full potential.

Keywords: teachers' perspective; iPad; dyslexia; intermediate phase; learning support.

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CHAPTER 1 OVERVIEW OF THE STUDY

1.1 INTRODUCTION AND PROBLEM STATEMENT

The implementation of iPads in the classroom environment has led to advancements in the field of education (Clark & Luckin, 2013; Gasparini & Culén, 2013). iPads are easy to use for learners and more appealing compared to the traditional materials used in teaching (Gasparini & Culén, 2013). The research on iPad use and its adoption overwhelmingly reports that tablet devices have a positive impact on learners‟ engagement with learning (Benton, 2012; Bugaj et al., 2014; Clark & Luckin, 2013; Henderson & Yeow, 2012; Roth, 2014; J. Smith, 2012). Findings in this regard show increased motivation, enthusiasm, interest, engagement, independence and self-regulation, creativity and improved productivity (Clark & Luckin, 2013).

"Although new technology tools are introduced to society almost daily, the Apple iPad has been at the centre of media attention since its release in February of 2010" (Benton, 2012, p. 2). Being a teacher at a remedial school, teaching learners with specific learning disorders, like dyslexia, has been challenging. The implementation of iPads acting as a support tool has assisted me in supporting these learners so that they are given the opportunity to reach their full potential in the classroom environment. White Paper 6 on Special Needs Education (Department of Education, 2001) emphasises the movement towards inclusivity and the recognition of every learner's human rights, including the rights of the learner with a learning disorder. iPads offer teachers the opportunity of teaching in a more inclusive classroom.

According to Roth (2014) integrating technology into education used to be a choice for teachers. She adds that some teachers took comfort in more traditional forms of teaching; however, the option to remain "no-tech" or "low-tech" is waning due to the significant investment schools are making in promoting the development of the *Net-Generation* of learners. When discussing the Net-Generation it is important to note that I am referring to learners who were born in the 1980's and later who have grown up with technology. More and more schools are implementing the use of iPads but for some teachers with little to no experience in using an iPad this can be quite daunting (Benton, 2012). By using new technology in the classroom teachers are likely to improve the impact of their lessons and

keep their learners engaged and up to date with technology. However, not all teachers experience the age of technology (iPads) in the same way. It therefore appears that teachers‟ thoughts are not being taken into consideration and that the focus on the development of the Net-Generation of learners needs to be refined.

1.2 RATIONALE AND PURPOSE STATEMENT

Since January 2010, when the iPad was first introduced, there has been a rapid uptake of iPads in education, especially in schools (Clark & Luckin, 2013). In the course of my studies, all my practical work was done with learners with various disabilities. I now work as a Grade 5 teacher in a remedial school in the process of implementing iPad usage in the classroom. In my class of fourteen learners there are, among others, specific learning disorders, such as dyslexia. Teachers and specialists, such as remedial therapists and speech therapists, often have the responsibility of teaching the child to manage dyslexia. Before initiating this study I attended an Apple Accessibility Conference that was held at the iStore in Sandton. At this course the speaker demonstrated various ways in which the iPad allows the learner with specific learning disorders to interact and have the same opportunities in the classroom as any other learner. I learned how to assist a child in a classroom using an iPad. After attending this conference and having discussions with various teachers I began to realise that perhaps we do not realise the extent to which iPads are being used in the classroom and their educational advantages and do not recognise an iPad as an intervention.

According to Sisler (2014) the introduction of new technology seems to be lacking in practising teachers‟ classrooms. Students are often better trained to use technology than the teachers themselves. The purpose of this study was to gain insight into the perspectives of teachers on the use of iPads and to provide a better understanding of the prospects and challenges teachers are faced with. This study was not only about gaining insight, but also aimed to highlight technology as an education device that can contribute to developing confident learners.

1.3 RESEARCH QUESTIONS

This study was guided by the following primary research question: *What are teachers" perspectives on iPad usage for learners with dyslexia in the Intermediate Phase classroom environment?* In addition, the following secondary research questions are addressed:

- How can the iPad be utilised by teachers to assist learners with dyslexia in the classroom?
- What applications/accessibility options with regard to the iPad do teachers find most useful when teaching learners with dyslexia?
- What are the challenges that teachers experience in using an iPad for learners with dyslexia?

1.4 CONCEPT CLARIFICATION

1.4.1 Dyslexia

Dyslexia can be defined as persistent literacy learning difficulties in otherwise typically developing children, despite exposure to high quality, evidence-based literacy instruction and intervention, due to an impairment in the phonological processing skills required to learn to read and write (Tunmer & Greaney, 2010). I understand dyslexia to be considered a specific learning disorder that affects a learner's ability to read and write. Common signs of dyslexia are letter or number reversals, omission of letters when writing and omission of words or letters when reading. Dyslexia is an inherited disorder and there is no medication to assist learners with dyslexia. Williams and Lynch (2010, p. 66) state that The International Dyslexia Association (2013) uses the following definition: "Dyslexia is a specific learning disability that is neurological in origin. It is characterized difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These typically result from a deficit in the phonological component of language and the provision of effective classroom instruction."

1.4.2 iPad

When the iPad was first introduced in 2010 it was portrayed as a innovatory device for browsing the web, reading and sending emails, enjoying photographs, watching videos, listening to music, playing games, reading e-books and much more (Smith & Evans, 2010). My understanding is that an iPad is computerised technology developed by the company Apple. An iPad provides its users with the same technology as a computer or a laptop with added features provided by Apple's App Store. The App Store allows the user to buy or use free apps on the iPad for educational, professional or entertainment purposes.

1.4.3 Intermediate Phase

In this study the *Intermediate Phase* refers to a group of learners in a school environment that are in Grade 4, Grade 5 and Grade 6. The teachers that work in this phase are Intermediate Phase teachers. When these learners are promoted to Grade 7 they enter the Senior Phase of their school career.

1.4.4 Perception

In this study *perception* refers to the way in which one views or experiences something. For the purpose of this dissertation perceptions refer to the way in which teachers view and experience the effectiveness/efficacy of the way in which iPads are used for learners with dyslexia.

1.5 THEORETICAL FRAMEWORK

To guide my study I relied on Vygotsky's theory of cognitive development. The central focus of the study is how teachers perceive iPad usage for learners with dyslexia. It assumes that cognitive development in learners with dyslexia takes place by using iPads.

According to Gonzalez-DeHass and Willems (2012) the major theme of Vygotsky's theoretical framework is based on the role that social interaction plays in the development of cognition. Gonzalez-DeHass and Willems (2012) to point out that Vygotsky believed in tools, namely physical tools and psychological tools that are used in cognitive development. Physical tools are material objects that facilitate the action between the learner's hand and the object upon which the tool acts. Psychological tools, on the other hand, are internal mediators between one's thoughts and the social world that changes an individual's mental functioning (Gonzalez-DeHass & Willems, 2012). Another major theme in Vygotsky's theory of cognitive development is what is termed as the Zone of Proximal Development (ZPD). Pritchard (2013, p. 27) defines ZPD as "a theoretical space of understanding that is just above the level of understanding of a given individual." He goes further to clarify that this is the area of understanding in which a learner is able to work effectively but only with support. Passing through ZPD is a process that can be aided by intervention of another person or

materials (Pritchard, 2013). Figure 1 provides a summary of the theoretical framework for this study.

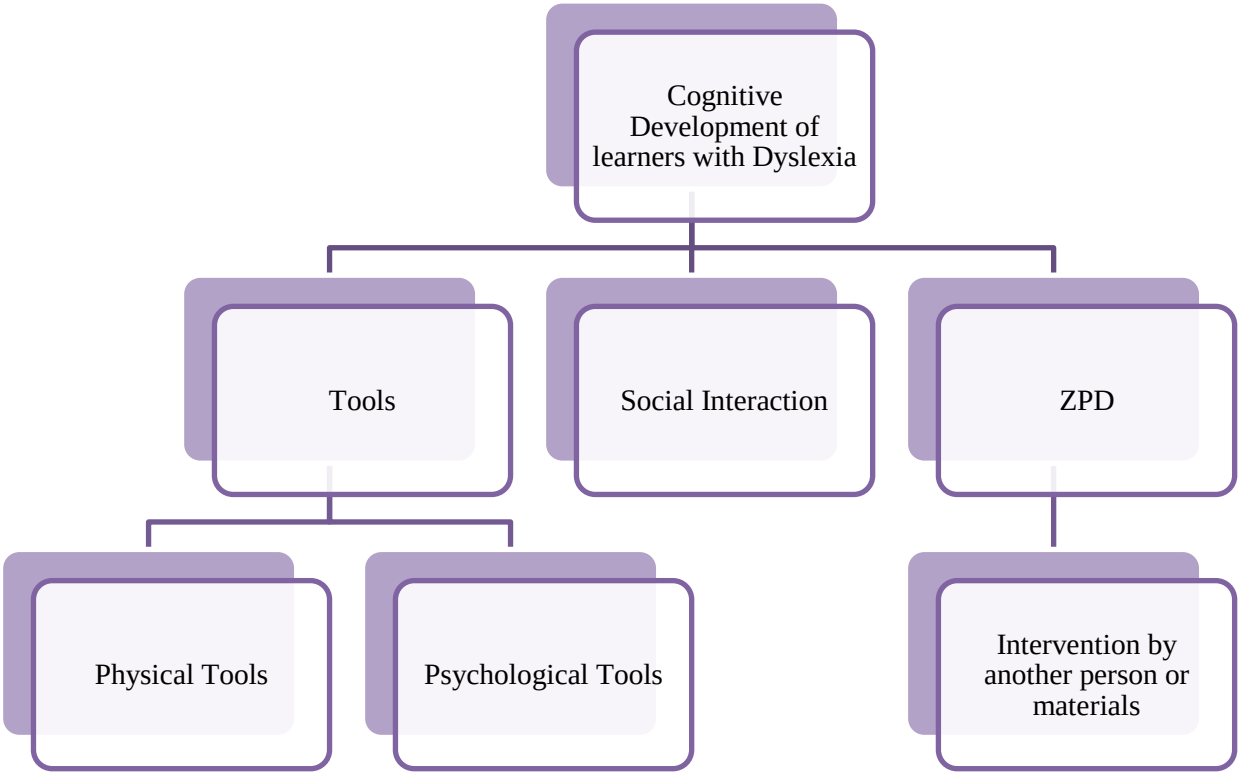

Figure 1: Theoretical framework. Adapted from *Ways of learning: Learning theories and learning styles in the classroom* (Pritchard, 2013)

1.6 RESEARCH PARADIGM

1.6.1 Epistemological Paradigm

Epistemology viewed by the qualitative researcher is regarded as the researcher making an effort to get as close as possible to the participant being studied (Bahari, 2012). This study positions itself within the constructivist paradigm. Constructivism can be seen as an approach to research where individuals develop subjective meanings of their experiences directed towards certain objects or things (Creswell, 2014). By using the constructivist approach the researcher opts for a more personal, interactive mode of data collection (Mertens, 1998). The connections in the research done in this study are not limited to how I construct my own learning (Nolan, 2014) as I believe that knowledge is socially constructed by people active in the research process (Mertens, 1998).

1.6.2 Methodological Paradigm

This study is a qualitative study guided by the goal of gaining an in-depth understanding of the chosen participants‟ views and experiences. Qualitative research is often characterised by a naturalistic approach concerned with exploring phenomena and starts with taking the perspectives of research participants into account (Ritchie, Lewis, Nicholls, & Ormston, 2013). I chose to conduct a qualitative study because it was important for me to explore and understand fully how teachers experience iPads in a classroom with learners with dyslexia. It is my opinion that a qualitative study and qualitative data collection techniques were best suited to accomplish this goal. Qualitative research allows participants to challenge the researcher‟s assumptions about the meaning and relevance of concepts and categories (Willig, 2013). This enabled me to gain a better understanding of the research problem and allowed me to look beyond my own biases.

Qualitative studies are faced with the issue of quality and require the use of various strategies to enhance validity (Maree, 2013). To ensure that the data gathered was credible and trustworthy, I made use of multiple data collection techniques, namely focus group discussions, semi-structured interviews, observations and visual data. I also ensured that this study made use of peer reviewing to increase the level of trustworthiness of the data collected.

1.7 RESEARCH PROCESS

1.7.1 Research Design: Multiple Case Study

Maree (2013, p. 75) describes a case study design as either positivist, interpretivist and/or critical in nature. He goes further to explain that it is a “systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest”. The case study design has the ability to answer *Why*, *What* and *How* questions, which is the main reason for case study research being used in explanatory and exploratory research (Saunders, Lewis, & Thornhill, 2007). According to Alan Bryman (2012), a case study involves the detailed and intensive analysis of a case and is associated with a location, such as a community or organisation with the emphasis on an intensive examination of the setting.

More specifically, a multiple case study was used in order to establish a focus on "whether the findings of the first case occur in other cases" (Saunders et al., 2007, p. 140). For the purpose of this study the *case* involved a community of teachers from three different schools, one school being a remedial school and the other two schools being mainstream schools.

It is important at this point to note that case study design has been criticised because its findings cannot be generalised (Yin, 2012). However, the purpose of this study was not to generalise but rather to gain an in-depth understanding of the problem. One of the key advantages of using a case study lies in the fact that it uses multiple sources and techniques in the data gathering process (Maree, 2013). This was an advantage to this study because it provided me, as the researcher, with the opportunity of gathering data using multiple techniques. This, in turn, enabled me to gain a deeper understanding of the teachers' perspectives on the efficacy of iPad usage for learners with dyslexia.

1.7.2 Selection of Participants

Convenience sampling was used; "convenience sampling usually refers to situations when population elements are selected based on the fact that they are easily and conveniently available" (Maree, 2013, p. 177). Convenience sampling was chosen simply because I am currently teaching at a remedial school. One mainstream school was selected to compare the data from each school. Eleven teachers from each school were chosen according to the following criteria:

- Teachers had to have learners with dyslexia in their classes.
- Learners with dyslexia must have had a formal diagnosis of dyslexia done by an educational psychologist/neurologist.
- Teachers had to be Intermediate Phase teachers.

1.7.3 Data Collection Plan and Documentation Strategies

Table 1.1 provides a summary of the data collection and documentation strategies used for the study.

Table 1.1: Data Collection and Documentation Plan

Data Collection Strategy	Documentation of Data	Aim of Data Collection
Semi-structured interview	Interviews were recorded and transcribed.	To gain answers to questions that would provide insight into teachers‟ perspectives on the efficacy of iPad usage for learners with dyslexia.
Observation	Observations were recorded using field notes.	To observe how teachers incorporate iPads into their lessons to benefit learners with dyslexia.
Visual Data	Photographs of work done on the iPads were taken.	To provide evidence of how the iPads are used within the classroom setting.
Focus group discussion	Discussions were recorded and transcribed.	To gain a group perspective on the research problem.

1.7.3.1 Focus Group Discussions

By having focus group discussions I was able to widen the range of responses, activate forgotten details of experience and release inhibitions that may otherwise discourage participants from disclosing information (Maree, 2013). Focus group discussions create a social space for individuals to interact (Robinson, 2012); as a result participants were able to build on one another's ideas and comments, resulting in in-depth views (Maree, 2013).

1.7.3.2 Semi-Structured Interviews

One of the most important sources of case study information is the interview (Yin, 2012). The value of using interviews as a data collection technique is founded on the belief that the participant is an individual who actively constructs the social world and can communicate insight about it verbally (Ritchie et al., 2013). The purpose of this study was to gain an in-depth understanding of the teachers' perceptions of iPad usage and therefore the semi-structured interview was best suited to this study.

1.7.3.3 Observations

By utilising observation techniques in this study a deeper understanding was gained of what teachers experienced in the classroom. Observations provided me with the opportunity of gaining an insider perspective on the group dynamics and behaviours; it also allowed me to experience reality as my participants did (Maree, 2013). "Observational evidence is often useful in providing additional information about the topic being studied. If a case study is

about a new technology, observations of the technology are aids for understanding the uses of the technology or potential problems" (Yin, 2012, p. 93). According to Bryman (2012) there is a risk of imposing a potentially inappropriate or irrelevant framework on the setting being observed. He goes further to explain that this risk is especially great if the setting is one about which little is known. In order to overcome this potential challenge, I planned to consult with my peers and supervisor continuously to ensure that background knowledge was gained on the setting.

1.7.3.4 Data Collection Schedules

Table 1.2 provides a summary of the planned schedules for data collection for this study.

Table 1.2: Data Collection Schedules

Data Collection	School	Number of Participants	Duration
Semi-structured interviews	Remedial School	1 teacher per school	2 weeks: 1 interview with each teacher in week 1 and another interview with each teacher in week 2.
	Mainstream School	1 teacher per school	
Observations	Remedial School	1 teacher per school	2 weeks: observe each teacher in week 1 and again in week 2.
	Mainstream School	1 teacher per school	
Focus Group Discussion	Remedial School	6 teachers	1 week: have a focus group discussion with each school separately.
	Mainstream School	6 teachers	
Visual Data	Remedial School	1 teacher per school	Take pictures of work done on the iPads during the observation period.
	Mainstream School	teacher per school	

1.7.4 Data Analysis and Interpretation

The study made use of thematic analysis during the data analysis phase. Thematic analysis can be used to address most types of qualitative research question, analyse most types of qualitative data, analyse data generated by both homogeneous and heterogeneous samples and analyse both smaller and larger datasets (Braun, Clarke, Terry, Rohleder, & Lyons, 2014). Table 1.3 provides a guideline of the data analysis plan that was used in the study.

Table 1.3: Data analysis plan. Adapted from *Qualitative Research in Clinical and Health Psychology* (Braun et al., 2014, pp. 95-96)

Phase	Explanation
Phase 1 **Familiarisation with the data**	This phase consisted of getting to know what was in the data and starting with the analytical engagement with the data by reading the data as data and starting to note potential points of analytical interest.
Phase 2 **Coding the data**	A code is effectively a succinct label that captures a key analytical idea in the data and conveys this to the researcher.
Phase 3 **Searching for themes**	Different codes were clustered to create each potential theme.
Phase 4 **Reviewing the themes**	This phase consisted of quality control by checking that the themes were a good fit for the coded data. It also consisted of identifying the themes so that they described the full story of the relevant data.
Phase 5 **Defining and naming themes**	The overall analysis was developed through a detailed analysis of the data in each theme that determined the *story* of the data.
Phase 6 **Producing the report**	This phase consisted of a polished analysis, which indicated what was in the data, why it was interesting and/or significant and answering the research question. This phase also included a polished report which explained, located and contextualised the analysis in relation to existing theory and research.

1.8 ETHICAL CONSIDERATIONS

"Research ethics relates to questions about how we formulate and clarify our research topic, design our research and gain access, collect data, process and store our data, analyse data and write up our research findings in a moral and responsible way" (Saunders et al., 2007, p. 178).

Permission was obtained from the Ethics Committee of the Faculty of Education before the research took place. Informed consent was obtained from all relevant authorities and participants prior to the commencement of the study. This included obtaining informed consent from the teachers and principals. The consent forms were clear as to what the focus of the study was, what the procedures were and also if there were any dangers to which the participant might be exposed. Permission to take photographs of the work done on iPads during the observation phase as well as permission to audio-record during the interviewing phase was requested in the consent forms.

The identity of the interviewees was kept anonymous by ensuring that their names were not mentioned anywhere in the study. Data was stored in a safe place throughout on my laptop that only I had access to and it was password protected. Participation in this study was completely voluntary and therefore the participants had the right to withdraw from the study at any stage. My relationship with my colleagues was kept on a professional level to avoid captive audience even though I was not in a position of authority over the participants and they were not obligated to participate; instead they were reassured that their participation was completely voluntary. Learners‟ identity during observations was kept confidential at all times. If a child's name was mentioned by one of the participants the name was changed to *the learner* instead. Photographs taken did not show participants‟ faces but rather the work done by them. At no point were the learners‟ names revealed or displayed in the photographs.

1.9 QUALITY CRITERIA

Table 1.4 provides general guidelines for the quality criteria of the proposed study.

Table 1.4: Quality Criteria. Adapted from *Judging interpretations: but is it rigorous? Trustworthiness and authenticity in naturalistic evaluation*. New directions for evaluation, 2007(114), 11-25. (Schwandt, Lincoln, & Guba, 2007)

Quality Criteria	Guidelines
Credibility	Prolonged engagement Persistent observation Triangulation Peer debriefing Negative case analysis Member checking
Transferability	Thick descriptive data
Dependability and confirmability	An external audit

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CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

Researchers have spent decades debating the use of technology to assist children in the classroom. Even though schools have adopted some form of technology, iPads are still fairly new to the world of education. In order to locate my study in the existing research, I needed to evaluate existing knowledge. Therefore I sought to identify correlations and contradictions relating to the studies of learning disorders – more specifically dyslexia – how teachers‟ accommodate or remediate these learners within the classroom and how these learners are supported using technology. I examined existing research on iPads in education, focusing on the manner in which they provide support in general and specifically for learners with dyslexia. Furthermore, teachers‟ perceptions of technology and the use of iPads in the classroom were explored.

Chapter 2 is structured in the following way: I began by discussing specific learning disorders to get an idea of the existing research done in this area. I then examined what literature says about dyslexia. It was also relevant to understand the prevalence of dyslexia globally and nationally. The literature on causes as well as symptoms of dyslexia was then identified. Possible implications of dyslexia in a classroom environment as well as remediation strategies to support learners with dyslexia were discussed according to the literature. The literature review examined the aspect of technology in the classroom to understand how technology assists or supports those learners with specific learning disorders and specifically learners with dyslexia. I compared the research previously conducted on ways in which the iPad assists in the classroom, functions as a learning support tool and the manner in which it is utilised for learners with dyslexia. Thereafter teachers‟ perspectives on the use of technology and the iPad specifically were discussed. Finally, Vygotsky (1987) theory of cognitive development was reviewed as this formed the theoretical framework that guided this study. Then I provided a summary on the literature focusing on what we know about the perceptions and utilisation of iPads in the classroom for learners with dyslexia.

