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College of Education

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A CASE STUDY OF AN INTERVENTION PROGRAM FOR STUDENTS WITH DYSLEXIA IN A PRIMARY SCHOOL IN THE UAE

Elazab Mohamed Elazab Elshazly

This thesis is submitted in partial fulfillment of the requirements for the degree of Master of Education (Special Education)

Under the Supervision of Professor Efthymia Efthymiou

May 2016

Declaration of Original Work

I, Elazab Mohamed Elazab Elshazly, the undersigned, a graduate student at the United Arab Emirates University (UAEU), and the author of this thesis entitled "*A case Study of an Intervention Program For Students with Dyslexia in a Primary School in the UAE",* hereby, solemnly declare that this thesis is my own original research work that has been done and prepared by me under the supervision of Professor Efthymia Efthymiou, in the College of Education, at UAEU. This work has not previously been presented or published, or formed the basis for the award of any academic degree, diploma or a similar title at this or any other university. Any materials borrowed from other sources (whether published or unpublished) and relied upon or included in my thesis have been properly cited and acknowledged in accordance with appropriate academic conventions. I further declare that there is no potential conflict of interest with respect to the research, data collection, authorship, presentation and/or publication of this thesis.

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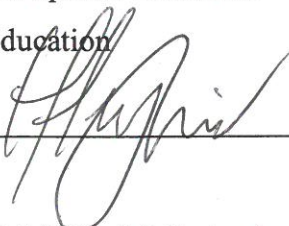
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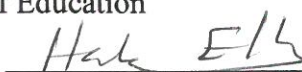
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Abstract

The study aims to investigate the impact of an iPad programme on the performance of students with dyslexia on reading, writing and spelling skills in two classes of a public primary school in Al -Ain, UAE. The study follows a mixed method approach (questionnaire; face-to-face interviews; pre-posttests). Twenty (20) 3rd graders male students with dyslexia, attending English as a Foreign Language (EFL) classes were the participants of the study. Students' performance on spelling, reading and writing skills were tested after instructed through an iPad intervention programme with multisensory applications. The experimental group's performance (10 students with dyslexia) was compared to the control group's (10 students with dyslexia) instructed through traditional, non-computer-based, methods. A pre-assessment test was conducted for evaluating the reading, spelling and writing skills of both groups of students prior to the intervention. After eight (8) weeks, both groups were involved in post-tests for evaluating their performance on reading, spelling and writing skills. The study found that the students' with dyslexia skills were improved after the iPad intervention programme as opposed to the students instructed through mainstream methods. Interviews with the parents and the teachers corroborated the results of the post-tests but also validated the usefulness and effectiveness of the intervention programme for the students' academic improvement.

Keywords: iPad, EFL, dyslexia, multi-sensory approach, iPad applications.

Title and Abstract (in Arabic)

دراسة حالة أثر برنامج التدخل على الـلالالا الذين لديهم عسر القراءة في مدرسة ابتدائية في دولة الإمارات العربية المتحدة

الملخص

إن الهدف من هذه الدراسة هو استكشاف الآثار الأكاديمية لدمج تكنولوجيا التدريس باستخدام الأياد لطلاب الصف الثالث الإبتدائي والذين يعانون من عسر القراءة في اللغة الإنجليزية كلغة أجنبية (EFL) في الجوانب المتعلقة بالقراءة والهجاء والكتابة .اتبعت الدراسة الاسلوب المختلط (المتباين) مثل (الاستبيان – المقابلات – الاختبار القبلي والبعيد).. وتكونت عينة الدراسة من (20) عشرون طالبا من الذكور الذين يعانون من عسر القراءة، من شعبتين مختلفين (2) للصف الثالث الابتدائي(3) في أحد المدارس الابتدائية في مدينة العين في نتائج الطلاب في الهجاء والقراءة والكتابة – تم اختبار أدا الطلاب في مهارات القراءة والهجاء والكتابة باستخدام تطبيقات الاياد المعتمدة على اسلوب تعدد الحواس . ولقد تم مقارنة أداء طلاب المجموعة التجريبية (10 طلاب لديهم عسر قراءة) باستخدام تطبيقات الاياد (تطبيقات في الهجاء والقراءة والكتابة)، بينما تمت مقارنة التحسن في النتائج للمجموعة الضابطة (10 طلاب مع عسر القراءة) من خلال استخدام الطرق التقليدية (أي بدون استخدام الاياد في التسيرد). تم اجراء اختبار قبلي لتقييم الطلاب في مهارات القراءة والهجاء والكتابة لكلا المجموعتين قبل تطبيق البرنامج. و بعد ثمانية (8) أسابيع من استخدام البرنامج، قد شارك كلا المجموعتين في الاختبار البعدي لتقييم مدى تحسنهم في هذه المهارات(في القراءة والهجاء والكتابة). ولقد توصلت الدراسة إلى تحسن مهارات الطلاب الذين لديهم عسر قراة بعد برنامج التدخل باستخدام الاياد مقارنة مع الطلاب الذين استخدموا الطريقة السائدة في التدريس داخل المدرسة. ولقد أكدت المقابلات مع المعلمين وأولياء الامور نتائج الاختبار البعدي ولكنها أيضا أكدت مدى فائدة وتأثير برنامج التخل على التحسن الأ كاديمي للطلاب.

مفاهيم البحث الرئيسية: الاياد،عسر القراءة، اللغة الانجليزية كلغة اجنبية ، منهج الحواس المتعددة، تطبيقات الاياد .

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Dedication

To my beloved parents and family

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List of Abbreviations

EFL   English as a Foreign Language

LRE   Least Restrictive Environment

App/s   Application/s

IEP   Individualized Educational Plan

ADEC   Abu Dhabi Education Council

SLD   Specific learning disability

IDEA   Individuals with Disabilities Education Act

Chapter 1: Introduction

1.1 Overview

Dyslexia is a neurological issue that shields an extensive variety of reading disabilities (Reid, 2012) however, still not completely comprehended it is perceived that what most students with dyslexia have in like manner is a trouble in getting a handle on the shapes of letters and afterward relating those shapes to the sounds that the letters symbolize. Students with dyslexia frequently invert the order of the letters in a word or even forget them totally. Different impacts of Dyslexia incorporate troubles in memory, association, numeracy (Herold, 2003), time administration, low self-esteem and an absence of confidence (Snowling, 2005).

The British Psychological Society (BPS) defines dyslexia as evident when accurate and fluent word reading and/or spelling develops very incompletely or with great difficulty (British Psychological Society, 1999: reprint 2005). According to BPS reports, dyslexia affects about one in ten people with around 4% of the world's population being severely dyslexic, and a further 6% having mild to moderate problems. Typically, dyslexia is characterized by problems with reading, spelling, and word recognition (Grigorenko, 2001). Internationally recognized indicators of dyslexia include hesitant and labored reading, with a low level of comprehension and difficulty in selecting main ideas of read texts. Failure to recognize familiar words, missing lines, and omitting or adding extra words into texts are some other reading problems that they might encounter. Specific types of problems experienced in writing include poor standards of written work with poor handwriting and confusion in spelling. Compared to normal readers, they have difficulty with punctuation, grammar, and taking notes. Difficulties may also manifest as impairments in short-

term memory, and visual processing (Fawcett & Nicolson, 1994; Beech & Singleton, 1997); and they may also find organization of work and personal timetabling especially difficult. Such difficulties that are assumed to be the defining characteristics of dyslexia often result in great frustration and problems in interpersonal skills. Interestingly, those individuals are often of high or above-average intelligence, but they do not seem to reach their full potential in academic fields (Snowling & Hayiou-Thomas, 2006).

Students with dyslexia are known to have trouble remembering phonemes, but their working memories can be strengthened, and the phonemes can become distinctive as tactile and kinesthetic activities are added to verbal and aural presentations of the material. As multiple representations of the phonemes are presented, and thus added to the working memory, there is a greater chance the information will last long enough to be stored in long-term memory (Hall & Moats, 1999).

As for students' performance in learning English as a Foreign Language (EFL).Dyslexia is a language processing disability, that is to say those who have dyslexia have a weakness is one or more area of language such as decoding, encoding, phonological awareness, word retrieval and syntax. To be successful within a Foreign language (FL) it, "need[s] the use of specifically those language skills in which [dyslexics] are weak in [their first language]" (Arries, 1999, p. 1). Dr. Kenneth Dinklage (1997) He is a researcher within the field of learning disabilities and second language learning, believes that dyslexics, due to their disability can only, "make tentative attempts at gaining proficiency with a second language" (Ott 1997, pg.187). This being much due to the language processing problems they had

within their first or native language. According to Peter Skehan and Dr. Bernard Spolsky, along with studies by Dinklage(1997), have found that there is a connection between foreign language difficulties and difficulties within ones native language. "Skehan believes that second or foreign language learning is the equivalent for the first language learning faculty and children who develop faster in their first language also score higher on foreign language aptitude tests" (Nijakowska, 2010, p. 67). It can then be said that those children who develop slower within their first language, as found with dyslexic students, will have problems when learning a foreign language. Other studies within the field of foreign language learning and learning disabilities have shown that if one has language problems in their native language, these problems will be carried over to the FL leading to an inability to learn a new language fully. This phenomenon is called the Linguistic Coding Differences Hypothesis (LCDH) by Sparks and Ganschow. LCDH has also shown that poor phonological awareness or phonological-orthographic processing, the ability to see the connection between how letters sound and how they are written, is often times the reason behind a dyslexic's inability to learn a FL. According to the hypothesis, even subtle language processing difficulties will, "resurface when learning a foreign language". This can explain why even students who have "overcome" (Schneider, 2009, p. 299), their dyslexia through the use of learning strategies may have to re-learn these skills as they embark on learning a FL.

There have been many suggestions on the most effective ways to educate students with specific learning disabilities, such as dyslexia over the recent years. Some examples include unit delivery, special schools, whole class approaches, and thematic learning based on practices incorporating the social, emotional and the learning need of all children, peer-assisted learning (Reid., 2012) and peer mentoring

(Topping, 2001). One of the approaches for teaching students with dyslexia is through multisensory techniques (Moats & Farrell, 1999). Therefore, the researcher started reading on the integration of technology and iPad applications in teaching students with dyslexia.

Mobile technology consists of smart phones, MP3 players such as iPad, and tablet computers. Children and adults alike have embraced mobile technologies not only for time-out activities such as playing games, watching cartoons or listening but also for keeping planned and for assisting with learning (Ritchey & Goeke, 2006). Education has traditionally been a field slow to adopt new technologies, but these technologies have been embraced, in the school sector as well as the public sector, with over 1.5 million iPad's deployed in educational programs in the USA alone (Apple Press Info, 2012). Through low-cost mobile applications (apps) that can be downloaded to and used on the devices, mobile tools seem to have unlimited possible for converting teaching, learning and communication. The value of these devices is when we use its applications, which adapt the need of individuals into an appropriate digital education. The ability to adapt iPad apps to suit each individual with disability is to motivate them because these apps. Interact with those students and make the learning process very attractive to them (Apple Press Info, 2012).

Other educational tool is multisensory techniques which help students with dyslexia to use their senses in learning especially spelling; reading and writing multisensory approach employs more than one sense in the teaching process to improve the process of learning for the students. When learning takes place through more than one sense the students "learning capacities and the maintenance of the learnt materials have been improved, (Ritchey & Goeke, 2006).

Most of the teaching in schools is done using either visual or auditory mode (visual or Audio). Multisensory approach is otherwise known as VAKT Method. The four modalities of learning styles have been summarized by the short form VAKT, for Visual, Auditory, Kinesthetic and Tactile, (Teitelbaum, 1997):

- Visual: what you see;

- Auditory: what you hear;

- Kinesthetic: the use of touch and movement;

- Tactile - where the child touches and handles objects.

The best teaching method is to implicate the usage of more of the student's all the senses, especially the use of touch and movement (kinesthetic). This will give the student's brain tactile and kinesthetic memories to hang on to, as well as the visual and auditory ones. Populations are constantly changing and adapting to their environments, and species are diverging and creating entirely new lineages.

As for the intervention program, the iPad device might be an effective tool for the students because of the multisensory (seeing, hearing, touching) touch screen capabilities (Apple Press Info, 2012). The students were fascinated not only by what they were hearing and seeing, but what they were capable of manipulating with their fingers on the screen. Students can move images on the screen with their fingers and regulate the size of images or words by the swiping of the thumb and fingers(Apple Press Info, 2012). This was important because those who have dyslexia often experience visual challenges or fluctuation with their visual perception (Saunders & White, 2002). The researcher considered that the iPad tablet is a device that not only allows for visual and tactile adjustments, but also implicates aural and kinesthetic purposes, or senses.

The goal of the intervention program is to use multisensory iPad applications to enhance the ten (10) students' with dyslexia phonological awareness and to improve their reading, writing, and spelling skills in EFL.

1.2 Statement of the Problem

Society recognizes reading, writing, and spelling skills as a key to success in a working life demanding for learning new things, and adapting to new technology (Lundberg, 2010). A large number of young students with dyslexia find reading, writing, and spelling very difficult tasks (Mullis, Martin, Kennedy, & Foy, 2007). Students with dyslexia appear to be less competent in acquiring reading, writing, and spelling skills in English as a Foreign Language (EFL) compared to typical peers, unless they received additional support (Fawcett & Nicolson, 1994; Beech & Singleton, 1997).

Of the diverse learning difficulties, school students with dyslexia may experience failure in these basic skills, which educators address in the classroom (Bramlett, Murphy, Johnson, & Wallingsford, 2002). Therefore, it is important for educators to be well prepared and act appropriately for struggling readers, writers, and spellers. Knowledge and support are available in current research regarding appropriate measures, but more knowledge is required on appropriate interventions and reasons for using them (Song, Manson, Lee, & Zhang, 2012).

1.3 Purpose of the Study

This study is a case study of a combined intervention programme in English as a Foreign Language (EFL) for students with dyslexia, who are native speakers of Arabic in the UAE .

It examines through quantitative analysis and qualitative data analysis, the effects of the reading, writing, and spelling intervention programme, on twenty (20) participants (experimental and control group) studying English in the inclusive EFL classroom in a primary school in the UAE.

1.4 The Study's Research Question

What effects, a reading, writing, and spelling intervention programme in EFL, has on students with dyslexia studying in an inclusive classroom of a primary school?

A specific iPad program with multisensory applications was used to teach the students with dyslexia to improve their skills on reading, writing, and spelling for learning English as a Foreign Language.

1.5 Significance of the study

According to Wanzek, Wexler, Vaughn, and Ciullo (2010), most knowledge about reading interventions concerns early intervention for young children, or interventions for pupils aged 12 or more (e.g. Edmonds et al., 2009). Thus, there is a scarcity of studies for children aged between 9 and 11.

Though some research has been conducted in relation to improvement in reading, writing, and spelling in a foreign language (FL) of students with dyslexia, little like Interventions with focus on mapping sounds of language to letters and words yielded small to moderate effect sizes. Fluency training showed inconsistent results. Only two multi-component studies were found and included in the analysis. However, they showed promising outcomes on various reading measures, implying that more research is needed to confirm the effects (Wanzek et al., 2009)., if any, has

examined the effects of a combined intervention for these students, beyond improvement in reading in EFL, particularly in the UAE.

Globalization and the increasing supremacy of the English language over the political, cultural and economic levels necessitate an effective preparation for the young generation to acquire the abilities and skills that help them meet the needs of their future careers. The ability to read English effectively and to handle various iPad tools purposefully has become an essential need for the young generation to cope with the current information revolution.

This study is unique in its deep analysis of the effect of iPad tools on the reading skill to achieve better integration of iPad to improve reading English as a Foreign language. The study explores the effect of various iPad tools on the spelling, reading and writing skills. The results of the study can be helpful for all educational administrative entities in general and those who are interested in improving learning and teaching English Language in particular to support and provide resources needed to reach effective integration of iPad in education and in TEFL. In addition, this study is significant for English language learners and students in the UAE since they can explore various channels of improving their reading through iPad on one hand and see the effects of such tools on their spelling and writing on the other hand.

Finally, this study can contribute to our knowledge base because of its attempt to investigate the impacts of certain grouping of iPad tool (iPad apps.) on reading, writing and spelling skills.

1.6 Definition of Terms

Specific Learning Disabilities (SLD): According to IDEA, SLD is "a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Such term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not apply to students who have learning problems that are primarily the result of visual, hearing, or motor disabilities; cognitive disability; emotional disturbance; or environmental, cultural, or economic disadvantage Reference.

Dyslexia: is a neurological issue that shields an extensive variety of reading disabilities (Reid, 2012) however, still not completely comprehended it is perceived that what most students with dyslexia have in like manner is a trouble in getting a handle on the shapes of letters and afterward relating those shapes to the sounds that the letters symbolize. Students with dyslexia frequently invert the order of the letters in a word or even forget them totally. Different impacts of Dyslexia incorporate troubles in memory, association, numeracy (Herold, 2003), time administration, low self-esteem and an absence of confidence (Snowling, 2005).

Multisensory approach: means helping a child to learn through more than one sense. Most viewing procedures are done utilizing either sight or hearing (visual or sound-related). The vision is utilized as a part of reading data, taking a gander at content, pictures or reading data based from the board. The listening sense is utilized to listen to what the instructor says. The child's vision may be influenced by

challenges with following or visual handling. Now and then the kid's sound-related preparing may be frail. The answer for these challenges is to include the utilization of a greater amount of the kid's detects particularly the utilization of touch (material) and development (motor).

English as a Foreign Language (EFL): Teaching English as a foreign language and means teaching English in a non-native speaking country like UAE, Oman etc.

According to Routledge (2009) An EFL classroom (EFL is usually learned in environments where the language of the community and the school is not English. EFL (English as Foreign Language) are often use is in a country where English is not the dominant language. Students share the same language and culture. The teacher may be the only native English speaker they have exposure to. Outside of the classroom students have very few opportunities to use English. For some, learning English may not have any obvious practical benefit. Students have limited exposure to English-speaking culture, most often through a distorted lens like TV or music.

To clarify the idea, Kachru (1991, 1992) has divided the countries into three circles: (1) The inner circle: In these countries, English is the mother tongue; countries included in the inner circle are Great Britain and Ireland, the United States, Canada, Australia, and New Zeeland, (2) The outer or extended circle: In these countries, English language is adopted in nonnative contexts, but it has an essential role in the communication in the different institutions;

countries included in the outer or extended circle are India, Singapore, Malawi, and 50 other territories, and (3) The expanding circle: In these

countries, English language has no special role in communication, nor does it have administrative status; the expanding circle encompasses countries in which English is a foreign Language .

According to this scheme, all Arab countries fall within the expanding circle where English is a Foreign Language and its use is predictably increasing.

Based on this information, this study is a case study of a combined intervention programme in English as a Foreign Language (EFL) for students with dyslexia, who are native speakers of Arabic in the UAE .

IPad: It is a designed tablet marketed by Apple Inc. It is a fast and exact electronic device that has the capacity to receive, store, and treat data. This device offers a new technology that can split and communicate presented information to help learners acquiring information in an easy, simple and clear way. Also, researcher believes that the iPad is a great tool to view lessons, photos, videos and different software .The iPad reduces students' distraction inside the classroom, and helps them engage in further discussion.

IPad applications (apps): iPad apps are software applications' programs developed for use on Apple's iPad devices. IPad apps are available through the Apple App Store and are designed to run on Apple's IOS mobile Effects of iPad Apps on Literacy operating system, which powers the iPad. All of the iPad Apps referred to in this paper are categorized in the Apple App Store as educational, early or primary learning, and/or reading, spelling and writing for students with dyslexia.

Intervention: It is a generic term for the provision of more intensive spelling, reading and writing instruction, teaching methods and, where necessary, appropriate

support teaching that given individually or in groups to failing readers with dyslexia for the 8-11 years of schooling ,(Scammacca et al. (2007).

Academic improvement: is the amount of what has been achieved by students from behavioral learning objectives in the content of their curriculum and relating to standards of their outcomes at schools (Lauer et al., 2004). In the current study, improvement is measured by the total mark of student obtained from the test prepared by the researcher for this study. It means the degree of students in the pretest in comparison with the posttest' results.

Effectiveness: The degrees to which objectives are achieved and the extent to which targeted problems are solved. Adequacy to accomplish a purpose : producing the intended or expected results. Effectiveness means "doing the right thing."

Inclusive classroom: UNESCO views inclusion as "a dynamic approach of responding positively to pupil diversity and of seeing individual differences not as problems, but as opportunities for enriching learning." "The fundamental principle of English for All (EFA) is that all children should have the opportunity to learn. The fundamental principle of Inclusive Education is that all children should have the opportunity to learn together." The Inclusive Classroom Inclusion is a controversial concept in education whereby each student is integrated to the fullest extent possible in a general education classroom (Burke & Sutherland, 2004)

1.7 Organization of the study

This study consists of five chapters. Chapter One presents a background about dyslexia's problem in reading, writing and spelling skills. , It discusses also the performance of students with dyslexia in learning English as a Foreign Language

(EFL). The intervention program and how it is effective   is discussed. The problem statement, research questions, purpose of the study, significance of the study, and definitions of the terms of the study are covered. Chapter Two ,

In this section, different theories will discuss the theoretical framework, nature of dyslexia, multisensory approach to teaching dyslexic students; previous studies related to iPad as an intervention program and some cognitive theories.

Chapter Three describes the methods used in this study. A mixed-method approach to the collection and analysis of the data was followed. A quasi-experimental, design was implemented to investigate the effectiveness of iPad tools students' with dyslexia reading, writing, and spelling skills in EFL. Also, The researcher conducted qualitative interviews with the teachers and parents of the students. In addition, this section includes a brief description on the sampling, the instruments, research design, the participants, data collection procedures, data analysis and ethical considerations.

Chapter Four presents the findings of the study and provides an analysis of those findings. Chapter Five includes a discussion of the results of the study, recommendations for future research and implications of practice based on the findings of the study.

1.8 Limitations of the study

This is a small-scale study conducted with a small sample of participants (20 students) in one of Al-Ain's public primary schools, so the results cannot be generalized to other settings. Furthermore, the study was conducted only on male

students as the educational system educates male and female students separately. There are no data collected on female students.

Chapter 2: Review of the Literature

2.1 Introduction

Technology is often integrated into educational programs and practice to facilitate learning for students of all abilities across all grade groups. Students with disabilities are progressively capable of interacting with classroom technologies and teachers are increasingly able to adapt content for changing students' needs or preferences (Catchan, 2013) new technological advancements and educational applications for students with disabilities are produced with the contribution of researchers, curriculum developers, teachers, parents—and students (Honan, 2012).

In this section, different theories will discuss the theoretical framework, nature of dyslexia, multisensory approach to teaching dyslexic students; previous studies related to iPad as an intervention program and some cognitive theories.

2.2 Theoretical Framework

2.2.1 The usefulness of Piaget's theory for constructing the iPad program

The researcher selected Piaget's theory of cognitive development because it has an important implication in adaptation the content of instruction to students' developmental level. This was the basis of my intervention program because through my intervention I tried to facilitate the learning content for students with dyslexia by providing a variety of experiences for creating new schema. It communicates that knowledge is constructed and learning occurs when children create products or artifacts (Liebert, 1986). They assert that learners are more likely to be engaged in learning when these artifacts are personally relevant and meaningful. In my study the integration of iPad technology in the teaching and learning process enabled the

participants to engage actively and enthusiastically into acquiring the basic skills of reading, writing, and spelling, thus becoming the agents of their knowledge.

According to Piaget, the concrete operational stage typically develops between the ages of 7-11 years. Intellectual development in this stage is demonstrated through the use of logical and systematic manipulation of symbols, which are related to concrete objects. Thinking becomes less egocentric with increased awareness of external events, and involves concrete references. The study's participants were between 8-9 years old, and were selected for the purpose of being able to logically use and manipulate symbols and objects. In my intervention, the iPad program involved symbols from which the students could make logical association.

" Discovery learning" provides opportunities for learners to explore and experiment, as I gave the students a chance to discover by using their senses to trace letters, pronounce, repeat, read and write and then they experienced themselves as they can't go to next exercise without answering the previous one correctly. Opportunities that allow students of differing cognitive levels to work together often encourage less mature students to advance to a more mature understanding, (Slavin, 1988). One further implication for instruction is the use of concrete "hands on" experiences to help children learn. Additional suggestions include: 1) Provide concrete props and visual aids, such as models and/or time line. 2) Use familiar examples to facilitate learning more complex ideas, such as story problems in math. 3) Allow opportunities to classify and group information with increasing complexity; use outlines and hierarchies to facilitate assimilating new information with previous

knowledge. 4) Present problems that require logical analytic thinking; the use of tools such as "brain teasers" is encouraged.

2.2.2 Cognitive Theory of Multimedia Learning

Multimedia philosophy supports learners to understand concepts by using both words and pictures. Mayer (2003) identified three intellectual methods for significant learning: select -organize -integrate. These are the leading processes of the multimedia techniques. In the current study, the researcher used the applications which helped students to use their senses to improve their spelling, reading and writing skills.

Based on these three cognitive principles of learning, the CTML outlines seven factors of multimedia design, multimedia principle (students learn better from words and pictures than from words alone); spatial contiguity principle (people learn better when related words and pictures are in close proximity); temporal contiguity principle (people learn better when related words and pictures are close together in time); coherence principle (people learn better when irrelevant words, pictures, and sounds are eliminated from the presentation); modality principle (people learn better from narration and animation than from text and animation); redundancy principle (people learn better from narration and animation compared to animation, narration, and text); and individual differences principle (individuals with low prior content knowledge and individuals with high spatial skills benefit most from animation and narration-presented), and evaluated these principles based on transfer (Mayer, 2001) Austin (2009) replicated the redundancy effects, with students exposed only to narration and text scoring higher on transfer and retention tests. The redundancy principle shows the importance of developing proper multimedia learning tools for

learning. Therefore, this theory enhanced the use of multisensory techniques and iPad technology with students with dyslexia as it focused on studies of how individual contrasts in verbal or visual learning styles which influence learning. Also, humans have separate data preparing channels for verbal and visual data. People have the capacity to process just little measure of data in each channel at any one time. Deep learning happens when learners rationally select significant approaching data, sort out it into rational structures, and coordinate it with former information

Cognitive Theory of Multimedia Learning

MULTIMEDIA PRESENTATION	SENSORY MEMORY	WORKING MEMORY			LONG-TERM MEMORY
Words	Ears	selecting words → Sounds	organizing words →	Verbal Model	
Pictures	Eyes	selecting images → Images	organizing images →	Pictorial Model	integrating → Prior Knowledge
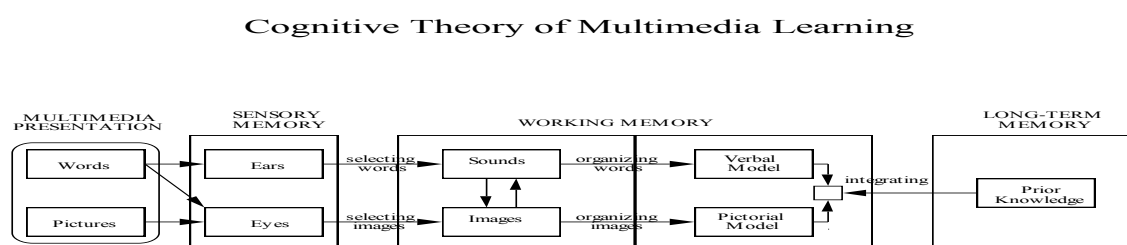
Figure 1**:** Cognitive Theory of Multimedia Learning

The present study focuses on a multimedia learning device; therefore, it is important to understand the cognitive functioning of people learning from multimedia. According to the cognitive theory of multimedia learning (CTML), the visual information processing channel may become overloaded when students must process on-screen graphics and on-screen text at the same time (Mayer, 2001). However, when words are presented as narration, words can be processed in the verbal channel, thereby reducing the cognitive load in the visual channel. The results show students who learn from interactive (graphics and narration) learn more deeply and perform better on problem-solving transfer tests than students who learn from no

interactive (graphics and on-screen text) (Moreno & Mayer, 2000); (Mousavi, Low, & Sweller, 1995); (Sweller, 1999)). Austin (2009) explains the bases of CTML:

2.3 Review of the Literature

2.3.1 The Nature of dyslexia

Dyslexia is a language processing disability, that is to say those who have dyslexia have a weakness in one or more area of language such as decoding, encoding, phonological awareness, word retrieval and syntax. To be successful within a FL it, "need[s] the use of specifically those language skills in which [dyslexics] are weak in [their first language]" (Arries, 1999, p. 1). Dr. Kenneth Dinklage, researcher within the field of learning disabilities and second language learning, believes that dyslexics, due to their disability can only, "make tentative attempts at gaining proficiency with a second language" (Ott 1997, pg.187). According to Professor Peter Skehan and Dr. Bernard Spolsky, along with studies by Dinklage, have found that there is a connection between foreign language difficulties and difficulties within ones native language. "Skehan believes that second or foreign language learning is the equivalent for the first language learning faculty and children who develop faster in their first language also score higher on foreign language aptitude tests" (Nijakowska, 2010, p. 67). It can then be said that those children who develop slower within their first language, as found with dyslexic students, will have problems when learning a foreign language. Other studies within the field of foreign language learning and learning disabilities have shown that if one has language problems in their native language, these problems will be carried over to the FL leading to an inability to learn a new language fully. This phenomenon is called the Linguistic Coding Differences Hypothesis (LCDH) by Sparks and

Ganschow. LCDH has also shown that poor phonological awareness or phonological-orthographic processing, the ability to see the connection between how letters sound and how they are written, is often times the reason behind a dyslexic's inability to learn a FL. According to the hypothesis, even subtle language processing difficulties will, "resurface when learning a foreign language". This can explain why even students who have "overcome" (Schneider, 2009, p. 299), their dyslexia through the use of learning strategies may have to re-learn these skills as they embark on learning a FL.

These distinctions in dialects can obviously be a test for anybody attempting to master another language yet for the dyslexic students who have a decreasing capacity to process language; FL courses can be an extraordinary conflict. The techniques and principles they have learned in their local language are shortly of practically no utilization inside of the new language. For instance, numerous dyslexics get to be capable of utilization different words with a specific end goal to clarify an incomprehensible word, when they experience issues recovering words from their long term memory. This procedure can't be utilized when taking in a FL since their oral aptitudes are not at a sufficiently high level to do as such (Snowling, 2005, p. 91). The inquiry then turns out to be the means by which an outside dialect educator can encourage for this figuring out how to happen inside of the domain of the classroom. Amazingly it has been found that most isolated language educators get next to no instruction inside of the field of unique needs. They are, at the end of the day, not prepared to help their dyslexic students subsequent to the techniques they normally utilize will regularly impede the dyslexic child more than offer them some assistance with succeeding inside of FL learning (Schneider, 2009, p. 298).

2.3.2 Auditory processing in dyslexia

Three debates surround the study of dyslexics' auditory processing: 1) what proportion of dyslexics is affected? 2) Can the deficit be characterized in terms of "rapid auditory processing"? 3) Does it explain the phonological deficit?

Most of the auditory studies have been taken to support the view that dyslexics' auditory processing is impaired specifically on short sounds and fast transitions: this is called the "rapid" or "temporal" auditory processing deficit, (Tallal., 1980). Such a characterization of the auditory dysfunction is consistent with the magnocellular theory, since magno-cells are particularly sensitive to high temporal frequencies, (Stein, 2001). However, a closer look reveals major inconsistencies between data and theory: some deficits are found in tasks that don't tap rapid auditory processing, like frequency discrimination, (Amitay, Ben-Yehudah, Banai, & Ahissar, 2002), or frequency modulation detection at 2 Hz. On the other hand, expected rapid processing deficits are often not observed; in fact, when inter-stimulus intervals have been manipulated in a systematic manner, dyslexics were not found to be poorer at short than at long intervals (sometimes they were even better), (Chiappe, Stringer, Siegel, & Stanovich, 2002). Finally, three separate studies have investigated dyslexics, auditory processing on a large array of psychophysical tests administered within subject: they have concluded that a subset of dyslexics do have difficulties with certain tests, but that the pattern of good and poor performance can in no way be characterized as a problem with rapid or temporal processing, (Rosenberg, 2001) Moreover, the pattern varies across individuals. A coherent characterization of dyslexics' auditory performance remains elusive.

The next question is: when an auditory deficit is present in a dyslexic individual, is it responsible for the phonological deficit and/or for the reading disability? Supporters of the auditory processing theory hypothesized that impaired perception of brief sounds and transitions would be particularly detrimental to speech perception, hence would undermine the development of the child's phonological representations , (Wright, Bowen, & Zecker, 2000) Counter-evidence against this hypothesis was soon put forward , (Mody, StuddaertKennedy, & Brady, 1997). Recent studies have now amply confirmed that there is no reliable relationship between performance on rapid auditory processing tasks and speech categorization and discrimination , (Serniclaes, Sprenger-Charolles, Carré, & Démonet, 2001) Neither is there a reliable relationship between any auditory measure (speech or non-speech) and more general measures of phonological skill or reading ability , (Marshall, Snowling, & Bailey, 2001), even when assessed longitudinally. If anything, it seems that the most auditorily impaired dyslexics also have severely impaired phonology and reading, although the reverse is not necessarily true, (Witton, Stein, Stoodley, Rosner, & Talcott, 2002)

Remarkably, there have been claims that auditory training programs can improve dyslexic children's language and reading skills, (Kujala, et al., 2001). Unfortunately, these studies have not protected themselves against placebo and Hawthorne effects by running double-blind randomized controlled trials. A few independent studies that have attempted to assess the effects of the controversial Fast Forward program have not found it more efficient than more traditional intervention programs, and have challenged the role played by the part of the training focusing on temporal processing .

In summary, the auditory disorders observed in dyslexia are not particularly "rapid" or "temporal" in nature, disorders are restricted to a division of the population, and have little influence on the development of phonology and reading. It therefore seems that the phonological deficit characteristic of dyslexia can arise in the absence of any auditory disorder, with the most severe auditory impairments nevertheless acting as irritating factors.

2.3.3 Visual processing in dyslexia

The debate on visual deficits in dyslexia is articulated around three similar questions as for the auditory deficit:

1) Do visual disorders cause reading difficulties? 2) Do those visual disorders have a magnocellular origin? 3) What proportion of dyslexics is affected?

Even when rejecting major ophthalmologic disorders, it seems reasonable that more indirect visual deficits might have an impact on reading. Perhaps the clearest example is visual stress, Wilkins (Bouldoukian, Wilkins, & Evans, 2002), a condition which irritates visual distortions and sometimes leads to impaired reading fluency, which can be improved by using colored intersections or glasses Bouldoukian (Bouldoukian, Wilkins, & Evans, 2002). Other visual problems that are often mentioned include binocular fixation instability and poor vengeance control, increased visual crowding, as well as slight visual-spatial attention deficits.

Although these are all plausible proximal causes of reading impairment, both their prevalence and their relationship to reading retardation remain hotly debated, especially since visual disorders are often accompanied by a phonological deficit.

Whether a magnocellular dysfunction is the underlying cause of those proximal visual impairments is far from clear. A number of studies do provide evidence that dyslexics have elevated detection thresholds or abnormal visual evoked potentials for stimuli in the spatial and temporal ranges of the magnocellular system , (Pammer & Wheatley, 2001), although it has been disputed whether some of the stimuli used uniquely tap the magnocellular system , (Skottun, 2001) However, a growing number of studies report findings inconsistent with a visual deficit specific to the magnocellular system ,Heievang(2002) often finding that visual deficits, when present, cover the whole range of spatial and temporal frequencies. Questions have also been raised as to whether group differences could be explained by attention or memory rather than sensory deficits, (Hill & Raymond, 2002). Moreover, visual deficits seem to be restricted to a subset of dyslexics: looking at 7 recent-studies displaying individual data, one finds 37/128 (29%) dyslexics with elevated visual thresholds in the target conditions, (Ridder, Borsting, & Banton, 2001). Finally, no demonstration has been provided that magnocellular dysfunction, when present, engenders visual problems that are more proximal to reading, like visual instability, crowding or stress. In fact, in the case of visual stress, there is evidence that the symptoms are unrelated to magnocellular dysfunction, (Simmers, Bex, Smith, & Wilkins, 2001)

To summarize, a minority of dyslexic children seem to have visual problems. At least visual stress seems to be dissociated from the phonological deficit, and is therefore a possible independent cause of reading disability.

However, the underlying biological cause of these visual disorders and their precise impact on reading still need to be clarified. The hypothesis of a magnocellular origin does not seem to be well supported.

2.3.4 Early Intervention

Research has not been able to identify one type of intervention as better than another for teaching at risk or dyslexic readers, although all methods seem to work for some learners. However, it has been found that early intervention, designed to improve the specific needs of the individual, reduces the prevalence of dyslexia compared to individuals who did not receive intervention or support. Students who had early intervention compared to remediation at an older age show bigger gains in reading accuracy and fluency. It is also easier for them to catch up with their peers, and the long-term cost of their education is lower. (Schneider et al., 1999; Borstrom & Elbro, 1997; National Reading Panel, 2000; Torgerson et al., 2006; O'Connor, 2000)

Teaching focused on individual learners needs. Identification of effective intervention methods for at risk or dyslexic readers is a challenging process because every person with dyslexia is different. To be effective these interventions need to be focused on each individual learner's strengths and weaknesses, and have the flexibility to change with the needs of the 8 individual. (Whiteley et al., 2002; Given & Reid, 1999; Torgesen, 2000; Velluntino et al., 2004; Alexander & Slinger-Constant, 2004).

In the current study, the researcher worked with a small sample to concentrate on each individual learner's strengths and weakness and to focus on teaching them one to one during the intervention program.

Computer assisted instruction. Computer technology is showing great potential for improving reading achievement, with promising approaches for promoting word recognition and vocabulary and comprehension development. (Swanson & Hoskyn, 2000; Pressley, 2001; National Reading Panel, 2000). In the current study, the researcher implemented an intervention by using iPad applications which served as a multisensory techniques to help students improving their reading, spelling and writing skills.

2.3.5 Dyslexia and the Phono-Graphix reading and spelling programme

The study reported here set out to investigate the effectiveness of the Phono-Graphix reading programme with ten learners, aged 9-11 years, assessed as having specific learning difficulties/dyslexia. Testing was carried out via initial and final analysis of the students' phonological processing skills and reading/spelling ability over an 8-month intervention period. The students were instructed on a one-to-one basis and each received an average of 24.3 hours of instruction. Findings suggest that the Phono-Graphix programme did appear to help improve students' phonological processing skills. They further show that a majority of the students recorded an average gain in reading age of 21 months and an average gain in spelling age of 12 months at the end of the training period. Qualitative findings from the study also show overall positive perceptions of the Phono-Graphix intervention among the parents and class teachers involved. The study reported here adds to the total of

information on UK trials of the Phono-Graphix approach and makes a helpful commitment to the literature on remediation techniques for dyslexic students.

The Dias and Juniper (2002)study, carried out in Bristol, involved reception classes in both experimental (using Phono-Graphix only) and control(using National Literacy Strategy plus teachers' preferred resources) groups. Findings are positive for Phono-Graphixin that, while all groups made significant progress, the children taught Phono-Graphix made more progress than the other ch i l d ren and none of the ch i l d ren on theP h o n o - G raphix programme re q u i red additional literacy support in the following year.

Lore's (2001) study also reported favorably on the use of Phono-Graphix with dyslexic students in one school in Surrey. Apart from these two studies, little seems to be documented on use of the approach in the UK, either as a general teaching programme or as an intervention for children with reading difficulties. It was the purpose of the research reported in the present paper, therefore, to add to the sum of knowledge on the approach by testing its effectiveness with children assessed as having specific learning difficulties/dyslexia.

2.3.6 Effects of a Randomised Reading Intervention Study

According to Wanzek, Wexler, Vaughn, and Ciullo (2010), most knowledge about reading interventions concerns early intervention for young children, or interventions for pupils aged 12 or more (e.g. Edmonds et al., 2009). Thus, there is a scarcity of studies for children aged between 9 and 11. Wanzek et al. (2010) conducted a synthesis of reading intervention studies for children of these ages. Interventions with focus on mapping sounds of language to letters and words yielded

small to moderate effect sizes. Fluency training showed inconsistent results. Only two multi-component studies were found and included in the analysis. However, they showed promising outcomes on various reading measures, implying that more research is needed to confirm the effects (Wanzek et al., 2009). The main aim of that research was to investigate the effects on reading-related skills of an intensive phonics-based intervention program for nine-year-old Swedish pupils in grade 3 with reading difficulties.

The intervention program was designed for one-to-one tutoring during an intensive and limited period of time. It was based on three main components: (i) phonemic decoding and phonemic awareness training; (ii) reading fluency training; and (iii) reading comprehension strategies. According to the National Reading Panel (2000), these aspects of reading instruction should be integrated to create a complete reading programme. Reading fluency and accuracy in decoding are supposed to reinforce reading comprehension skills. Four aspects of reading were in focus: reading comprehension, spelling, reading fluency, and phoneme awareness. Structural equation modeling (SEM) was used to analyse interrelations among these aspects. The idea was that adequate reading comprehension, reading fluency, and spelling are the skills to be developed, and that phoneme awareness underpins these skills. Using latent variable models, the effects of the intervention were examined over time with longitudinal data.

The researcher in the current study implemented an intervention program relevant with the content of the learning outcome of grade three which lasted for eight weeks (two months) to examine the effectiveness and the improvement in three essential skills which are reading, spelling and writing.

The number of students in the experimental group (10 students) gave a chance to the researcher to work with them individually during an intensive and limited period of time.

2.3.7 The Orton-Gillingham approach as an intervention Program

A popular form of phonologically based intervention practiced in Singapore is the Orton-Gillingham (OG) approach. A key feature of this approach is its multisensory instruction that emphasizes the learning of alphabetic phonics in a systematic, analytic (application of rules), cognitive (consciousness of the thinking process), sequential and cumulative (moving from simple to complex) and emotionally sound manner (Gillingham & Stillman, 1997). Its multi-sensorial approach involves the integration of multiple learning pathways, and auditory and visual feedback for sounds as well as the kinesthetic/tactile input of letter formation (Alexander & Slinger-Constant, 2004; Ritchey & Goeke, 2006). This approach also emphasizes explicit instruction in phonology, phonological awareness, sound–symbol correspondence, syllables, morphology, syntax and semantics (Ritchey & Goeke, 2006). These principles and components fall in line with what is prescribed on the basis of empirical evidence (Swanson, 1999; Snowling & Hulme, 2011). However, despite its popularity, relatively few studies have been published in peer-reviewed journals that validate its effectiveness, and where research is reported, studies are troubled by inadequate sample sizes, and by intervention gains being reported in age-equivalents rather than standard scores (see Alexander & Slinger-Constant, 2004).

The purpose of that study is to demonstrate reading and spelling gains in a sample of students with dyslexia in Singapore following OG remediation for one

year. Recently, Chia and Houghton (2011) reported that following a year of OG intervention in Singapore, 77 students with dyslexia made significant progress in word recognition age (WRA) and word expression age (WEA) on the Schonell Graded Word Reading Test-Revised.

In the current study, the researcher used the multisensory approach within iPad intervention program to help students using their senses to improve their reading, spelling and writing skills.