2.2 SPECIFIC LEARNING DISORDERS

Part of the central aspect of this study is dyslexia; however, before understanding dyslexia it is important to understand the concept of specific learning disorders because dyslexia falls into the category of a specific learning disorder and is a central part of this study. The concept of *learning disorders* has been researched widely across the world. It is important first to understand the definition of learning disorders before understanding what research on the concept.

According to Sotelo-Dynega, Flanagan, and Alfonso (2011) the earliest recorded definitions of the term *learning disorders* was developed by clinicians, based on their observations of individuals who experienced considerable difficulties with the acquisition of basic academic skills, despite their average or above-average general intelligence. It is important to note that the term *learning disorders* has been at the forefront of school psychological debate, research, and practice since its commencement as an educationally challenging condition (Feifer, 2011).

Specific learning disorders can be defined, according to the American Psychiatric Association (2013, p. 68) as "neurodevelopmental disorders with a biological origin at a cognitive level that are associated with the behavioural signs of the disorders". For the purpose of this study, when the term *dyslexia* is used, it is in reference to this definition. It is important to discuss the fact that in terms of terminology researchers generally use either the term *learning disability* or *learning disorder*. According to Dednam (2005) a person with a disability is seen as a person with a physical impairment and who is restricted from full and equal participation in society. Therefore, for the purpose of this study, I have used the term *learning disorder* as opposed to *learning disability*.

People with specific learning disorders have difficulty in one or more of the basic psychological processes involved in understanding or using spoken as well as written language (Jena, 2013). This is important to understand because in order for teachers to support a child with dyslexia fully they need to understand where the barriers lie. This in turn allows for a deeper understanding of how teachers can implement the iPad as a remediation tool.

According to DeFina and Moser (2012) learning disorders affect 5% to 7% of children in general; these learning disorders include reading disorders (dyslexia) as well as mathematics disorders (dyscalculia). For the purpose of this study I have paid close attention to reading disorders in particular and more specifically how iPads are perceived by teachers when using them for these learners. Feifer (2011) states that learning disorders represent heterogeneous skill deficits in various academic domains, such as reading, mathematics, written expression and oral language. It is important to understand how teachers overcome these barriers and what has worked and what has not worked, which will be discussed later in the chapter.

According to Jena (2013) it is important to understand that learners with learning disorders may not have identifiable brain damage; however, brain pathology appears to have etiologic significance. Therefore, regarding intervention for learning disorders it is crucial to distinguish between the cause and symptoms of the specific learner.

When reviewing the literature it becomes clear that there are not only learning barriers that a learner with a learning disorder faces, but also emotional and psychological barriers as well. According to Lerner and Johns (2009) the following characteristics are commonly seen in learners with learning disorders: cultural and linguistic diversity; passive learning; poor self-esteem; social and behavioural problems; attentional difficulties as well as a lack of motivation. It is important to note that even though these are common characteristics of learners with learning disorders every learner is unique and therefore these characteristics may not be valid for all learners with learning disorders.

There appears to be consensus among researchers and practitioners that learning disorders are brain-based and heritable even though measuring brain dysfunction and heritability have proven to be elusive (Fletcher, 2012). This study could potentially contribute to studies of learning disorders, more specifically to studies of dyslexia, by understanding teachers‟ perceptions of accommodating these learners in the school environment through the use of an iPad.

According to the American Psychiatric Association (2013) one of the most common manifestations of specific learning disorders is difficulties in learning to map letters with the sounds of one's language and to read printed words, which is often referred to as dyslexia.

2.3 DEFINING DYSLEXIA

Of the various learning disorders, specific reading disorders (better known as dyslexia) are the most important from a clinical perspective because of the significance of literacy as a social skill as well as the link between reading problems and conduct problems (Carr, 2006). This is important because the source of development of activity lies in the social environment of the child (Rieber, 1999). The topic of dyslexia appears to be a common term in educational research. It is a topic that has been researched extensively. Historically the word *dyslexia* was derived from Greek: *dys* meaning poor, and *lexia* meaning word or language (H. Harper, 2012). Children and adults with dyslexia are assumed to have difficulty encoding, maintaining and retrieving phonological representations (De Bree, 2007). By understanding what difficulties learners with dyslexia face, we are able to make connections between how they could possibly be overcome or maintained through the use of accommodations such as the iPad.

Dyslexia is generally defined as a reading and spelling difficulty discrepant with intelligence and educational opportunities (De Bree, 2007). "Dyslexia refers to a pattern of learning difficulties characterised by problems with accurate or fluent word recognition, poor decoding, and poor spelling abilities" (American Psychiatric Association, 2013, p. 67). The relation between reading performance and general intellectual ability has been assumed as a central importance in definitions of dyslexia (Beaton, 2004). However, according to Shaywitz and Shaywitz (2005), dyslexia can be characterised by an unexpected difficulty in reading in children and adults regardless of the possession of intelligence and motivation considered necessary for accurate and/or fluent reading. Similarly, Benítez-Burraco (2010, p. 564) explains that "dyslexia is a learning disorder characterised by a difficulty in recognising written words accurately and fluently, as if there were a significant loss in the ability to decipher or spell them out". She adds that these difficulties experienced are constant and therefore do not disappear over time.

It seems that most researchers agree that dyslexia can be classified as a specific learning disorder with evident difficulties in literacy and mathematics skills. Historically, definitions have been used to label rather than inform, which according to Reid (2005) has been relevant for the purposes of recognising the necessary support needed for learners. The purpose of this study was to provide a deeper understanding of how teachers perceive the use of an iPad to support learners with dyslexia. While the basic phonological shortfall central to dyslexia

commonly persists into adulthood, a proportion of learners with dyslexia continue to show improvements in reading skills in adulthood, provided they are supported by their families, given additional tuition in schools and practise reading regularly with manageable and motivating materials (Carr, 2006).

It is important to note that there is no single assessment or single agreed standard for testing dyslexia that all specialists use (Marshall, 2004). However, in a school environment it is important for learners to be diagnosed with dyslexia by a professional and by someone who is qualified to do a formal diagnosis; a teacher cannot simply assume that a learner has dyslexia if he/she has not been properly diagnosed. Dyslexia can be diagnosed by a specialist who is trained and qualified in the field of assessment of learning disorders, such as a clinical or educational psychologist, school psychologist, neuropsychologist, learning disorders specialist, medical doctor with training and experience in the assessment of learning difficulties (Marshall, 2004).

When discussing dyslexia Georgiewa et al. (2002) refer to the phonological deficit hypothesis of dyslexia that posits that reading acquisition critically involves the segmentation of text into graphemes that are related to phonemes, and grapheme-phoneme conversations are then related to the whole sound of the word. Research points to the link between phonological development and dyslexia. Over time, extensive research has been conducted into individual differences in children‟s phonological abilities, that is, their sensitivity to the speech sound structure of words (Muter, 2004). De Bree (2007) argues that the absence of detailed insights into phonological development justifies further and more elaborate investigations.

It is crucial to note that even though dyslexia is often described as being genetic, it can also be differentiated into different categories as discussed by Perlstein (2013) who describes three different types of dyslexia, namely Trauma Dyslexia, Primary Dyslexia and Developmental Dyslexia. Trauma Dyslexia: occurs after a brain trauma or an injury to the area of the brain that controls reading and writing. Primary Dyslexia: results from a dysfunction of the left side of the brain and does not change with age. Developmental Dyslexia: appears to be the most commonly discussed, is caused by hormonal development during the early stages of foetal development. Jena (2013), however, categorises dyslexia into two major groups, namely Peripheral and Central. She explains that Peripheral Dyslexia results from impairment of

brain processes that are required for transforming printed text to visual word forms; Central Dyslexia, on the other hand, results from damage to one or more of the *routes* by which words are read.

There appears to be an agreement among researchers that dyslexia is a neurological disorder and in most cases it is genetic. For the purpose of this study I have worked with the definition provided by the American Psychiatric Association (2013) that states that "dyslexia is an alternative term used to refer to a pattern of learning difficulties characterised by problems with accurate or fluent word recognition, poor decoding, and poor spelling abilities".

2.4 PREVALENCE OF DYSLEXIA GLOBALLY AND NATIONALLY

Much of our current knowledge and understanding of dyslexia pertains to the challenges within the English language. However, many studies have been conducted proving the prevalence of dyslexia worldwide.

Vasudevan and Iyer (2015) identified a gap in literature regarding the prevalence and treatment of developmental dyslexia in India. They found that there were a limited number of studies on standard and impaired reading in Indian languages even though dyslexic difficulties in Indian languages have an underlying phonological deficit as with English. They also found that dyslexia in other European languages like French, German, Italian and Finnish have similar cognitive and neurological bases to English. The results of their study revealed that despite the high incidence of dyslexia, there is very little awareness of learners with dyslexia, even among educators and as a result there is very little help for such learners (Vasudevan & Iyer, 2015).

In a cross-sectional study Lodhi et al. (2016) focused on assessing the knowledge, attitudes and practices of teachers regarding dyslexia and other learning disorders in Karachi, Pakistan. The conclusion of the study was that knowledge about learning disorders is very limited among teachers, which may limit their ability to identify learning impairments. They also found that dyslexia is the most common of the specific learning disorders, affecting 80 per cent of all learning disorders.

From a South African perspective, the prevalence of dyslexia seems to be harder to identify. Research seems to point to the fact that due to the number of languages spoken in South Africa it is difficult to pinpoint whether a child has dyslexia or simply a reading difficulty. Ndombo, Ojo, and Osunmakinde (2013) conducted a study that consisted of 24 learners, who most of the time spoke their mother tongues, but used English as the language of education. Different literacy skills assessments were carried out and they found that there was evidence of dyslexia and their learning levels were below average for their age.

In a book based on looking at dyslexia from a worldwide view Smythe, Everatt, and Salter (2005) point out that dyslexia, regarded as a specific learning disorder in South Africa, is a concept not widely used or addressed, because of the huge number of reading difficulties found in learners because of other factors that are not of neurological or psychological origin. They believe that children who suffer from reading disabilities usually have parents who are illiterate.

Research conducted on the prevalence of dyslexia seems to point more to a worldwide view and not to a South African view due to the fact that we as South Africans are surrounded by such a vast number of languages. It is important to note that South African teachers are still faced with supporting learners who might present dyslexic qualities but have not necessarily been diagnosed.

2.5 CAUSES OF DYSLEXIA

There appears to be no consensus as to what causes a person to develop dyslexia; however, some evidence points to a possibility that the condition could be inherited, as dyslexia often runs in families (Nordqvist, 2013). However, researchers like Peterson and Pennington (2012) found that the cause of dyslexia is multi-factorial, indicating there could be more than one cause. They believe that it is associated with multiple genes and environmental factors. Shaywitz and Shaywitz (2005) argue that dyslexia can be hereditary; moreover, environmental influences and genetic influences can also affect the expression of dyslexia. According to The International Dyslexia Association (2013) dyslexia runs in families; having a parent or sibling with dyslexia increases the probability that one will also have dyslexia. It is important at this point to note that children with dyslexia in their families are referred to as *at-risk* learners.

According to Shaywitz and Shaywitz (2005) it is important to take into consideration the genetic factors that may cause dyslexia. They state that family history is one of the most important factors when discussing the cause of dyslexia, with 23 per cent to as much as 65 per cent of children who have a parent with dyslexia having been reported to have the disorder as well. Similarly Marshall (2004, p. 8) states that "by studying genetic markers in families in which there is a high incidence of dyslexia, scientists have now identified genes on at least eight different chromosomes as having some role or connection with dyslexia". Tunmer and Greaney (2010) argue that a learner can only be identified as having dyslexia when factors that would be expected to cause difficulties in all areas of learning, not just reading, are excluded.

2.6 SYMPTOMS OF DYSLEXIA

Due to the fact that dyslexia is primarily a reading difficulty, it cannot be reliably diagnosed until the learner is at the age at which reading typically begins (Marshall, 2004). The core difficulty for learners with dyslexia involves word recognition, reading fluency, spelling as well as writing (The International Dyslexia Association, 2013). It is important to take into consideration that dyslexia can also be influenced by a learner's experiences and environmental factors.

Symptoms of dyslexia seem to be the most evident in Mathematics and literacy skills; however, it is important to note that these are not the only symptoms. The International Dyslexia Association (2013) describes numerous signs and symptoms of learners with dyslexia. Table 2.1 displays a summary of the signs and symptoms described by The International Dyslexia Association (2013).

Table 2.1: Signs and symptoms of dyslexia. Adapted from *Dyslexia in the Classroom: What every Teacher needs to know*. Baltimore: The International Dyslexia Association (The International Dyslexia Association, 2013, pp. 4-5)

General problems experienced by people with dyslexia	Signs in primary school learners
Learning to speak	Difficulty remembering simple sequences such as counting to 20, naming the days of the week or reciting the alphabet.
Learning letters and their sounds	Difficulty understanding rhyming words, such as knowing that „fat" rhymes with „cat".
Organising written and spoken language	Trouble recognising words that begin with the same sound.
Memorising number facts	Difficulties with pronunciation.
Reading quickly enough to comprehend	Trouble easily clapping hands to the rhythm of a song.
Keeping up with and comprehending longer reading assignments	Difficulties with word retrieval.
Spelling	Difficulties remembering names of places and people.
Learning a foreign language	Difficulty remembering spoken direction.
Correctly doing mathematics operations	

Nordqvist (2013) explains that speech problems such as mispronouncing words and difficulties distinguishing between different word sounds could also be a sign of dyslexia. Some difficulties identified under the concept of dyslexia are struggles with reading and struggles to read and write (Aladwani & Al Shaye, 2012). Dyslexia is a language-based learning disorder that results in people having difficulties with specific language skills, particularly reading, spelling, writing and pronouncing words (Aladwani & Al Shaye, 2012). More recent research has increasingly focused on characteristics that could be assessed through neuropsychological evaluations like right-left confusion, finger agnosia, language and perceptual problems, and motor coordination problems (Fletcher, 2012). According to Feifer (2011) the identification of a specific reading disorder should be determined from neuroscience; moreover, cognitive neuropsychology may provide the best scientific rationale for the selection, implementation and monitoring of reading programs used to meet the needs of children who display early reading difficulties.

2.7 THE IMPLICATIONS OF DYSLEXIA IN THE CLASSROOM

Many learners with dyslexia have experienced frustration and limited success, despite countless hours spent in special programs or working with specialists, which consequently affects learners‟ self-image and can result in depression (The International Dyslexia Association, 2013). It is, however, important to note that in schools many of these learners become skilled at covering up and compensating for their dyslexic difficulties, usually by avoiding specific tasks. These learners also tend to extend more effort than others as a result of their difficulties, and therefore may become tired very easily as a result (Reid, 2012). It is important to note that the impact that dyslexia has in general depends on the severity of the condition and the timeliness and effectiveness of instruction or remediation (The International Dyslexia Association, 2013).

This study can potentially add to the existing theories of possible consequences of dyslexia in the classroom by providing perspectives of teachers on how they experience and manage learners with dyslexia.

Learners with dyslexia experience the following difficulties in the classroom environment according to Stienen-Durand and George (2014): difficulties taking notes; difficulties planning and writing essays, letters or reports; difficulties reading and understanding new terminology; difficulties revising for examinations; struggles to communicate knowledge and understanding in examinations; forgetting names and factual information, even when familiar; struggles to meet deadlines; struggles with personal organisation; difficulties when under pressure.

As a result of their cognitive disorder, learners with dyslexia may need to compensate for their difficulties by using alternative modes of learning, both in and outside the classroom (Stienen-Durand & George, 2014). Currently learners are faced with more mandatory tests compared to previous years and it is important to earn diplomas and degrees to obtain a successful career; overcoming these challenges makes life for poor readers difficult and full of difficult barriers (Lerner & Johns, 2009).

2.8 REMEDIATION STRATEGIES FOR LEARNERS WITH DYSLEXIA

When teachers work with learners with dyslexia, remediation relies heavily on interventions for language, phonology, reading and speech adapted to a learner's disorder (Démonet, Taylor, & Chaix, 2004). According to Carr (2006, p. 300) "remediation for learners with specific reading difficulties should be based on a thorough assessment of the child's abilities and the potential resources within the family, school and wider professional network for remediating the child's reading difficulties". When choosing remediation strategies and methods, the learner's learning style, such as whether the learner is visually orientated or kinesthesticlly orientated, should be taken into consideration (Landsberg, 2005). When looking at the iPad in particular its functions allow for the learner to be both visually and kinesthetically orientated.

Table 2.2 provides a summary of the suggested remediation strategies used for learners with reading disorders according to Feifer (2011). It is important to understand how learners with dyslexia could be supported in the classroom without the use of technology before fully exploring how learners are supported with technology. Table 2.3 displays various principles that can be applied in the classroom to allow learners with dyslexia to compensate for their weaker phonological and auditory skills, according to (Stienen-Durand & George, 2014).

Table 2.2: Remediation strategies for learners with reading disorders. Adapted from *How SLD Manifests in Reading.* In D. Flanagan & V. Alfonso (Eds.), Essentials of Specific Learning Disability Identification (Feifer, 2011, pp. 32-38)

Strategy	Explanation
Phonological Strategies	Step 1: Phonemic awareness: teaching learners how to listen properly to a single word or syllable and break it into individual phonemes. Step 2: Phoneme/grapheme correspondence: the introduction of the alphabet system representing a visual component to link with phonemes. Step 3: The six types of syllable: closed syllables, open syllables, vowel syllables, vowel-team syllables, r-controlled syllables, consonant-"le" syllables. Step 4: Probabilities and rules: these are explicitly taught as the English language provides more than one way to spell the same sound. Step 5: Roots and affixes: these are taught to expand a learner"s vocabulary and ability to comprehend unfamiliar words.
Fluency Strategies	Read naturally: focus on building reading fluency, speed and comprehension skills. Great Leaps Reading: this was designed as more of a supplementary reading program and works on phonics, sightphrases and fluency. Read 180: The software component of this program offers opportunities to repeat oral readings, to hear models read with fluency, and to watch videos that provide background knowledge and introduce new words. Wilson Reading System: This is a multisensory and synthetic phonics approach to teaching reading for learners with languagebased difficulties.
Reading comprehension Strategies	Soar to success: this is a program focusing mainly on languagebased strategies aimed at improving reading comprehension skills. The Lindamood-Bell Learning Process Centre: This centre offers various products that assist with reading comprehension by enhancing working memory skills.

Table 2.3: Principles of Supporting learners with Dyslexia in the Classroom. Adapted from *Supporting Dyslexia in the Programming Classroom.* Procedia Computer Science, 27, 419 - 430 (Stienen-Durand & George, 2014, p. 421)

Principle	Supporting Learners with Dyslexia
Multi-sensory Techniques	Kinesthetic activities, as a form of active learning where learners actively participate in their education will encourage the learner with dyslexia to use their strongest learning channels in the classroom.
Overlearning	Learners should have the opportunty to overlearn through multiple differing and complementary learning modes to compensate for weak retention.
Metacognition	Awareness of the learning process should be encouraged so that learners can control personal goals and effectively self-regulate their learning process. Discovery learning will also actively encourage the learner with dyslexia to map prior knowledge.
Personal Motivation	A real-world context that is applicable outside the classroom will stimulate interest and motivate learners.
Short Concentration Span	As the learner with dyslexia can lose concentration quickly, lessons should be compartmentalised into manageable segments that allow learners with dyslexia to concentrate for short periods of time.

It appears that there are many ways in which learners can be supported within the classroom; however, for the purposes of this study it is important to explore fully how these remediation strategies and principles could be used through the use of technology and more specifically an iPad.

2.9 CURRENT TECHNOLOGICAL TRENDS IN THE CLASSROOM

In 1922 Thomas Edison predicted that television would largely replace textbooks; however, after a little less than a century schools are still largely reliant on teachers and textbooks (Lim, Zhao, Tondeur, Chai, & Tsai, 2013). Regardless of this statement, today's youths interact readily with technology and expect technology to be available at all times (Ashman, 2012). It has been long argued that effective use of computers in education has enormous

potential impact on instruction and learning (Keane & Keane, 2016). Technology offers a range of new learning opportunities that are increasingly used in classrooms to support and enhance learning experiences (Jones, 2013). For instance, Microsoft Word and Microsoft PowerPoint are two commonly used powerful tools in the classroom environment (Bugaj et al., 2014). Social networks and Web 2.0 tools give learners a more active role in their own education by allowing them to become both producer and consumer (Martin et al., 2011).

Transformations that technology has made include a shift in the role of teacher from being the sole source of information to a more complex role of negotiating lesson objectives with learners, providing a varying degree of support for different learners, monitoring learners‟ progress, and encouraging reflection on classroom activities (Lim et al., 2013). However, Ashman (2012) argues that technology allows teachers to generate and deliver educational experiences in settings that contain a wide range of learning characteristics and capabilities. This study could potentially add clarity on whether the teachers‟ perspectives on a newer type of technology, i.e. iPads, are similar to Lim et al.'s views and opinions and Ahman's views and opinions.

According to Domings, Crevecoeur, and Ralabate (2014) new digital technologies are developing in ways that were impossible to envision in the 1900s. For example, it is relatively recent that technology in education has been able to support a constructivist approach because smaller devices are better able to facilitate social collaboration as opposed to PCs (Henderson & Yeow, 2012). Domings et al. (2014) explain that developments have had a huge impact on peoples‟ lives, particularly on the availability of information and our ability to connect with one another. Since the 1980s computers have been primarily identified with maths and science departments but have since migrated to wider curriculum use as software tools have developed (Abbott, 2013).