2.3.8 Efficacy of the cell field Intervention for reading difficulties: An integrated computer-based approach targeting deficits associated with dyslexia

Despite contemporary research on dyslexia moving toward multi-deficit hypotheses, intervention studies tend to focus on specific causal mechanisms. The Cell field Intervention, which includes designed activities related to computer and aimed to remediate multiple deficits concurrently is evaluated

Participants were 262 Australian school children (187 males, 75 females; mean age 11.05) who carry out the ten intervention sessions at the Cell field Clinic in 26 mean days between pre- and post- test, during a 24 month period. Pre- and post-intervention data were collected using the Wide Range Achievement Test, the Woodcock Reading Mastery Tests - Revised, the Neale Analysis of Reading Ability, and visual assessments. Significant gains ($p < .05$) were made in all three sets of dependent measures analyzed (i.e., reading-related skills, oral reading proficiency, and ocular measures) providing some support for the efficacy of an integrated approach to the treatment of reading difficulties ,Prideaux, Lee-Ann; Marsh, Kerry A; Caplygin, Dimitri(2005).

In the present study,the result is coming toward the experimental group who carried out the 40 sessions iPad intervention program which improved the skills of students in reading,spelling and writing skills.

2.3.9 The relation of dyslexia with a foreign language

As dyslexia is a language-based disorder (Schneider, 2009), it will affect a student's academic performance in most subject, but no more so than in language subjects such as their first language or a foreign language (Miles, 1999) .

Although dyslexia is not a disorder which can be cured, most dyslexic students work with a special-education teacher in their first language to help them create strategies they can use to succeed in school. The students whom applied the program and involved in the intervention program of the research have the same problem in not only English language but also Arabic language concerning to the teachers' reports and during the interviews with their teachers and parents.

2.3.10 Dyslexia in other languages

Since dyslexia influences one's capacity to process language, it will unavoidably show itself diversely relying upon the language being talked. For instance, the issue of phonological awareness may not be an issue for the individuals who talk a straightforward dialect, for example, Spanish while it is a standout amongst the most widely recognized issues in less straightforward dialects, for example, English. Straightforward languages are those that have an immediate relationship between's the grapheme and the phoneme i.e. there are not very many digraphs and diphthongs (Miles, 1999)

Most students with dyslexia at our schools who speak these languages might, in any case, still have word recovery troubles, motor skills abilities issues or challenges with their transient memory. Other straightforward languages incorporate; Italian, Czech, German and Welsh, while less-straightforward dialects incorporate; English and French (Miles, 1999) Most research on dyslexia depends on how dyslexia shows itself in English local speakers (Arries, 1999). This is because of the way that the vast majority of the examination relating to dyslexia originates from English talking nations, for example, America, Great Britain and Australia. The general comprehension of dyslexia will be influenced by the way that examination depends on the English language as it is a straightforward language (Miles, 1999).

Why is learning a Foreign Language (FL) particularly difficult for dyslexic students?

It is of course problematic to know exactly why a particular subject may be more demanding on one dyslexic student than another since every dyslexic has varied strengths and weaknesses but it can generally be said that dyslexics have problems with learning a Foreign Language (FL) because of two main reasons; 1) their disabilities' nature 2) the way and manner used in teaching at schools (Schneider, 2009, p. 297).

2.3.11 Language differences between Arabic and English speakers

According to Swan and Smith (2001) it has been noted that many learners of English, including Arab learner's public schools in UAE exhibit difficulties with English spelling. These difficulties have been recognized to a number of causes to students at schools, such as the irregularity of the orthographic system of English and

mother tongue interference. The researcher noticed this while intervention program started. These spelling challenges cause learners to confer numerous spelling blunders that twist their writing creation as they can't write even simple words, influencing contrarily their general writing capability. Notwithstanding the negative impact of poor spelling on composing capability, it has been contended that numerous poor spellers have issues with perusing. In this way, general examination has stressed the significance of spelling for improving able second language users, (Ediger .2001.)

It is a fact that Arabic and English are linguistically distant. Swan and Smith (2001) point out that "all aspects of writing in English cause major problems for Arabic speakers". The languages are distinct in almost all linguistic features. For example, in our Arab country, the UAE, we are writing Arabic from right to left, while English is written from left to right. Furthermore, the communication between the written form and the spoken form in Arabic is much more regular than that in English. To demonstrate, the letter /A/ in the words man and make has two different pronunciations. Another example is "silent letters." In Arabic, silent letters are very exceptional, while they are found plentifully in English. Another reason that may cause Arab learners to have spelling errors is Arabic interference. For instance Arabic does not have the voiceless bilabial stop /p/ of English, which seems to cause a sort of confusion too many Arab Learners of English (ALEs) who tend to pronounce it as /b/ and spell it as b .

Kharma and Hajjaj (1997) talked about some of the phonetic refinements that exist in the middle of Arabic and English that makes the obtaining of English for Arab learners entirely difficult. One of these refinements is the distinctions in the

orthographic frameworks. They take note of that "the best trouble for Arab learners of English (ALEs) emerges from the contrast between the apparently unpredictable spelling arrangement of English contrasted and the more noteworthy consistency of the transcendently phonetic script of Arabic" (p. 56). As talked about before, the English composing framework is entirely sporadic which causes most learners of English, including local speakers some perplexity. Interestingly, Arabic has a very general written work framework that is for the most part phonetic. Along these lines, Arab learners, as a consequence of their L1 foundation, will be searching for sound-image correspondence in English words, which is, as Ediger (2001) shows, not accessible in most normal words in English. For instance, as Kharma and Hajjaj note, noiseless and multiplied letters are a percentage of the dialect anomalies that are not found in Arabic, and in this manner befuddle Arab learners.

In like manner, Swan and Smith (2001) examined that "all parts of writing in English cause real issues for Arabic speakers" (p. 199). They talk about a portion of the real contrasts between the two languages that cause Arab learners a considerable measure of troubles. For instance, Arabic is a cursive framework that once in a while perceives words written in segregated types of letters. To show, the Arabic comparable expression of the English word study is يدرس , which is framed of the different Arabic letters(س\ر\د\ي)

Nonetheless, it would be exceedingly irregular to see this word, or most Arab words, composed utilizing separate letters. Another imperative contrast they say is that Arabic is a composition framework that keeps running from right to left, which makes Arab learners misread and now and then incorrectly spell words that contain letters with mirror shapes, for example, p and q and d and b. They additionally add

that the privilege to left written work framework makes learners misread letters inside of words by right to left eye development. For instance, learners may misread form for from.

Bahloul (2007) included another motivation behind why many Arab learners of English (ALEs) discover English spelling extremely troublesome. This potentially on the grounds that the composed structure in Arabic does not understand vowels as much as English does. He takes note of that Arabic just has three composed long vowels, while alternate vowels are short ones that are now and again appeared as images put over or under a few letters. These short vowels show up in the talked type of Arabic, yet are not generally acknowledged in the composed structure. All things considered, most Arabic words are composed just utilizing consonants and the three long vowels that have composed structures. Bahloul includes that an incredible number of Arabic words can be composed without the utilization of any composed vowels. The result is that students in primary schools, especially with dyslexia have a lot of trouble when they start to spell and write words in Arabic because of this variance between both languages.

The short vowels are, as Bahloul continues, easily filled in by skilled Arabic readers using contextual clues. Thus, many ALEs may transfer their knowledge of writing in Arabic to English, and consequently make a lot of spelling mistakes, especially with words that have uneven use of vowels. For example, the results of a study that he conducted on ALE displayed that some students wrote many English words with a unsystematic use of vowels or without the short vowels at all .

To additional complicate the problem for Arab learners, lots of research has shown that the phonological differences between Arabic and English also might

cause some pronunciation difficulties for ALEs that might also extend to hindering the acquisition of spelling. For instance, Odlin (1989) points some of the spelling errors which Arab learners might make to the differences in the phonological systems between Arabic and English. He specifies that some Arab learners be likely to write English words in the same way as they pronounce them. For example, the results of three studies on spelling errors that were done in Jordan by Ramadan (1986), Al- Bakri (1998), and Al-Karaki (2005) highlighted the influence that Jordanian Arabic has on Jordanian learners of English. Results presented that because Jordanian Arabic does not have a phonemic distinction between /p/ and /b/ as in English, many of the Jordanian learners of English who participated in this study tended to misspell many of the words that have the letters p and b. To exemplify, instead of writing playing, many learners wrote belaying .

As we can see in the schools these days, there are many variations of Arabic. Arab Students from different countries usually have different dialects and even in the same country differences in pronunciation can be noticed. In the UAE, students from different Arab countries study in public schools, such as Emiratis, Egyptians, Syrians, Palestinians, Sudanese, Tunisians, and Somalis. The effect of pronunciation on spelling can be noticed in those students. Written work, Examples of the effect of different Arabic backgrounds on pronunciation and spelling can be taken from a study conducted by Broselow (1993). He carried out a study that brought to light some of the phonological differences between Arabic and English that may account for some of the spelling errors that some ALEs make. In his study, Broselow examined the issue of "epenthesis," which refers to the addition of a vowel sound to break consonant clusters. He conducted his study on ALEs in two Arab countries, Iraq and Egypt.

In conclusion, although the issues that the abnormality of English composing framework causes and the characteristic issues dispensed by the formative stages, ALEs likewise appear to be prone to have extra sorts of issues created by the impact of their native language. Being speakers of an exceptionally phonetic dialect that is additionally etymologically altogether different from English in print and elocution, Arab learners of English appear to have a wide range of issues in learning English, specifically spelling, from different learners from different foundations.

In addition to the obvious learning difficulties that ALE have in learning English spelling, and consequently developing their writing proficiency, it seems that that ALEs are not in much a better situation when it comes to learning how to read .

To many researchers, ALEs are predictable to have difficulties in increasing their reading proficiency as a result of the differences in linguistics that exist between English and their mother tongue.

2.3.12 Previous studies related to iPad as an Intervention Program

Dyslexia and iPad

Students with dyslexia have problems with decoding texts; they can get benefit from the usage of differentiated settings and predictive texts. Students report having more control through the crossing point to set up the possibilities they need, e.g. the font size and color, background, color and speech support, alongside with the easy to highlight words, and the zoom in to see more detail (Go Learning, August 2013). For students who have impairment in reading skill, they can only listen to what the text said and try to understand as much as they can. Furthermore, students who cannot write, they can speak orally by using the tool of speech programs,

Nuance and others that permit them to copy out anything with their words. Both potentials can be a 'game changer' for these students, letting them to go to college and do other activities. That way, a tablet can act as an effective education help (Schaffhauser, 2013).

2.3.13 Technology and reading instruction:

New literacies are speeding up this process dramatically, changing the nature of literacy practices and interactions both inside and outside of the classroom. The way in which a student engages with a text is changing, depends upon their interaction. (Leu, et al., 2011) The natural development of Internet based technologies has resulted in the development of a broad range of different tools that can be used to interact with literacies in a variety of new ways (Leu, Kinzer, Coiro, & Cammack, 2004).

Researchers suggest that many educators simply integrate the technology into the classroom with little consideration of the benefits that it may deliver. (Honan, 2012) refers to educators using new technologies within classrooms as 'old wine in new bottles' (Honan, 2012, p. 83). This example highlights that some educators simply use electronic texts in the same form as they would a paper copy of a book. In working in this fashion, some educators are failing to realize the potential that these texts can provide. Bormann & Lowe (2010) and Larson (2010) refer to the benefits that reading on an electronic device can provide.

2.3.14 Tablets for students with special needs

Tablet PCs were not initially intended to be instructive instruments, but they rapidly moved into schools (Grezlak, 2011; Jackson, 2011; McCrea, 2010).

Instructors at all levels are receiving cell phones and are discovering energizing approaches to utilize them in their guideline (McMahon & Walker, 2014). These hand-held gadgets offer students with and without disabilities simple access to learning open doors, data, hierarchical frameworks, correspondence, and, fascinatingly, emotional reinforce (Newton & Dell, 2011). The same highlights that speak to the general user (basic interface, adaptability, speed, practicality, implicit camera, web association, area administrations, mixture of applications) make them an important instrument that can upgrade teaching and learning (Schaffhauser, 2013).

Touch screen offers numerous preferences to students with disabilities (Bouck, 2007).They can access a tablet significantly more successfully than a PC. Items like Avaz that encourage kid's special needs and their care givers have added force to the movement towards tablets and far from bigger gadgets (Mitra, 2013). The touch screen presents a range of sensory input and proficiencies. The most effective teaching strategies with children with disabilities involve visual, auditory and kinesthetic (tactile) learning cues (McCrea, 2010). Tablets incorporate a hands-on component that is anything but difficult to utilize. The probability for greatly personalized usage is an additional advantage, by the use of the personal selection and organization of applications (Johnson, 2013 b).

Furthermore, tablets encourage the move to cloud-based and web-based software, which enable a student with disabilities switching easier between various tools (Schaffhauser, 2013).

There are two benefits for students with disabilities: they are motivated (Johnson 2014) to learn and they facilitate more tailored learning, as it is easier to

differentiate instructions and follow progress and to delete, adjust, modify content to suit all students' diverse needs (Robinson, 2014).

In this way, tablets help distinguishing between different learning styles and the capabilities of learning and enable them with several methods to access and present knowledge to students with disabilities whom challenging with traditional methods, Technology is facilitating and making it easy to differentiate instructions among diverse students. "It can be so definitely differentiated" (Dwight, 2013, pg.51). An additional attractive aspect of tablets for students with disability is their inclusive way to make students so closer to their peers (Schaffhauser, 2013).

The Tablets for Schools report published in 2013 in the UK proposes as one of its most stimulating results that tablets are opening up a new world of promises for students with special needs. One result was that "by choosing the right apps. Students with special needs were capable of keeping up with other classmates in the class and doing homework as peers by using the same tool, besides, they got immediate feedback" (Tablets for schools, 2014 C) and the more students with special needs using these apps, the better achievement will gain when they learn the same materials as their classmates during school (Tablets for schools, 2014 C).

Students with disabilities use the same tool as others and they are sociable and not sitting alone (Clarke, Svanaes, & Zimmermann, 2013). For example, Hanan Elattar, Research for the UK Tablets for (McClanahan, Williams, Kennedy, & Tate, 2012) schools report showed that SEN students improve a sense of achievement when they use the similar apps as their peers (Tablets for schools, 2014 C).

Attractively, according to the tablets for schools report, most of the apps that were found to be useful for SEN students were not designed especially for these students. Teachers contributing in the research are likely to recommend multipurpose applications (e.g. dictionaries or mind maps) for students with special needs. One of the example related to applications, usefulness is that student academic achievement as a result of iPad use was the most likely benefit mentioned in the survey conducted by the Curtin University (Australia), enhanced student motivation and ease of individualized instruction are likely to result in improved student competencies (Johnson, 2013).

2.3.15 Multisensory Instructional Approach for Reading skills

A multisensory approach for teaching students with dyslexia and reading disabilities (Moats & Farrell, 1999), "regularly includes a hand-kinesthetic segment" (Moats & Farrell, 1999, p. 1) for teaching or learning language structure; e.g., utilizing manipulative shapes as a part of the type of letters to take in the letter set, or feeling so as to rehearse discourse with the fingers the way the sounds are framed with the mouth. Studies of the brain have demonstrated that there are no less than two types of long-term memory forms (Shaywitz, 2003). One includes orderly learning of skills, for example, critical thinking and perceptual discovering that are performed consequently.

Canals and Farrell (1999) reasoned that, because of the two sorts of long term memory storing, multisensory course would be successful as students with dyslexia may figure out how to utilize one kind of long term- memory in recompense for a deficit in the other. Further, they asked for that, in spite of the fact that instructors

and clinicians have long employed multisensory instructional practices, there has been little acceptance in support of their utilization by experimental research.

Joshi & Boulware-Gooden (2002) examined the adequacy of the multisensory way to deal with to enhance reading skills in first grade students. Is precisely needed to choose if, after one year of multisensory guideline, there would be improvement of students' reading comprehension and phonological abilities. The members were four classrooms from inner-city schools. There were an aggregate of 32 subjects in the control groups and 24 in the experimental groups. Two of the classrooms (control group) were taught utilizing the Houghton-Mifflin Basal Reading Program (Houghton-Mifflin, 2001) and two of the classrooms (experimental group) were taught utilizing the Language Basics: Elementary (Cox, 1974), a project in view of the Orton-Gillingham Alphabet Phonics Method. The letter is a multisensory methodology taking into account the standards of Samuel T. Orton, a neurologist, who supposed that reading disorder with children were because of an "absence of cerebral dominance" (Lerner, 1985). In spite of the fact that Orton's standards for a multisensory methodology to teaching reading have been in presence since the 1930_s. The methodology is regularly alluded to as the OG technique a multisensory system that uses "sounds, syllables, words, sentences, and written discourse" (Joshi, Dahlgren, & Boulware-Gooden, 2002, p. 231).

One example of teaching students by utilizing OG technique, Students in the experimental group were taught lessons that included the three learning modalities of aural, visual, and kinesthetic – all parts of a multisensory approach. The multisensory lessons included guideline on "phonemic awareness, alphabet exercises, oral dialect, reading and spelling practice, reading comprehension and vocabulary improvement

in light of the sound-structure of the English language" (Joshi, Dahlgren, & Boulware-Gooden, 2002, p. 234). Students in the control group were taught reading lessons from the Houghton Mifflin Basal arrangement.

Findings (Joshi, Dahlgren, & Boulware-Gooden, 2002) demonstrated that significance increases in reading comprehension, translating, and phonological awareness were made by the experimental group (utilizing the OG technique) however, the control group (utilizing the Houghton Mifflin Basal arrangement) just enhanced in reading comprehension. In comparison of the addition scores of the treatment and control group, discovered the increased scores of the experimental group higher than of the control groups: phonological awareness, $F (1, 53) = 5.02$, $p < 0.03$; decoding, $F (1, 55) = 8.94$, $p<0.004$; reading comprehension, $F (1, 52) = 6.35$, $p < 0.02$. The analyst's concluded that the higher scores of the youngsters in the treatment gatherings could be ascribed to the use of the multisensory guideline. Their decision gives backing to the utilization of multisensory guideline in the present study.

2.3.16 The benefits of multisensory teaching for spelling skills

Research (Hildreth & Gertrude, year) found a direct correlation between a student's favored learning modality and his spelling capability. Students whose favored modality is primarily visual find learning to spell almost effortless and are often referred to as "natural spellers." They can tell whether a word "looks" right or wrong at a glance and often excel at spelling even when not taught spellings a separate, formal subject. These are the lucky learners for whom the advice "teach them phonics and give them lots of good reading materials and they'll learn to spell" actually works.

Unluckily, not all learners are visual learners. Poor spellers, more often than not, learn best through a modality other than visual recall.

Kinesthetic learners need movement that involves the large body muscles to learn professionally. They find writing a word several times using whole arm movements to be the most helpful way to master spelling words. When asked how to spell a word, it is not uncommon to hear the kinesthetic learner say, "just a second, let me write it down." Their necessity on their motor-memory of a word's spelling requires them to "feel" whether a word is correctly spelled (Young, 2001).

Because of the focus on movement and probe of concepts, kinesthetic learners often benefit from "hands-on" curriculum approaches when learning spelling skills and rules. While hands-on learning includes kinesthetic elements, they are not one and the same approaches. The concept of a hands-on curriculum goes further than simple use of movement in learning .

To learn the spelling of words, an auditory learner depends on memorizing the sounds of the letters being recited in order (Rayner, 2006). For the auditory learner it doesn't matter who is doing the reciting, it could a recording, his teacher, or even himself. Singing the spelling of a word in a rhythmic or singsong way is even more likely to help the auditory student recall the correct spelling of a word and motivate him to complete the necessary repetition required to learn the material. Spelling riddles, silly songs about the spelling rules and exceptions, and other activities that "play with sound" greatly appeal to and aid recall for these students. Because auditory learners naturally focus on sound patterns, they benefit more when spelling words are grouped by sound patterns rather than the grapheme (written) patterns that are typically used in "phonics for reading" programs. Because they

depend so heavily on their auditory memory and the related phonetic cues, it is crucial that the teacher check that the student can properly pronounce his spelling words (Donna, 2001).

The tactile learner absorbs information best through the act of physically touching that requires small motor movements and activities that emphasize "feeling" an item with the tips of his fingers. He may primarily look like to be an auditory or kinesthetic learner, but he is truly learning through the tactile impressions made as he writes or recites the spelling of a word. Individuals in this last group recall the spelling in terms of the lip and throat movements made when spelling the word aloud for him.

Tracing the word with the tips of his fingers or feeling the shape of the word also helps the tactile learner master his spelling words. In this regard, adding pleasant textures or sensations creates a stronger neural impression of the words. In the past, tactile and kinesthetic learners' were often put up with together. However, some of the most current research on how the brain functions shows that two distinct and separate areas of the brain are responsible for storing these two types of sensory input.

Students' dominant learning modality may also have developmental implications. For example, very young children are known to learn mainly through auditory modalities; early school-aged students tend to use more kinesthetic and concrete avenues; and as a student nears adolescence, he tends to rely more and more on his abstract and analytical reasoning along with his visual recall. Skills taught using only one learning modality may need to be re-taught using another modality as he enters each new developmental level and begin to depend more on another

learning modality to store and retrieve information. Teaching using multiple learning modalities eliminates this inefficiency (Anderson, 2004).

Research has consistently shown that use of simultaneous multisensory teaching and learning approaches are critical for students who have moderate to severe learning disabilities. In the mid-1920, Dr.Samuel T. Orton and his colleagues Anna Gillingham and Bessie Stillman (Gough, 1996) first initiated using multi-sensory techniques with his dyslexic students. Orton was influenced by Grace Fernald and Helen Keller's descriptions of the kinesthetic methods used by Dr. Maria Montessori. Orton theorized that Montessori's use of kinesthetic support of visual and auditory relations would correct the tendency to converse letters and transfer the sequence of letters his dyslexic students made while reading and writing. Their program, which includes multi-sensory learning as well as other important concepts, is commonly called the Orton-Gillingham approach (Gough, 1996).

Recent research demonstrates that the more senses we integrate into the learning process the more well-organized learning becomes for all types of learners (Scheffel, 2008). Farkus (2003, 42-51) Stated, "The power of evidence supporting the benefits of learning-style methodology is compelling. Achievement test scores of students taught using their preferred modalities were statistically higher than of students who were not taught using their favored learning modalities".

To take in the spelling of words, an auditory learner relies upon remembering the sounds of the letters being recited all together (Coffield, 2004). For the sound-related learner it doesn't make a difference who is doing the discussing, it could a recording, his instructor, or even himself. Singing the spelling of a word in a musical or dull way is much more inclined to auditory students with recalling the right

spelling of a word and motivates him to take in the material. Spelling puzzles, senseless tunes about the spelling principles and exemptions, and different exercises that "play with sound" incredibly speak to and help review for these students. Since auditory learners normally concentrate on sound examples, they advantage more when spelling words are assembled by sound examples as opposed to the grapheme (composed) designs that are ordinarily utilized as a part of "phonics for reading" projects. Since they depend so vigorously on their auditory-related memory and the related phonetic prompts, it is critical that the instructor watch that the student can properly pronounce his spelling words (Harold, 2009).

Following the word with the tips of his fingers or feeling the shape of the word additionally offers the tactile learner some assistance with mastering his spelling words. In such manner, including wonderful compositions or sensations makes a more grounded neural impression of the words. Before, tactile and kinesthetic learners' were frequently assembled up with. However, some of the most current research on the functioning position of the brain demonstrates that two unique and different areas of the brain are in charge of storing these two kinds of senses input (Arndt,2006).

Early grade students are known to be taught during auditory modalities; early school-matured students tend to utilize more kinesthetic; and as a student nears immaturity, he has a tendency to depend more on his dynamic and logical thinking alongside his visual review (Bodemer, 2004). Abilities taught maybe utilizing stand out learning methodology ought to be retaught utilizing another methodology as he enters each new formative level and start to depend more on another learning methodology to store and recover data.

2.3.17 Spelling impact on reading and writing skills

Spelling instruction supports reading (Moats, 2006). Accurate spelling directs that students know the sounds of language as well as the letter or letter mixtures that represent each sound (Steffler, 2001).

Students who do not have adequate knowledge of phonics struggle with reading and writing (Ehri, 2000; Fayol, Zorman, & Lété, 2009). Automaticity in reading and spelling needs repeated exposure to letter-sound patterns of the language delivered through explicit phonics instruction (Robbins, Hosp, & Flynn, 2010)

When reading and spelling are taught together, students have more practice applying common patterns. Joining evidence shows that integrated spelling and decoding instruction results in significant gains in multiple areas of reading, including word reading skills, fluency, and comprehension (Graham & Hebert, 2010; Weiser & Mathes, 2011).

Spelling instruction and interpreting instruction are integrated throughout the Reading methods as students learn the letter(s) that represent each sound in the English language. Students are capable of putting this knowledge to use as they learn spelling patterns for single words and syllables. As students become more knowledgeable about the spelling patterns in the English language, their spelling improves (Gentry, 1982).

The process of dictation is a central part of each direct instruction lesson. Students apply the skills they have learned by listening to and spelling each word the teacher dictates to them and develop the students' writing skill as well.

2.3.18 Multisensory Instructional Approach for writing skills

Handwriting lessons are enhanced by the utilization of multisensory exercises that express to diverse senses and make learning fun, which is basic in the classroom. Children learn best by doing, so there ought to be numerous chances for dynamic learning. Manipulative ought bring letters and give a range of distinctive instruments and procedures to accentuate lessons and ideas (Adey, 1999).

Multisensory exercises offer kids some assistance with learning. Indeed, students who investigated letters both visually and tactilely scored higher in a first grade post-test for pseudo-word decoding (Bara, Florence, Edouard, & Pascale, 2007). Another study, led by (Kast, Martin, Christian, Markus, & Lutz, 2007), observed that guiding numerous senses through a written work preparing project helped students with and without developmental dyslexia toward enhance composing abilities.

Multisensory course can likewise offer students some assistance with becoming more taken part in the classroom. Molenda and Navaz (2009) demonstrated that students turn out to be candidly included in multisensory exercises in the classroom. On the other hand, while bringing multisensory components into your classroom, verify they are steady with your educational modules.

In several of research studies, multisensory course is ended up being more compelling than traditional guideline in the territories of phonemic awareness, decoding skills, and reading comprehension (Carreker, et al., 2005; Carreker, Neuhaus, & Swank, 2007; Foorman, Francis, Beeler, Winikates, & Fletcher, 1997; Joshi, Dahlgren, & Boulware-Gooden, 2002). In one study on the advancement of

education related aptitudes, second and third graders who got an Orton-Gillingham-based, manufactured phonics (i.e., part-to-entire) methodology beat kids who got a joined engineered/expository (i.e., part to entire/entire to-part) phonics methodology or a sight-word approach (Foorman, Francis, Beeler, Winikates, & Fletcher, 1997).

Multisensory teaching links listening, speaking, reading, and writing to reinforce learning of the language structure through active student engagement. Multisensory learning implicates the simultaneous use of visual, auditory, and kinesthetic-tactile modalities to improve memory and learning of written language (Ferrell & Sherman, 2011, pp. 25-43).

2.3.19 Empowering readers

Electronic devices can empower readers by providing chances to adjust font sizes and use text to speech functions empowers them to use in built structures to support their reading advance and therefore take part with the text in a more complex way than with a traditional paper text (Gandhi,2007).

Developing struggling readers' skills in the use of new literacies raises their capability to become more skillful readers. The experiences of technology highlight the use of specific devices in a range of educational settings using e-Readers to assist struggling readers (Scardamalia,2004).

The Kindle in this case study gives John a chance to read alone. The Kindle allowed John to adapt the size and placing of the font to his specifications without him feeling overwhelmed by a page of text-dense print. The screen reader and the dictionary prompt were available to support John when he confronted unfamiliar words. According to John, the Kindle was ''cool''. The Kindle allowed John the

flexibility to make choices about his reading content, complimented his use of technology and gave him the independence that adolescents strive to have.

In this case study, the authors described the value of the e-reader in engaging John in reading as providing authentic reading experiences, giving students responsibility and choice in what they read and encourage students to be self-regulating.

Larson ((2010) noted that the e-reader promotes new literacy practices, whilst extending connections and promoting engagement (Larson, 2010, p. 17). The Kindle tools (adjusting font size, text to speech functions) were those that most prompted engagement and placed the reader in greater control when reading the text.

Ciampa (2012) highlighted the differences that may be identified to traditional reading methods. The reading behaviors of the students in the class prior to the introduction of technology were characterized by low participation levels and frequent unmotivated off task behaviors. Children in the class were frequently noted to stop reading when reaching unfamiliar words and were heavily reliant upon teacher assistance in order to continue. During the study, students were introduced to e-readers and read texts in a similar way to traditional texts. Observations of these sessions indicated that students were on task and engaged all of the time. Clear indicators of increase incomprehension were also evident with the use of e-readers. Students were more inclined to have a go at answering questions about the text and were correct on more occasions. Whilst it is easy to identify that motivation was a clear benefit from the use of technology, the side benefits of greater engagement with the text and decreased off task behavior illustrate clear advantages towards meaning making and therefore increased levels of comprehension.

2.3.20 Using iPad support for students with dyslexia

McClanahan, Williams, Kennedy, & Tate (2012) underlined the multiple ways in which the iPad has been used to effectively support reading instruction for disengaged learners. Most notably, the ability to use the device for effective one on one instruction is demonstrated. In analyzing research into the use of new technologies with struggling readers, the modifications that can be made to the texture considered to be of the most useful. The study investigated the use of the iPad in a number of ways, including reading eBooks, using educational websites and utilizing educational games. . The app allowed Josh to read the text whilst recording his voice, and then re-read the text while listening to his own narration .The benefit that was gained from this activity by being able to listen and identify his own miscues, he was able to improve his level of comprehension and gain more from the story. The use of the iPad in this way demonstrates a clear gain to engaging and assisting reluctant readers. Not only does the iPad provide for increased levels of engagement, as mirrored in previous accounts with e-readers, it also provides the means for a way in which to assist with increasing awareness of the text and build comprehension(McClanahan, Williams, Kennedy, & Tate, 2012).

Culén and Gasparini (2011) analyzed how iPad can assist with the teaching of reading in a classroom setting with 26 students. Students were immersed in a technology rich classroom that along with use of the iPad also included interactive whiteboards, laptops and stationary PC's. The iPad was able to be taken home by students, which ensured that students had ample opportunities to become familiar with the use of the device and opportunities to experiment with its use. The theme of engagement was once again evident as a result of this study. 85% of students in the

beginning of the study reported that the iPad was their preferred platform for reading. This figure remained consistent up until the end of the study, where students still preferred this method than traditional print books.

The integration of iPad into a medium sized comprehensive primary school in the Australian Capital Territory served to develop new pedagogical practices in the teaching of reading amongst educators within the school. The leadership team within the school aimed to provide all classes with reasonable access to class sets of iPad devices for use in literacy learning contexts. Little professional in-service was provided to the predominately young teaching cohort, which provided the opportunity for experimentation and new discoveries. Interviews with teaching staff confirmed that the iPad had the advantage of driving participation in reading lessons, by encouraging students who would have been otherwise reluctant to engage in the lessons (Personal Communication, 10 December 2012).

2.3.21 Benefits of iPad on instruction

1. **Easy Interaction:** The high-end touch-based interaction supported by the iPad provides essential quality experience during reading and writing activities (Ostashewski, 2010). This device is easy and quick to use even for digital immigrants as iPad does not require prior digital knowledge for its intuitive navigation gestures [Hutchison, 2012]. Due to its high-end touch-based interaction support, the iPad is a feasible platform for supporting sketch-based activities such as mathematical expressions (MacLean, 2011).

2. **Anytime, Anywhere Use:** The iPad enables both educators and students to use it anytime and anywhere when needed (Kerviv, 2006; Vardy, 2007).

3. **Classroom Demonstration:** The iPad enables students and teachers several possibilities for showcasing and demonstrating their work such as content viewing, video playback facility through iTunes library, or the built-in multimedia database, spot demonstration of any concept and lesson, sharing of content with classmates and teachers (Ostashewski, 2010a; Bansavich, 2010).

4. **Small group teaching**: The iPad is highly suitable for supporting teaching activities in small groups (Ostashewski, 2010a).716 Dhir A., Gahwaji N.M., Nyman G.: The Role of the iPad.

5. **E-readership:** The iPad supports e-readership among students through its electronic textbook capabilities. Additionally, it enriches the reading experience by its note-taking and annotation capabilities (Bansavich, 2010).

6. **Interactive and Collaborative Learning:** The iPad fits best for this kind of learning due to its portability, network capability, ease of use, and support for engagement (iPad in schools, 2010; Bansavich, 2010). The iPad is deemed effective for language learning, presenting new concepts, student counseling, and other research related purposes (Bansavich, 2010).

7. **Localization support:** Students can also use the iPad in their native language (Hutchison, 2012).

8. **Wide-spectrum of Applications:** The iPad supports a large number of applications that can easily serve classroom instruction (Bansavich, 2010). These applications are easily downloadable as the iPad supports quick access to a large population of students (iPad in schools, 2010).

9. **Communication Tool:** The iPad improves communication between students and students can easily collaborate with their peers using email, chat, and other built-in communication tools.

10. **Energy Efficient:** The iPad can be switched off and on without taking much time; hence, it saves battery life-time (Hutchison, 2012).

2.3.22 Font types for dyslexic students

In terms of font types used in dyslexia, Rollo (2014) presented the first experiment on eye-tracking to measure the impact of font type on reading speed and on the performance of reading.

Font types have a noteworthy effect on the readability of students' with dyslexia. Good fonts for people with dyslexia are Helvetica, Courier, Arial, Verdana and computer Modern Unicode, taking into consideration reading performance and subjective preferences. On the contrary, Arial It should be avoided since it declines readabilities. Sans serif, roman and moonscape font types increase the reading performance of our participants while italics did the opposite (Rello, 2014).

In the current study the researcher used Helvetica and Verdana fonts when preparing pretest and posttest for students. From the previous study, font played a great role in enhancing the performance of students with dyslexia in reading skills.

2.3.23 Screen Reading vs. Paper Reading

With an increasing amount of time spent reading on computer screen, screen-based reading behaviors have gradually begun to form. Instead of doing in-depth and concentrated reading, readers spend more time browsing and skipping on the computer screen. Screen reading was also characterized as one time reading, keywords tagging, on-linear reading, and more selective reading (Liu, 2005). In a study of reading practices at the National University of Mexico in 2003, students were asked to do a survey on computer screen reading versus printed media reading.

(Ramirez, 2003) Found that nearly 80% of students preferred to print out the needed digital documents in order to understand the text fully. Nearly 68% of respondents reported that they could gain more information when they read the text on paper format. (Olsen, 1994) Found that lower resolution on computer screens was one of the major reasons that led readers to choose print-outs. He also mentioned that readers could more easily gain "visual memory" (get a sense of the whole text) by flipping a paper document, rather than scrolling on a computer screen. In a readability study in 2010, (Jakob, 2010) conducted a survey on two of the highest profile tablets: Apple's iPad and Amazon's Kindle 2. The study showed that both devices gave readers a more relaxed feeling as opposed to a computer. However, the printed book offered the fastest reading speed over the computer and e-Reader.

2.4 Summary of the literature review

It is obvious from the review of literature that iPad integration in Education has a lot of advantages. Newer forms of interactive handheld devices have successfully transformed the lives of common people into a "digital" one (Attewell, 2005)Handheld devices like the iPad represent "newest technology revolution" mainly because it offers wide range of functionalities in a compact and portable form (Csete, 2004). The iPad was rolled out in January 2010 with slim and thin body, good memory and display size, and high-end multimedia support with advanced graphics. Unlike laptops and PCs, iPad is used via fingers as it provided touch-based screen for its users and comes with an inbuilt support for Wi-Fi and 3G/4G network. These capabilities and features make the iPad superior to PCs, laptops (Churchill, 2008; Song, 2001), and even smart phones (Churchill, 2012).

The iPad is not just a consumption tool, unlike other handheld devices, but it is also meant for easy and socially viable creation and presentation of new ideas and content (Walters, 2011). Existing studies have shown that the iPad is very effective at concept presentation and can also be used as a demonstrator for classroom material; however, the iPad's contributions to educational literacy and learning are still unknown because of the absence of thorough empirical studies (Timmermann, 2010).

It has been claimed that traditional educational systems meet challenges to respect the ever-changing needs and requirements of young children of today's generation (Timmermann, 2010). A modern education system is one in which new forms of pedagogy and instructional strategies are implemented in a way that does not see students as recipients of information only but instead as active participants' who decode information actively and engage in fruitful discussion with peers and teachers.

The ultimate goal of this form of pedagogy and instruction is to support and reflect students' learning so that their needs and expectations are understood and met (Timmermann, 2010).

The overwhelming benefits of the use of technology with dyslexic students are motivation, and engagement in learning. The previous studies work to prove the claim made by (Barone & Wright, 2008). Each experience indicated how the use of technology encourages reluctant readers to re-engage in a new and exciting way. The ability for technology to make texts accessible in new ways through the adjustment of font sizes and layouts are also valuable advantage (Barone & Wright, 2008, p. 302). The multiple benefits of using iPad technology were taken into consideration when designing the applications for the iPad program used in the current study.

Based on the objectives of the current study, Technology motivates and encourages –
Students that are otherwise disengaged when it comes to reading traditional print
books are excited when the reading material is presented in an electronic form.
Technology gives student's responsibility and choice in what they read – By allowing
students the choice to read what they like on an electronic device and making it
accessible through font size or text to speech functions, educators are driving
authentic reading experiences. Students are encouraged to be self-regulating (Barone
& Wright, 2008, p. 302) – Reading on an electronic device is an overwhelmingly
private experience, no-one can see what the student is reading. Students make choice
on what they want to read based on their own opinions – not the peer pressure
exerted from others.

The present study focuses on a multimedia learning device; therefore, it is
important to understand the cognitive functioning of people learning from
multimedia. According to the cognitive theory of multimedia learning (CTML), the
visual information processing channel may become overloaded when students must
process on-screen graphics and on-screen text at the same time (Mayer, 2001).
However, when words are presented as narration, words can be processed in the
verbal channel, thereby reducing the cognitive load in the visual channel. The results
show students who learn from interactive (graphics and narration) learn more deeply
and perform better on problem-solving transfer tests than students who learn from no
interactive (graphics and on-screen text) (Moreno & Mayer, 2000); (Mousavi, Low,
& Sweller, 1995); (Sweller, 1999)). Austin (2009) explains the bases of CTML:

For constructing the iPad program the researcher followed the studies that
suggested specific font types for dyslexic students' reading skills. Additionally,

Piaget's theory on cognitive development guided the researcher through the process of deciding upon the content of the program.

Chapter 3: Methodology

3.1 Introduction

This chapter describes the methods used in this study. A mixed-method approach to the collection and analysis of the data was followed. A quasi-experimental, design was implemented to investigate the effectiveness of iPad tools students' with dyslexia reading, writing, and spelling skills in EFL. Also, the researcher conducted qualitative interviews with the teachers and parents of the students. In addition, this section includes a brief description on the sampling, the instruments, research design, the participants, data collection procedures, data analysis and ethical considerations.

3.2 Sampling

Students of grade 3 at one of the Primary school in Al-Ain were the population of this study. The school was being selected because of the feasibility. The whole population who would comprise is 20 male students distribute in two classes. The majority of the students would from the Emirates whose native language was Arabic. They came approximately from the same social, cultural and economic background. They were all learners of English as a foreign language.

The students have been diagnosed that they have dyslexia according to multidisciplinary team report, class teachers' report, students' IEP and students are documented in Abu Dhabi Education Council Screen (ESIS program) that they are students with dyslexia. The sample had chosen by their teachers to participate in the study as a convenience sample because of the following reasons; the selection of the participants in this study will be conveniently and purposively. In the main, the

criteria of choosing the participants are their accessibility and readiness to participate in this study as one of the main features of the convenience sampling (Bryman, 2012). The students have been chosen according to their language, they can express their ideas, critical thinking and reasoning as they can assess the efficiency of the intervention (Herbert, 1979). According to Piaget theory about cognitive developments, the concrete operational stage is the third stage of Piaget's theory of cognitive development. This stage, which tracks the preoperational stage, arises between the ages of 7 and 11 (preadolescence) years which is the same ages of students in the third grade at school and is classified by the proper use of logic. In the course of this stage, a child's thought processes turn out to be more mature and "adult like". They start resolving problems in a more logical fashion. Abstract, hypothetical thinking is not yet developed in the child, and children can only solve problems that put on to concrete events or objects. At this stage, the children presumed modification where the child learns rules such as conservation. Piaget also determined that children are capable of integrating Inductive reasoning. Inductive reasoning covers drawing implications from observations in order to make a generalization ,(Santrock, 2008).the nature of students' difficulties, the timetable at school, the syllabus of school subjects which should be finished with students before the final examinations and the number of students (20) as an experimental and control group had been chosen too because of the necessity of the program itself as school didn't teach students by using iPad, the time of students themselves to be saved as the researcher interacted with the teachers who teach students during English periods. The intervention program itself needs a lot of focus on each individual to interact with iPad applications. The students taught through the same

teacher. The first group which consisted of 10 students would be the experimental group. The second group which consisted of 10 students would be the control group.

Students

Twenty 3rd grade students with and without dyslexia participated in the study. They were enrolled in EFL classes. The students are diagnosed with dyslexia according to the school's multidisciplinary, IEP team report, class teachers' report, and students have statements of dyslexia from Abu Dhabi Education Council Screen (ESIS program). The teachers nominated the students with dyslexia. For this purpose, the students of grade 3 with dyslexia were the population of this study.

The students received little or no previous instruction on the English syllabus before the current study. Prior to the beginning of the instructional period for the current study, a cooperating English teacher at the school split the classes in half by randomly drawing names of the students and placing them in two groups (control and treatment). Since the students are randomly placed in the classes at the school, the occurrence of comorbidity for both treatment and control groups would be similar; that is, the diversity of challenges among the students would be similar due to the randomness of class assignment. However, the students in both groups have been selected purposively according to the views of English and special need teachers related to the previous reasons.

Table 1 provides information on the study's participants.

Table 1: Subject Demographics Age Percentage of Students Grade Percentage of Students Number in experimental and control group

Teachers from	Teachers of the	Parents of	Control group	Experimental

the school	students with dyslexia	the students with dyslexia		group
15	3	7	10	10
12 Males and 3 females	2 Males and 1 female	3 Males and 4 females	Males	Males
2 Special and 13 General Education teachers	1 Special and 2 general teachers		3rd grade	3rd grade
			8-11 years old	8-11 years old
			Emirati	Emirati

3.3 instrument

3.3.1 Pilot study

A pilot study is pre-testing or 'trying out' of a particular research instrument. It conducted for the purpose of developing and testing adequacy of research instruments (Baker 1994: 182-3).In this study, the pilot study enabled the researcher to test the validity and reliability of the instruments before their implementation, with a number of participants. Specifically, the content of the iPad applications used in the program were piloted through two students from the same school. Additionally, the questions of the parents' and the teachers' semi-structured interviews were also piloted with two parents and two teachers before their implementation with the study's participants. The purpose was to check whether the content of the iPad program and of the interview questions would measure what they were supposed to measure, eliminating mistakes and enhancing the trustworthiness of the study.

The following instruments were implemented for the purpose of the study (Table 2).

Table 2: Responses of teachers toward the survey relating to technology in general and the implications of the iPad use on students' with dyslexia learning.

15 Teachers	3 Teachers	7 Parents	10 Students control group	10 Students experimental group
Questionnaire	Semi-structured interviews	Semi-structured interviews	iPad program Pretest-posttest	Pretest-posttest

Questionnaire

The questionnaire was given to a sample of teachers in the same school and involved questions pertaining to information on what the students with dyslexia needed to learn; what skills lack; how they enjoyed learning; and the level of skills they needed to acquire in EFL. This was background information used to decide upon the content of the applications on the iPad. This was necessary as the objective of the program was to target those problematic skills of the students with dyslexia for learning English as a foreign language.