Mobile devices appear to have unlimited potential for individualising instruction, learning and communication through mobile applications that can be downloaded and used on the devices (Reid, Strnadová, & Cumming, 2013). Today investment made in technology in schools is often based on the assumptions that technology-mediated learning environments give learners the opportunities to search for and analyse information, solve problems, communicate and collaborate (Lim et al., 2013).

From a South African perspective a study conducted by Lawrence (2016) on learner experiences of using mobile phones for Afrikaans Vocabulary Development found that using a mobile phone as a learning tool allowed learning to take place anywhere, anytime and serves as a bridge between formal and informal learning. New mobile devices raise learner engagement in indoor and outdoor activities with applications like mobile augmented reality (Martin et al., 2011). However, it is important to note that schools have been drawn into numerous legal, ethical and ideological battles over the uses and misuses of modern technology (Lim et al., 2013). This could perhaps be a potential challenge that teachers face when using iPads for learners with dyslexia. Education improvements do not necessarily have to be driven by technological developments; however, there is an increasing interest in researchers in using new technologies to improve education (Martin et al., 2011). Research in this field is still emerging as technology is being updated and changed on a continuous basis. This provides the rationale and context to researching the topic of iPads as they are seemingly new to the world of technology. This study can potentially provide information on how teachers perceive technology in the classroom, specifically for learners with reading disorders.

As mentioned previously tablets like iPads are among the latest in a long list of current technological tools that have been introduced to classrooms around the world with the hope of facilitating the shift in technology's role from deliverer to enabler that enriches the learning experience (Tamim, Borokhovski, Pickup, & Bernard, 2015). According to Murray and Olcese (2011) people who promote technology put across the idea that suggests technology use in schools can transform instruction and learning. It is the central aim of this study to find out how teachers' perceive this statement. According to Puerling (2012) it is important for teachers to prepare learners for the technology skills they will need when they venture out into society as technology continues to transform daily life worldwide.

According to Sisler (2014) it is apparent that more research needs to be done on the implementation of technology in the classroom; he emphasises that this research should not just include the iPad, but all technology in general. I agree on this statement as current technological trends are changing each and every day and therefore this topic requires an ongoing study.

It is significant to understand that technology is continuously updating, upgrading and transforming. Teachers, learners and even society need to keep up with all these changes. It is therefore evident that teachers as well as parents need guidance to make informed decisions about how to support learning through technology, what technology tools and screen media are appropriate, when to integrate technology and how to use technology to enhance communication (Puerling, 2012).

The Apple Classrooms of Tomorrow (ACOT) is a research project that started in 1985. This study found that technology was viewed as a tool to support learning across the curriculum and teachers found strategic ways to use the technology in their classrooms (Sandholtz & Ringstaff, 2004). It is important to understand that although this study focuses on the use of iPad there are other forms of technology and devices used apart from the iPad.

2.10 CURRENT TECHNOLOGICAL TRENDS FOR LEARNERS WITH LEARNING DISORDERS, SPECIFICALLY DYSLEXIA

With technology being introduced into the classroom it quickly became evident that it could be used to accommodate, remediate or support learners with various physical disabilities as well as specific learning disorders. An example of this was the introduction of digital text. According to Rose and Dalton (2009) digital text is highly flexible, unlike printed text, because once a document is opened, the user can change from one font, size, or colour to another with ease, which may not be particularly beneficial to most readers; but for learners with visual disorders, however, they are critical. They added that digital text creates support for learning because even though learners read the same content, support for learning is selected and displayed individually for each learner. The main benefit of digital reading is argued to be the ability to support different reading comprehension and engage learners with reading disorders (Clarke & Svanaes, 2014). Rose and Dalton (2009) believe that digital text is more individualisable that a printed book and as a result creates more flexibility to its accessibility and effectiveness as a scaffolded learning tool for diverse learners.

Another form of technology that was introduced into the world of education was Information Communication Technology (ICT). According to Benmarrakchi, El Kafi, Elhore, and Haie (2016) ICT has the potential to provide learners with learning disorders access to the curriculum and progress of a mainstream school environment by assisting and reinforcing the

learning process and creating a developmentally appropriate learning environment, depending on the needs of the learner. However, it is important to note that factors that are important in promoting teachers' ICT use are their levels of confidence about their own expertise, and whether teachers wok in a school environment where there is collaboration and planning for ICT use (Erstad, Eickelmann, & Eichhorn, 2015).

Technologies that assist learners with physical disabilities and learning disorders very often support and assist learners with dyslexia. An example of this is ICT. In a study done by Benmarrakchi et al. (2016) their preliminary results revealed that the ICT has a valuable role in providing opportunities for learners with dyslexia because multimedia applications not only allow but also support the bimodal presentation of information by using visual and auditory channels.

Another form of technology used to support learners with dyslexia is an assistive technological tool that was investigated through a study conducted by K. A. Harper, Kurtzworth-Keen, and Marable (2016) on the effectiveness of the Livescribe Pen with a primary school learner identified with dyslexia. They found that the Livescribe Pen was primarily used for curriculum accessibility and an audio tool to improve academic independence. In the end the academic team and the parent reported a sense of higher aspirations for this learner.

According to Levine (2013) learners with learning disorders need to develop compensatory methods to be successful in an inclusive education setting. "The use of the iPad in particular can be an essential tool for successful reading remediation and compensatory strategies for learners with learning disorders" like dyslexia (Levine, 2013, p. 25). Another way in which the iPad provides potentially useful opportunities in the classroom is through digital and interactive books that can support the text comprehension of individual readers and potentially engage struggling readers (Hutchison, Beschorner, & Schmidt-Crawford, 2012).

2.11 WAYS IN WHICH AN IPAD ASSISTS IN THE CLASSROOM

"Technology, whether it be an iPhone or an iPad, is changing the way we live our lives and interact with the world and also the way we teach" (Puerling, 2012, p. 1). Recent studies have shown an interest in the potential of mobile technology devices in the classroom

environment; these devices are smaller, lighter, more flexible, and potentially more interactive than laptops (Warschauer, 2011).

iPads are increasingly being adopted by various schools; however, in current research there appears to be little empirical evidence on whether, or how, iPads facilitate learning (Pegrum, Howitt, & Striepe, 2013). Levine (2013) explains that iPads ensure that the learners are engaged and teachers can use iPads to encourage learners to become engaged in almost any text. J. Smith (2012) argues that we cannot expect the iPad to teach – the teacher must still teach concepts and skills in the classroom environment. The iPad's purpose in the classroom is practising, reinforcing, reviewing and creating (J. Smith, 2012). This correlates with the fact that "learners learn more efficiently when material is presented visually. They can experience even more success when they have the opportunity to interact with material kinaesthetically" (Reid et al., 2013, p. 176). Taking into consideration the needs of learners with dyslexia, this may very well benefit them in a classroom environment.

The iPad has many advantages when used in the classroom setting. According to J. Smith (2012) the following advantages of iPads over traditional computers and software have been identified: apps can be selected for targeted instruction; there is an available app for each area of literacy; the iPad allows for better documentation; it has been found that iPads allow the teacher to do more one-on-one intervention. Apps are applications created for digital devices to serve a single, specific function and can be downloaded wirelessly or by connecting to a computer (Hutchison et al., 2012). Hutchison and Beschorner (2014) identified the following characteristics of the iPad that are useful in instruction: learners are able to use prior knowledge of other digital technologies when using iPads; the selection of application makes it simple to differentiate assignments for learners; iPads turn on and off more quickly than computers and they can be easily stored.

It is important at this point to clarify that iPads also have disadvantages. According to Warschauer (2011) they are expensive to purchase and more difficult to write on and edit on, unless one has an external keyboard at an extra expense; furthermore, iPads are unable to access websites that use an Adobe Flash multimedia platform, which is still common on many educational sites.

In relation to my study I was able to compare existing research to how teachers experience and perceive using iPads in the classroom environment, specifically for learners with dyslexia. After reviewing the literature, the research on using iPads in the classroom is still emerging as the iPad is still a fairly new technological device. What appears to be clear is the capability of the iPad's hardware (Murray & Olcese, 2011); however, proper management, facilitation and a conducive learning environment are required (Henderson & Yeow, 2012) for the iPad's potential to be reached.

2.12 THE IPAD AS A LEARNING SUPPORT TOOL

According to Reid et al. (2013) devices such as iPads are widely recognised and used by learners of all ages, making them more readily adopted by learners with physical disabilities or learning disorders. The mobility of the iPad allows for its use in a general education setting and this should in turn enable the device to be used as an accommodation for learners who could use it as a compensatory strategy in general education settings (Levine, 2013). A study by Hutchison et al. (2012) found that when dealing with literacy instruction the iPad not only supported the learner, but learners were also highly engaged and able to demonstrate unique and creative ways of responding to text.

The iPad's simplest feature, the camera, is important to mention. The mobility of the iPad allows the camera to be used both inside and outside the classroom. According to Puerling (2012) photographs can be used to support learning facilitating conversations, developing emotional vocabulary, modelling desired behaviour, recalling a learning experience, developing schema, helping learners inspire other learners, exploring the neighbourhood, building classroom and school community, learning about authors and sharing other communities and cultures.

According to O'Connell, Freed, and Rothberg (2010) technologies that help address physical and time constraints can have a measurable impact on learners' engagement with learning, as can technologies that scaffold reading, writing and organisation. They add that we know that learners who struggle to understand print, visual and auditory inputs are less able to experience deep engagement while learning new content because the decoding process consumes a disproportionate share of working memory. According to Clarke and Svanaes (2014) research has found that offering learners alternative ways of engaging with texts

through a tablet, such as an iPad, made them more engaged and motivated them to improve their reading.

2.13 IPAD USE FOR LEARNERS WITH DYSLEXIA

Reid et al. (2013) identified that a tablet device like an iPad affords learners with dyslexia the ability to have a virtual technology toolkit at their fingertips. Table 2.4 identifies and summarises some of these toolkits and how they support learners with dyslexia in an inclusive environment.

Table 2.4: iPad toolkits that support learners with dyslexia. Adapted from *Expanding horizons for students with dyslexia in the 21st century: universal design and mobile technology*. Journal of Research in Special Educational Needs, 13(3), 175181 (Reid et al., 2013, p. 177)

Skill	Toolkit
Reading **Reading is one of the main areas of academic difficulty for learners with dyslexia and applications like these assist learners with learning content.**	Many mobile devices have a read-aloud function built-in as part of their accessibility package. The *Goodreader* application has features such as reading pdf files and allowing the user to annotate in the documents that are downloaded. Applications to teach reading, build fluency and increase comprehension.
Composing text **Word processing applications like these can be** reading **very useful tools for learners with dyslexia who often have difficulties composing text.**	*Appwriter* is an application that features text-to-speech, context-based word suggestions and optical character recognition to help with and writing. *Dyslexia font* has shown to decrease reading errors of learners with dyslexia.
Notetaking **This is another area in which having a toolkit can benefit learners with dyslexia. There are a number of good notetaking applications as well as applications that can also assist with writing by providing learners with speech-totext tools.**	*iTalk* is a simple recording application that enables the learner to record whatever is going on, such as a lecture or group discussion.

Organisational skills	*iCal* is a suitable application allowing learners to keep track of time and efficiently plan activities.	
Staying organised is a skill that escapes most learners but learners with dyslexia have particular difficulties with organising time, planning assignments and work in general.		

Certain assistive technology used for learners with dyslexia can also be synchronised with an iPad, like the Livescribe pen that was mentioned previously because notes are synchronised with the iPad and then appear on the iPad and can be stored for future reference (K. A. Harper et al., 2016).

In a study conducted by Tanimoto, Thompson, Berninger, Nagy, and Abbott (2015) learners that were taught letter formation with sequential, numbered, coloured arrow cues with full contours who wrote letters on lines added to an iPad screen showed more and stronger treatment effects than those taught using only visual motion cues for letter formation written on an unlined computer monitor.

It is, however, important to note that when utilising mobile devices like the iPad to facilitate reading interventions, it is necessary to determine that the selected application meets the learner's predetermined instructional needs (Larabee, Burns, & McComas, 2014)

iPads can also be used as e-book readers to support mobile personalised learning because ebooks seem to have greater flexibility and accessibility than paper-based texts and have multimedia-enriched visual appeal that has the potential to integrate various supportive materials for personalised learning, especially for learners with dyslexia (Huang, Liang, Su, & Chen, 2012). Although some applications are not necessarily created to be used in the context of a reading intervention, with an appropriate instructional approach they may be an effective way to improve learner decoding performance and promote greater task engagement (Larabee et al., 2014).

2.14 TEACHERS' PERSPECTIVES ON THE USE OF TECHNOLOGY AND THE IPAD SPECIFICALLY

A study conducted by Kafyulilo and Keengwe (2014) found that the perspectives on overall computer use in instruction and learning in Tanzanian schools were very limited. They found that teachers' perspectives revealed that they had limited confidence in using technology to facilitate specific concepts or skills, to support creativity, and to support learners to learn complex concepts. Similarly in a study by Keane and Keane (2016) on implementing a 1:1 program in a secondary school found that despite teachers‟ familiarity with using technology, only three subjects used the iPad constantly and the devices were not used as much during the school day as other technologies like Netbooks were. It became clear that teachers struggled to adjust their curriculum and assessment to take into account the new device. Erstad et al. (2015) found that from the position of the teacher technology might create ambivalence between old and new models of instruction and learning that used new technologies. For teachers, there is evidence that iPads have enhanced learning experiences and have transformed teaching practice (Clark & Luckin, 2013). However, teachers, particularly those that had been in the profession for a longer period of time were not happy about the addition of all the new technologies to the classroom (Sisler, 2014). There appears to mixed reviews on what teachers‟ perspectives were.

A study conducted by Culén and Gasparini (2011) found that teachers displayed a general acceptance of iPads due to variables such as increased creativity, positive attitude to learning and the emergence of new social patterns. Both teachers‟ and learners had a positive attitude toward adopting applications on an iPad like e-book in education (Huang et al., 2012). Teachers believed that the iPad Mini was light, easy and versatile with its learning applications and games for elementary level learners (Varier et al., 2017). Gasparini and Culén (2013) found that the possibility of the iPad providing a greater variety in the way learners can deliver their work appealed to teachers. Teachers embraced the iPad's physical features, such as its large touch screen and flat design, which enable the learners to maintain eye contact with the teacher (Hu, 2011).

According to Clarke and Svanaes (2014) one of the main concerns around introducing technology into schools is teachers‟ levels of knowledge and confidence. Some teachers are concerned that the technology itself can become a distraction from learning (Benton, 2012).

Neumann and Neumann (2014) confirm this statement in a study they did as they had teachers reporting that asking children to manipulate the controls on the touch screen was disruptive, diverting children's attention from the story line. They added that they believed that resistance to its use by some educators might be due to possible negative impacts on children's cognitive, physical, social and emotional development. Similarly in a literature review by Clarke and Svanaes (2014) teachers that were surveyed reported that having a personal device constantly available made the temptation to chat to friends or play games too much to resist for some learners, which teachers felt was affecting their academic performance. Hutchison and Beschorner (2014) argue that the number of applications available for the iPad could potentially be overwhelming for teachers to begin selecting applications to use in their classrooms and therefore could be a potential limitation when using iPads. When planning instruction, teachers must meet curricular expectations and teach skills consistent with various educational standards within constraints of time and available resources (Larabee et al., 2014) In a study by Varier et al. (2017) all teacher participants described experiencing a learning curve for using the device; at the beginning of the implementation period teachers and learners expressed concerns over the lack of internet access at home for some learners.

According to Hutchison et al. (2012) when using iPads in the classroom, it is important for teachers to take into consideration whether or not the iPad should be used for curricular integration rather than just technological integration. Another important factor for teachers to consider when using iPads in the classroom is the aspect of multimodal representation as specific content requires a new kind of literacy for the teachers as well as the learners (Gasparini & Culén, 2013). However, research in this field still appears to be limited; hence the decision to base the study on what teachers' perspectives on using an iPad in the classroom are. In my opinion this field requires ongoing research due to the fact that there is a gap in the literature on teachers and iPads. Future research in this field, according to Hutchison and Beschorner (2014), could be aimed at investigating how teachers select applications that they use for literacy instruction.

2.15 VYGOTSKY'S THEORY OF COGNITIVE DEVELOPMENT

The theoretical framework that guided this study is based on Vygotsky's theory of cognitive development. The reason for choosing Vygotsky's theory is that it has particular relevance to exploring the learning process facilitated by the iPad. It is therefore important to discuss what literature says about Vygotsky's theory and how it links to this study. Vygotsky assumed that advances in technologies have the potential to change how learners construct and understand the world (Kucirkova, Sheehy, & Messer, 2015) suggesting that the iPad has an impact on the learner's learning experience as it is a new, more advanced *cultural tool* for meaning making (Vygotsky, 1987).

Vygotsky believes that social growth is caused mainly by social interaction, meaning the relationship between the role of the affect and the intellect is emphasised when simple or complicated tasks are tackled (Maree, 2004). Vygotsky's socio-cultural theory of cognitive development focuses on how culture (namely the beliefs, values, traditions and skills) of a social group can be transmitted from one generation to the next generation (Shaffer & Kipp, 2007). Vygotsky pointed out an important link between language development and cognitive development, namely that the development of internal thought processes is the result of social experiences that are internalised and transformed through language (Human-Vogel, 2004). This particular statement is linked to the study as dyslexia is specifically a language disorder discussed earlier in the chapter.

It is important to point out that Vygotsky believed that the socio-cultural context of cognitive development interacts with the brain's biological maturation (Passer & Smith, 2008). Several important concepts are linked to Vygotsky's cognitive development theory. For instance, according to Maree (2004), problem-solving is established through the incorporation of personal traits, such as motivation, learners‟ ambition, their cognitive strategies and the extent to which they implement meta-cognitive processes during the process of problem solving. This could possibly be linked to why teachers and schools might be incorporating iPads into their lessons. It was mentioned earlier in the chapter that some teachers perceived iPads as an advantage because they increase the motivation levels of the learners.

According to Gonzalez-DeHass and Willems (2012) the major theme of Vygotsky's theoretical framework is based on the role that social interaction plays in the development of

cognition. Gonzalez-DeHass and Willems (2012) point out that Vygotsky believed in tools that are used in cognitive development, namely physical tools and psychological tools. Physical tools are material objects that facilitate the action between one's hand and the object upon which the tool acts. Psychological tools, on the other hand, are internal mediators between one's thoughts and the social world that changes one's mental functioning (Gonzalez-DeHass & Willems, 2012). Physical tools could very well include the iPad.

According to Carr (2006) there are various main traditions within which intelligence has been studied and they have relied predominantly on an individualistic approach to the development of skills and problem-solving capabilities. It has been identified that iPads provide individualised learning through the use of digital text.

Passing through the Zone of Proximal Development ZPD is a process that can be aided by intervention of another person or materials (Pritchard, 2013) that could include the teacher aiding the learner with dyslexia through the use of an iPad. Human-Vogel (2004, p. 26) defines the zone of proximal development as "the distance between the actual development 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 observed that children who displayed similar levels of individual problem-solving skills when operating in isolation often showed marked individual differences when coached by an adult or peer; therefore the difference between aided and unaided performance is what Vygotsky referred to as the Zone of Proximal Development (Carr, 2006). Engagement occurs when learners take responsibility for their own learning, feel invested in learning tasks, and see the value of school learning in the real world (Varier et al., 2017).

The Zone of Proximal Development is identified as being important because it helps us recognise what learners may soon be able to do on their own, and it also emphasises that we can help move a learner's cognitive development forward within limits dictated by the child's biological maturation (Passer & Smith, 2008). By using the approach of digital technology to differentiate, smart learning materials can support learners in their Zone of Proximal Development (Rose & Dalton, 2009).

2.16 SUMMARY

It is imperative at this point to summarise what research says about this very relevant and current topic of research. According to Neumann and Neumann (2014) the optimal use of tablets like iPads may be dependent upon the type of scaffolding used by the teacher and the availability and quality of the applications available for the tablet.

According to Wardley and Mang (2016) the introduction of iPad technologies in university classrooms, the majority of the learners mentioned positive perceptions or aspects that could potentially increase their self-efficacy. They reported that the iPad became a way to overcome limited in-class interaction and promoted the broadening of course content through learners‟ independent research.

It appears that across countries, the integration of digital technology into education has been a slow process due to a number of factors, such as lack of research on the impact and potential benefits of using digital technology (Neumann & Neumann, 2014). The existing body of literature examining mobile learning is small and peripheral in nature, consisting primarily of technical reports and exploratory studies (Larabee et al., 2014).

Technology-based solutions for learners could be considered and integrated into interventions if they provide evidence of effectiveness as an instructional practice and may work best as supporters and facilitators of quality reading instruction rather than replacements for teaching (Larabee et al., 2014).

Nowadays the tablet computer, such as the iPad, equipped with a high-resolution colour display, has become a popular personal digital device (Huang et al., 2012). The advancement of tablet technologies has enhanced opportunities for developing 21st century learning skills in learners (Varier et al., 2017) Tablet devices provide easy and continual access to technology that overcomes draw-backs associated with dedicated technology/computer labs.

2.17 CONCLUSION

Research in this field is still developing as the iPad is a fairly new concept, especially in the field of education. I therefore believe that the gap in literature relates to the use of iPads for learners with dyslexia. More specifically, there appears to be a gap in how teachers perceive

iPad usage for learners with dyslexia in the Intermediate Phase. As a result the main research question was formed based on the gap found in the literature available. Neumann and Neumann (2014) believe that the specific lack of reference to tablets like iPads in current education policies may be due to the relatively recent release of iPad technologies and limited evidence-based research needed to inform educational policy. It is important to take into consideration that not all schools have implemented the use of iPads and therefore research in the field of iPads as a learning support tool is still ongoing. This study could possibly add to this phenomenon.

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CHAPTER 3 RESEARCH METHODOLOGY

3.1 INTRODUCTION

Chapter 2 highlighted the need for the use of technology in our schools as well as the benefits that technology, specifically iPads, has for learners with dyslexia. It also highlighted the gap in literature regarding the perspectives of teachers on using iPads in the classroom to enable learners with dyslexia to reach their full potential. To address the goals of this study I used a multi-method strategy that was supported by a case study design when collecting data.

This chapter begins with a discussion of the purpose statement of the study. It then moves to an outline of the research paradigms in which the epistemological stance, general assumptions as well as the advantages and disadvantages are reviewed. The chapter then moves to discussing the methodological approach, general assumptions as well as their advantages and disadvantages. Following the discussion of the methodological approach the research design is then explained in detail after a discussion of the selection of cases and participants. The data collection and documentation tools and procedure are laid out; thereafter data analysis and interpretation is explained. Finally, the ethical considerations are outlined preceding the conclusion to the chapter.

3.2 PURPOSE STATEMENT

The purpose of the study was to gain insight into the perspectives of teachers on the use of iPads and to provide a better understanding of the prospects and challenges teachers are faced with. The purpose of this study was also to provide a better understanding of what teachers' perspectives are on ensuring that learners with dyslexia reach their full potential through the use of an iPad. The study was guided by the following primary research question:
What are teachers" perspectives on the efficacy of iPad usage for learners with dyslexia in the Intermediate Phase classroom environment?

In addition, the following secondary research questions were addressed:

- How can the iPad be utilised by teachers to assist learners with dyslexia in the classroom?
- What applications/accessibility options with regard to the iPad do teachers find most useful when teaching learners with dyslexia?
- What are the challenges that teachers experience in using iPads for learners with dyslexia?

3.3 PARADIGMATIC STANDPOINT

A paradigm rests on contentions about interconnectedness of method and epistemology in particular (Bryman, 2012). Table 3.1 provides a brief summary of the paradigmatic approach related to this study.

Table 3.1: Research paradigms

Epistemological Approach	**Constructivism**	This study positions itself in the constructivist paradigmatic standpoint. When discussing constructivism I share the view of researchers that believe that assertions about "reality" and "truth" depend exclusively on the information and degree of sophistication available to the individuals and audiences engaged in forming those assertions (Guba & Lincoln, 2001).
Methodological Approach	Qualitative	The study required an in-depth understanding of the participants" views and experiences. Qualitative Research was best suited to answer the question of what teachers" perspectives on the efficacy of iPad usage for learners with dyslexia are as it will allow for a deeper understanding of different perspectives.

3.3.1 Epistemological Stance General Assumptions

The following section provides information about my epistemological stance general assumptions.

3.3.1.1 General Assumptions

Epistemology refers to the concern of how things can be known and how truths can be discovered (Maree, 2013). Epistemological assumptions can be defined as a question of what is regarded as acceptable knowledge in a discipline. This study is a qualitative study, which positions itself within the constructivist paradigmatic standpoint.
Constructivism is often seen as a variety of cognitivism where constructs are equated with cognition (Raskin, 2008). Constructivism emerged as scholars entertained the problems and difficulties posed by empiricists and rationalist accounts of knowledge and other perspectives that maintained sharp separations between the knower and the known (Mascolo & Pollack, 2007).

According to Bednar, Cunningham, Duffy, and Perry (2013) the term *conceptual growth* is considered significant in constructivism. They explain that it comes from the sharing of multiple perspectives and the concurrent changing of our international depiction in response to those perspectives as well as through collective experience. This study aimed at exploring in-depth the perspectives of multiple teachers regarding the discussion of iPads for learners with dyslexia, thereby justifying the use of constructivism as an epistemology.

The context of this study emphasises that this research is a product of my values and cannot be independent of them (Mertens, 1998). It also rejects the notion that there is an objective reality that can be known and takes the stance that my goal was to understand the multiple social constructions of meaning and knowledge (Mertens, 1998) regarding the use of iPads for learners with dyslexia.

According to Mascolo and Pollack (2007) constructivism consists of the proposition that meaning is constructed of human activity rather than an innate characteristic of the mind or an inherent property of objects or events in the world. The aim of this study focused on

identifying a theme in the activity of teachers using iPads for learners with dyslexia and how they perceived this experience.

Constructivists see human meaning as constructed frameworks rather than direct reflections of the real world and focus on individual knowledge construction (Raskin, 2008). This study not only made use of focus group discussions but also included semi-structured interviews to gain a deeper understanding of individual knowledge regarding iPad usage for learners with dyslexia.

3.3.1.2 Advantages of Constructivism

When discussing the advantages of constructivism it is important to note that constructivism suggests due attention to process (Onuf, 2013). The process of the study was carefully considered with a view to not wasting any time and to gain as much data as possible.

According to Bednar et al. (2013) an advantage of constructivism is that it is constantly open to change, its structure and relation forming the underpinning. Constructivism as a method adds value to the production of effective educational practices and as a referent it offers a general and comprehensive theory of learning (Osborne, 1996). It is part of the aim of this study to add knowledge to existing research done on the topic.

According to Mack (2010) researchers in this paradigm seek to understand rather than explain. I have listed this as an advantage of constructivism because part of the aim of the study is to understand the phenomenon rather than explain it; therefore Mack's view of constructivism is an advantage to this study specifically.

3.3.1.3 Addressing Potential Challenges

Constructivism fails to consider the issue of theory mediation and conveys a mechanism to establish how one theory may be considered to be better than another (Osborne, 1996). It is my opinion, however, that constructivism was best suited to the study as it was advantageous in gaining in-depth understanding and perspectives.

In choosing to go the constructivist route a limitation to the study is that it abandoned the scientific procedure of verification and therefore the results cannot be generalised to other

cases (Mack, 2010). It is important to note that the purpose of this study was not to generalise findings but to gain a deeper understanding of teachers‟ perspectives on iPad usage for learners with dyslexia.

3.3.2 Methodological Approach

The following section provides information about my methodological stance.

3.3.2.1 General Assumptions of the Qualitative Study

This study is a qualitative study that had the aim of gaining a deeper understanding of the participants' views and experiences related to the research topic. According to Mertens (1998), if researchers accept the assumptions associated with constructivism that multiple realities exist that are time and context dependent, they will choose to carry out the study using qualitative methods so that they can gain an understanding of the constructions held by people in the specific context. Qualitative research cannot be clearly defined; however, Ritchie et al. (2013) explain that qualitative research is a very broad methodology and includes a wide range of approaches, like the naturalistic approach and methods found within different research disciplines. This study made use of a wide range of data collection methods as well as methods specifically chosen so that the research participants‟ views and perspectives could be gained.

Maree (2013) explains that qualitative research is an umbrella term used for a wide range of research approaches and research methodologies often referred to as naturalistic, subjective, interpretivist and constructivist. As discussed previously, this study is positioned in a constructivist standpoint. Wilson and Sharples (2015) state that qualitative research, in simple terms, is concerned with the understanding of meaning; being a qualitative researcher, I was interested in how people make sense of their world and how they interpret and experience different phenomena. The purpose of this study was to interpret and experience how teachers perceive iPads for learners with dyslexia. It was important for me to explore and understand fully how teachers experience and view this phenomenon in everyday life to be able to answer the research question.

The qualitative methodology of this study is based on the foundation that the social world is very different from the natural world and what we see is not necessarily the truth (Basit,

2010). A qualitative approach was chosen for this study because it was best suited to answer the question of what teachers‟ perspectives of iPad usage for learners with dyslexia are. A qualitative study and qualitative data collection techniques such as focus group discussions, semi-structured interviews and observations were best suited to accomplish this goal.

3.3.2.2 Advantages of Qualitative Research

There is a constant debate about whether qualitative research or quantitative research is the *better* methodology. Qualitative research allowed my participants to challenge my assumptions about the meaning and relevance of concepts and categories (Willig, 2013). This enabled me to gain a better understanding of the research problem and allowed me to look beyond my own biases.

Qualitative research explores a particular and often unique phenomenon or experience in great detail (Willig, 2013). This study offers insight into a somewhat new technology (iPads) and how it is able to aid learners with dyslexia; it viewed the phenomenon through the teachers‟ eyes, thereby justifying the need for a qualitative approach.

Because this study is situated in the educational field where programs are based on humanistic values, the type of personal contact and data that emerged from doing a qualitative study was therefore preferable (Mertens, 1998). Qualitative data enabled me to tell a story because such data generally captures and communicates someone else’s experience of the world in his or her own words (Patton, 2001).

3.3.2.3 Confronting Potential Challenges and Limitations

In choosing to do a qualitative study I was faced with the issue of quality and required the use of various strategies to enhance trustworthiness and reliability (Maree, 2013). To ensure that the data gathered was credible and trustworthy, I made use of multiple data collection techniques, namely focus groups, observations and semi-structured interviews. I also ensured that this study made use of member checking to increase the level of trustworthiness within the data collected. Qualitative data also tends to be voluminous and hard to manage; however, through the use of extensive planning and preparation as well as a journal throughout the research process, it was easier to manage the data.

Being a qualitative researcher I also had to wait for the data analysis phase of the research before I could begin to reduce the data and then I needed to be aware of how and what I had left out. As mentioned earlier, I planned and prepared for this study extensively to avoid wasting time. Continuous discussions with my supervisor took place as well during which I gained valuable insight.

When participants‟ activities were audio-recorded and transcribed, the accuracy of the interpretation of transcripts could have been weakened by a failure to note apparently trivial, but often crucial, pauses, overlaps or body movements (Silverman, 2001). To overcome this challenge I made use of member checking as well as field notes.

It is focal to repeat that the purpose of this study was not to generalise the findings but rather to explore and understand the experiences and views of the participants in full. In this regard the constructivist paradigm served as a guide in fulfilling the aims and goals of this study.

3.4 RESEARCH DESIGN: MULTIPLE CASE STUDY

A case study design or approach can be based on its function, characteristics or disciplinary perspective (Hancock & Algozzine, 2006). Maree (2013, p. 75) describes a case study as being a "systematic inquiry into an event or a set of related events which aims to describe and explain the phenomenon of interest". According to Creswell (2013) a case study design is a qualitative approach where the researcher explores a real-life, current system over time, through detailed, in-depth data collection involving multiple sources of information.

This case study involved detailed and intensive analysis and was associated with a community of teachers with the emphasis on an intensive examination of the setting (Bryman, 2012). A case study was used as a research design to contribute to existing knowledge of the related phenomenon (Yin, 2003). This case study design was set within a qualitative paradigm, thus providing a design that focused on smaller groupings or individuals rather than large populations and attempted to answer questions about contexts, relationships, processes and practices (Hamilton & Corbett-Whittier, 2013). By using a case study method I had the ability to answer *Why*, *What* and *How* questions (Saunders et al., 2007) relating to teachers' perspectives on iPad usage for learners with dyslexia.

Case study research could involve single or multiple case studies; however, for the purpose of this study a multiple case study was used to establish a focus on "whether the findings of the first case occur in the other case" (Saunders et al., 2007, p. 140). Furthermore this study's *case* involved a community of teachers from three schools. In addition, "a case study is able to provide a unique example in real situations, enabling readers to understand ideas more clearly than simply by presenting them with abstract theories or principles" (Cohen, Manion, & Morrison, 2011, p. 289).

3.4.1 Advantages of a Case Study Design

Using a case study design in educational research enabled the understanding of the contexts, communities and individuals (Hamilton & Corbett-Whittier, 2013). Doing case study research created powerful progress by enabling me to make constructive use of a research approach that began to capture the complexity of instruction and learning and contexts and communities surrounding it (Hamilton & Corbett-Whittier, 2013).

One of the key advantages of using a case study lies in the fact that I used multiple sources and techniques in the data gathering process (Maree, 2013). This was an advantage to the study because it provided me, as the researcher, with the opportunity to gather data using multiple techniques. This, in turn, enabled me to gain a deeper understanding of the teachers' perspectives of the efficacy of iPad usage for learners with dyslexia.

3.4.2 Addressing Potential Challenges

It is important at this point to note that case study research has been criticised because it cannot be generalised (Yin, 2012). According to Maree (2013), case study research is incapable of providing a generalising conclusion. The purpose of this study, however, was not to generalise and as Maree states, it is aimed at gaining greater insight and understanding.

Even though case study design is considered robust and reliable it was time consuming to a certain extent (Baxter & Jack, 2008). Moreover, one of the common pitfalls of case study research according to Baxter and Jack (2008) is the tendency of researchers to attempt to answer a question that is too broad, or choosing a topic that has too many objectives for one

study. The topic for the current study was carefully selected in consultation with my supervisor to ensure that there were not too many objectives and the scope was not too broad.

3.5 SELECTION OF CASES

One remedial school and two mainstream schools were used so that a comparison of the schools could be done. This provided an in-depth explanation of what teachers' perspectives are on using iPads for learners with dyslexia in different schools. This in turn improved the scope of the data collected.

3.6 SELECTION OF SCHOOLS

The first school chosen was a remedial school (School A); it was chosen because the school met the criteria of what was needed to conduct the study. I currently work at the school as a teacher and have developed good rapport with the school. (Ethical considerations are discussed in sections 1.8 and 3.11).

A second and a third school were sought to be able to compare data between the three schools. Many schools were approached to participate in the study as a result the second school (School B) that met the criteria for selection was a mainstream school. The third school (School C) that was chosen was also a mainstream school.

3.7 SELECTION OF PARTICIPANTS

Convenience sampling was used; "convenience sampling usually refers to situations when population elements are selected based on the fact that they are easily and conveniently available" (Maree, 2013, p. 177). Convenience sampling was chosen simply because I was already teaching at a remedial school with teachers available to participate in the research. The two mainstream schools were chosen in order to compare the data with each school. Ten teachers in total were chosen according to the criteria mentioned earlier. Table 3.2 provides a summary of the participants that were chosen.

Table 3.2: Participant Summary

	Participant	Occupation
School A	SAP1	Grade 6 Teacher
	SAP2	Grade 6 Teacher
	SAP3	Grade 5 Teacher
	SAP4	Grade 5 Teacher
	SAP5	Grade 4 Teacher
	SAP6	Grade 4 Teacher
	SAP7	Remedial Teacher
School B	SBP1	Remedial Teacher
	SBP2	Remedial Teacher
	SBP3	IT Specialist
	SBP4	Remedial teacher and IT Specialist
School C	SCP1	Grade 6 Bridging Class Teacher

3.8 DATA COLLECTION AND DOCUMENTATION

In this study I relied on focus groups, observations, semi-structured interviews and a reflective journal as means to collect data. Table 3.3 provides a summary of the data collection and documentation strategies for the study.

Table 3.3: Data collection and Documentation Plan

Data Collection Strategy	Participants	Documentation of Data	Aim of Data Collection
Focus group discussion	SAP1, SAP2, SAP3, SAP4, SAP5, SAP6, SBP1, SBP2, SBP3.	Discussions were recorded using an audio recorder and transcribed by the researcher.	Gained a group perspective on the research problem
Semi-structured interviews	SAP7, SBP4, SCP1.	Semi-structured interviews were recorded and transcribed by the researcher.	Gained answers to questions that provided insight into what teachers‟ perspectives are on the efficacy of iPad usage for learners with dyslexia.

Observations	SAP7	Observations were recorded using field notes taken by the researcher.	Observed how teachers incorporated iPads into their lessons to benefit learners with dyslexia.
Visual data	SAP7	Photographs of work done on the iPads were taken.	Provided evidence of how the iPads were used within the classroom setting.

3.8.1 Focus Group Discussions

Focus groups are a way of collecting qualitative data, which involves engaging a small number of people in an informal group discussion, focused around a particular topic or set of issues (Silverman, 2004). The informal group discussion is usually based on a series of questions and the researcher generally acts as a moderator for the group: posing the questions, keeping the discussion flowing and enabling group members to participate fully (Silverman, 2004).

Focus groups provide a way of collecting from a large number of research participants' data relatively quickly (Silverman, 2004). According to Patton (2001) the data collection of focus group discussions is cost effective; interaction among participants enhances data quality; a shared view or great diversity of views can be assessed quickly and focus groups are enjoyable to participants. Focus groups are more naturalistic and therefore include a range of communicative processes that often result in the production of more elaborated accounts compared to those that are generated through individual interviews (Silverman, 2004).

According to Patton (2001) focus group discussions could be a limitation due to the fact that the number of questions that can be asked is restricted, and the available response time for any particular individual is restrained in order to hear from everyone. He adds that facilitating and conducting a focus group interview requires a considerable group process skill beyond simply asking questions, and that the participants who realise that their view is simply a minority perspective may not be inclined to speak up and risk negative reactions.

Focus group discussions were used as a form of data collection as I felt that they suited the needs of this study. I was able to get a deeper understanding of a group of teachers and how

they perceived iPad usage for learners with dyslexia. Focus group discussions were used in the first phase of data collection as they enabled me to explore the perceptions, experiences and understanding of a group of teachers who have some experience in common with regard to the use of iPads for learners with dyslexia (Kumar, 2011).

Focus group discussions were conducted with a time frame of one hour per group. There were two groups. The first group that consisted of six participants was from a remedial school. The second group that consisted of three participants was from a mainstream school. The focus group sessions were audio-recorded and participants were made aware of this in the consent forms given to them prior to the focus group discussion. All participants were encouraged to participate to ensure that a group viewpoint was reached as far as possible. Both majority and minority views were recorded. Focus group sessions were held with two groups of teachers and the schedule was the same for both groups. Recording equipment was tested to make sure it was working and that the sound was recording at an acceptable level. I took notes and used a researcher diary to reflect and make notes of observations. I ensured that all the paperwork, such as consent forms, was ready before the participants arrived.

3.8.2 Observations

Two observations took place of lessons presented using iPads. Photographs of the work done on the iPads were taken because, according to Cohen et al. (2011), photographs used as data have a central place in educational research as they carry meaning that words alone cannot. Cohen et al. (2011) state that photographs display meaning and reflections as well as information and factual data. Visual data for this study included a collage of photographs of what had been observed in the classroom. These provided evidence of occurrences. Visual data collection techniques provided an in-depth understanding of the activities that took place and how teachers utilised an iPad for learners with dyslexia. A reflective journal was kept to reflect on the observation that took place.

The aim of observations is to gain first-hand information about social processes in a naturally occurring context (Silverman, 2001). In this study the observations took place in the teacher's classroom while he/she was presenting a lesson. Observations are used when the researcher is interested in observing people's behaviours as they naturally occur in terms that appear to be meaningful to the participants involved (Mertens, 1998).

Observational evidence is often useful in providing additional information about the topic being studied. The data from the observations consisted of detailed descriptions of teachers' activities, behaviours, actions and the full range of interpersonal interaction and organisational processes that are part of observable human experience (Patton, 2001). According to Strydom (2002b) participant observation focuses on explaining the natural occurrence of a phenomenon and thus the results can be of a high standard. If a case study is about a new technology, such as iPads, for instance, observations of the technology at work are invaluable aids for understanding the actual uses of the technology or potential problems being encountered" (Yin, 2012, p. 93). Through direct observations the researcher is better able to understand and capture the context within which people interact (Patton, 2001).

By utilising observation techniques in this study a deeper understanding was gained of what teachers experience in the classroom. "Observation provided me with the opportunity of gaining an insider perspective on the group dynamics and behaviours; it also allowed me to experience reality as the participants did" (Maree, 2013, p. 84). I endeavoured to become part of the lives and daily routine of respondents (Strydom, 2002b). As a researcher I strived after gaining feelings and impressions, and experiencing the circumstances of the real world of participants by observing them, and by interpreting and sharing their activities (Strydom, 2002b).

3.8.3 Semi-Structured Interviews

After the focus group discussions took place one participant from each group was chosen to participate in the observation part of the data collection as well as a semi-structured interview. Two separate semi-structured interviews took place. The semi-structured interview schedule was the same for both participants.

According to Yin (2003) one of the most important sources of case study information is the interview. Maree (2013) explains that "the semi-structured interview is commonly used in research projects to corroborate data emerging from other data sources and it requires the participant to answer a set of predetermined questions". To gain sufficient data a series of semi-structured interviews were held with the participants.

A strength of qualitative interviewing like focus groups is the opportunity it provides to collect and rigorously examine narrative accounts of social worlds (Silverman, 2004). The value of using semi-structured interviews as a data collection technique in this study is the belief that the participant is an individual who actively constructs his or her social world and can communicate insight about it verbally (Ritchie et al., 2013). Focus group research ensures the benefit of additional insight gained from the interaction of ideas among group participants (Mertens, 1998).

3.9 DATA ANALYSIS AND INTERPRETATION

This study made use of thematic analysis that focuses on identifying and describing implicit and explicit ideas within the data through themes during the data analysis phase (Guest, 2012). Thematic analysis can be used to address most types of qualitative research question, analyse most types of qualitative data, analyse data generated by both homogeneous and heterogeneous samples and analyse both smaller and larger datasets (Braun et al., 2014). One of the reasons for using thematic analysis is because it is "the most useful in capturing the complexities of meaning within a textual data set" (Guest, 2012, p. 3).

During the study all data was transcribed and by using the process of thematic analysis it was carefully analysed, categorised and sorted into themes that are discussed further in Chapter 4. Triangulation and member checking were used as a form of data analysis as well. Triangulation is mostly a process of repetitious data gathering and critical review of what is being said (Stake, 2006). Member checking was also used as a data analysis technique as transcriptions as well as the final results of the study were sent to the participants via email once they were completed to read them for accuracy and possible misrepresentation.
According to Stake (2006) member checking is a vital technique for field researchers.