3.3.2 Semi-Structured Interviews

The semi - structured interviews with the teachers and the parents of the students with dyslexia as a qualitative tool provided the study with more details and in depth information on the students' with dyslexia development in reading, spelling, and writing skills by using iPad technology.

Using a semi- structured design for the interview would allow the researcher to ask some specific questions, with a space for open discussion for other potential ideas that might occur during the interview. It would allow determining the parents'

and teachers' feedback and their notes toward iPad applications about reading strategies and how their children influenced by the use of reading' strategies, Gordon (1975). In the semi-structured interviews the questions are open ended thus not limiting of the respondents/interviewees choice of answers (Gubrium& Holstein, 2002, McCracken, 1988). The purpose is to provide setting/atmosphere where the interviewer and interviewee can discuss the topic in detail. The interviewer therefore can make use of prompts and clues to help and direct the interviewee into the research topic area as a result being capable of gathering more in depth or detailed data set (Creswell, 2003, McCracken, 1988, Patton, 2002).

The researcher transcribed the notes and analyzed the data for the common themes and key issues related to the questions. The data was then reviewed several times and the results were built from this careful analysis of the data.

3.3.3 Pre and post-test

The pre and post-test was used as a quantitative tool to measure the participants' improvements in reading, spelling and writing.

According to Whitney (1996) the purpose of using pre and post-test is to quantify the knowledge attained in the class from a group of students with diverse learning styles and educational backgrounds. More specifically, the tests indicate how the students are learning in the course. The data would target students requiring extra help and would identify teaching and learning methods that need to be changed or developed.

3.3.4 The construction of the iPad intervention program

The applications integrated within the specific iPad program were constructed by taking into consideration the useful information by the students' with dyslexia teachers. The researcher distributed a questionnaire to the teachers (Appendix D) to identify the level of the students' with dyslexia in spelling, reading and writing; what they needed; what they enjoyed in learning; how they enjoyed learning.

A sample of 17 teachers responded to the questionnaire (Table 3). Table 3 indicates the questionnaire and what are the responses of teachers toward the most common skills that the students with dyslexia need to acquire; the programs they need; and the applications that might help them improve their spelling, reading and writing skills in EFL.

Table 3: Information from the teachers' questionnaire

Gender		Years of experience	Teachers' views	
Males	Females	Most teachers have more than 5 years of experience	Teaching methods	Technology
10	7		Language skills specially spelling, memorization skills, phonics, reading comprehension and handwriting.	All of them used computer software in teaching. Most of them (99% like to use iPad application in teaching. Most of them (95%) heard about iPad applications, useful features used in learning applications for children with dyslexia.

Most teachers (above 90%) agreed on the importance of technology and of iPad use for teaching students with dyslexia. Based on their information, the researcher started brainstorming on how to construct and what kind of applications to integrate into the iPad program to help the students with dyslexia improving their spelling, reading and writing skills in EFL.

3.3.5 iPad Implementation

The experimental group had 45 minutes for use of iPad during each English period. Only the experimental groups had access to the English skills app. The researcher confirmed this by downloading all of the general reading, spelling and writing apps on my own iPad and checking them thoroughly for inclusion of note reading. The researcher borrowed (10 iPad) for the study from me and school teachers. This was an applicable number since there were no more than 10 students at a time in the experiment group. Student's appeared excited to try the iPad. The researcher had downloaded 10 games for the students in the experimental groups to use during iPad time. I downloaded the apps (reading, writing and spelling) on each iPad and purchased. The students in the experimental group worked on the selected app. Since there were no more than 10 students in the group, The researcher was able to monitor the students in the group to make sure they did what required to in front of me. There is an aural component to the guided-practice app. The tones are sounded simultaneously with a child's voice saying the name of each word. The researcher gave initial instruction for the each skill app to the group and had the students started to practice the program with my help and instruction. Students in the experiment group quickly became involved in the app and were very interested in moving through the levels. Students moved through the levels at their own pace and were

able to repeat the exercises in each level as many times as they felt necessary to learn the material. This supported the concept of over learning that was shown to be effective in Nicolson and Fawcett's theory (1990) of automaticity, Automaticity is often defined as processing without attention. Attention is necessary to support initial performance, but gradually with practice, the need for attention diminishes, until ultimately performance can proceed without attention (LaBerge & Samuels, 1974; Logan, 1978; Posner & Snyder, 1975; Shiffrin & Schneider, 1977).

The researcher noticed that students in the experimental group enjoyed the use of the iPad and responded positively to its multisensory capabilities. Such capabilities included the way they could move images on the screen with their fingers and manipulate the size of images or words on the screen by the swiping of the thumbs and fingers. Students also had fun trying the different games. They especially liked the ones that included different levels of play so they could challenge themselves and each other to reach higher levels. The iPad apps had chosen carefully to enhance students 'reading, writing and spelling skills and help them in the intended course. These apps were arranged and numbered so students could find their way to their iPad and use the same one for every session. The app is designed in such a way that students may always repeat and review levels of learning. The researcher cleaned all iPad screens with a antiseptic wipe after each period. Students accustomed well to the routine of each iPad period. They were able to get over the excitement of having an iPad to use and would quickly become quiet at the opening of each period to listen for my instructions. The experimental group was able to work their way through different levels of intended apps for spelling, reading and writing skills.

3.3.6 The criteria of Program's iPad Applications

The multisensory applications used in the study were developed by the researcher and enabled the students with dyslexia to use all of their senses, for example, to hear, see, and touch the music notes, allowing them to practice for automaticity. Additionally, the applications chosen were consistent with the recommended criteria for the selection of instructional standards by ADEC (Roblyer & Doering, 2010). The instructional applications had appealing formats and activities, with levels matched to the capabilities of the students with dyslexia. Also, the applications were examined for their instructional value so that "…students will be motivated rather than frustrated by the activities" (Roblyer & Doering, 2010, p. 92), taken into consideration any "…social, societal, and cultural…" implications (Roblyer & Doering, 2010, p. 92). The applications chosen for the guided-practice exercises on the iPad met all of the ADEC's criteria for what is considered good instructional software. The applications were attractive and students could advance their level depending on their abilities on reading, writing, and spelling (Appendix C). Students were motivated to progress through the different levels by comments that appeared on the screen. The 3 applications were educational and included aspects of teaching the English skills under investigation. For example, an aspect of the applications allows students to use their senses to learn. Students may choose the applications which they prefer to start with or may choose their additional games which also intended to enhance learning. The applications were developed by the researcher and incorporated both directed (objectivist) and constructivist ways of learning in that it is a guided-practice operation that also provides pathways for students to develop their learned skills farther through the exploration of different ways to spell, read and write. The researcher evaluated the content validity of the

apps through professional teachers who teach students at the same school as these apps are matching are suitable for students 'ages, the content of the intervention test and straightforward (Appendix d). .This included reading melodies of their choice and playing along with educational apps. "Software based on constructivist ideas allows the user to derive some meaning from the experience of using it, which is not typically a result of drill-and-practice software" (Dorfman, 2006).

Table 4: Applications used in the iPad program for the students with dyslexia

Target Skills	Applications	Description	How to play
Spelling	Simplex Spelling Phonics English	Improves English spelling and reading skills by using a powerful combination of phonics lessons, spelling/word patterns, our unique "reverse phonics" approach and contextually relevant spelling rules.	Guides the student and acts as a personal spelling coach with every word, while teaching "how to spell" English words. - not only teach a list of words, but to teach students "how to spell" these words. -have a higher level of literacy than students who learn to read by using flash cards and the whole word approach. Also that not all readers are good spellers, but almost all good spellers are also good readers.
Writing	Jumbled Sentences	-is a series of five free iPad apps designed to help students learn to construct sentences. - drag and drop activities in which they sort jumbled words into sentences. -When students correctly create sentences they earn virtual coins that they can then use to buy virtual stickers to mark their progress.	-The students put the parts in order to form a sentence. -They tap on 'OK' to check their answer. Students earn one coin for each correct answer. If they get stuck, they tap on 'Hint' and use one coin to find out the next correct part. They play as fast as you can to level up. The more coins they collect, the more hints or stickers they can get. They can design their own sticker page with the colorful stickers.

| Reading | The Visual Reading App | -assists those with Dyslexia, or individuals who have difficulty reading words. | -The students need to place images or videos above each word. They have fun adding their own concrete nouns for everyday common objects that they are familiar with. - For some abstract words the students are encouraged to find images or make videos that are familiar with. |

3.3.7 The Spelling Skills Test

A spelling test designed to check the students' with dyslexia ability to spell words with short and long vowels, which included in the students' outcomes documents. The purpose of this achievement test was to measure the students' proficiency to spell words well. The test would be comprised of 12 items. The test would take 40 minutes. All items in the test were equivalent to what included in ADEC's syllabus (outcomes).

Table 5: The Spelling skills test

Skill	*Test description*
Spelling	1- Short a (a):
	2- Short o (o):
	3- Short I (i):
	4- Short u (u):
	5- Short e (e):
	6- Long a (a_e):
	7- Long a (ai):
	8- Long a (ay):
	9- Long o (o_e):
	10- Words with (sh):
	11- Words with (th):
	12- Words with (ck):

3.3.8 The Writing Skills Test

In the writing test, the student would answer Jumbled Sentences which designed to help students learn to construct sentences. The test provided students

with drag and drop activities in which they sort jumbled words into sentences. The sound could be turned off and on in each app. When the sound was turned on students could hear the words read them by the narrator. The narrator also read the sentences that students construct. The test provided students with immediate feedback on each of the sentences that they built to mark their progress.

Table 6: The Writing skills test

Skill	Test description
Writing	(jumbled sentences)
	Drag the words into the correct boxes and make a correct sentence.

3.3.9 The Reading Skills Test

The reading test included 5 items, i.e., phoneme blending, phoneme segmentation, phoneme deletion, phoneme manipulation and reading real words. These different items had chosen carefully according the courses of English at school and with the cooperation of teachers at school. These varied items to give both the researcher and students a chance to evaluate and assess the students' abilities in reading skill. All items in the test were equivalent to what included in ADEC's syllabus (outcomes).

Table 7:The Reading skills test

Skill	Test description
Reading	1- Syllable Deletion
	2- Phoneme Categorization
	3- Phoneme Blending
	4- Phoneme Segmentation
	5- Phoneme Deletion
	6- Phoneme Manipulation
	7- Nonsense Words and Real Words

This test contained three skills, i.e. spelling, writing and reading would be used in evaluating students' vocabulary improvement in the primary school would be

used as the major instrument in this study. The researcher chose to work with students in order to improve their reading, writing and spelling skills and not only one skills as they are integrated skills and effect on each other (Chamot and O'Malley, 1994).Also, students have learned Math and Science by using English Language and according to ADEC Policy In Cycle 1 grades, the language of instruction will differ by subject. English Medium Teachers (EMTs) will provide instruction in English Language, Mathematics, and Science (Policy Manual 2012-2013 P-12).that's why the researcher used the three basic skills of reading ,writing and spelling in the current research as a step to improve these skills which will help students not only in English Language but also with Science and Mathematics subjects. The purpose of this achievement test was to evaluate the students 'improvements as the researcher would modify the test and would investigate its validity and reliability beforehand. A pretest would be held at the beginning of the third semester. All items in the test were specified in the students' outcomes documents and its standards and at the same time on iPad applications. Most of the language used in the test would include spelling, writing and reading exercises learnt in previous years' textbooks as well as the target items in the test.

The posttest would be held 8 weeks later which is the period allocated for the whole course coverage. In this way there would be no harm on students' achievement as the teacher would follow the schedule and instructions of the school. The study would be carried out during the students' timetable.

3.3.10 The Scoring System

The researcher used a pretest posttest with the criteria of the students' standards document as follows; Mastered, Developed, Emerging and Not achieving.

The teacher would tick under the face which suited students' responses (Mastered= 3 marks, Developed=2 marks, Emerging=1 mark, Not achieving= 0 mark) according to the time of the test.

3.3.11 Reliability and Validity

The content of the pre and post-tests was reviewed by a jury of experts in the UAEU and experienced school teachers. The pretest would have the same type and number of questions as the posttest. In addition, the rubrics for assessment would be the same. Johnson and Christensen (2004) proposed that any testing effect that might have occurred in the experimental group would have also occurred in the control group. In addition, The researcher would make sure that participants received no feedback about pretest responses prior to receiving the treatment and taking the posttest.

As for the test validity and reliability, to determine the validity of the test Is chose to measure the content validity by asking a jury of five experts to judge the validity of the test.

As for reliability, The researcher determined to measure the stability of the test by the test retest reliability or stability reliability. The same test would be administered twice within one weeks' time. Then correlated the two tests scores to measure the stability of the test.

The internal consistency reliability would be measured by the split half reliability. The test divided into two comparable halves and administered for one group. The participants' scores of both halves would be calculated and the two sets of results would be correlated.

Halkier (2010) explained validity as what a research focuses on and sets out to explore. This research has answered the questions raised in this study. The questions were answered in a subjective way and they supported the purpose of the study, which is to explore the academic effects of integrating iPad technology in teaching 3rd-grade primary school students with dyslexia, English as a foreign Language (EFL) reading, spelling and writing skills. (Yin, 2009, p. 42) Stated that there are two types of validity, which are internal and external validity. Internal validity, according to (Yin, 2009), seeks to confirm that the research answers the study questions, and external validity clarifies whether the study can be generalized or not. The outcome of this research cannot be generalized; however, the research questions have been answered adequately. Nonetheless, the possibility of transferring the outcome of this research for use in other similar context can as well not be ruled out.

The reliability of this study refers to how the method of data collections can yield a repeatable and consistent result. (Yin, 2009) Stated that the reliability of a study shows the degree of trustworthiness that one can find on the procedure or the instrument used and to ensure that if the same study had to be carried out by another researcher it would be almost exactly the same result. Essentially, (Kananen, 2011) clarifies the reliability quality of a subjective examination approach as far as "repeatability" and "consistency" in the translation of the exploration result. As such, this tosses all the more light on the likelihood of concocting same results ought to the study be rehashed. The face to face interview of this study was completed from 3 elementary school teachers (grade 3) and the parents of experimental group students (7 parents). The consequences of the analysis completed on the information gathered from the teachers and parents were comparative in correlation which related the

utilization of technology and its effect on enhancing students 'skills. Basically, the results from the pre and posttest and face to face interview were reliable from the perspective of differentiation in points of view and conclusion. The consistency in the clarification of the research results from pre and posttest and interview techniques fortified the reliability and validity of this study.

3.4 Research Design

3.4.1 The philosophical paradigms and my methodological choices

In order to show what The researcher decided was the most appropriate methodological approach for this research, the ideas and objectives of two main research paradigms - the positivist and interpretive/constructionist prevalent in special needs research are underlined. This is important as the decision making process when approaching research depends on the paradigm which is followed (Avramidis & Smith, 1999:27). The following table compares the two paradigms.

Table 8: Comparing the two paradigms

Underlying assumptions about:	Interpretivism	Positivism
Purpose(s) of research	To understand and interpret daily occurrences and social structures as well as the meanings people give to the phenomena	Discover laws and generalizations which explain reality and allow predict and control
Nature of reality (Ontology)	Multiple, constructed through human interaction, holistic, divergent	Single, givens, fragmentable, tangible, measurable, convergent

Nature of Knowledge (Epistemology)	Events are understood through mental processes of interpretation influenced by and interacts with social context-mutual simultaneous shaping	Events are explained based on knowable facts, real causes or simultaneous effects; lawlike regularities exist
Relationship between the knower and the known	Interrelated, dialogic	Independent, dualism

Positivism: The positivist view of phenomena as independent entities and quantifiable variables unaffected by the existence of other phenomena cannot represent their dynamic and cultural character. Positivists argue that the purpose of looking at phenomena scientifically is to establish causal explanations for social phenomena (Schwandt, 2000:190). The positivist paradigm has a tendency to employ quantitative methodologies, which presuppose a specific theory from which specific cases are drawn. Theoretical assumptions are developed before the beginning of the research, and determine the type of data required to test them; 'the previously acquired knowledge is substantiated in the form of an expanded and confirmed paradigm' (Markova, 1994:161).

Interpretivist/constructivist: Interpretivist/constructivist researchers argue that reality is subjective and has multiple meanings which people construct through their actions in the social world. It is necessary to understand human action and participants in research should be allowed to reflect on the phenomena under study and act upon them (Robson, 1993). The interpretive approach studies 'the individual [through] small-scale, non-statistical research, interpreting the specific; the researcher had an active personal involvement and deals with 'micro-concepts:

individual perspective, personal constructs, negotiated meanings, definitions of situations' (McKenzie, 2001:17).

The effects of iPad intervention program on students' with dyslexia skills was studied using both qualitative and quantitative methods to enable a holistic and deep understanding of how their skills are improved and what significant others around them identify as their weaknesses and strengths in using the iPad program.

A mixed method design used in order to obtain rich data about the participants' reading, spelling and writing development; in which multiple instruments are required.

The basis for conducting the multi method design is to support the quantitative data through providing in-depth qualitative information for more rich understanding of the quantitative results. This method of research is titled as embedded mixed method design which Creswell (2012) identified it as a design "to collect quantitative and qualitative data concurrently or serially, but to have one form of data play a helpful role to the other form of data" (p. 544).

A quasi-experimental research implemented on two classes of grade 3 male students at one of the primary school in the UAE. One of the two classes would be used as the control group where the reading skill would be taught and learned without using iPad. The second class would be the experimental group where the reading skill will be taught and learned using iPad tools (applications). A pre-test, posttest experimental design would be used to assess the general reading skill and its two relative components: spelling and writing to answer the first research questions. A Simi-Structure Interviews would be administered to the students' parents after the

end of the experiment to answer the posttest of the intervention program. The independent variable is employing iPad tools in learning and teaching the reading skill. The dependent variables are the general reading skill and its two relative components: spelling and writing.

3.4.2 Timeframe

The study took place during the final two months at the close of the 2014 - 2015 school year. The pretests were administered to the students prior to the beginning of the structured learning outcomes of Abu Dhabi Education Council (ADEC) syllabus for grade three and the students took the posttests during the final week of the English syllabus' lessons. The instruction for the English reading, spelling and writing skills occurred over a period of 8 weeks (in between pretest and posttest) in a series of 40 lessons. All the ethical guidelines were followed in the study. Permission from the school administration was established the week prior to the beginning of the study and a letter of information on the study's objectives and a consent letter (Appendix A) was sent to parents through school before the onset of the study. Parents were given the option to refuse the participation of their children in the study. Moreover, a letter of consent (Appendix B) was read to the students prior to the beginning of the study to inform them about their participation in the research.

3.4.3 Site and Subject Selection

School

The site chosen for the study was a public; primary school (cycle 1), where the researcher worked before and the administration expressed the interest for the intervention program to be implemented with their students. The school is under ADEC supervision and Al-Ain Educational Zone where they applied inclusion for

children with learning disabilities. The school provides service to students and their families in the surrounding areas with a socioeconomic status ranging from low to high income.

All students at the school have language-based learning disabilities /differences which include dyslexia, and possibly dysgraphia (difficulty with handwriting) and dyscalculia (difficulty with numbers) as they have been recorded on ADEC Screen. All students at the school had a full psycho-educational evaluation and social education with the help of special needs teachers from grade one up to grade five for consideration for permission to the school. The psycho-educational evaluations include a number of assessments but each one includes an intelligence test such as the Wechsler Intelligence Scale for Children (WISC). Students at the school have average to above average IQs.

3.4.4 Procedures

The intervention program itself needs a lot of focus on each individual to interact with iPad applications. The students would be taught through the same teacher. The first group which consisted of 10 students with dyslexia was the experimental group. The second group which consisted of 10 students was the control group was taught without using iPad but through the teacher's traditional mode of instruction.

The researcher taught the reading, spelling and writing skills to the experimental group, the control group, without integrating iPad depending on all teaching aids. The researcher used the same content of the iPad tools but through paper-based instructions. Students of the control group had to answer some

worksheets, at home, that have the same objectives of the homework which give to the experimental group.

In this study, the same subject matter would be covered and the 20 students with dyslexia in both groups used the same content with different teaching aids. Both groups' had the same content of homework but the experimental group would do their tasks on iPad. The study would last for 8weeks (around two months).

3.5 Data collection

The researcher started doing the pre-test in order to know the comparison between the experimental and control group. I did the following steps:

The researcher told students in both experimental and control group to answer the pre-test according to the test procedures. The researcher started to ask students the questions in each domain (spelling, reading and writing).He did the test in separate (spelling then reading and after that writing). He started to tick under each face which exactly expressed students' response. The faces were interpreted with names which totally expressed ADEC criteria (Mastered, Developing, Emerging and Not achieved). The researcher gave each face number in order to be used in the statistical data, for example (Mastered means 3marks, Developing means 2marks, Emerging means 1mark while Not achieving means 0). Then he collected the data from the pre-test and started to analyze the data to compare between both experimental and control group in the pre-test by using Mann Whitney Test and why I chose this method (as indicated above). The researcher analyzed the data through tables to indicate the difference between groups.

After, The researcher began the intervention program using iPad applications for (two months that means 8 weeks, 5 periods a day that equals 40 periods during the program). The intervention program consisted of three domains, spelling, reading and writing. Each domain had some questions and time limit as I asked students to respond and gave their marks (according to the faces which interpreted into marks as mentioned above). The researcher would like to mention why using faces in the test as followed; "There are many strategies a teacher can implement in the classroom to help a Dyslexic student do well and understand the different skill sets such as spelling, reading, writing, arithmetic and understanding time. Most of these suggestions are beneficial for any student but especially important for Dyslexics." When children saw faces, they felt relax and motivated in order to obtain the happy face (which can get with the right answer only and the researcher ticked according to students response). The researcher did the test with the experimental group in three periods. The first period for spelling test, then the researcher corrected the test and gave students marks. Then writing test and reading test in order to give students a chance to respond. He collected the data and stated them in the tables.