3.10 QUALITY CRITERIA

Table 3.4 provides a guideline of how trustworthiness was enhanced in the study.

Table 3.4: Trustworthiness guidelines**.** Adapted from *Epistemological and methodological bases of naturalistic inquiry* (Guba & Lincoln, 1982, pp. 233-252)

Quality Criteria	Guidelines
Credibility	• The method of triangulation was used due to the fact that a variety of data sources was used to gain different perspectives and different methods were pitted against one another to cross-check data and interpretation. • Member checking took place as data and interpretations were checked with members from whom data was solicited. Transcriptions of the interviews as well as the full dissertation were emailed to the participants for checking. Continuous discussions took place with my supervisor to provide the opportunity to test growing insights, to receive advice about important methodological steps in the emergent design and to discharge personal feelings, anxieties and stresses.
Transferability	The narrative about the context was developed so that descriptions were "thick" and detailed.
Dependability and confirmability	To increase dependability I attempted to justify the differences and similarities in the findings between the cases and previous literature (Mertens, 1998). Any data gathered from the participants was interpreted by me with the guidance of my supervisor in order to increase confirmability of this study (Bertram & Christiansen, 2014).
Authenticity	To ensure the authenticity of the research I kept a field notes diary where I documented my personal growth and interactions with participants and ensured that my decisions and behaviours were founded on moral principles (Mertens, 2014)

A number of research strategies can be used to enhance credibility. I aimed to use as many of these strategies as possible, because the goal was to provide evidence from a multiplicity of sources of the credibility of the research (Mertens, 1998). The credibility of qualitative inquiry depends on three distinct but related inquiry elements: rigorous methods, the credibility of the researcher and a philosophical belief in the value of qualitative inquiry (Patton, 2001). To ensure transferability it was my responsibility as the researcher to provide sufficient detail to the reader by ensuring extensive and careful descriptions were provided of the time, place, context and culture (Mertens, 1998). A confirmability audit can be conducted in conjunction with the dependability audit (Mertens, 1998). Authenticity answers the question of whether or not the researcher has been fair in presenting views (Mertens, 1998).

3.11 ETHICAL CONSIDERATIONS

"Research ethics relates to questions about how we formulate and clarify our research topic, design our research and gain access, collect data, process and store our data, analyse data and write up our research findings in a moral and responsible way" (Saunders et al., 2007, p. 178). Ethics in research should be an integral part of the research planning and implementation process according to Mertens (1998).

When obtaining informed consent emphasis must be placed on accurate and complete information so that subjects fully comprehend the investigation and consequently are able to make a voluntary, thoroughly reasoned decision about their possible participation (Patton, 2001). Informed consent was obtained from all relevant authorities and participants prior to the commencement of the study. This included obtaining informed consent from teachers and principals. The consent forms were clear about the focus of the study and what the procedures of the study were. Permission to take photographs during the observation phase was requested in the consent forms as well as permission to audio-record during the interviewing phase.

Confidentiality can be violated in a variety of ways and it is imperative that the researcher understands the importance of safeguarding the privacy and identity of participants (Strydom, 2002a). According to Mertens (1998) confidentiality means that the privacy of participants will be protected in that the data they provide will be handled and reported in such a way that it cannot be associated with them personally. Therefore the identities of the interviewees were anonymous and data was stored in a safe place throughout. Photographs did not show learners‟ faces but rather the work that had been done by them on the iPads. At no point were the learners‟ names revealed or displayed in the photographs.

Participation in this study was completely voluntary and therefore the participants had the right to withdraw from the study at any stage. If this was to happen the data collected from those participants would be withdrawn as well.

3.12 CONCLUSION

In this chapter the methodological design was discussed and justified together with the research design, data collection and data analysis and interpretation. The following chapter is a presentation of the data analysis and the interpretation of the results.

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CHAPTER 4 RESEARCH FINDINGS AND INTERPRETATION

4.1 INTRODUCTION

Chapter 4 presents the research results and interpretation. The data was collected and then processed in response to the problems mentioned in Chapter 1. The problem that was researched was based on a gap in literature as to what teacher's perspectives on iPad usage for learners with dyslexia are. This chapter presents the results and interpretation in various themes and subthemes that were identified during the data analysis phase.

4.2 RESULTS OF THE THEMATIC ANALYSIS

Five main themes and twelve subthemes were identified during the thematic analysis process. The themes are related to the perceptions of teachers in the given respects. The chapter is structured according to the five main themes:

Theme 1: Teachers' understanding of their role in assisting learners with dyslexia.

Theme 2: Teachers' utilisation of iPads to assist learners with dyslexia.

Theme 3: Application and accessibility options on the iPad to assist learners with dyslexia.

Theme 4: The perception on the usage of iPads to assist learners with dyslexia.

Theme 5: Challenges relating to the usage of iPads

Table 4.1 below provides an outline of the different themes and the data sources.

Table 4.1: Visual presentation of themes and data sources

Themes	Subthemes	Data Sources				
		Focus Group 1	Focus Group 2	Semi-Structured Individual Interview 1	Semi-structured Individual Interview 2	Observation
Teachers' understanding of their role in assisting learners	1. Interventions and accommodations used to support learners with dyslexia.	X	X	X	X	
Teachers' utilisation of iPads to assist learners	1. Consolidation, support and intervention of a topic or subject.	X	X	X	X	
Application and accessibility options on the iPad to assist learners with dyslexia	1. Applications utilised for learners with dyslexia. 2. Accessibility options utilised for learners with dyslexia.	X	X	X	X	X
The perception of the usage of iPads to assist learners with dyslexia	1. Teachers' reflection of learners' perceptions. 2. Teachers' personal perceptions of iPads being utilised.	X	X	X	X	
Challenges relating to the usage of iPads	1. Technical and curriculum challenges. 2. Classroom management and conceptual challenges.	X	X	X	X	

In this study, all information that referred specifically to the perceptions of teachers' was included in the discussion as directed by the research questions that I intended to answer. A

wealth of information on the personal experiences of different learners with dyslexia as well as different training that teachers had had was excluded. Table 4.2 depicts the codes utilised to describe the participants.

Table 4.2: Codes utilised to describe participants

School	Participant	Code
School A	Teacher 1	SAP1
	Teacher 2	SAP2
	Teacher 3	SAP3
	Teacher 4	SAP4
	Teacher 5	SAP5
	Teacher 6	SAP6
School B	Teacher 1	SBP1
	Teacher 2	SBP2
	Teacher 3	SBP3
	Teacher 4	SBP4
School C	Teacher 1	SCP1

4.2.1 Theme 1: Teachers' understanding of their role in assisting learners with dyslexia

This section commences by reporting on the results related to how teachers' perceived and understood their role in ensuring learners with dyslexia reached their full potential. This theme is relevant to the study because it was important first to understand teachers' knowledge of dyslexia and their perceptions of supporting these learners before understanding how they perceived the use of iPads in supporting learners with dyslexia. Table 4.3 below is a summary of Theme 1, the subtheme, categories of data and the data sources wherefrom data of the teachers' perceptions was obtained, followed by their detailed discussion.

Table 4.3: Theme 1 - Summary

Theme 1			
Teachers' understanding of their role in assisting learners with dyslexia			
Subtheme			
Interventions and accommodations used to support learners with dyslexia			
Categories			
Learning support/ Remedial therapy	Multidisciplinary approach	Differentiation	Concessions
Data **Sources**			
Focus Group Interview 1	Focus Group Interview 2	Semi-structured Interview 1	Semi-structured Interview 2

4.2.1.1 Subtheme 1.1: Interventions and Accommodations

Remediation for learners with a learning disorder should be based on the potential resources within the school and wider professional network (Carr, 2006). Teachers in this study explained that learners with dyslexia require support both inside and outside the classroom environment. I present this perception that the teachers‟ of this study have regarding learning support and remedial therapy. Using a multidisciplinary approach requires working in conjunction with other professionals as a team. I discuss the findings based on teachers' perceptions on their roles as part of a multidisciplinary approach. The teachers in this study also made reference to differentiation in the classroom environment, which refers to adapting class work and classroom space to suit the needs of the learner. Finally the use of concessions to support learners with dyslexia are discussed, referring to concessions such as the use of a scribe, a reader, extra time as well as spelling concessions.

a) Learning support and remedial therapy

Teachers indicated that part of their responsibility in supporting learners with dyslexia is referring these learners to a remedial therapist or a learning support co-ordinator where intervention can be received outside of the classroom environment. The intervention received focuses on the child's needs like the reviewing of sight words and vowel sounds.

"Receives extra remedial therapy, they go through site words, recognising vowels, vowel sounds and, a lot of very, very basic work"[1] (FOC1 SAP3, line 114 - 116).

In addition teachers are required to make accommodations like putting key cards on the child's desk or scaffolding the learners work for them in the classroom as part of differentiation after gaining insight from the remedial therapist or learning support coordinator. Differentiation refers to a philosophy or mind-set that teacher's embrace where they understand that there are ways to differentiate learning processes that are appropriate at different times in assorted situations with diverse learners (Gregory & Kuzmich, 2014). In the context of this study differentiation refers to differentiation of content and activities within the classroom.

"They go to learning support and obviously every teacher makes those accommodations in class, you know as part of differentiation" (INT1 SBP4, line 5 - 7).

The findings correlate with Démonet et al. (2004) statement that when teachers work with learners with dyslexia, remediation relies heavily on interventions for language, phonology, reading and speech adapted to a learner's disorder. The findings also correlate with Landsberg (2005) because when choosing remediation strategies and methods the teachers took into consideration the learners‟ learning style as part of differentiation.

It can thus be asserted that teachers in this study view learning support/remedial therapy as part of assisting learners with dyslexia and it is regarded as part of the teachers' responsibility to refer learners to specialists and make accommodations in the classroom as needed with their help and guidance. As part of my own reflection I realised that I refer children to remedial therapists when I notice that the learner is struggling to keep up with the rest of the

[1] Responses are given verbatim and have not been edited.

class. I am also in constant communication with remedial therapists so that we are both focusing on the same concept. This results in the learner having constant repetition of a specific concept, meaning that the learner is learning a topic in more than one occasion in different settings.

b) Multidisciplinary approach to supporting learners

It has emerged from the data analysis that teachers view it as part of their responsibility to work as a team with other professionals regarding supporting learners with dyslexia. Teachers form part of a team with other specialists like remedial therapists as well as speech therapists. Remedial therapists have the role of working with children on a one-to-one basis, targeting the academic needs of the learner. The role of a speech therapist focuses on targeting the learner's needs regarding speech and language.

"We follow an interdisciplinary approach, or actually a multidisciplinary approach" (FOC1 SAP2, line 276 - 277).

"That's also just like working in conjunction with other professionals" (FOC1 SAP2, line 280 - 281).

Teachers pointed out that this approach starts when the learners are younger and not just in the Intermediate Phase. In other words, even learners in the Foundation Phase are referred to other professionals when necessary.

"At younger ages we have lots of speech therapy interventions" (FOC2 SBP1, line 4 - 6).

I realised at this point that over the years of teaching I too have worked in conjunction with other professionals. I feel that it is important to do this for the child to reach its full potential. I have worked in conjunction with remedial therapists, occupational therapists, speech therapists as well as educational psychologists.

c) Using the skill of curriculum differentiation in supporting learners

According to Stienen-Durand and George (2014) learners with dyslexia may need to compensate for their difficulties by using alternative modes of learning, both in and outside

the classroom. Teachers view differentiation within the classroom environment as part of their role in supporting learners with dyslexia.

"So one of the things is differentiation of the classroom space" (INT1 SBP4, line 11 - 12).
"At classroom level, I think differentiation is just the answer. You can accommodate each and every learning style in that space" (INT1 SBP4, line 16 - 17).

Teachers explained that part of differentiation is scaffolding the learners‟ work so that they are able to keep up with the rest of the class and the skills the curriculum requires the child to achieve.

"And what we do we differentiate the children's work, so we scaffold it for them, especially for the dyslexic kids. They would get a less amount of work" (FOC1 SAP5, line 143 - 144).

It became clear at this point that the teachers' that participated in this study cared very much for the learners in their class and made it clear that they were willing to do as much as they could to ensure these learners reached their full potential.

d) The use of concessions in supporting learners with dyslexia

From the data analysis it was clear that teachers perceive that another part of their role in supporting learners with dyslexia is providing them with some form of concession. Concessions involve the allowance of facilitation like a reader, scribe, extra time, etc. according to the learner's specific needs. The most prevalent concession appears to be the use of a reader, scribe and extra time. Learners with dyslexia often qualify to have someone read the questions to them or answer orally and have someone write their answers verbatim.

"They can qualify for, if they are dyslexic or specifically diagnosed with dyslexia is a reader, where someone can read the questions to them and they answer or a scribe where they provide the answer and someone else writes it down for them, which is usually the case with dyslexia. And often we also give them extra time because it takes them longer to read the passage" (FOC1 SAP2, line 164 - 168).

"She has a reader, she also has extra time" (FOC1 SAP4, line 156).

"I read the word problems to her" (INT2 SCP1, line 20).

One teacher even felt that the use of concessions, specifically the use of a scribe, was more effective than the use of an iPad.

"The use of a scribe being most effective for her, I think she's a lot more confident in that, the iPad wasn't ... the same" (INT2 SCP1, line 36 - 37).

The findings coincide with how De Bree (2007) defines dyslexia – as a reading and spelling difficulty discrepant with intelligence and educational opportunities. The teachers that participated in this study made use of concessions like providing a reader or a scribe or giving a spelling concession to alleviate the reading and spelling difficulty that learners with dyslexia faced. I reflected on my own teaching and how I support learners with dyslexia in my own classroom and realised that the use of concessions is a major support strategy for me. When a learner presents signs of dyslexia, concessions are immediately put into place so that the learner is able to reach his/her full potential.

4.2.2 Theme 2: The Utilisation of the iPad for learners with dyslexia

According to J. Smith (2012) the iPad's purpose in the classroom is practising, reinforcing, reviewing and creating. Teachers in this study discussed the many ways in which the iPad is used both inside and outside the classroom environment. Table 4.4 below provides a summary of data that demonstrates how teachers utilise the iPad.

Table 4.4: Theme 2 – Summary

Theme 2			
The Utilisation of the iPad for learners with dyslexia			
Subtheme			
Consolidation, support and intervention of a topic or subject			
Categories			
The use of the iPad across subjects	The use of the iPad as a support or intervention tool across subjects		
Data Sources			
Focus Group Interview 1	Focus Group Interview 2	Semi-structured Interview 1	Semi-structured Interview 2

4.2.2.1 Subtheme 2.1: Consolidation, support and intervention of a topic or subject

In this study it is evident that teachers utilise the iPad in many ways and one of the ways in which it is utilised is for consolidation of a topic or subject being taught. It became clear that some teachers used this as a whole class approach rather than just for the learner with dyslexia.

"We are using the iPads for consolidation of an activity or of a concept" (FOC1 SAP5, line 318).

a) The utilisation of the iPad across subjects

According to teachers who participated in this study, one of the main ways in which iPads are utilised is across all subjects in the school curriculum to consolidate topics taught.

"By far the majority of our work is pencil/paper tasks but we also have iPad periods once a week, where we use it for different kinds of subject so sometimes we will let write stories, and using the iPad on Kahoot ..., and then all kinds of ..., we'll practise times tables with them,

so most of them would use, integrated with some topic that we doing in one of our other subjects" (FOC1 SAP2, line 346 - 351).

I have used Kahoot as well to consolidate a topic taught in my own classroom or to practise for an upcoming test. It is a program where the learners connect to your Kahoot quiz using the iPad and then answer multiple choice items. It then tracks the progress of each learner and reveals a winner at the end of the quiz. The learners in my class thoroughly enjoyed this task as it became a game instead of a normal pen to paper quiz.

"We did art on the iPad" (FOC2 SBP3, line 106).

"We use them in different subjects for different reasons" (INT2 SCP1, line 69 - 70).

"We play maths games, we do English projects and they do a lot of videos, they do a lot of Book Creator and that sort of thing" (INT2 SCP1, line 72 - 73).

In addition some teachers utilise the iPad for communication between learner and the teacher across subjects.

"They can email through their projects through to us .., or .., there's a lot of email communication between Grade 6s and 7s and the teachers" (INT2 SCP1, line 76 - 77).

It appears that the teachers in this study make use of the iPad to consolidate a task and practise skills and concepts that have already been taught. This links to the belief of J. Smith (2012) where the iPad's purpose in the classroom is practising, reinforcing, reviewing and creating.

b) The utilisation of the iPad as a support or intervention tool across subjects

The teachers in this study explained that the iPad can be beneficial, specifically for learners with learning disorders, much like dyslexia.

"And also to help with children with learning difficulties because the iPad was meant for everyone, even blind people you know" (INT1 SBP4, line 38 - 40).

Another way the iPad is utilised is as a support or intervention tool where it is utilised by the teacher as well as other professionals.

"I do know some of the therapists also use iPads, the speech therapist specifically ... yes, some of the remedial therapists as well" (FOC1 SAP2, line 351 - 352).

In addition some teachers indicated that the iPad could be used to provide support to enhance specific skills like reading and writing.

"She would record what she wanted to say and then we would type it out for her" (FOC1 SAP5, line 435 - 436).

"We started with making the kids read to the iPad, to record what it was that they were saying" (FOC2 SBP3, line 78 - 79).

The data analysis suggests that teachers recognised that the iPad not only supported the learner with learning disorders but it provided support for the entire class. In terms of learners with dyslexia in particular the findings correlate with the opinion of Levine (2013) in that the use of the iPad can be an essential tool for successful reading remediation and compensatory strategies for learners with dyslexia. It appears that the teachers that participated in this study acknowledged that the iPad can be a beneficial tool regarding reading as well as writing instruction. These two skills were identified earlier as two of the main difficulties that learners with dyslexia face.

4.2.3 Theme 3: Applications and accessibility options utilised for learners with dyslexia

Hutchison and Beschorner (2014) argue that the number of applications and accessibility options available for the iPad could potentially be overwhelming for teachers to begin selecting applications to use in their classroom and therefore could be a potential limitation to its use. In this section I present the various applications and accessibility options that teachers‟ perceived are useful or beneficial in supporting learners with dyslexia. Theme 3 is summarised in the table below. Table 4.5 below provides a summary of Theme 3.

Table 4.5: Theme 3 – Summary

Theme 3				
Applications and accessibility options utilised for learners with dyslexia				
Subthemes				
Applications utilised for learners with dyslexia	Accessibility options utilised for learners with dyslexia			
Categories				
Applications specifically designed for learners with dyslexia	Educational apps designed for every learner but used as a support tool	The reading and audion function utilised as a support tool		
Data Sources				
Focus Group Interview 1	Focus Group Interview 2	Semi-structured Interview 1	Semi-structured Interview 2	Observation

4.2.3.1 Subtheme 3.1: Applications utilised for learners with dyslexia

Teachers discussed various applications utilised for learners with dyslexia. Interestingly teachers discussed not only applications designed specifically for learners with dyslexia but also applications that were designed for every learner but used as a support tool. This is interesting as this could possibly point to teachers being open-minded and creative in the way that they utilised the iPad and the applications that could be downloaded onto the device.

a) Applications specifically designed for learners with dyslexia

In the context of this study, teachers used the words *Dyslexia Quest* extensively and perceived this application as beneficial to learners with dyslexia; they also discussed how it could be used as an intervention tool.

"And that Dyslexia Quest that is on that iPad that the children can use as an intervention" (FOC1 SAP4, line 411 - 412).

It appears that the teachers acknowledged that parents could also take a role in providing intervention by using the Dyslexia Quest application.

"Even parents can use Dyslexia Quest if they are trained and they can also still work on the areas because it identifies the strengths and weaknesses of a child" (FOC1 SAP2, line 514 - 516).

Below are pictures 4.1 from the observation of a lesson using the iPad. A child with dyslexia was using Dyslexia Quest. The learner was familiar with the programme and was excited to get started. He worked on various skills, such as memory and word identification. At the end of the *quest* it displayed his progress in each area.

Pictures 4.1: Observation of a lesson

In addition teachers discussed other applications that were designed specifically for learners with dyslexia that were utilised by them, such as Dyslexia Font.

"That is also a font that's specifically easier for children with dyslexia to access" (FOC1 SAP2, line 440 - 441).

Reid et al. (2013) also mentioned Dyslexia font and pointed out that it had proved to decrease reading errors of learners with dyslexia in particular. During one of the focus group

discussions teachers were briefly side-tracked and argued among themselves about whether one is able to download a worksheet onto the iPad and change the font into Dyslexia Font. Although some of them were adamant that you could do this none of them knew how to convert the font of a worksheet, suggesting that teachers required more training in this area.

b) Educational applications designed for every learner but utilised as a support tool

The data analysis indicates that teachers had not limited the applications they used to specifically applications designed for learners with dyslexia. Instead they found that educational applications, like mind map applications and applications that read to one could be used as support tools.

"They also have an app that has mind maps, and that mind map app is wonderful for them" (FOC1 SAP5, line 490 - 491).

"There's an app that underlines words as they read which helps a child like that." (INT1 SBP4, line 50-51).

One school that participated in the study mentioned how they had subscribed to an additional library that was accessed on the iPads and consisted of audio books so that the learners could listen and read at the same time.

"We are subscribed to additional library with audio books as well, so they can listen on audio books" (INT1 SBP4, line 52 -53).

Furthermore teachers discussed how educational applications like *Explain Everything* and *Text Help* could be utilised for referencing and consolidation during a lesson. The learners were able to make notes during a lesson and then refer back to them.

"There's an app called Explain Everything, the children can, as I was saying it underlines, there are pointers that they can use when reading to it, they can actually create their own content in terms of their notes or whatever they are learning in class, they can create themselves with small video clips, small pictures that they animate, so they can know when they refer back to that work" (INT1 SBP4, line 59 - 62).

"There's also a wonderful programme called Text Help, which we still need to look at, but in terms of highlighting words, instead of there being like a long explanation, is a picture linked to it and that any text that you throw into Text Help it just ..., which I think is great, where they get the visual understanding of the word rather than having to read text they can understand more" (FOC2 SBP3, line 123 - 126).

"And every boy here at the school is ..., they do Reading Eggs and Mathletics" (FOC2 SBP2, line 128 - 129).

It appears that there were only a handful of applications that the teachers who participated in this study were using for learners with dyslexia. Not many of the applications mentioned by the teachers were found during the literature review process.

4.2.3.2 Subtheme 3.2: Accessibility options utilised for learners with dyslexia

Accessibility options that can be utilised to support learning disorders are already built into the iPad. It is evident in this study that teachers perceived the accessibility options of the iPad as important when supporting learners with dyslexia. The teachers that participated in this study made specific reference to the reading and audio functions that the iPad offers.

a) The reading and audio function of the iPad utilised as a support tool

The teachers‟ in this study appeared to perceive the audio and reading function of the iPad as an important accessibility option regarding supporting learners with dyslexia.

"You know just that one feature of being able to listen to what they've written is great" (FOC2 SBP3, line 177 - 178).

In addition teachers explained how learners were able to let the iPad read notes and worksheets to them while they followed. This allowed the learner to use both audio and visual skills.

"I know that I've also put on certain things on the iPad for kids, like worksheets and also notes and there's another app, I think it's on the accessibility, so it can be read to them" (FOC1 SAP5, line 429 - 431).

"I think the audio function where, depending on which app you are using, we use PDF here, even when the child has got some notes from the class teacher, it annotates and reads to the child and underlines" (INT1 SBP4, line 47 - 50).

"It's got the reading function, so what ..., you just turn on in settings they've got a thing where you can highlight text and it reads it to you" (INT2 SCP1, line 110 - 111).

Teachers mentioned that they found that most applications were designed for younger Foundation Phase learners; however, the audio and reading function of the iPad was beneficial for learners with dyslexia. In observing the teachers that participated in the study I realised that they would get excited about one application or accessibility option and then talk a lot about it and not discuss any others that they might use.

4.2.4 Theme 4: Perceptions on the utilisation of iPads

In this section I provide data that relates to the teachers' perception of using iPads for learners with dyslexia in the school environment. It became clear at this point that the teachers who participated in this study cared about how learners perceived iPads and not only how they as teachers perceived iPads. Table 4.6 provides a summary for this particular theme.

Table 4.6: Theme 4 – Summary

Theme 4			
Perceptions on the utilisation of iPads			
Subthemes			
Teachers' reflections on learners perceptions		Teachers' perceptions of iPads being utilised	
Categories			
Perceptions of enjoyment and interactivity in learning.	Perceptions of enhanced independence, confidence and ownership of learning.	The iPad as a tool that children can relate to that enhances learning.	The iPad as a tool that creates more work for the teacher and increases responsibility and distractibility.
Data Sources			
Focus Group Interview 1	Focus Group Interview 2	Semi-structured Interview 1	Semi-structured Interview 2

4.2.4.1 Subtheme 4.1: Teachers' reflections on learner perception

As mentioned previously, teachers cared for how learners perceived iPads. This became clear when teachers reflected on what learners felt before discussing their own personal perceptions. The data provided below explains how learners perceived iPads through the eyes of the teacher.

"The kids really enjoy it, they really thoroughly enjoy learning through them" (FOC1 SAP6, line 311 - 312).

a) Perceptions of enjoyment of interactive learning

Teachers‟ discussed how most learners enjoy utilising the iPad because they come from a technology filled era. Some teachers discussed the enjoyment of learning where they felt that learners purely just loved learning with the iPad or did not realise they were learning.

"He found it interesting" (FOC1 SAP2, line 398 - 399).

"They think that they are having fun but at the same time they are learning" (INT1 SBP4, line 143 - 144).

"They love iPads, they love computer work" (FOC2 SBP2, line 73).

In addition teachers discussed how learners found the iPad a more interactive way of learning,

"I think that children find it more interactive" (FOC1 SAP2, line 397).

These findings relate to the opinion of Levine (2013) in that iPads ensure that the learners are engaged and teachers can use iPads to encourage learners to become engaged in almost any text.

b) Perceptions of enhanced independence, confidence and ownership of learning

Teachers' mentioned how they perceived the enhancements of learner independence by the utilisation of the iPad.

"She was much happier as a person, as little girl, as a 13 year old girl because she could do it herself" (FOC1 SAP5, line 482 - 483).

In addition teachers discussed their perceptions of how learners take ownership of learning by utilising the iPad.

"It is actually children who get excited about something and they share it with the teacher" (INT1 SBP4, line 133 – 134).

"It gives children ownership of that learning" (INT1 SBP4, line 135).
Furthermore teachers discussed how learners' confidence was affected by using the iPad.

"They feel more confident when they're reading on their own with the iPad" (FOC2 SBP1, line 84 - 85).

It is, however, important to note that one teacher felt that a learner in her class was not confident in using the iPad.

"She wasn't very confident in that" (INT2 SCP1, line 13 - 14).

There is a correlation between the findings and what Clarke and Svanaes (2014) say about the fact that if one offers learners alternative ways of engaging with texts through a tablet such as an iPad, learners will be more engaged and motivated to further their efforts to read. In observing the teachers discuss this particular topic I noticed that they all agreed that learners found it more interesting and fun to learn through the iPad. They all spent much time talking about how their learners enjoy using iPads. They appeared to put their own views aside for a moment.

4.2.4.2 Subtheme 4.2: Teachers' personal perception of iPads being utilised

Some teachers that participated in this study perceived the iPad as a helpful and beneficial tool in the learning environment. They perceived the iPads as a tool that children related to, which enhanced learning, improved learners‟ work and provided the tools to help the learner.

"So if it's really, if it's up and running and it works yes definitely, and has amazing benefits" (FOC1 SAP5, line 438 - 439).

"So this enabled her to be just part of the class, to be one just like everybody else" (FOC1 SAP5, line 476 - 477).

"I think we are all very pro it ..., I think we are all completely on board" (FOC2 SBP1, line 102).

"And for dyslexic kids iPads work really well because you can implement the layered curriculum" (FOC2 SBP1, line 110.-.111).

"Especially for the dyslexic child, the advantage I think just so outweighs the disadvantage" (FOC2 SBP1, line 155.-.156).

a) The iPad as a tool that enhances learning and that children can relate to

Teachers felt that the iPad has the ability to enhance learning and encourage creativity. The colour of the iPad seemed to be the most important point discussed here.

"They could enhance their learning with colour pictures on dinosaurs" (FOC1 SAP1, line 336).

"And I think the colour of the iPad and its interactivity does draw the attention more than always writing on black and white paper; they love that interactivity with pictures and the, ... you know that kind of input that the iPad does give you" (FOC1 SAP1, line 405 - 408).

"It brings out those kids that are creative" (FOC2 SBP3, line 105).

"She's had an iPad now for two, two and half years, and her spelling has gone from zero to hero, just from working with that iPad" (FOC2 SBP2, 142 - 144).

In observing the teachers' during the study I noticed that in many cases their worksheets and resources that went into the learner books were often in black and white, which could possibly be a reason for pinpointing the iPads colour as so important.

In addition, teachers discussed how the utilisation of the iPad reduced anxiety and how children related to the iPad.

"I think it's less anxiety provoking and also I think that's the world they are coming from. So they can relate to it, it's interactive, it gives you immediate feedback and stuff so I really think that it's useful for kids with dyslexia, who are used to, or they find it very tedious to always just be reading and you know spelling, is just something different and I think that's always a good thing" (FOC1 SAP2, line 399 - 404).

Teachers explained that the iPad provided the learners with dyslexia the necessary tools to reach their full potential.

"If they've got that little pad that attaches the keyboard that attaches to an iPad for children who are dyslexic it's a wonderful tool for them to have in class" (FOC2 SAP4, line 375 - 377).

"I'm excited in the sense that it comes with tools that help the learner and the teacher, it sounds like a lot of work at the beginning, but once you are set up it makes life easier" (INT1 SBP4, line 42 - 44).

"So that redeems them from always having to say, „I don't know what's going on, I can't keep up", and it stops them from disrupting the rest of the class because now they're bored and can't keep up" (INT1 SBP1, line 169 - 171).

Teachers view the iPad as beneficial, especially through the eyes of the learner; however, not all teachers felt that the iPad was necessarily a helpful tool to have in the classroom.

b) The iPad as a tool creates more work for the teacher and increases responsibility and distractibility

The main reason for teachers not wanting to utilise the iPads appeared to be due to the responsibility for learners carrying around the iPads. Some teachers felt that the learners were not mature enough yet.

"It's quite taxing on the teacher to make sure that they are cared for properly" (FOC1 SAP5, line 325 - 326).

"You know you do feel scared, oh my gosh, these iPads children walking around with them" (FOC1 SAP5, line 327 - 328).

"I think they're not mature enough to have iPads all day" (INT2 SCP1, line 97).

Teachers discussed how the iPad can be a distraction within the classroom environment.

"So, everyone assumes because I'm young I should love it. I don't ..., I like it but I don't love it because, especially with the Grade 6s and 7s having their own iPads it's with them all the time and the distraction is just too great" (INT2 SCP1, line 79 - 81).

Some teachers believed that the iPad just increased their work load and was time consuming.

"I think it can be quite time consuming" (FOC1 SAP2, line 659 - 660).

This correlates with a study done by Benton (2012) where some teachers were concerned that the technology itself could become a distraction from learning.

In my own reflections I took note that teachers had ambivalent perceptions of iPads. Although they acknowledged that there are benefits to using the iPad they also noted their concerns about using it. This made it difficult to identify whether teachers were actually for or against using iPads in the classroom. I also noticed that teachers did not appear to be confident in using iPads.

4.2.5 Theme 5: Challenges relating to the utilisation of the iPad

In this section I present data relating to the challenges that teachers experienced in their quest to utilise iPads to assist and enhance the learning of learners with dyslexia.

Table 4.7: Theme 5 – Summary

Theme 5				
Challenges relating to the utilisation of the iPad				
Subthemes				
Technical and curriculum challenges		Classroom management and conceptual challenges		
Categories				
Batteries are flat	Challenges with accessing Wi-Fi	Playing games instead of working	Changing the mind-set of teachers	Linking the curriculum to the iPad
Data Sources				
Focus Group Interview 1	Focus Group Interview 2	Semi-structured Interview 1	Semi-structured Interview 2	

4.2.5.1 Subtheme 5.1: Technical and Curriculum Challenges

It is evident from the data analysis that teachers experienced challenges that were beyond their control. Teachers appeared to find it challenging when iPads were not charged, Wi-Fi was inaccessible or the curriculum could not be linked to the applications available on the iPad.

a) Technical challenges with the battery of the iPad and accessing the internet

Teachers expressed a need for iPads to be charged before the lesson takes place but often the iPads arrived and they were not charged.

"But then I always find as well that sometimes you get them and they are flat" (FOC1 SAP1, line 536 - 537).

"They are not charged" (FOC2 SBP3, line 199).

"When a child has forgotten the iPad and you want to do an iPad lesson or they arrive with an iPad that is not charged" (INT1 SBP4, line 73.-.74).

In addition, teachers express their main concern of not having access to Wi-Fi.

"And also there's no Wi-Fi in the classrooms" (FOC1 SAP4, line 545).

"It's infrastructure and unfortunately our school is in a place where we are looking at optic fibres and all the other things, but we not at that stage yet" (FOC1 SAP5, line 550 - 551).

"Little basic like practical things like Wi-Fi doesn't work that day, or the airdrop doesn't work" (INT2 SCP1, line 137-138).

"Getting on to Wi-Fi" (FOC2 SBP1, line 200).

These findings relate to the findings of a study conducted by Varier et al. (2017) where all teacher participants described experiencing a learning curve for using the device at the beginning of the implementation period and teachers and learners expressed concerns over lack of internet access.

b) Linking the curriculum to the iPad

It appears that for all the teachers who participated in this study, there was pressure to ensure that everything they did was related to the CAPS curriculum so that they were able to complete the curriculum within the school year. Teachers expressed their frustration in linking the curriculum with an activity they wanted to do on the iPad.

"Because the main challenge was linking the curriculum and the technology" (INT1 SBP4, line 104 - 105).

These findings correlate with Larabee et al. (2014) who state that teachers must meet curricular expectations and teach skills consistent with various educational standards within the constraints of time and available resources.

Teachers appeared to agree that the majority of the applications available for the iPad were more beneficial for the Foundation Phase and not as much for the Intermediate Phase and older learners.

"And some of that is more baby apps to be honest, foundation phase apps ..." (FOC1 SAP1, line 561).

"A lot of the apps that you find on the curriculum are slightly different or wording is different, and things like that that don't work" (INT2 SCP1, line 135 - 137).

"But yes, a lot of the apps I've also found, because I teach Grade 6 and Grade 7, are a lot more for younger children. There's a lot of maths apps out there and English apps, but it's very basic. There's not a lot out there for older learners" (INT2 SCP1, line 145 - 148).

It was at this point that I reflected on the fact that I too had struggled at times to link the curriculum to the applications that were on the iPad. Often I found that the applications were American in origin and differed in some respects from our South African curriculum.

4.2.5.2 Subtheme 5.2: Classroom Management and Conceptual Challenges

Another challenge that appears to be evident when utilising the iPad is classroom management and conceptual challenges. Most teachers found the iPad to be a distraction resulting in challenges with classroom management. Teachers that were pro using iPads found it challenging to change the mind-set of other teachers.

"Sometimes children get too excited and classroom management becomes a challenge" (INT1 SBP4, line 69 - 70).

a) Learners using the iPad for other things

Teachers pointed out the challenge of making sure that the learners did not play games on the iPad during school time. They found that learners would play games instead of doing the work that was required or learners played games on the iPad in between classes, resulting in the loss of battery power and learners not being able to use it in class.

"I could check that none of them were playing Mine Craft, and doing their own thing on the iPads because that's what they tend to do if you are not walking around" (FOC1 SAP1, line 532 - 534).

"Somehow as much as the school has put in measures and controls to make sure they don't play games at school, it happens" (INT1 SBP4, line 75 - 76).

Clarke and Svanaes (2014) also found that teachers that were surveyed reported that having a personal device constantly available made the temptation to chat to friends or play games too much to resist for some learners.

b) Changing the mind-sets of other teachers

Teachers‟ that participated in this study expressed the challenges of changing the mind-sets of teachers. They believed that teachers had their set pedagogy and to change that was a challenge. They also believed that the problem was not the children but it in fact resided with the teacher who was not comfortable using new technology.

"Some teachers are still struggling with the computer, the normal computer, so adding on the iPad then is quite challenging" (INT1 SBP4, line 122 - 123).

"I think the biggest issues ..., is not the kids" use of the iPads it's us teachers who are not trained and comfortable with it" (FOC2 SBP1, line 213 - 215).

"Teachers have developed their pedagogy, and now you've actually got to change their thinking and that's hard" (FOC2 SBP3, line 217 - 218).

This correlates with Clarke and Svanaes (2014) as they found that one of the main concerns around introducing technology into schools has been teachers' levels of knowledge and

confidence. Therefore it appears that for greater acceptance of iPads among teachers perhaps more intense training should take place in schools.

4.3 Conclusion

In this chapter I reported the results that I obtained from this study by using direct quotations and discussed the results with reference to literature and personal reflection. Themes that emerged from the thematic data analysis were illustrated. The results and findings indicate that most teachers perceive iPad usage for learners with dyslexia as beneficial; however, not all teachers agreed. Teachers continued to utilise the iPad for learners with dyslexia despite the challenges they faced with using the iPads.

In chapter 5 I answer the research questions and discuss recommendations for future research.

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CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 OVERVIEW OF THE PREVIOUS CHAPTERS

The purpose of this study was to gain a deeper understanding of what teachers' perspectives on the utilisation of iPads for learners with dyslexia are. The study made use of a qualitative methodology with a case study design of eleven teachers from three different schools in the Johannesburg area.

Chapter 1 provided an introduction by discussing the problem statement, the purpose and rationale of the study, the conceptual framework and the methodological paradigm used. The study then moved on to the literature review in Chapter 2, which focused on investigating literature based on learners with dyslexia, the iPad and teachers' perceptions of utilising the iPad. Chapter 3 focused on the research process, the research design and the methodology

that guided this study. In the previous chapter, I outlined the results of this study by presenting themes, sub-themes and categories of data that emerged during the thematic analysis.

This chapter concludes the study by answering the research questions starting with the sub-questions and then the main research question: *What are teachers' perspectives on iPad usage for learners with dyslexia?*

Subsequently, the secondary research questions of this study are addressed:

- How can the iPad be utilised by teachers to assist learners with dyslexia in the classroom?
- What applications/accessibility options with regards to the iPad do teachers find most useful when teaching learners with dyslexia?
- What are the challenges that teachers experience in using iPads for learners with dyslexia?

5.2 ADDRESSING THE RESEARCH QUESTIONS

5.2.1 Secondary Research Questions

Secondary Question 1: How can the iPad be utilised by teachers' to assist learners with dyslexia in the classroom?

Teachers that participated in this study indicated that they utilised the iPad mostly across subjects as a consolidation tool. They would allow learners to do things, like writing stories using the iPad and practise mathematics. They integrated a lesson using an iPad with a topic or a subject that had already been taught. Teachers mentioned how they found it useful to get the learners to read to the iPad while recording themselves and then listen to what they had read. This was utilised for sentence construction as well as reading fluency so that the learner could identify errors independently. It appears that the teachers found it a useful tool not only for the learner with dyslexia but for the class as a whole as teachers acknowledged that the iPad was meant for everyone.

The findings of the study correlate with the principle of supporting learners with dyslexia in the classroom mentioned by Stienen-Durand and George (2014) who believe that the learners should have the opportunity to over-learn through multiple differing and complementary learning modes to compensate for weak retention. The findings also relate to the view of J.Smith (2012) who believes that the iPad's main purpose in the classroom is for practising, reinforcing, reviewing and creating.

Secondary Question 2: What applications and accessibility options with regards to the iPad do teachers find most useful when teaching learners with dyslexia?

Various applications were identified by teachers as being useful for enhancing the quality of learning of learners with dyslexia. Applications such as *Dyslexia Quest* could be utilised as an intervention and also as an application for the parent to use at home. *Dyslexia Quest* is part of a *Nessi Programme* that focuses specifically on improving the difficulties that learners with dyslexia face such as letter reversals, spelling, etc. Applications such as *Dyslexie Font* could be used to convert worksheets and texts so that they are easier to read for the learner with dyslexia. The findings relate to the findings of Reid et al. (2013), who found that *Dyslexie Font* was shown to decrease reading errors of learners with dyslexia. Mind map applications allow the learner with dyslexia the opportunity to be more creative and to get their ideas onto paper. Furthermore, teachers mention applications that underline words as the learner reads, helping them to stay on track. Teachers also mentioned applications like *Explain Everything* which is an interactive screen-casting whiteboard with real-time collaboration that allows you to animate, record, annotate and allows learners to reflect on learning; and *Text Help* which is a literacy, accessibility and dyslexia software. Both *Explain Everything* and *Text Help* are utilised by the learner as a referencing tool, allowing the learner to go back at any time when feeling confused. These applications enable the learner to keep up with the rest of the class.

Regarding the accessibility options utilised for learners with dyslexia most teachers that were part of the study mentioned how the audio function as well as the iPad's ability to read to the learner was beneficial for learners with dyslexia as it allows for the iPad to read to the learner as opposed to the learner reading on their own and falling behind. The teachers that

participated in the study seemed to regard only these two accessibility options as beneficial to learners with dyslexia.

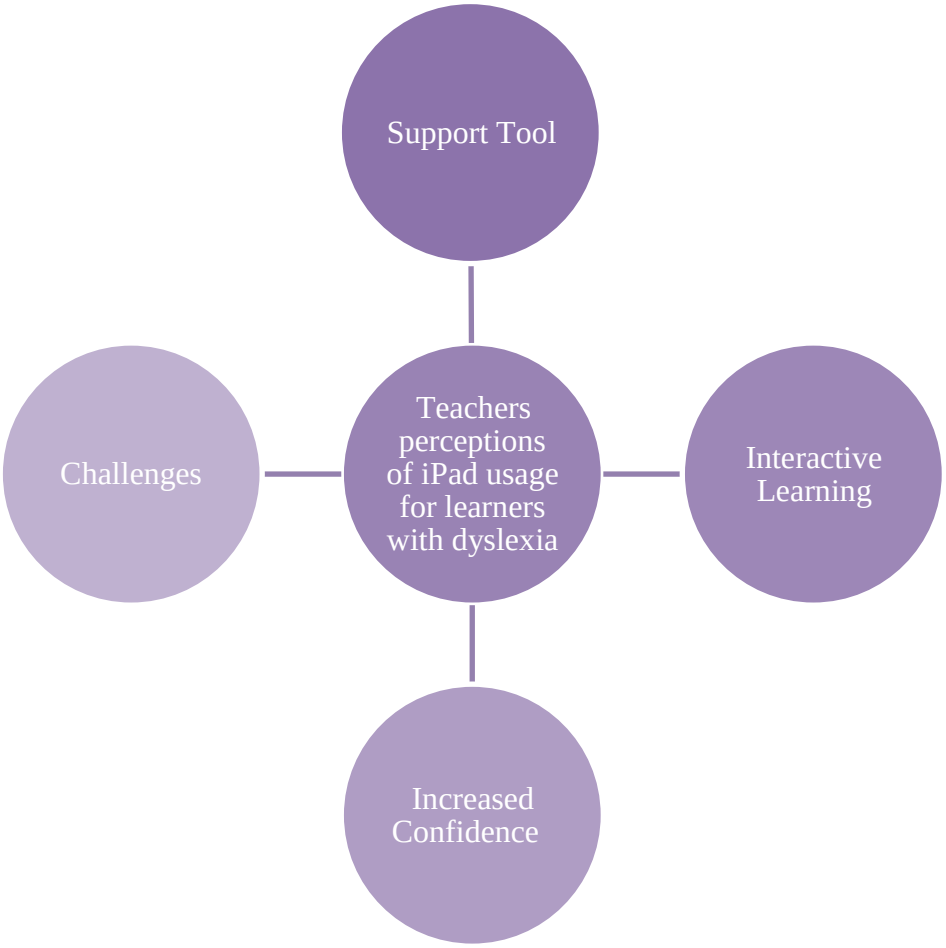
Secondary Question 3: What are the challenges that teachers experience in using iPads for learners with dyslexia?