The researcher addresses the intervention program that used in the current study to decrease dyslexia among a sample of students with learning disabilities, a program based on using iPad applications with the employment of the senses strategies(multisensory approach) and explains the categories that designed for the program, the general objectives, the procedural goals of the program ,its importance , and scientific foundations of the program, and the requirements of the program preparation, which includes identifying the skills involved in the program (spelling, writing and reading), Educational assistance, and activities used in carrying out sessions, the exercises and the main dimensions of the program. Also, the temporal

and spatial boundaries as The researcher explains how the program assessed and finally addresses the program's content, and its sessions are presented below of the foregoing points:

Researcher had taken into account during the test's application, few observations:

Determine the period of time (time limits) for the application of the test so that The researcher observed students' performance in light of the indicators that have already been briefed by The researcher, as well as in light of the test phrases, as The researcher mentioned on the first page of the test for what is dyslexia mean?, the name of the test, which part they answer and what do they do (how can they answer) and time limit for the test. In order to further clarification, and to ensure that students are fully aware of what they are going to do.

The test's instructions are simple and clear where The researcher asked students to spell, read and write and then he tick under the face which suits their response .the faces are getting numbers and names (ADEC Criteria) ;(Mastered=3 marks, Developing=2 marks, Emerging =1mark while, Not achieving =0).

Test aimed to give a hand to students who suffer from manifestations of dyslexia (grade 3) in the first cycle of basic education between the ages (8-11) years, and the number of test phrases amounted to (24) distributed over a three dimensions, where the first dimension, which included spelling (12phrases), and the second dimension, which is writing (5) and a third domain is reading (7phrases).

3.5.1 The Coding of the Interviews

All the participants' responses to the interview questions were transcribed and were thematically analyzed. The parents' questions of the interviews was transcribed into both English and Arabic language. No digressions and side discussions were transcribed because of their irrelevance to the research. Halkier (2008) referred to Bloor et al. (2001) that one should not try to change the word order or otherwise make the spoken language more similar to written language. The transcription was written directly on the computer, and key points were underlined with different colored text. The recordings were listened to many times for a better understanding of what was said and the expression in which they were said and referred to. Wibeck (2000) also highlights the significance of recurring to the tape recordings and transcriptions probably several times to keep high quality in the interview. The interview was transcribed in order to get an overview of the collected material and be capable of enhancing the quality of the analyses.

To facilitate the analysis, the results of the interviews were coded. Rubin & Rubin (2005) defined coding as "methodically marking concepts, themes, events, and tropical markers so that you can readily recover and examine all of data units that refer to the same subject across all your interviews" (p. 207). Each of the interviews was coded individually trying to distinguish key concepts that repeatedly came up by highlighting them in different text colors. Rubin & Rubin (2005) stated that in doing coding, I desire to look out for concepts, themes interviewees repeatedly mentioned and indirectly revealed. The coding system was also used in order to be able to focus on the research questions and in order to classify, categorize and analyze the responses.

Participants were assigned a code, prefixed by "T" for teachers and "P" for parents.

The codes were numbered to let I to differentiate among the interviewees.

The dialogue between the individual teacher and the researcher provided great understanding into how the teacher and children use technology at school. In preserving the data, the copies of the entire data set were taken. Appropriate folders were created for the interviews, voice memo and video recording.

3.5.2 Limitations:

The interview questions were formulated based on the aim of the study. The parents' questions were translated into Arabic. There was a challenge of understanding and hearing what one of the interviewees tried to say, but listening to the recording several times gave a clear understanding of what the interviewee was trying to say. However, certain aspects of the interviews were not transcribed due to the poor sound. Transcriptions were made directly on the computer because it saved a lot of time and this facilitated new ideas and critical thinking. It is helped in the reorganizing the transcription and helped in the immediate manual coding of the data, giving a direct fictitious name to the participants and to ensure confidentiality (Fetterman, 2010, p. 73).

3.6 Data Analysis

The Interviews Thematic analysis' is that they provide much more detailed information than what is available through other data collection methods. The Thematic analysis is 'Identifying, analyzing and reporting patterns (themes) within data. It minimally organizes and describes your data set in (rich) detail. However,

frequently it goes further than this, and interprets various aspects of the research topic (Braun and Clarke, 2006, p.79).

3.6.1 The iPad Program's Data Analysis

The data from the spelling, writing and reading pre and post assessments measured the effect of the iPad program on the students' with dyslexia improvement based on average group scores. The individual results of the electronic and the paper-based assessments were compared across the two groups. Information would also note as to how students scored on an individual basis to determine the impact of the iPad on spelling, writing and reading development. The test used for the analysis of the pre and posttest quantitative data was Mann Whitney U test. This test was selected because The Mann‐Whitney U test null hypothesis (H0) specifies that the two groups come from the same population. In other terms, it demands that the two independent groups are homogeneous and have the same distribution. An advantage with this test is that the two samples under consideration may not necessarily have the same number of observations. It deals with small samples that generally include less than 15 participants (Kazdin 2003).

Table 9: Results of the Mann Whitney U Test Comparing the Groups' Pretest Academic Achievement Scores

Test Domains	Groups	N	Mean	S td. Deviation	Mean Rank	Sum of Ranks	Value of U	Significance level
Spelling	control	10	4.2	0.873	6.8	68.5	0.22	not statistically significant
	experimental	10	4.1	0.875	6.8	68.5		
Writing	control	10	6.8	1.154	6.4	64	0.11	not statistically significant
	experimental	10	8.7	1.159	6.4	64		
Reading	control	10	7.1	1.370	6.9	69	0.07	not

	experimental	10	6.9	1.370	6.9	69		statistically significant

An examination of the findings in Table 9 reveals the results of Mann Whitney U test for the pretest academic achievement scores of the students in the experimental and control groups did not show any statistical difference where the value of (U) that reflects the differences between the two groups, respectively, is (0.22) , (0.11), (0.07), (0.49), and (0.30), The rank average of the pretest scores of the experimental group and control group students was as follows;(6.8),(6.4), and (6.9). The same rank averages of the groups' pretest academic achievement scores indicate that before the intervention program for the experimental group, the experimental and control groups had somewhat equal pretest academic achievement levels.

The following table indicates the results of the experimental group after the intervention program.

Table 10:Results of the Mann Whitney U Test to Compare the Groups' Post test Academic Achievement Scores

Test domains	Groups	Student numbers	mean	SD	Mean of ranks	Total of ranks	Value of u	Level of significance
spelling	Experimental	10	5.7	1.059	14.15	140.5	2.076	0.05
	Control	10	4.2	0.873	6.8	68.5		
writing	Experimental	10	8.5	0.707	14.6	146	3.099	0.01
	Control	10	6.7	1.159	6.4	64		
Reading	Experimental	10	8.9	1.197	14.1	141	2.721	0.01
	Control	10	7.1	1.370	6.9	69		

The results indicated that, there is an existence of statistical significant differences of the Ranks average grades of the experimental group and the Ranks average grades of the control group in the post test on the dimensional measurement on dyslexia test, where the value of (u) for the domains of the spelling (2.076) and

written performance (3.099), and Reading (2.721), and that statistically significant differences at the level (0.05), while the value of (u) for the all domains of the post test is statistically significant at the level of (0.01) for the benefit of students of the experimental group.

3.7 Ethical considerations

All the participants were informed about the purpose of the study, and the research procedures. They were provided with an informed consent form for ensuring issues of anonymity and confidentiality (Oliver, 2003; Gregory, 2003) (Appendix D).

Moreover, participants were aware of the ways the study's results will be used to decide whether they wanted to participate or not (Creswell, 2012). Therefore, their rights of voluntary participation and freedom to withdraw from the study with no negative effects made the participants comfortable during research.

Additionally, the teachers and the parents were allowed to review their responses for avoiding any bias or misinterpretations by The researcher thus, ensuring objectivity.

Chapter 4: Results

4.1 Introduction

The objective of the thesis is to examine the effects of reading, writing, and spelling intervention programme in EFL on students with dyslexia, who are Arabic native speakers, studying in an inclusive classroom of a primary school. This chapter reveals the major findings of the study

The main research question was:

What effects, a reading, writing, and spelling intervention programme in EFL, has on students with dyslexia studying in an inclusive classroom of a primary school?

4.2 Findings of the Study

4.2.1 First hypothesis

The first hypothesis states that there are statistically significant differences between the mean ranks of the experimental group students and average students arranged the control group to the achievement test and the total score in the dimensional measurement of reading, spelling and writing for the benefit of students of the experimental group.

To validate this hypothesis, The researcher used the Mann-Whitney U Test non-parametric test to calculate the significance of differences between the mean ranks grades of the experimental& control group averages to the academic achievement dimensions, after the application of the program used in the study, The Mann-Whitney test statistic "U" reflects the difference between the two rank totals

The sampling distribution of U is known and is used to test hypotheses in the same way as the t distribution and Table (11) indicates what conclusions has been reached about the current hypothesis.

Table 11: The Value (U) of the significance of differences between the mean ranks grades of the experimental and control group to the dimensional measurement of academic achievement.

Test	Students with Dyslexia Groups	Student Number (n)	Mean (M)	Standard Deviation (SD)	Mean of ranks	Total of ranks	Value of u	Level of significance
Spelling skills	Experimental	10	5.7	1.095	14.15	141.5	2.076	0.05
	Control	10	4.2	0.873	6.8	86.5		
Writing skills	Experimental	10	8.5	0.707	14.6	146	3.099	0.01
	Control	10	6.7	1.159	6.4	64		
Reading skills	Experimental	10	8.9	1.197	14.1	141	2.721	0.01
	Control	10	7.1	1.370	6.9	69		

The results indicated that, there are statistical significant differences between the ranks average grades of the experimental group and the ranks average grades of the control group in the posttest on the dimensional measurement on the achievement test, where the value of (u) for the dimensions of the spelling (2,076) and writing (3,099), and Reading (2,721), and that there are statistically significant differences at the level (0.05) in spelling, while the value of (u) for the dimensions of the writing and reading is statistically significant at the level of (0.01) for the benefit of students in the experimental group.

4.2.2 Second hypothesis

The second hypothesis states that there are significant differences averages of the experimental group on the test dimensions, and the total score in the two measurements pre and post in favor of the posttest test. To validate this hypothesis, The researcher used the Wilcoxon Test, the non-parametric test to identify any significant differences between the students 'mean ranks degrees of the experimental group on each of the test before and after the intervention program in the study. The following table (12) indicates the results.

Table 12 : The value of the critical ratio (Z) to significant differences between the mean ranks grades of the experimental group in pre and posttest of the academic achievement test.

Test Dimensions	Mean		SD		Measurement results pre /post	numbers	Mean of ranks	Total of ranks	Value of Z	Level of significance
	Post	pre	post	pre						
Spelling Skills	5.7	4.1	1.059	0.875	Negative ranks	0	-	-	2.699	0.01 Statistically significant
					Positive ranks	9	5.00	45.00		
					Neutral ranks	1	-	-		
					total	10	-	-		
Writing Skills	8.5	6.7	1.197	1.316	Negative ranks	0	-	-	3.051	0.01 Statistically significant
					Positive ranks	10	5.50	55.0		
					Neutral ranks	0	-	-		
					Total	10	-	-		
Reading Skills	8.9	6.9	1.197	1.370	Negative ranks	0			2.970	0.01 Statistically signific
					Positive ranks	10	5.50	55.00		

			Neutral ranks	0	-	-		ant
			Total	10	-	-		

The results indicated significant differences between the mean ranks grades of the experimental group in pre and posttest of the academic achievement test for the benefit of students of the experimental group in the posttest, where the z value of the dimensions of spelling, writing and reading is (2,699) (3,051), and (2,970), a significant difference at the level (0.01). However, an examination of the rank averages of their posttest academic achievement scores demonstrates that the students in the experimental group had higher academic achievement than those in the control group. This result indicates that the experimental group students attained higher improvement after the experimental application when compared to their peers in the control group.

4.3 Summary of the major findings

The dependent variable data used to formulate results of the study were collected with the use of pretests and posttests on English as second language skills (spelling, reading and writing) recognition. The differences in the means of the experimental and control groups before and after the intervention program were determined by using Mann Whitney Method.

The results of the test of Interaction between experimental group and pretest by using the Wilcoxon Test versus posttest showed an interaction effect, the posttest scores were as follows, (1,059), (1,197) and (1,197). A significant interaction was discovered at the (0, 01) level of significance.

Findings showed that there was no significant difference between the means of the pretest, but the experimental group significantly outperformed the control group on the posttest.

The difference between the means of the experimental and control groups on the pretest was 2.92, with the control group being above the treatment group, while the difference between the means of the treatment and control groups on the posttest was 35.65, with the treatment group being above the control group.

The following figures indicate the results of the students with dyslexia (experimental group) in the spelling, reading, writing and total marks.

Figure 2: Showing pre-posttest results for spelling skill

The figure 2 indicates the pre-posttest results for the spelling skills in the experimental group.

As an overall trend, all students from experimental group have improved in the posttest as the results have achieved by all students and their results have

increased, however, the individual with the least improved was by two (2) marks, this was achieved by 9 students out of 10 and this equivalent to 90 %.

Only 1 student has improved 3 marks and he was student number nine (9).

Figure 3**:** Showing pre-posttest results for reading skill

Figure (3) shows the information about the pre-posttest for the reading skills of the students with dyslexia.

As an overall all students from the experimental group have improved in the posttest except student eight as he got 5 in both pre and posttest according to the figure some students improved slowly by increasing only one mark such as the second, sixth and ninth students while the remaining students like the first, fourth, seventh and tenth students have improved by 2 marks however, the third student has improved by achieving 3 marks. Figure (4) shows the pre-posttest results of writing skill.
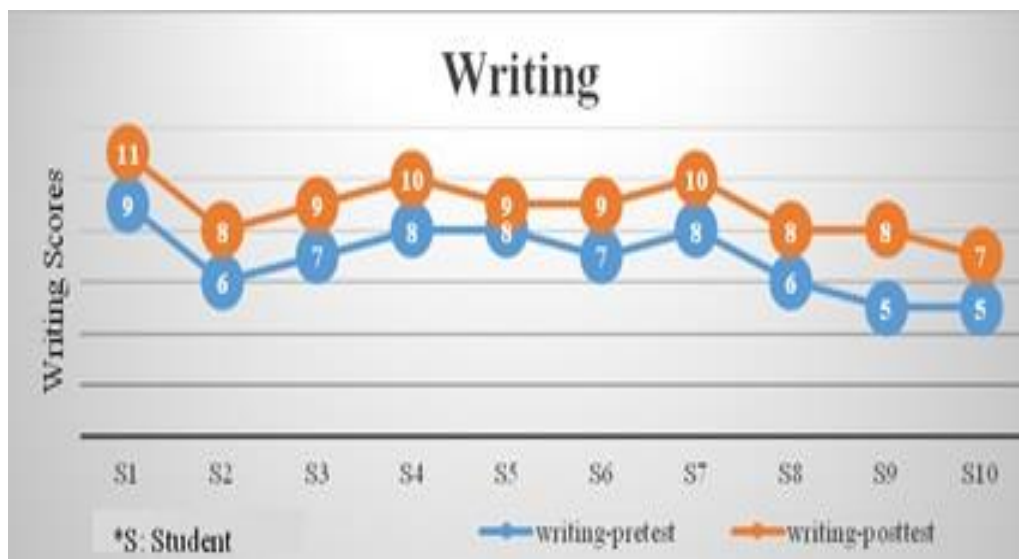
Figure 4: Showing pre-posttest results for writing skill

As an overall, all the students from the experimental group have improved in the posttest as they have achieved between 2 and 3 marks except the third student has improved only 1 mark, as we can see in the figure, all students did well in the posttest rather than the pretest.

Figure 5: Showing the total marks of pre-posttest results for experimental group students

Figure (5) indicates the total results of pre-posttest for spelling, reading and writing of the experimental group.

As an overall, all students have a significance increase in all skills; spelling, reading and writing in the posttest. As we can see, all students have improved in the posttest as the results have achieved by all students and their results have increased in all skills during the posttest. Finally, the result of the intervention indicated improvement in the pertinent skill areas.

The researcher prepared the profile of academic learning for students in the experimental group according to their improvement in the spelling, reading and writing skills after the intervention program as shown below in Table (13).

Table 13 : Profile of academic learning for students in the experimental group

Student Code	Age	Gender	Grade	Before the intervention program				After the intervention program			
				Spelling	Reading	Writing	Total	Spelling	Reading	Writing	Total
S1	8Y-4M	Male	3	9	3	9	21	11	5	11	27
S2	8Y-1M	Male	3	6	4	6	16	8	5	8	21
S3	8Y-8M	Male	3	7	3	7	17	9	6	9	24
S4	8Y-5M	Male	3	8	5	8	21	10	7	10	27
S5	8Y-8M	Male	3	7	5	8	20	9	7	9	25
S6	8Y-5M	Male	3	7	4	7	18	9	5	9	23
S7	8Y-0M	Male	3	8	4	8	20	10	6	10	26
S8	8Y-6M	Male	3	6	5	6	17	8	5	8	21

| S9 | 8Y-11M | Male | 3 | 5 | 3 | 5 | 13 | 8 | 4 | 8 | 20 |
| S10 | 8Y-8M | Male | 3 | 5 | 5 | 5 | 15 | 7 | 7 | 7 | 21 |

* S1 stands for Student 1

*8Y: 8years; 4M: 4 months

In summary, the students in this study were struggling in both Arabic and English languages. The researcher confirmed that the iPad apps worked well overall. With few exceptions, the researcher reported that the challenges matched the abilities and interests of the students and aligned with personal learning goals. Some students struggled with vocabulary and the complexity of directions for some apps, but it should be remembered that the students were in the third grade.

Students reported few or no problems using the devices or the apps, Some students in the treatment group reported that the apps selected for them could be challenging, but this comment was more likely attributed to the content skills required, not basic operations. The researcher reported that some students got frustrated when they did not complete a content challenge with appropriate accuracy, indicating that the instruction may indeed have provided an accurate level of challenge for students at different levels. The researcher considered that most of the students were in third grade, the gesture-based interface of the Apple iPad apparently was easily understood and operated by many students. The researcher reported that any devices selected for student use should be suitable enough to use so that students can focus on instruction and practice to master learning goals of their learning outcomes of the third grade syllabus rather than having the technology be a barrier to learning.

4.3.1 Qualitative analysis

4.3.2 Findings from the semi-structured interviews with the teachers

- The face-to-face, semi-structured interviews were conducted with the parents and teachers of the students with dyslexia to identify their perceptions regarding the students with dyslexia learning with the iPad intervention program.

- The interviews were useful for extending my understanding of how the IPad was used in the specific class or at home and the benefits and/or challenges regarding the program.

- The thematic analysis of the teachers' responses allowed the following themes and subthemes to emerge:

- Internal support to the students with dyslexia

- Classroom activities using technology

- Curriculum approach to the students with dyslexia

- Special knowledge and skills to teach the students with dyslexia through technology

- Using iPad to teach the students with dyslexia EFL skills

- The beneficial role of iPad in teaching basic EFL skills to the students with dyslexia

4.3.3 Internal support to the students with dyslexia/ Individual instruction

Two teachers (T1; T2) as one is a special needs teacher and the other is a general teacher emphasized the individual instruction as students with special needs receive a special program.

Special Needs students receive individualized instruction from Special Needs teachers (SEND), as well as guidance from mainstream teachers who are informed about the particular needs have said students.(T1)

…students receive five sessions in the resource room and receive special program only for Arabic language and we are trying to make learning individually through IEP and depend on the skills of each student (T2)

Classroom activities using technology

Both two teachers agreed on the use of smart boards and computers inside the classroom.

The teachers are using Smart boards and Listening Stations can aid with students who have hearing and sight disabilities. (T1)

The Smart board can project images and help students see more clearly. The listening stations can help students with auditory difficulties. (T2)

Curriculum approach to the students with dyslexia

One general teacher emphasized differentiation strategy and how he is preparing the lesson well in order to meet the challenges and deal with all types of students in the classroom. And the other teachers agreed with his opinion as they said below.

I try and find ways to include all students in the curriculum, through differentiated activities based on skill and learning ability. (T2)

I try to include all students in the curriculum through differentiated activities based on their abilities (T1)

I prepare lessons according to the learning styles. (T3)

Using iPad to teach the students with dyslexia EFL skills

Regarding to the use of iPad with dyslexia, one teacher has no special knowledge related to the use of iPad in the classroom; while, the other two teachers emphasized the role of iPad in teaching students with dyslexia;

…I have no special knowledge, but try to bring this technology to the aid of my teachers in the instruction of SEND students. (T1)

IPad attracts students' attention and support our aim for learning if we have it at school (T2)

IPad is very beneficial but students' need to develop their motor skills and their handwriting (T3)

Choosing the right applications

Two teachers have the same point of view; if they use iPad in the classroom, they should select appropriate applications that fit into the students' needs.

…I think the iPad could be useful in the classroom, given the right application. (T1)

If I have to use iPad, that is great but we should use the suited applications... (T2)

The beneficial role of iPad in teaching basic EFL skills to the students with dyslexia

All teachers agreed on the use of iPad in their classes because of its easiness, good methods of communication and speed;

… IPad is an easy and modern tool in teaching (T3)

…iPad makes learning fast and helps students to communicate easily... (T1)

….I'm always using computers and smart board and I like to use iPad in the classroom… (T2)

The reading was more enjoyable with the iPad, and it was also easier to make notes on documents, organize work, develop IT skills, and work at one's own pace.