Teachers seemed to reach consensus regarding the various challenges that teachers face in utilising the iPad. The teachers were concerned about the consistency of use within the classroom because of the duration of battery power and access and connectivity to WiFi. This seemed to be of particular concern as they felt that the learners would then feel disappointed. This appeared to have affected their ability to execute planned lessons and result in some level of frustration.

Another concern that the teachers raised was the challenge of being able to link the South African curriculum to the available applications. Teachers felt that often the applications available on the App Store were not suitable for the intermediate phase. They raised the concern that often there are numerous applications for younger learners, such as in the Foundation Phase and only a limited number of applications for older learners in the Intermediate Phase. This contradicts the findings of Hutchison and Beschorner (2014) who argue that the number of applications available for the iPad could potentially be overwhelming for teachers. Furthermore, teachers perceived that a major challenge that they faced was that they were not trained adequately to be able to utilise the iPad to its full capacity. The teachers also mentioned that it was difficult to change the mindset of other teachers who found it hard to stray away from their pedagogy, making it harder to work with iPads as a whole school approach.

Figure 5.1 below summarises the findings of my study, thereby indicating the relationship of teachers‟ perspectives regarding iPad use for learners with dyslexia. Teachers perceive the iPad as a tool that can support learners with dyslexia. They perceive that it enhances interactive learning and increases the confidence of learners with dyslexia. Teachers perceived the iPad as beneficial; however, they acknowledged that implementing the iPad in the classroom is not without its challenges need to be addressed by school management.

Figure 5.1: Summary of teachers‟ perspectives on iPad usage for learners with dyslexia



5.2.2 Primary research question

What are teachers' perspectives on iPad usage for learners with dyslexia?

The findings indicate that although using the iPad comes with multiple challenges, teachers perceive the iPad as a useful tool for consolidation of tasks or activities done as well as a support tool for learners with dyslexia. Teachers found that learners‟ confidence levels rose from utilising the iPad and it enhanced the quality of learning in learners with dyslexia. One could assume that teachers‟ perceptions regarding iPad usage for learners with dyslexia are influenced by the perceived roles and responsibilities of how learners with dyslexia are supported. Teachers perceived their role and responsibility of supporting learners with dyslexia as referring such learners to remedial teaching specialists when necessary, making the required accommodations within the classroom environment, providing the necessary concessions and differentiating tasks so that the learner was able to keep up with the rest of

the class. It emerged from the data analysis that the iPad is able to assist with some of these roles and responsibilities that the teachers identified.

Support Tool:

Teachers viewed the iPad as being most useful when it is utilised as a support tool, particularly for learners with dyslexia. It became very clear that teachers perceived that part of their role of being a teacher was to provide support for learners with dyslexia. Various support strategies were identified in the results, such as concessions as well as remedial therapy or learning support. From the data analysis it emerged that the teachers‟ realised that the iPad was used for many of those support strategies; for instance, the use of a scribe as a concession. Instead of a person being utilised as a scribe, many teachers mentioned how they would let learners with dyslexia type work out on the iPad, thereby eliminating the scribe and utilising the iPad instead.

Another support strategy utilised by teachers was referring learners to a remedial therapist or working as a team using a multidisciplinary approach. In a few instances teachers mentioned how the remedial therapist or the speech therapist would utilise the iPad during their one-on-one session. It therefore became clear that the iPad was being utilised by other professionals as part of a support strategy for learners with dyslexia. Teachers‟ also mentioned how the iPad was able to read to the learner by utilising its audio function that enabled the learner to see and hear the text or story.

Interactive Learning:

Teachers perceived the iPad as an interactive learning tool that allows for consolidation of topics and subjects taught. They mentioned how learners find it interesting to learn with the iPad. Furthermore, teachers found that learners have fun while learning to the point where they do not realise they are still learning. Teachers utilised the iPad specifically to make learning more interactive by making use of educational applications or programmes like *Kahoot*, Maths games and *Book Creator*. More one-on-one interactive applications like *Dyslexia Quest* were also utilised by teachers‟ and remedial therapists.

It became clear that by utilising the iPad teachers‟ were able to make lessons more interactive for learners thereby facilitating concept formation for the learner with dyslexia to grasp a concept. This task was not without its challenges though, as teachers perceived many of the applications to be more suitable for the younger age group rather than the Intermediate Phase age group. This particular challenge made it difficult for teachers to link the curriculum to the iPad and this resulted in a limited number of applications utilised. Despite being faced with this challenge teachers still persevered and made use of applications that they knew and felt comfortable with to make lessons more interactive. Teachers also perceived accessibility options like the audio function a useful tool in making lessons more interactive.

It appears that teachers perceive the iPad as a way of encouraging learners to be more interested and engaged in lessons taught through the iPad. This correlates with the findings of Levine (2013) who explains that iPads ensure that the learners are engaged and teachers can use iPads to encourage them to become engaged in almost any text. This relates to with the findings of Clark and Luckin (2013) who state that iPads enhance learning experiences and transform teaching practice.

Increased Confidence:

The findings of the study relate to The International Dyslexia Association (2013) that describes an effect of dyslexia as displays of frustration and limited success, despite countless hours spent in special programs or working with specialists which consequently affects a learner’s self-image and can result in depression. Interestingly teachers appeared to try their best to eliminate this effect through the use of the iPad.

Teachers that participated in this study viewed the iPad as a beneficial tool as it increased the confidence of the learners with dyslexia. They found that using the iPad in teaching made the learner with dyslexia much happier as a child. The iPad gave learners the opportunity to be able to read independently as opposed to having the teacher read to them. Furthermore, teachers found that utilising the iPad allowed the learner to be a part of the class as it prevented learners from falling behind. Learners with dyslexia are able to keep up with the rest of the class when taught with the help of an iPad. Teachers viewed the iPad as a type of technology that their learners could relate to. They also found that an iPad was less anxiety

provoking. Furthermore, they were able to bring out the creativity in learners by utilising the iPad.

5.3 STRENGTHS OF THE STUDY

Most of the literature focused on the efficacy of iPads rather than teachers' perspectives of iPads particularly for learners with dyslexia. A main strength of this study is that it focused on the perceptions of teachers about the utilisation of the iPad for learners with dyslexia rather than the efficacy of iPads. This was a gap in literature as information on teachers' perspectives specifically on the use for learners with dyslexia is not available.

This study made use of different means to collect data which in ensured triangulation of the data that was collected. The data that was collected and used for this study comprised rich descriptions of teachers‟ perceptions and experiences that helped me gain a deeper understanding of how teachers‟ perceive the utilisation of iPads for learners with dyslexia. The study therefore demonstrates the strengths of a qualitative research study. Furthermore this study made use of a small group of participants wherein all participants had the opportunity to participate and provide an in-depth contribution to the discussions that took place.

5.4 LIMITATIONS OF THE STUDY

The following limitations were experienced during this study:

- This study was conducted on a small group of participants who work in different schools in Johannesburg; therefore the results cannot be generalised to the population of South Africa.
- I struggled to find participants for the study as schools claimed to be too busy.
- The participants included only of female teachers, making the results gender specific. Male voices could have added other insights.

5.5 CONTRIBUTIONS OF THE STUDY

The findings of this study have provided insights into the perceptions and experiences of teachers in the South African context regarding the use of iPads for learners with dyslexia in remedial and mainstream school environments. The insights emerging from this study thus provide rich information on teachers' perspectives that could contribute to expanding the literature on iPads‟ in South Africa.

There is an urgent need for schools to implement efficient infrastructure within the school setting to enhance the utilisation of the iPad and minimise the technical challenges that teachers face. The findings of the study underscore the need for teachers to be adequately trained so that the iPad can be utilised to its full potential. It is hoped that this study will contribute to shared discussions between teachers and school management to increase the training teachers require to become more confident in utilising the iPad and to improve infrastructure of schools to promote the use of the iPad to support learners with dyslexia.

5.6 RECOMMENDATIONS

It is recommended that similar research be conducted with a larger sample group with a view to generalise the findings. The findings of this study indicate that teachers care about how learners perceived the iPad; therefore research based on how learners perceive the iPad could be beneficial. Furthermore, as the iPad can be quite costly, research on what the parents or guardians perceive could also be beneficial.

Teachers that participated in this study raised the concern that many applications found on the App Store are intended for younger learners in the Foundation Phase rather than learners in the Intermediate Phase; there is thus a need for applications to be designed for older learners and these should be curriculum compliant. It could be beneficial for a developer to communicate with schools before designing applications that potentially will not be used to its full potential. Schools could also write a proposal to developers explaining what they require as a school to support their learners. Another concern that teachers raised was access to WiFi and depletion of battery life. It could be beneficial for schools to develop policies to accommodate the necessary infrastructure to avoid these challenges. Perhaps schools could

invest in better internet connections and power banks for the classrooms to charge iPads that have low battery power.

It is also important to note that dyslexia is only one of many different learning disorders; therefore it could be beneficial to explore how the iPad could benefit learners with other learning disorders or even physical disabilities. The iPad was technically designed to support everyone and therefore it could benefit researchers to explore this. It could also benefit teachers to receive training in how to use the iPad for other learning disorders and physical disabilities so as to utilise the iPad in the classroom to its full potential.

5.7 CONCLUSION

The findings of this study indicate that teachers perceive the iPad as beneficial in supporting the learner with dyslexia. These perceptions are of importance as they contribute to existing literature and provide insight into how teachers support learners with dyslexia using a new technology. Although the utilisation is perceived as an important learning support tool, the teachers that participated in this study made it very clear that it does not come without its challenges. This indicates the need for training and infrastructure. With the correct training and infrastructure in place most of the challenges that teachers face could be eliminated.

This research benefited me, as a researcher, to gain a better understanding of the perspectives of teachers on iPad usage and how it can affect and support learners with dyslexia. As a researcher I have gained valuable knowledge about research and have realised that I would like to be more involved in research involving technology as a tool for supporting learning as technology change lives.

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LIST OF APPENDIXES

APPENDIX A Focus Group and Semi-Structured Interview Schedule

Two separate focus group discussions will be taking place. The focus group discussion schedule will be the same for both groups. After the focus group discussions have taken place one participant from each group will be chosen to participate in the observation part of the data collection as well as a semi-structured interview. The semi-structured interview schedule will only be able to be formed after the observations have taken place as questions will be based on the observations that took place.

1. Running the Focus Group Sessions

- Focus group sessions will be audio recorded and participants will be made aware of this.
- All participants will be encouraged to participate as to ensure that a group viewpoint is reached as far as possible. Both majority and minority views will be recorded.
- Focus group sessions will be held with two groups of teachers and the schedule is the same for both groups.

2. Before the group assembles

- Recording equipment will be tested to make sure it is working and that the sound is recording at an acceptable level.
- I will ensure that all the necessary paperwork is ready before the participants arrive.

3. Preparing to start the session

- Once participants are settled, I will check with the group whether they all know each other. If not, I will start by going round the group and getting everyone to introduce themselves. For your own convenience it helps to draw a „map“ of where

everyone is sitting. I will make sure that everyone is comfortable before I start and that everyone can see each other. I will then read out a statement on confidentiality:

✓ *Opinions expressed will be treated in confidence for the purpose of establishing a base of evidence as to what teacher"s perspectives are on the efficacy of iPad usage for learners with Dyslexia in the intermediate phase classroom environment. All responses will remain anonymous.*

❖ I will then check that there are no objections to the use of the audio recorder; then switch it on.

4. Introduction to the session

✓ *I"m very grateful to you all for sparing time to talk about your perspectives on iPad usage. The purpose of this focus group is to establish a base of evidence as to what teacher"s perspectives are on the efficacy of iPad usage for learners with dyslexia in the intermediate phase classroom environment, which will help to inform the future development of iPad usage in schools. I would like to concentrate on discussing first your perspectives on learners with dyslexia and then move on to discuss your perspectives the efficacy of iPad usage specifically for these learners. There are no right or wrong opinions; I would like you to feel comfortable saying what you really think and how you really feel.*

5. Discussions

Discussion 1: Learners with dyslexia

A major area of interest to this study is teaching learners with dyslexia. Thinking specifically about learning support for learners with dyslexia we would like to discuss with you motivations, incentives and constraints that you to experience in your classroom when teaching learners with dyslexia.

Question 1: What is your understanding of the term dyslexia?

Question 2: What intervention do you use to support learners with dyslexia?
Question 3: How are learners identified as having dyslexia in your school?

Discussion 2: the efficacy of iPad usage for learners with dyslexia

iPads are being implemented more and more in schools around the world, I would like to build up a picture of what your perspectives are when it comes to using iPads specifically for learners with dyslexia.

Question 1: How do you feel about iPads being implemented in your school?

Question 2: Do you think iPads benefit learners with Dyslexia in particular?

If yes, please explain how they benefit?

Question 3: Do you feel that certain applications or accessibility options benefit learners with Dyslexia? Please explain.

Question 4: What challenges have you been faced with in terms of using the iPad?

Question 5: Have you received any support in using the iPads?

6. Ending the session

To end the discussion I will summarise the discussions that took place and thank the participants for their time.

APPENDIX B Excerpts from Transcripts: Focus Group Discussions

Facilitator: Okay we will jump straight into the first question. My first question is: how are learners with dyslexia supported in your school?

SBP1: Okay they are supported in a whole variety of ways. Firstly we have a programme called Clara Read which the children can log into and the article that they need to read or the work they need to read can be read to them. So they can see it on the screen, they can then change the font size, the colour, the speed that it's read at, the screen, they can put a screen over them. Some of our boys find a coloured screen over it works quite nicely. So they can use that. We also do use it for assessments where necessary, so we've allowed some boys to do their assessments on there. We also used readers and scribes. So at the moment we have got three boys who are diagnosed dyslexia. One of them writes fully with a scribe and a reader now, so she comes in this morning and she takes them one side, she reads and scribes because he's diagnosed dyslexia. The other two actually come and write with us, so they read where they can and when they get stuck they put up their hand and then.

Facilitator: In a separate venue?

SBP1: Yes it is a separate venue yes, and I sit with them, [redacted] sits with them or one of our other learning support staff sits with them and then read for them.

Facilitator: Okay (someone came in, [redacted] IT expert). So do the kids have to .., is there a whole process that they have apply for concessions or ..?

SBP1: If a child comes into the school and has been diagnosed as dyslexia and has proof then we will make the accommodations where necessary, otherwise we do all our assessments initially and then when we find a child that we are concerned about we will then ask for a full ed-phsyc evaluation and then we will take it from there.

Facilitator: Okay great …

SBP2: And it goes through to the high school then .., also for grade 5,6 and 7s and she looks after those boys to go to the high school tech …

Facilitator: Okay so it carries right through the whole school?

SBP2: Yes.

SBP1: We try and get our accommodations for all our boys in grade 8 now, so that they've got it for the full length of their high school, because they can get them now in grade 8.

Facilitator: My second question is, out of the methods used to support learners with dyslexia, what methods do you like or approve of or believe are effective and why?

SBP1: Okay I personally prefer the one on one, because I find you get a good understanding from the child, what they say and what they feeling. So when reading with them, when scribing with them, any other work I do I prefer to do in a one on one or have very small groups. So I do take out 6 to 8 children in a group and then a dyslexic child will come out in the third group, so you've got …

SBP2: So I also got quite small groups, varying from 4 to 6 and ja, the little ones because I've got the grade 3s and 4s, obviously its more about the spelling and the sounds and that's what we do with that, with those boys. And then you know, its very difficult for me to say this child is dyslexic, I don't really like putting that .., on someone so early, so I prefer it in later years, the later groups where [redacted] then takes over from there, I think it's a little bit unfair to say at such a young age, you must just give them a chance first and do all the exercises and see what comes from that.

SBP1: At younger ages we have lots of speech therapy interventions. The speech therapist who is here and [redacted] will preside so and so should be on speech therapy and involve and communicate with the parents

SBP2: And then we've also got an extra staff member, she takes more individual voice throughout the day, one on one …

SBP1: And she's worked with dyslexia so she likes to do different methods, so we try and do lots of auditory work with them because they are dyslexic obviously they can't read it as well. So we do, we try to establish sounds .., more auditory, and then obviously lots of tactile work, so playing with the letters, playing with the sounds, trying to build up words and using the different letters and so on to do that …, so she uses the whole range.

Facilitator: My next question is, which methods do you feel are not very popular?

SBP1: Do it on your own methods, it doesn't work like that .., leaving the children to work independently when they're dyslexic we find doesn't work well, although I must tell you that we have got a little grade 7 who has come into the school diagnosed, he's got his spelling concessions, he is the one child who was being diagnosed dyslexia, so extensively and he's the one who takes the least assistance from anyone, and his marks are very good.

Facilitator: Sure fascinating ….

SBP1: He is grade 7 already, so he really is … Otherwise we pretty much try everything, there's nothing that we don't …

SBP2: Somehow these boys in the beginning they don't really feel, they don't like to be taken out the classroom, they don't want to be singled out, but they really enjoy our classes .., they enjoy being supported, and being you know they feel the help is good I think. So they don't get …

SBP3: …help them more than …

SBP2: I don't know if they don't enjoy any .., there's not something specific that they don't enjoy … They love ipads, they love computer work, love games …

SBP1: And mine loves listening skills, they absolutely love listening skills, to them is all a game …

Facilitator: So the next one is: how are iPads incorporated into your school?

SBP3: Well we sort of…, starting the journey I would say of trying to incorporate it more, and in [redacted] one class we started with making the kids to read to the iPad, to record what it is that they are saying and I just love the questions that they ask, like the big "why .., why must we do this?" and when I say to them is to hear yourself speak and to then go back and re-do it again if you not quite happy with it and that repetition for themselves and not for the teacher that I think helps, when it comes to the iPads because they're not reading directly to you …

SBP1: So they're not being judged at that moment, so they feel more confident when they're reading on their own with the iPad.

SBP3: And when they listen back they can hear for themselves where they've made a mistake rather than a teacher saying "no" or you know.., is a bit of …

Facilitator: And do you have enough iPads for each and every class or do you sort of rotate them?

SBP3: Okay 5,6 and 7 will have their own .., and then the grade 3s and 4s there's a bank that they use.

SBP1: So there's never anybody without one, there's always enough iPads …

SBP3: And I have mentioned to you that keyboard that I found for dyslexia is just a matter of whether or not we are allowed to use it, so that's something I need to have a look at.

SBP1: I can tell you on the girl's side there's quite a lot of iPad apps that they've used and as soon as I find my form I'll send those through to you ..

Facilitator: Thank you

SBP1: I did one of these meetings on the other side and got some information from them.

Facilitator: Okay, how do you feel about iPads being implemented in your school?

SBP1: We have to I think we all very pro it…, I think we all completely on board or support staff is definitely on board …

SBP3: You know what it takes the others shine is not always about the kid that is the good learner, is about .., it brings out those kids that are creative and there's been odd comments like when we did art on the iPad, it was the kids that actually aren't so great at arts when it comes to pencil that have done better on the iPad, so it sort of gives the opportunity for other kids to …

SBP2: It's a balance…

SBP1: And for dyslexic kids iPads work really well because you can implement the layered Curriculum, do you know the layer? Curriculum, so you would set up a section of work on 30 marks and of them two would be for question A which is answer a, b, two would be for two marks which you've got to find the two pictures that match and so it goes from basic to complicated, but different styles, so matching pictures, or researching something themselves, or listening to a song to find information or .., so it's a little bit of everything. So the dyslexic kid can have a look at the questions if necessary with a reader and then can choose how they going to approach the task. So it doesn't have to be the old pen and paper where I'm just gonna write it, they can create an iMovie out of it or they can make a slide show just of words that are familiar to them or pictures or .., so for the dyslexic child the iPad is a wonderful way of working because they can also incorporate so many other ways of learning. They don't have to just read and write.

SBP3: There's also a wonderful programme called Texthub, which we still need to look at, but in terms of highlighting words, instead of there being like a long explanation, is a picture linked to it and that any text that you throw into Texthub it just .., which I think is great, where they get the visual understanding of the word rather than having to read text they can understand more.

SBP2: And every boy here at the school is .., they do Reading Eggs and Mathletics I don't know if you know those two programmes …?

Facilitator: I know the Mathletics...

SBP2: And is really good …

SBP1: And there's the reading eggs which is the same sort of thing but there's a maths one …, reading one and words that you will quite enjoy, so it goes really basic and the nice thing with the dyslexic boys is they don't have to stand out in the classroom to do this, is all computer driven .., so they've got their own earphones and they work at their pace and there's little buttons to push that help them, that talk to them .., so for the dyslexic children that makes a big difference for them.