…..It has effect on students' reading skill and help them to read some words correctly and let them enjoy in learning. (T1)

…It's more fun to read with the iPad […] than with a paper book. (T3)

…it's great that students can put words in the right place. The iPad makes my students want to read again. (T2)

…with iPad, it's enjoyable for students to go from step to another step.(T3)

4.3.4. Findings from the semi-structured interviews with the parents

The thematic analysis of the six parents' responses allowed the following themes and subthemes to emerge:

- Using educational technology at home

- The favorite technological tool for children with dyslexia

- The children's benefits from using the iPad intervention program

- The use of technology at school

- The effects of using iPad at school with the students with dyslexia

- The recommendations to teachers related to using technology

Using educational technology at home Entertainment

According to the parents' responses, the students with dyslexia spent most of their time on the iPad outside class entertaining them by playing games (P1) or socializing and chatting with friends (P3), after completing their homework.

They started to […] they often on drawings […] they look at it all the time […] (P4).

My child followed by painting and drawing (P6).

…my child use iPad every time at home (P4)

My child use laptop, phones and iPad (P2)

The favorite technological program for children

Regarding to the most favorite technological device for children, most parents agreed that the iPad intervention program is the most suitable tool children use all times, as it has benefit programs, it is a friendly tool for children to play and for learning.;

…My child is fond of iPad. It's like his friend as can't leave it at all. Sometimes I annoyed as he all the times sticking with iPad (P1).

…I find it hard to get them to leave it for some times. (P6)

…my child used iPad at home all the times as it had benefit programs for boys and girls. Also it contained educational programs (P2)

…my child used laptop and iPad (P3)

The children's benefits from using the iPad intervention program

To explore the children's benefit from their use of technology at home, I asked the parents if their child got any benefit from using technology. Some identified the positive side of using the iPad like learning skills, but others identified how distractive its use was in studying and doing homework.

…my child always plays on his iPad and didn't do his homework but sometimes he played a game of English letters, spelling words (P7)….my child started to read some words (repetitions) few times a week. He came to me and shows me what he read on the iPad. (P5)

I think that no benefit at all as my child played all the times and he didn't do his homework. He didn't study (P3)

….My child always playing educational games.(P4)

…my child get more benefit , the technology especially iPad strengthen the child's skills, concentration and help children to read and write(P1)

….my child sits playing on iPad all times so he learnt something (P7)

The use of technology at school

Regarding to the use of technology at school, the parent have different views about the use of technology at schools, some of them agreed that their children used computers only during IT periods, others " once a week".

….I knew that my child used computers at school and PowerPoint's as he asked me to do prepare a PowerPoint for his teacher. (P1).

…my child use computers at school especially in IT period (P3)

……used computer only during IT Periods and once a week (P5)

Interaction between the children and the technology device

Most parents had the same opinions that their children have interaction with technology "as they get benefit", "developing reading and writing", "strengthen memory" and these are their responses;

[…]I think that my child get benefit when teachers presented the lesson on computer like PowerPoint or watched films or videos (P2).

[…] my child liked to do worksheets in Math and he always prefer to sit on computers (P4)

[…] sure there are a lot of benefits in learning in general and in developing reading and writing skills in particular. They get benefit in strengthen memory for children (P3)

[…] yes, especially in IT and English language as my child can learn how to read, how to speak English (P2)

The effects of using iPad at school with the students with dyslexia

The parents supported the use and the benefits of the iPad program applications and mentioned the merits of this program.

[…] My child was happy after getting the applications on his iPad and started to practice spelling words and played educational games. (P 3)

[…] the applications of reading and writing were excited and my child liked them very much. (P7),

[…] my child started to like English language because of these educational games. (P6)

My child liked to touch the screen and spell the letters. (P2)

[…]my child get benefit in developing the skills of both reading and writing (P3)

[…]iPad helps my child to write and read, new programs help in developing the students' understanding and grasping information (P5)

The recommendations to teachers related to using technology

Using the iPad with constraint

Regarding to the recommendation to teachers, most parents prefer if their children can use iPad at school but with some constraints like choosing the right applications, suitable programs, as a tool of developing teaching and learning;

[…] I prefer if they try to teach students on iPad but with well- chosen and guided apps (P6)

[…] teachers must control the use of technology in their classroom (P2)

[…] sometimes teachers wasted times and let students watched videos or films rather than studying (P7).

[…] I knew that some schools using different types of technology but teachers should choose the best and help children to learn (P2)

[…] I recommend if the school can use iPad as it helped children to imitate and get involved in learning (P4)

[…]I want teaches to use technology in all subjects not only in IT and English (P1)

[…] teachers should use Computers and all technologies to help children in learning and I hope if they used the developed methods in teaching (P2)

4.3.5 Summary of the qualitative findings

The findings highlighted that the iPad intervention program can enhance the children's with dyslexia aptitudes, communicative skills and participatory learning capacities and understandings. The interviews with the teachers and parents of the students with dyslexia, agreed that the iPad intervention program and its applications served as a multi-sensory, attractive tool, with social and informative implications, that might entertain the children and motivate them to learn in a more relaxed and joyful way.

Most of the teachers preferred using the iPad as it helps children to use their senses, especially with special needs and helps them to distinguish among letters as the main important thing in teaching children with special needs how to combine and distinguish among letters and iPad can give them a chance to do this, also to know letters which will help them to spell words, read and write some of them according to the well- chosen applications. Besides, most of parents agreed that iPad has a great effect on their children progress in spelling, reading and writing and they want if school can use iPad in teaching their kids but with controlling and choosing the suitable applications.

Finally, findings showed that iPad considered as a multisensory tool which help children to listen , imitate, trace letters, spell words, repeat , read and write which will help children to maintain some words in their memory and helps them in their learning of the English language .

The differences in the means of the experimental and control groups before and after the intervention program were determined by using a mixed-design analysis of variance. Findings showed that there was no significant difference between means for the pretest; the pretest academic achievement scores of the students in the experimental and control groups did not show any statistical difference where the value of (U) that reflects the differences between the two groups, respectively, is (0.22) , (0.11), (0.07), (0.49), and (0.30), The rank average of the pretest scores of the experimental group and control group students was as follows;(6.8),(6.4), and (6.9). The same rank averages of the groups' pretest academic achievement scores indicate that before the intervention program for the experimental group, the experimental and control groups had somewhat equal pretest academic achievement levels.

While in the posttest, the value of (u) for the domains of the spelling (2.076) and written performance (3.099), and Reading (2.721), and that statistically significant differences at the level (0.05), while the value of (u) for the all domains of the post test is statistically significant at the level of (0.01) for the benefit of students of the experimental group. The overall conclusion of the study was that the use of the iPad as multisensory tool for the use of guided apps in combination with instruction was more effective at increasing the ability of students with dyslexia to spell, read and write. Within the framework of the current study, the effect was significant. Therefore, the null hypothesis was rejected.

4.3.6 Conclusion

The results of the current study show that the use of the iPad as a multisensory digital tool with an app for made a difference in the learning for the students in the experimental groups; therefore, teachers who must address the above-

mentioned standards can do so by incorporating the use of the iPad in their strategic planning for ways to use digital tools to promote student learning and address the diverse learning differences of students. In other words, the findings of the current study provide empirical evidence that the iPad is indeed worth incorporating into English classrooms as an effective technological learning device.

Chapter 5: Discussion

5.1 Introduction

This chapter summarizes the findings in response to the research question and explains some of the lessons learned from carrying out the research. The theoretical construct of multisensory learning theory; Piaget's cognitive development theory and cognitive theory of multimedia learning were most useful for constructing a holistic view of how the integration of technology in teaching and learning EFL skills enabled the students with dyslexia activate their multiple ways of acquiring and improving knowledge on basic skills.

This chapter includes a discussion of the results of the study, recommendations for future research and implications of practice based on the findings of the study.

In the next section, the researcher summarized the main points that answer the research question.

5.2 Discussion of findings

The central question

What effects, a reading, writing, and spelling intervention programme in EFL, has on students with dyslexia studying in an inclusive classroom of a primary school? In response to this question, the findings from this research found that the use of the iPad as a multisensory intervention tool with the pertinent applications improved the students' with dyslexia, spelling, writing and reading skills compared to traditional, non-computer-based methods of teaching the same skills..

The findings of the study confirmed the value of multisensory learning for teaching effectively students with dyslexia as in the study of Canals and Farrell (1999) who found that multisensory course would be successful as students with dyslexia figure out how to utilize one kind of long term- memory to compensate for a deficit in the other..

Research demonstrates that the more senses we integrate into the learning process the more well-organized learning becomes for all types of learners (Scheffel, 2008). Farkus (2003, 42-51) stated that "The power of evidence supporting the benefits of learning-style methodology is compelling. Achievement test scores of students taught using their preferred modalities were statistically higher than of students who were not taught using their favored learning modalities". In this study, the integration of different applications in the iPad intervention program, enabled the students with dyslexia in the experimental group, to improve their basic skills in reading, writing and spelling. The use of sound, colour, image, and interaction in these applications engaged the students in the active process of learning by perceiving information through different sources of stimuli, e.g. visual, auditory, and tactile. Bara, Florence, Edouard, and Pascale (2007) found that students who investigated letters both visually and tactilely scored higher in a first grade post-test for pseudo-word decoding. Additionally, the findings of the study match with the research of Ferrell and Sherman (2011) who found that multisensory teaching in listening, speaking, reading, and writing reinforces the learning of the language structure through active student engagement. Multisensory learning implicates the simultaneous use of visual, auditory, and kinesthetic-tactile modalities to improve memory and learning of written language.

As for intervention, the iPad program involved symbols from which the students could make logical associations and the participants selected for the purpose of being able to logically use and manipulate symbols and objects. According to Piaget, the concrete operational stage typically develops between the ages of 7-11 years. The findings proved the usefulness of Piaget theory as opportunities that allow students of differing cognitive levels to work together often encourage less mature students to advance to a more mature understanding (Slavin, 1988). One further implication for instruction is the use of concrete "hands on" experiences to help children learn.

Relating to cognitive theory, in the current study, the researcher used the applications which helped students to use their senses to improve their spelling, reading and writing skills. According to the cognitive theory of multimedia learning (CTML), the visual information processing channel may become overloaded when students must process on-screen graphics and on-screen text at the same time (Mayer, 2001).the findings of the study proved the importance of the theory with helping students with dyslexia to spell, read and write .

The Arabic native students with dyslexia, who were able to use the iPad applications for studying English skills can recall the information, recognize letters, and spell correctly, put words in order to shape a well-organized sentence and read words when presented in the posttest.

The same students who performed well on the posttest would, with regular practice, be able to use the iPad applications for practicing English language skills, e.g., spelling, writing and reading, either on their own, or in a group setting.

The researcher chose the applications for the current study based on recommended criteria for the selection of instructional games by Roblyer and Doering (2010). At the time of the current study, the chosen applications met the recommended criteria. Since iPad applications were added to the App store on the Apple website every day, there may well be a subsequently created app for the guided-practice of English skills that would be appropriate for use in a future study regarding the ability of students who have dyslexia to read, spell and write English words. A replication of the current study or a similar study using a newer app would certainly be recommended.

The positive interaction effect in the findings is also exciting because it shows that using an iPad app has the potential to help students with disabilities in general and students with dyslexia in particular who defined in this study, move information into their long-term memory.

The positive impact of using iPad applications with dyslexic children allows teachers to differentiate between different learning styles and abilities making them a perfect learning tool for SEN students. Students who typically struggle with traditional ways of accessing and presenting knowledge now not only have more options, but can use the same device as everyone else and are not set apart in class. IPad devices enable students to present information so that it is easily understood, providing a more accurate picture of their abilities and progress (Techknowledge for Schools, 2015)

The devices (iPad) have proved especially beneficial for dyslexic pupils, who are able to increase the font size for texts to de-clutter their vision, and this goes with the study of Rello (2014) presented the first experiment on eye-tracking to measure

the impact of font type on reading speed and on the performance of reading the technology enables them to highlight words they may not recognize and immediately access a dictionary definition the study findings of interview with parents of students with dyslexia and teachers is linked with one of the examples related to applications, usefulness is that student academic achievement as a result of IPad use was the most likely benefit mentioned in the survey conducted by the Curtin University (Australia), enhanced student motivation and ease of individualized instruction are likely to result in improved student competencies (Johnson, 2013).

Findings from Phono-Graphix programme showed that students with dyslexia improved their phonological processing skills. They further show that a majority of the students recorded an average gain in reading age of 21 months and an average gain in spelling age of 12 months at the end of the training period and this go with the current study of using an intervention program to improve the skills of students.

Findings from Nicolson and Fawcett's research (2008) showed that students with dyslexia often experience difficulty with automatic recall, but can, with wide-ranging practice incompetent and incremental steps, acquire a certain amount of automaticity (Reid, 2011). Retained that most students could acquire automaticity by repeatedly practicing skills;

The use of iPad helps to improve student decoding performance and potentially promote greater task engagement as an existing iPad application Although this application was not necessarily created to be used within the context of a reading intervention, with an appropriate instructional approach, it may be an effective way to improve student decoding performance and potentially promote greater task engagement.

The findings of the Randomized Reading Intervention program were designed for one-to-one tutoring during an intensive and limited period of time go with the current study in the application of the the intervention program and the overall results. As the Randomized Reading Intervention program was based on three main components: (i) phonemic decoding and phonemic awareness training; (ii) reading fluency training; and (iii) reading comprehension strategies. Als the in the current studty,the intervention program based to improve the three basic skills which are reading, spelling and writing. According to the National Reading Panel (2000), these aspects of reading instruction should be integrated to create a complete reading programme. Reading fluency and accuracy in decoding are supposed to reinforce reading skills.

However, students with dyslexia take a longer amount of time to comprehend new information to the point where it can be recalled automatically. Findings of the current study displayed that the students in the experimental group, with the repeated use of the guided- app on the iPad, attained a greater ability to recognize English Spelling, Writing and Reading skills.

Currently, there are no published studies systematically comparing the effects of mobile applications to standard reading interventions. Accordingly, it is necessary to compare the results of this study to existing educational research involving mobile technology. Such research has generally concluded that instruction supported with mobile technology is associated with increased engagement and improved academic outcomes (Chiong and Shuler 2010; Cumming and Draper Rodriguez 2013; Fishburn 2009; Getting and Swainey 2012; Hutchison et al. 2012; McClanahan et al. 2012; Shuler 2009). For example, in their use of iPads with their Tier 2 and 3 classroom

reading groups, Getting and Swainey (2012) observed increases in the students' time on-task behavior over the course of the school year. This is consistent with time on-task data for Derek and Amy, whose percentages visually trended positive for the iPad condition and negative for the standard materials. One interpretation of this pattern is that, for some students, iPad supported reading interventions may support more sustained levels of task engagement over time. However, it's not investigated the length of time within which the students with dyslexia can retain the acquired information.

Two potential concerns with the study have to do with time of exposure to the instructional material and I as instructor. Those in the treatment group had more exposure to identifying the exercises, choosing the most suitable apps, matching the apps with the learning outcomes of ADEC through the time they spent on the iPad guided app. However, the purpose of this study was to see if the using of iPad apps will improve students with dyslexia spelling, reading and writing skills. After data analyzed the use of iPad apps, would make a difference for the students in the experimental groups. The control groups had all the same experiences, except teaching with iPad tool.

And it should be noted that the experimental group made significant improvement over the course of the instruction. Even so, more research is needed to certainly report these concerns.

5.3 Implications for practice

5.3.1 Implications for English as a foreign language Education

A general hope for the current study was that any findings showing a progressive effect would provide important information that would add to the educational strategies of general English teachers who teach students with learning disabilities, especially dyslexia. Certainly, the fact that the use of the iPad app for guided-practice of reading , spelling and writing showed an optimistic influence on the learning of the students in the experimental groups offers a possible effective strategy for both English and special need teachers who teach reading, spelling and writing skills to students who have dyslexia. Delimitations of the current study notwithstanding, the possibility exists that other English teachers, and not only those who teach students who have dyslexia, may be able to use the iPad app integrated in the current study as an effective multisensory tool.

The literature examined for this study included studies on iPad integration for educational purposes. General findings from all of the studies indicated that the iPad is an effective instructional tool. Students reported that they were more engaged in lessons when the iPad was used for delivery of lessons or material and students also reported that they were most engaged when I pads were used for creative activities and they were able to use them, for example, for spelling words, dragging and adding their own pictures or recordings to their assignments. This type of active involvement for student learning can certainly be facilitated in both general and English lessons with the use of an iPad or any tablet computer for that matter.

The iPad offers English educators great activeness in given those opportunities for students to be creative. English applications for teaching English skills, words and recording are only a few of the apps that may be used for English learning and processing. The possibility exists for the students to move beyond learning the material to be able to improve their memory skills.

Benton, (2012) examined the implementation experiences of teachers' use of the iPad as an instructional tool and found that participants believed the iPad had a positive impact on student engagement and learning. The teachers in Benton's study reported that classroom management issues were almost non-existent when the iPad were being used; the students participated enthusiastically in the learning activities. It is reasonable to assume that the increased engagement would occur in any content area, including English education.

Research has shown the iPad is an effective learning tool for its technical features such as portability, touchscreen, adaptability for learning differences, and multisensory components. These attributes coupled with a multitude of apps available for an endless number of subjects make the iPad a valuable tool for all educators and learners.

Thousands of apps have been created for English skills, especially for children with dyslexia education purposes, including many apps for spelling, reading and writing skills. The possibility exists for users to learn these skills from the apps by practicing individually, a situation that would enable skills' learning to occur outside of the formal English classroom. English educators inside or outside of the classroom could incorporate this type of individual practice and learning opportunities into their curricula.

McClanahan, Williams, Kennedy, & Tate (2012) investigated the effect of using an iPad in a single case study of a student with a reading disability and ADHD and found the student had a seemingly increased attention span while using the iPad. The student was able to listen to self-recordings of reading assignments and was able to determine that it was necessary to slow down in order to make sense of the reading and meaning of the text. As in this case study, one would expect that English educators of students with similar learning disabilities and who might have trouble with reading, spelling, writing or understanding English as a foreign language in general could find the instrument useful for allowing them to pace them by using apps that can be adapted to individual learning differences.

Part of the rationale for the current study was that research on the use of the iPad would provide empirical evidence to determine if the iPad was worth incorporating into English classrooms as an effective technological learning device. In 2008, the International Society for Technology in Education (ISTE) issued the new National Educational Technology Standards for Teachers (NETS-T), now called ISTE Standards (ISTE, 2014). Roblyer & Doering (2010) outlined the directives of standards and included the following sub-directives: teachers must "design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity" and "customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources" (p. 1).

5.4 Recommendations for future research

Although the findings of the current study indicated a positive effect of guided practice for not only teaching English skills in general but also to help

students with dyslexia to recognize words and enhance their working memory through iPad applications.

It would be interesting, in a follow-up study, to re-test the same students of the study after a certain amount of time, perhaps a year later, to compare the results with the initial post-testing.

The students with dyslexia need to be provided with treatment programs that employ more than one academic skill. Also, these programs will be based on the positive interaction between students and teacher, based on performance of students and receiving feedback from the teacher. Additionally, the students can be educated through computer-based programs related to the literacy of reading and writing.

The use of recent teaching methods and modern programs especially that related to the use of senses to give students with dyslexia the opportunity to recall and recognize words and sentences. Provide all schools with iPad tablets as they have a great impact on student's achievement and behavior.

Gudmundsdottir (2010) offered suggestions for future research in a literature review on the reading, particularly for the investigation of cognitive development and its role played in relation to the reading of English. The findings of the current study show that the students in the treatment groups, with the repeated use of the guided-practice app on the iPad, acquired a greater ability to recognize English skills. This most likely resulted from the consistent practicing of the skills (over learning) and led to a greater ability for automaticity, as explained by (Reid, 2011). In turn, the consistent guided-practice with the multisensory tablet led to a greater ability for automatic recall necessary for a longer retention of new information.

New trends in teaching English with using technology are ever developing and the technology required for touchscreen capabilities is not limited to the Apple iPad. There are other touchscreen devices on the market and the availability of new apps carries on increasing. Although the current study was delimited to the use of an app for guided practice on the iPad as multisensory tool, further research is recommended for similar studies for students with dyslexia involving the use of suitable apps on different touchscreen devices.

Other touchscreen devices, similar to the iPad, may also be found to be effective multisensory technological tools that could be used for instructional purposes including, but not limited to, guided-practice. Further research is recommended on the use of touchscreen devices (iPad included) for English learning of students with all types of learning differences.

5.4.1 Lessons learned

The overall conclusion of the study is that the use of the iPad app for the guided practice of English skills' recognition, in combination with instruction, was effective at increasing the ability of students to recognize words beyond that acquired through instruction alone. Within the framework of the current study, the effect was significant. Since this was a quasi-experimental study, the results need to be interpreted carefully. However, the inclusion of a pretest showed virtually no difference between the control and experiment groups initially. This reinforces the findings of this study that the treatment was differentially effective. By itself, the use of technology does not guarantee learning; it is important to choose appropriate applications. A guided-practice application would appear to fit the needs of students with dyslexia for the learning of English skills' recognition as results indicated use of

the iPad was efficient as a multisensory tool. Additional research needs to be done to establish its unique effectiveness, as well as whether the benefit extends to the regular classroom.

The students with dyslexia need to be provided with treatment programs that employ more than one academic skill. Also, these programs will be based on the positive interaction between students and teacher, based on performance of students and receiving feedback from the teacher. Additionally, the students can be educated through computer-based programs related to the literacy of reading and writing.

The use of recent teaching methods and modern programs especially that related to the use of senses to give students with dyslexia the opportunity to recall and recognize words and sentences. Provide all schools with iPad tablets as they have a great impact on student's achievement and behavior.

A last word would be to keep on investigating the needs of vulnerable young individuals with learning difficulties, to identify best possible ways to transform their educational experiences to a path to success.

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Appendix

Appendix 1: Parent/Guardian Information Sheet

Title of Project: A Case Study of an Intervention Program for Students with Dyslexia in a Primary School in the UAE.

Researcher: Elazab Mohamed

Project Supervisor: Dr. Effie Efthymiou

Purpose of study

This study seeks to find a way to explore how the use of a specific learning program based on iPad technology can influence how students with dyslexia achieve their learning goals and motivation. Your child's participation in a questionnaire and classroom observations will help me to find out about their experiences of using the program I designed through iPad and their performance on reading, writing, and spelling activities.