Facilitator: So I think you've answered my next question. Do you think iPads benefit learners with dyslexia in particular if yes please explain, I think you've already answered that, but if there's anything you would like to add …

SBP2: Just on a personal level, my daughter has really really had difficulty with spelling and she's now in grade 7 at the girls prep, and she's had an iPad now for two, two and half years, and the spelling has gone from zero to hero, just from working with that iPad. You know sometimes you feel you need to take it away but by looking at the word, seeing it and getting the correct spelling immediately is like in memory .., in two years is absolutely awesome, it really helped her so much.

SBP3: I mean there's often stories like that, I have another friend who's got a dyslexic kid who gave him a computer and he couldn't believe that he had a spelling issue a few years down the line …

SBP1: Yes, we are aware that we still have to do lots of tactile stuff with the dyslexic kids because they do struggle with the whole visual issue, in trying to read the words, so we are aware and so our younger grades do and I know [redacted] with our speech therapy say that I know you people still do all sorts of handwriting exercises and .., the fine motor is still very important it has to be developed at the younger ages. And I think once they've got a place, especially for the dyslexic child, the advantage I think just so outweighs the disadvantage.

SBP3: And it also, you know in terms of the creativity that it gives those kids, that they're actually are good at something besides the norm of writing …

SBP2: And it gives them hope to be able to do something when they see that they can do something else…

SBP1: It also takes away the attention being drawn to them, so when they are given a task, that they're working on their iPads, they've got their earphones, they've got the one that reads to them …

SBP3: On the iPads under the general you can make it read it to them …

SBP1: So for them when they're sitting and they've got an exercise to do, they can literally listen to everything and follow with their eyes where they can, so …

SBP3: It highlights it with the iPad, what it's reading, and you can slow it down and speed it up…

SBP1: So that avoids them having to always be saying I don't know what's going on I can't keep up, and it stops them disrupting the rest of the class because now they're bored and can't keep up.

Facilitator: Okay. Do you feel that certain applications or accessibility options benefit learners with dyslexia? I know you were talking about the reading, I know in the accessibility options there's that options for it to read to you, but is there any others in particular that really benefit them, specific apps or?

SBP3: In terms of apps, there's that Text Help again, which is an app as well as a website, and then the keyboards that you can get but you know there's also that, you know just that one feature of being

able to listen to what they've written even is great, so is not always the text that has been given, but if they type something up and they listen to themselves again .., and you say listen to it and tell me when this lady stops and like has a breath because they don't actually like sometimes realise how long they've written for and …

SBP1: So it helps them with the structuring of sentences.

SBP3: Writing is also good ..

SBP1: There's an app the Girls side has used it's called Dyslexia something or other …

Facilitator: Dyslexy Quest?

SBP1: Yes so they use that quite extensively with some great apps ..

Facilitator: I know is part of the Nessi Programme, they've got a whole lot of them...

SBP1: Yes, that's right so that's on my page..

SBP2: Can I excuse myself?

Facilitator: Yes thank you... Im almost done...

SBP1: [redacted] have you got a class now?

SBP2: Ja …

SBP1: do you think there's any chance they can set my lab in the library up for me?

SBP2: Yes …

Facilitator: I just have two more questions. So my next question is what challenges have you been faced with in terms of using the iPads?

SBP3: They are not charged …

SBP1: Ja that's a big one and the girls said that too, wifi, getting on to the wifi ..

SBP3: Although you can do a lot without it …

SBP1: I know those were the ones, and there's nothing worse when you've got this whole lesson going and you are about to start and then three of your little darlings who needed haven't got their charged or forgotten at home .., so we got the bank to get from.

SBP3: Ja some of these boys they're a lot more clumsy than girls, and they seem to drop their iPads and break them, so they'll work with shattered glass and things like that.

SBP1: So our biggest thing are being forgotten at home, breaking iPads, we don't really .., iPads are always being stolen, its actually just been put somewhere and they can't find them obviously the security of the iPads has come up as an issue at the school there's been a lot of expense because now we've had to make sure we've got special lockers for the iPads and then I think the biggest issues, [redacted] can probably back me here, is not the kids use of the iPads is us teachers who are not as trained and comfortable within .., so there are some teachers who really are comfy but …

SBP3: You know when it comes to that its ., teachers have been teaching for so long that they've developed their pedagogy, and now you've actually got to change their thinking and that's hard.

SBP1: It's quite hard for teachers and I know even therapists and I've seen lots of my colleagues who are therapist/remedial therapists we tend to go back to what is familiar and we tend to making sure that we've got the body and the hands and the fine motor and the gross motor all developing. So sometimes that iPad is just a little bit of a threat in that it doesn't fit into our traditional pedagogy.

Facilitator: That's great, my last question is: have you received any support in using the iPads in terms of training?

SBP1: Yes, we getting there and [redacted] has actually being brought into the school to train us on iPads and last week we were at Google Offices where we had some training on two apps so they had us for the afternoon. So at this school, yes, they are very good at training us .., they give a little support ..

SBP3: Yes because teachers teach and they mark and they prep …

SBP1: So it's been completely embraced and it is being supported here very strongly.

Facilitator: Okay, thank you so much.

END

APPENDIX C

Excerpts from Transcripts: Semi-Structured Interviews

Facilitator: And so my first question is how are learners with dyslexia supported in your school?

SBP4: There's a learning support headed by [redacted], they obviously go there for sessions with her on referral by the class teacher. So teachers have to identify or if parents report that my child has got dyslexia, then they go to learning support and obviously every teacher then makes those accommodations in class, you know as part of differentiation.

Facilitator: Ja, okay. So out of the methods used to support learners with dyslexia, what methods do you like or approve of or believe are effective and why?

SBP4: Personally because I don't work directly with these children, I teach grade 3 to 7, so I sort of interact with them but not as a class teacher. So one of the things is differentiation of the classroom space, as you can see my spaces have got different colours, and each colour does different with the child. Also when I choose, on book selection, because they've got challenges of reading, so you have to get books that are suitable for them or stories that are suitable for them, I use the iPad for audio books, which works very well with that. And at classroom level, I think differentiation is just the answer. You accommodate each and every learning style in that space.

Facilitator: Okay, thank you. Which methods do you feel are not very popular and why?

SBP4: We've tried to use the Reading Lab, it's a different generation, the iPhone generation is quite .., they are multi-taskers and they easily get bored, so getting them stuck on reading is just not exciting for them and then if a child is dyslexic, and is struggling they would just dismiss them.

Facilitator: Can you explain a little bit more about the Reading Lab, what does it consist of?

SBP4: It consists of reading cards, and comprehensions and activities, so instead of having a full book that the children read, it is a box full of cards, themed cards, so they .., then when it was introduced into education it was meant to excite the children, and it has been several years back and things have changed, and this is a total different generation altogether.

Facilitator: Ja …

SBP4: It was a diversion from their book.

Facilitator: I know we've got Reading Lab as well, more audio based.

SBP4: Is it audio? Ours is text.

Facilitator: So how are iPads incorporated into your school?

SBP4: It's called what .., there's a programme Mobile E-learning and Technology Melt, and the thinking around it was it comes in as a tool that compliments the pedagogy that has been there

anyway. And also to help with children with learning difficulties because the iPad was meant almost for everyone, even blind people you know. So ja that was the thinking around it.

Facilitator: Okay. How do you feel about iPads being implemented in your school?

SBP4: I'm excited in the sense that it comes in with tools that help the learner and the teacher, it sounds like a lot of work at the beginning, but once you are set up it makes life easier for both the teacher and the child.

Facilitator: Do you think iPads benefit learners with dyslexia in particular and if yes please explain they benefit?

SBP4: Yes because (1) it comes with applications that are quite interactive, I think the audio function where, depending on which app you are using, we use PDF here, even when the child has got some notes from the class teacher, it annotates and reads to the child, and it underlines, there's an app that underlines words as they read which helps a child like that. The audio function, we, the potential to subscribe to additional library, we are subscribed to additional library with audio books as well, so they can listen on audio books, although they might then lose the spelling but there are other ways of mitigating that ja.

Facilitator: Do you feel that certain applications or accessibility options benefit learners with dyslexia?

SBP4: Yes …

Facilitator: Please explain?

SBP4: Just as I've said the audio function …, there's an app called Explain Everything, the children can, as I was saying it underlines, there are pointers that they can use when reading to it, they can actually create their own content in terms of their notes or whatever they are learning in class, they can create themselves with small video clips, small pictures that they animate, so they can now when they refer back to that work, is not the teacher's boring voice, but it is their work and they learn better through that.

Facilitator: What challenges have you been faced with in terms of using iPads?

SBP4: The disruption …

Facilitator: How is it disrupting?

SBP4: Sometimes children get too excited and classroom management becomes a challenge. Also in this school, grade 5 to 7 is compulsory for them to bring an iPad to school, so they have an iPad on them. For grade 3s and 4 we've got 30 iPads that are shared between those grades, so sometimes

there's a tug of war in terms of accessibility. With the grades 5,6 and 7 challenges, are when a child has forgotten their iPad and you want to do an iPad lesson or they arrive with an iPad that is not charged, or somehow as much as the school has put in measures and controls to make sure that they don't play games at school, it happens. They will play and the iPad goes flat so now he doesn't have a learning tool. Because with iTunesU the whole learning is programme is on there. So if a child doesn't have …, they cannot even log on to another child's because their work is on their device. So ja these are some of the pitfalls.

Facilitator: What do you do in cases like that?

SBP4: He borrows the school iPad because iTunesU is accessible if I log on, so if they log on to their iTunes account then they can .., but you know it's a personal device, so you would want your work on this, so they would end saving screen shots and things that they will then add to their iPad whereas it would have been simpler if they just started on their iPad

Facilitator: And then obviously if they use the school's one and that's taken away from the 3s and 4s?

SBP4: Also yes, and they only access it if it's here, if it's in the lab, if there's no iPad then there's no iPad for them, and is a boy's thing, is a boy thing.

Facilitator: I'm sure. Have you received any support in using the iPads?

SBP4: Yes and it's ongoing in the sense that when we went the MELT way initially we said all devices, and then we saw that you know it was a challenge, some android does not offer as much support as Apple does, and it would make also .., instead of researching because at that initial stage you would need to make it to .., research for an app that works across devices and some good apps do not work across, it can be an android or an apple, so we then, a year into it we then said maybe let's go with Apple, mostly because of Apple's history in education with Macintosh and also the support and I think once you get into it the ease of use with their applications. I don't know if I have answered, I sort of lost the question..

Facilitator: The question was have you received any support?

SBP4: Yes, yes, so with teacher development, the school has hired an Ed-Tech Coach, an Apple certified Ed-Tech Coach they are four in the country and two are sitting here at [redacted] so they help, because the main challenge was linking the curriculum and the technology, it was sort of we were operating a target, so the Ed-Tech Coach comes and say okay is the same curriculum, is the same work that you've been doing but now we are integrating the iPad into the curriculum, so how do you plan, how do you assess, things like that, so but it is ongoing, we are not yet there .., but with that kind of support and how they've structured staff development in the school we will get there.

Facilitator: It sounds like a lot?

SBP4: It is, and you know by the way it's a device that you cannot say I've learnt everything today I'm fine because the next day they've come up with new things, you need reorientation on but I think what you need to know, what we rather, you need to know as a teacher is that it's a tool that you can integrate and then you go on with the changes.

Facilitator: So that was my last question for you but if there's anything else that you'd like to add please feel free in terms of iPads.

SBP4: Ja, I think there has to be.., based on observation, there has to be a lot .., is an incredible tool, if you know how to use it and how to apply it. So there has to be a lot of staff development because where we are, you find that a few teachers are actually using it, and we are at a stage where even some teachers are still struggling with the computer, the normal computer, so adding on the iPad then is quite challenging, so there has to be a lot of staff development around that and I think [redacted] and other schools are doing on the right, because they are then employing Ed-Tech coaches who are just there for that kind of support, before we had an Ed-Tech coach it was the library and the academic director, who would, when we learn something new we will then transfer it but we were also on a learning path. So with the Ed-Tech coach, who is actually there for that kind of support it would hopefully make things easier and encourage more use as well as benefit the boys. The most interesting thing is that .., are you also going to interview children or …?

Facilitator: No …

SBP4: Okay is just for teachers, it is actually children who get excited about something and they share it with the teacher and then .., so somehow .., it's exciting in a sense that children .., it gives children ownership of that learning. I will tell you something funny that happened to .., is it a week or two weeks ago, I taught the boys how to create a Kahoot as they were preparing for assessments, so we created a Kahoot here, and they got excited, when they went down to the class teacher they were doing World War and they said can we create .., can you do a Kahoot with us .., and the teacher said I don't know how to do it and they said we will do it on the iPads and then she said but you also have to teach me .., so they taught her and it's .., you know those boys, the difficult boy that would struggle to do work, because they are doing it with a device, somehow they forget that they are learning ., they think that they are having fun but at the same time they are learning, your outcomes are being achieved, which is quite exciting, so now they are making demands on how they want to learn, which is exciting.

Facilitator: I've used that Kahoot as well it's really cool …

SBP4: Ja it is cool but I get annoyed with the map address it is cool and the boys love it.

128 **Facilitator:** Thank you so much for meeting with me, I really appreciate it you"ve given me a lot.

129 129 **SBP4:** I hope because I said to [redacted] you know...

130 **END**

APPENDIX D Principal permission letter

Teachers' perspectives on the efficacy of iPad usage for learners with Dyslexia in the intermediate phase

Dear (Principals name)

My name is Megan de Bruyn, and I am a masters student at the University of Pretoria. I am conducting research on teachers' perspectives on the efficacy of iPad usage for learners with Dyslexia under the supervision of Dr Funke Omidire. The University of Pretoria's Ethics Committee has given approval to approach schools for my research. A copy of their approval is contained with this letter. I invite you to consider taking part in this research. This study will meet the requirements of the Research Ethics Committee of the University of Pretoria.

Aims of the Research

The research aims to gain insights into the perspectives of teachers on the use of iPads and to provide a better understanding of the prospects and challenges teachers are faced with. My study also aims to provide a better understanding on what teacher's perspectives are when it comes to enhancing the learner with Dyslexia through the use of an iPad.

Benefits of the Research to Schools

There will be no direct benefit for taking part in the research, but teachers could possibly reflect on their teaching with iPads in terms of support for learners with Dyslexia as well as their outlook on using iPads in the classroom environment.

Research Plan and Method

Permission will be sought from teachers and information letters will be sent to parents prior to their participation in the research. Only those who consent will

participate. All information collected will be treated in the strictest confidence. Neither the school nor individual teachers will be identifiable in any reports that are written. Participants may withdraw from the study at any time without penalty. The role of the school is voluntary and the School Principal may decide to withdraw the school's participation at any time without penalty.

School Involvement

Once I have received your consent to approach learners to participate in the study, I will

- arrange for informed consent to be obtained from participants
- arrange a time with your school for data collection to take place
- obtain informed consent from participants

Attached for your information are copies of the parent information form and also the participant information statement and consent form.

Invitation to Participate

If you would like your school to participate in this research, please complete and return the attached form.

Thank you for taking the time to read this information.

Researcher	Supervisor
Megan de Bruyn	Dr Funke Omidire

School Principal Consent Form

I give consent for you to approach teachers in the intermediate phase to participate in the research, titled "Teachers' perspectives on the efficacy of iPad usage for learners with Dyslexia in the intermediate phase."

I have read the Project Information Statement explaining the purpose of the research project and understand that:

- The role of the school is voluntary

- I may decide to withdraw the school's participation at any time without penalty
- Teachers in the intermediate phase will be invited to participate and that permission will be sought from them.
- Only teachers who consent will participate in the project
- All information obtained will be treated in the strictest confidence.
- The teachers' names will not be used and individual teachers will not be identifiable in any written reports about the study.
- The school will not be identifiable in any written reports about the study.
- Participants may withdraw from the study at any time without penalty.
- A report of the findings will be made available to the school.

_____ _____

Principal Signature

_____

Date

APPENDIX E Teacher consent form

Faculty of Education

This informed consent form is for intermediate phase teachers in Johannesburg who I am inviting to participate in research, titled "Teachers' perspectives on the efficacy of iPad usage for learners with Dyslexia in the intermediate phase."

Name of Principal Investigator: Megan de Bruyn

Contact details: 0725346189

Email: megan_debruyn@yahoo.com

Name of Supervisor: Dr Funke Omidire

Email: Funke.Omidire@up.ac.za

Name of Organisation: University of Pretoria

This Informed Consent Form has two parts:

- Information Sheet (to share information about the study with you)
- Certificate of Consent (for signatures if you choose to participate)

You will be given a copy of the full Informed Consent Form

Researcher	Supervisor
Megan de Bruyn	Dr Funke Omidire

Part I: Information Sheet

Introduction

I am Megan de Bruyn, currently studying a masters degree at the University of Pretoria. I am doing research on teachers' perspectives on the efficacy of iPads. I am going to give you information and invite you to be part of this research. You do not have to decide today whether or not you will participate in the research. Before you decide, you can talk to anyone you feel comfortable with about the research. This consent form may contain words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask me.

Purpose of the research

The purpose of the proposed study is to gain insights into the perspectives of teachers on the use of iPads and to provide a better understanding of the prospects and challenges teachers are faced with. This study also aims to provide a better understanding on what teacher's perspectives are when it comes to enhancing the learner with Dyslexia through the use of an iPad. I believe that you could help by telling me about your experiences of using an iPad for learners with Dyslexia. I want to learn about what intermediate phase teachers experience and feel when it comes to using iPads

Type of Research Intervention

This research will involve your participation in a group discussion that will take about thirty minutes to an hour. After the group discussions have taken place two participants will be chosen to then do another 30 minute interview as well as a 30 minute observation of the classroom environment.

Participant Selection

You are being invited to take part in this research because I feel that your experience as an intermediate phase teacher can contribute much to my understanding and knowledge of the usage of iPads for learners with Dyslexia.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. The choice that you make will have no bearing on your job or on any work-related evaluations or reports. You may change your mind later and stop participating even if you agreed earlier.

Procedures

You are being asked to help me learn more about teachers' perspectives on the efficacy of iPad usage for learners with Dyslexia. If you accept you will be asked to take part in a discussion with 5 other people with similar experiences. This discussion will be guided by me. The group discussion will start with me, making sure that you are comfortable. I can also answer questions that you might have. Then I will ask you questions about your experiences with an iPad and give you time to share your knowledge. The questions will be about iPads for learners with Dyslexia, how they are used and what challenges arise while using them. You will be asked to share your personal opinions about the efficacy of iPads and how you use them specifically for learners with Dyslexia.

The discussion will take place in a convenient venue and no one else but the people who take part in the discussion and me will be present during this discussion. The entire discussion will be tape-recorded, but no one will be identified by name on the tape. The tape will be kept in a locked cupboard in my study. The information recorded is confidential, and no one else except my supervisor, Dr Funke Omidire, and I will have access to the tapes. The tapes will be destroyed once the research has been completed.

Duration

The data collection phase of the research will take place over the months of May and June of 2016. During that time the group discussion will be held once and will take about thirty minutes. Thereafter two participants will be chosen to do an interview and classroom environment observation of that participant's class.

Include a statement about the time commitments of the research for the participant including both the duration of the research and follow-up, if relevant.

Risks

It is unlikely that you will be harmed, but might feel uncomfortable during the interviews and observations. You might also fear discovery of incompetence with regards to teaching. However I do not wish this to happen. You do not have to answer any question or take part in the discussion if you feel the question(s) are too personal or if you feel uncomfortable.

Benefits

There will be no direct benefit to you, but you could possibly reflect on your teaching with iPads in terms of support for learners with Dyslexia as well as your outlook on using iPads in the classroom environment.

Reimbursements

You will not be provided any incentive to take part in the research.

Confidentiality

The research being done in the school community may draw attention and if you participate you may be asked questions by other people in the school community. I will not be sharing information about you to anyone besides Dr Funke Omidire. The

information that I collect from this research project will be kept private. Any information about you will have a number instead of your name. Only Dr Funke Omidire and I will know what your number is and I will lock that information up with a lock and key. It will not be shared with or given to anyone except Dr Funke Omidire. I will ask you and others in the group not to talk to people outside the group about what was said in the group. I will, in other words, ask each of you to keep what was said in the group confidential. You should know however, that I cannot stop or prevent participants who were in the group from sharing things that should be confidential.

Sharing the Results

Nothing that you tell me today will be shared with anybody outside my supervisor and I, and nothing will be attributed to you by name. The knowledge that I get from this research will be shared with you before it is made widely available to the public. Each participant will receive a summary of the results. Following this, we will publish the results so that other interested people may learn from the research.

Right to Refuse or Withdraw

You do not have to take part in this research if you do not wish to do so, and choosing to participate will not affect your job or job-related evaluations in any way. You may stop participating in the discussion at any time that you wish without your job being affected. I will give you an opportunity at the end of the discussion to review your remarks, and you can ask to modify or remove portions of those, if you do not agree with my notes or if I did not understand you correctly.

This proposal has been reviewed and approved by ethics committee of the University of Pretoria, which is a committee whose task it is to make sure that research participants are protected from harm.

Part II: Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study

Print Name of Participant_____

Signature of Participant _____

Date _____

If illiterate

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print name of witness_____ Thumb print of participant

Signature of witness _____

Date _____

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1. A group discussion will take place

2. Personal questions of views and experiences will be asked

3. Participation is voluntary and the participant can withdraw at any time

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this consent form has been provided to the participant.

Print name of researcher_____

Signature of researcher_____

Date _____

---oOo---