Privacy Protected

I will protect your child's name and all data will be kept confidential. The school will be given a fictitious name in the report to ensure the privacy of all participants.

Request for more information

Please feel free to ask me any questions you may have at any time.

Refusal or withdrawal

You may refuse your child to participate in this study and will be free to withdraw from the study at any time.

Contact Information

This study is part of my Master's dissertation at The United Arab Emirates University, Department of Special Education. All information at school will be collected by:

Elazab   Mohamed   (Master's   student)   Tel.:   0503111395
Email:201370252@uaeu.ac.ae

If you need to contact my supervisor, please use the following information:

Supervisor: Dr. Effie Efthymiou.   Tel.:   037316203
Email: Efthymia@uaeu.ac.ae

Appendix 2: Teacher Information Sheet

Title of Project: **A Case Study of an Intervention Program for Students**

with Dyslexia in a Primary School in the UAE

Researcher: Elazab Mohamed

Project Supervisor: Dr. Effie Efthymiou

Purpose of study

I wish to conduct a study about students' with dyslexia use of iPad technology in the classroom.

Procedure

I would like to include your students in the study by implementing a learning program based on iPads. I would also like to invite you to a short interview with me, which will be audio recorded.

Confidentiality

I will protect your names and all data will be confidential.

Request for more information

Please feel free to ask me any questions at any time.

Refusal or withdrawal

You may refuse to participate in this study and you will be free to withdraw from the study at any time.

Contact details

Researcher: Elazab Mohamed   Tel.:0503111395

Email: 201370252@uaeu.ac.ae

Supervisor: Dr. Effie Efthymiou   Tel.:037316203

Email: Efthymia@uaeu.ac.ae

Appendix 3: Parents/ Face To Face Interview

P1

1- Do your children use any educational technology to learn at home?

Yes, they are using laptop, mobile phones and iPad.

2- What kind of technological tools your children like using and why?

iPad as it contains educational programs.

3- Do children benefit from the use of technology?

Like children stories, songs. The students get benefit because these programs strengthen their skills more and more.

4- Do your children use technology at school? In which subjects?

If it is in reading. They will learn how to read, learn how to write and write in a good handwriting.

5- Are there any benefits in using technology at school?

Yes, they used technology during IT period (one period each week), PowerPoint…but I hope if they use technology in all subjects…

They get benefit in different skills like writing, reading and memorizing skills

6- During 2 months at school your child has used iPad for learning to read, write, and spell. What is your opinion?

Yes, it is good for all students if they are male or female…. It has a benefit and in the sake of students within the development of technology and programs "technology strengths skills".

7- Is there anything you would recommend to teachers in terms of using technology in their classes?

I recommend them to concentrate on computers and I hope that students use technology in Arabic and English as it has a value for students' development.

P2

1-   Do your children use any educational technology to learn at home?

Yes, laptop, phones but iPad is the most as you can download programs especially at English language like letters programs

2-   What kind of technological tools your children like using and why?

iPad all times, the children likes it as they sit on playing on iPad…" he likes to touch the screen all times..."

3-   Do children benefit from the use of technology?

They identified new skills, be good at vocabulary and helped   them to construct sentences and get benefit..

4-   Do your children use technology at school? In which subjects?

Yes, they used technology in IT and English language periods.

5-   Are there any benefits in using technology at school?

Yes. It has a lot of merits like, learning vocabularies in English, compose sentences and learn new words.

6-   During 2 months at school your child has used iPad for learning to read, write, and spell. What is your opinion?

Wonderful things as it helped my child to know English words, reading and in writing like, compose sentences and others……

7-   Is there anything you would recommend to teachers in terms of using technology in their classes?

I recommend to teachers that if they can set up new programs that help students to understand and comprehend. The teacher should choose the best type of technology…

P3

1-   Do your children use any educational technology to learn at home?

Currently, they use iPad

2-   What kind of technological tools your children like using and why?

They use iPad in playing games, chatting with friends

3-   Do children benefit from the use of technology?

It has a lot of things which give benefit and at the same time helped them in English dictation, playing…memorizing

4-   Do your children use technology at school? In which subjects?

No, he doesn't use it, only in IT period. Children will learn vocabularies in dictation and play." My child got benefit of using iPad in both reading and writing…"

5-   Are there any benefits in using technology at school?

My child speaks English in a good way.

6-   During 2 months at school your child has used iPad for learning to read, write, and spell. What is your opinion?

Good thing as it helped my child to talk good as he can listen and imitate…he started to play with the educational applications…

The using of iPad has advantages and disadvantages; if we use iPad in learning and education … this means good and if we use it in playing games, it is bad….

7-   Is there anything you would recommend to teachers in terms of using technology in their classes?

No recommendation at all.

P4

1-   Do your children use any educational technology to learn at home?

Of course, my children are using iPad.

Not all schools are using iPad and they don't teach the lessons through iPad; hence we can invest the using of iPad. Child used iPad in playing but if he used it in learning… this will make him concentrate and got benefit

2-   What kind of technological tools your children like using and why?

They are playing games, play station-programs especially for playing, drawing and sometimes educational games"

Nothing iPad at school so they will use it badly.

3-   Do children benefit from the use of technology?

Of course, if school is teaching students through iPad from KG Up to ….

If they teach students through iPad, doing his homework through it instead of carrying a heavy bag (15 kilos). He will carry only the iPad.

4-   Do your children use technology at school? In which subjects?

Frankly speaking, it might be only computers and there is no continuity." My child likes to do prepare Math worksheet on computer"

5-   Are there any benefits in using technology at school?

Of course, we are living in technology and development era so we have to cope with the era which we live in.

For example, the student is carrying a bag (15 kilos) instead we will give him iPad and a memory which has all subjects in separate like English, Arabic and others…

6-   During 2 months at school your child has used iPad for learning to read, write, and spell. What is your opinion?

I'm so happy about this program. It is a good thing and during this short period, that is good and a hardworking job during these two months. The students can imitate and do hardworking….

7-   Is there anything you would recommend to teachers in terms of using technology in their classes?

Yes, any new things in developed countries we have to get it in quick cope with the era, technology and progress and teach a good developed generation without any difficulties. We have to develop each year. How to develop yourself... this is the question. If you don't… this means how to deal with technology and developed countries in education so; for instance, teachers and principals have to write their reports, information and listen to others' opinions.

iPad is a very good tool especially for the first grades and it contained everything rather than bags and in addition the blackboard and handwriting.

P5

1-   Do your children use any educational technology to learn at home?

Frankly speaking, only general information, reading and writing. I tried to let them use benefit programs and if it is bad, I delete …

2-   Do your children use any educational technology to learn at home?

Computer, internet and iPad…. What's alike...?

3-   Do children benefit from the use of technology?

Games, cartoon, means drawings and games that children like.

4-   Do your children use technology at school? In which subjects?

Child is young and he likes to play not like us as we like to watch movies…..

- Thanks God as most of my children compete the first ranks at schools…

5-   Are there any benefits in using technology at school?

School teaches them some lessons through computers (he thinks a lot …..) only once a week"

6-   During 2 months at school your child has used iPad for learning to read, write, and spell. What is your opinion?

It is good from my point of view as my child learns and got benefit." He started to repeat some words" Thanks Allah.." iPad helps my child in reading and writing…"

7-   Is there anything you would recommend to teachers in terms of using technology in their classes?

Teachers will not use things as f it is good and help students.

P6

1-   Do your children use any educational technology to learn at home?

Yes, they use iPad, Sony and IPhone

2-   Do your children use any educational technology to learn at home?

Games as it full of action, competitions like car race, painting and drawing.

3-   Do children benefit from the use of technology?

Yes, I mean that they use for example, computer

4-   Do your children use technology at school? In which subjects?

During computer period and I don't know if they use it other technology in another subject.

5- Are there any benefits in using technology at school?

The school teaches them on computer and how to use it, and then they went home and applied what they learn like PowerPoint.

6- During 2 months at school your child has used iPad for learning to read, write, and spell. What is your opinion?

I hope the children got learned by iPad as if they use iPad, it will be better and his level will develop and learn through playing games. I see if they can use iPad at school as we live in technology and development era." My child has become loving English language…."

7- Is there anything you would recommend to teachers in terms of using technology in their classes?

Yes, of course, they should be developing; they must use iPad and download suited programs for children to get benefit.

"iPad is used by old and young students and it is lighter than carrying papers and sure it is better".

P7

1- Do your children use any educational technology to learn at home?

Yes, of course, they use computers, laptop and iPad.

2- Do your children use any educational technology to learn at home?

Playing games as they can get a mused and use their energy in playing.

3- Do children benefit from the use of technology?

Sure, it has pros. And a con, for example, some games and entertainment programs has made child think and others just for playing and wasting time.

4- Do your children use technology at school? In which subjects?

Yes, the most is iPad especially in IT and Arabic

5-   Are there any benefits in using technology at school?

Of course, it helped my child a lot to improve learning, increase it, quickly they learn more than using papers as most children like to use the iPad, work on it, understand more and learn more….. He becomes to play spelling letters games." He sits on playing so he learnt something"

6-   During 2 months at school your child has used iPad for learning to read, write, and spell. What is your opinion?

My child was very poor in reading and vocabulary and his standard were poor but after using this program, his level increased, improved through vocabulary and learns new things." He started to be excited with reading and writing…"

7-   Is there anything you would recommend to teachers in terms of using technology in their classes?

I recommend if they can use iPad for a short period of time as it will help students in the class and get benefit in learning and entertainment. As when they use it" Teachers sometimes let students' wastes time and watch videos….."

Appendix 4: Teachers / Face To Face Interview

T1 Responses to Interview

1.   Do children with special educational needs receive any internally extra help (e.g. teaching assistant, extra help from the teacher ?

Special Needs students receive individualized instruction from Special Needs teachers (SEN), as well as guidance from mainstream teachers who are informed about the particular needs of said students. Teachers see students' need through assessment in the classroom and teachers can modify students' lessons.

2.   Are there any activities in your classroom that promote the use of technology for students with SEND?

Smart boards consider as a big iPad, manipulate, students see videos, animations, many different apps, and Listening Stations can aid with students who have hearing and sight disabilities. These are making students interactive.

3.   What are the benefits of these activities for students with special educational needs?

The Smart board can project images and help students see more clearly. The listening stations can help students with auditory difficulties.

4.   What is your approach to curriculum for diverse learners?

I try and find ways to include all students in the curriculum, through differentiated activities based on skill and learning ability. We are trying to follow the standards of ADEC (mastered, developed, and emerged).

Teacher design the lessons according to the learners' style.

5. **What kind of special knowledge and skills do you use for helping students with SEND to learn through technology in the classroom?**

I have no special knowledge, but try to bring this technology to the aid of my teachers in the instruction of SEN students. The teacher can choose the best way to teach students.

6. **What do you think about the use of iPad in teaching students (EFL Skills?**

I think the iPad could be useful in the classroom, given the right application. If the iPad is used correctly, it will be an attractive tool as it helped students (video, audio) and so much they can do by it. iPad makes learning fast and helps students to communicate easily.

7. **Some of your students have been taught through iPad to learn basic skills. Are there any benefits?**

I am not aware of the effects of the iPad on our students. The students will enjoy if they use iPad correctly but when I asked the main teacher, she told me that students get some improvement of the intervention program especially in spelling and reading skills.

T2 Responses to Interview

1. **Do children with special educational needs receive any internally extra help (e.g. teaching assistant, extra help from the teacher?**

Students receive five sessions in a resource room; they receive special programs only for Arabic language

2. **Are there any activities in your classroom that promote the use of technology for students with SEND?**

There is some activities- smart board- computer-essential skills used PowerPoint- CD-use internet. All of these are only for Arabic language.

3. **What are the benefits of these activities for students with special educational needs?**

The benefits of the activities; like;

a-attract students' attention

b- When students see the word-voice, these will effect on and attract their attentions

c- Support our aim for learning

d- Imitate the vowels screen

students with dysgraphia, for instance, they see the letters, written in more than one color and this will help students with dyslexia too as the letter has more sounds in Arabic and this is a great challenge for SEND

4. **What is your approach to curriculum for diverse learners?**

We are trying to make learning individually through IEP and skills of each student.

In my point of view, multisensory approach is the best as students use more than one sense especially with SEND

5. **What kind of special knowledge and skills do you use for helping students with SEND to learn through technology in the classroom?**

The main skills, know letters, how to combine letters, how to read words. Writing, for example, is the reflection of the authority of reading.

How to distinguish among letters, we try to depend on multisensory approach to learn these skills. Originally, we depend on how to help students to combine letters.

6.   What do you think about the use of iPad in teaching students (EFL Skills?

All students in this age have iPad at home. It is a means to acquire the skills (multisensory approach) one of my students can't spell any word at absolutely and after I used the iPad with SEND, now he can spell some words

iPad helps students to read, it is a hand, attractive tool for SEND, students use it to learn by themselves and the reinforcement is coming automatically. It is very important to choose the suited applications.

7.   Some of your students have been taught through iPad to learn basic skills. Are there any benefits?

The program was successful. Of course, some students were difficult to them to learn.as I said before, and one of my students can't spell at all …

After intervention program, students try to read, spell and write some words. Most of them have achieved the tasks. If we use iPad to learn, it will be very effective as I used iPad with SEND and it was beneficial and very good. The students become aware and differentiate among letters like b and p, d and b, they can distinguish among at least 50 % and can write some simple words and this evidence that this program is beneficial.

T3 Responses to Interview

1.   Do children with special educational needs receive any internally extra help (e.g. teaching assistant, extra help from the teacher?

Yes, the special educational Needs Teacher works with students for Math.

2.   Are there any activities in your classroom that promote the use of technology for students with SEND?

The teacher uses interactive programs and websites on the interactive white board

3.   What are the benefits of these activities for students with special educational needs?

They are visually, auditory and kinesthetically stimulating. Teacher prepares the lessons according to the learning style of the learners.

4.   What is your approach to curriculum for diverse learners?

I prepare lessons for visual, auditory and kinesthetically learners

5.   What kind of special knowledge and skills do you use for helping students with SEND to learn through technology in the classroom?

Unfortunately we have only one computer in the classroom but I let them listen to stories on the CD player and hope to record their oral work soon.

6.   What do you think about the use of iPad in teaching students (EFL Skills?

Very beneficial- it is the way forward; it is easy and modern tool of technology, however, they also need to develop their motor skills and their handwriting.

7.   Some of your students have been taught through iPad to learn basic skills. Are there any benefits?

I don't have access to iPad in my school, however, the students who got learned by using iPad during this period of time, they got improved especially in spelling skills and reading some simple words…. (I think they become more active than before…). It is more fun to read from iPad rather than from paper book…"

Appendix 5: Parent/Guardian Consent Form

Project title: A case Study of an Intervention Program

For Students with Dyslexia in a Primary School in the UAE

Researcher's name: Elazab Mohamed

Supervisor's name: Dr. Effie Efthymiou

I understand the Participant Information Sheet and the purpose of the study.

I allow my child to participate in the study.

I understand that my child may withdraw from the research project at any stage.

I understand that my child will not be identified and the personal results will remain confidential.

I understand that my child will be observed while working on the program in the classroom.

I understand that all data will be kept in a safe and secure location and only I will have access to them.

I understand that I may contact I or supervisor, if I require further information about the research.

Signed _____

Print name _____   **Date** ___/___/2015

Contact details

Researcher: Elazab Mohamed   Tel.:   0503111395

Email: 201370252@UAE.ac.ae

Supervisor: Dr. Effie Efthymiou   Tel.:   037316203

Email: Efthymia@uaeu.ac.ae

Appendix 6: Applications
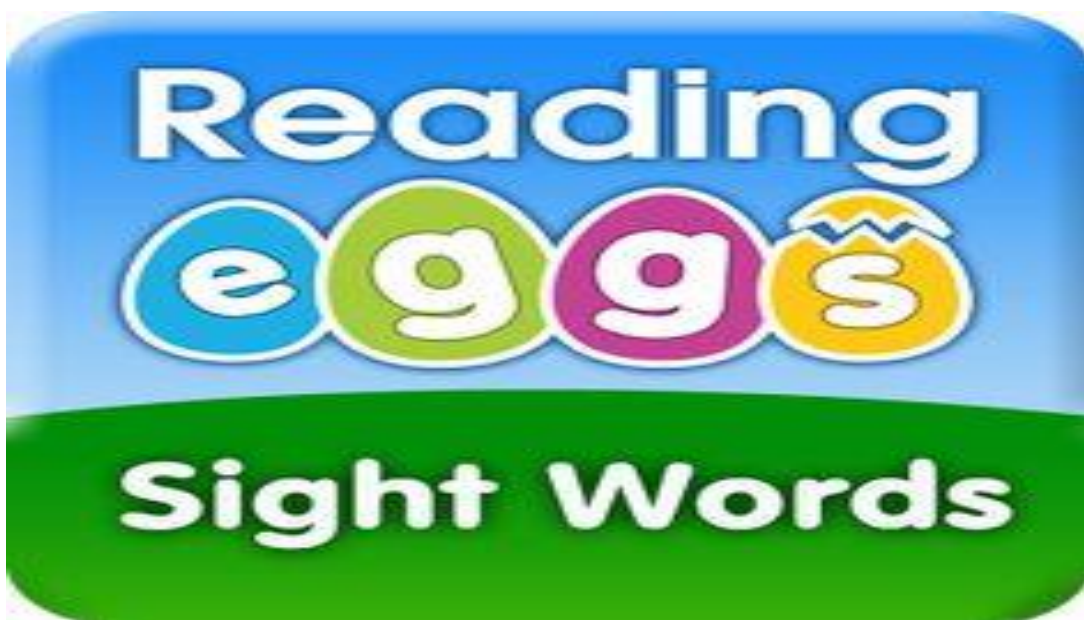
Appendix 7: To whom it may concern to facilitate the research's work at school

تسهيل مهمة باحث

UAEU College of Education

جامعة الإمارات العربية المتحدة
United Arab Emirates University

التاريخ   2015/02/23

السيد مدير مدرسة   المحترم

بعد التحية،،

الموضوع: تسهيل مهمة باحث

أرجو التكرم من حضراتكم تسهيل مهمة الباحث العزب محمد العزب، الطالب في برنامج الماجستير ، كلية التربية، بجامعة الإمارات العربية المتحدة، لتطبيق أدوات بحث تربوي ، عنوان البحث:

أثر تكنولوجيا الإيباد على أداء ودافعية الطلاب ذوي العسر القرائ

The Impact of Ipad Technology on The Performance and Motivation of Children with Dyslexia

وسوف تتواصل الباحث العزب محمد العزب مع حضرتكم لمناقشة تفاصيل تطبيق أدوات البحث.

شاكرا لكم تعاونكم الدائم،،

وتفضلوا بقبول فائق التحية والتقدير والاحترام،،

د. علي خلفان النقبي
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Appendix 8: Parent's Interview Questions (1)

1.   Do your children use any educational technology to learn at home?

2.   What kind of technological tools your children like using and why?

3.   Do children benefit from the use of technology?

4.   Do your children use technology at school? In which subjects?

5.   Are there any benefits in using technology at school?

6.   During 2 months at school your child has used iPad for learning to read, write, and spell. What is your opinion?

7.   Is there anything you would recommend to teachers in terms of using technology in their classes?

Appendix 9: Parent's Interview Questions EN & AR

1. Do your children use any educational technology to learn at home?

هل يستخدم أطفالك أي نوع من التكنولوجيا للتعلم في المنزل؟

2. Which type of technology tool your children like using and why?

أي أداة من أدوات التكنولوجيا يحب أن يستخدمها طفلك و لماذا ؟

3. What do children benefits from the use technology?

ما هي الفوائد التي تعود على الأطفال من استخدامهم للتكنولوجيا؟

4. Do your children use technology at school? In which subjects?

هل يستخدم أطفالك التكنولوجيا في المدرسة ؟ في أي مادة؟

5. Are there any benefits in using technology at school?

هل هناك أية فوائد من استخدام التكنولوجيا في المدرسة ؟

6. During 2months at school your child has used iPad for learning to read, write and spell. What is your opinion?

على مدار شهرين ، لقد استخدم طفلك فيها الأيباد في المدرسة لتعلم مهارات التهجئة و الكتابة والقراءة ما هو رأيك في ذلك؟

7. Is there anything you would recommend to teachers in terms of using technology in their classes?

هل هناك أي شيء توصي به المعلمين في مجال استخدام التكنولوجيا داخل الصف الدراسي؟

Appendix 10: Teacher Consent Form

Project title: A case Study of an Intervention Program

For Students with Dyslexia in a Primary School in the UAE

Researcher's name: Elazab Mohamed

Supervisor's name: Dr. Effie Efthymiou

-        I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me. I understand and agree to take part.

-        I understand the purpose of the research project and my involvement in it.

-        I understand that I may withdraw from the research project at any stage and that this will not affect my status now or in the future.

-        I understand that I will not be identified and my personal results will remain confidential.

-        I understand that I will be audio taped during the interview.

-        I understand that all data will be kept in a safe and secure location and only I will have access to them.

-        I understand that I may contact I or supervisor if I require further information about the research, at The United Arab Emirates University, if I wish to make a complaint relating to my involvement in the research.

Signed _____

Print name _____   **Date** ___/___/2015

Contact details

Researcher: Elazab Mohamed   Tel.:   0503111395

Email: 201370252@uaeu.ac.ae

Supervisor: Dr. Effie Efthymiou   Tel.:   037316203

Email: Efthymia@uaeu.ac.ae

Appendix 11: Teacher Interview Questions

1.   Do children with special educational needs receive any internally extra help (e.g. teaching assistant, extra help from the teacher)?

2.   Are there any activities in your classroom that promote the use of technology for students with SEND?

3.   What are the benefits of these activities for students with special educational needs?

4.   What is your approach to curriculum for diverse learners?

5.   What kind of special knowledge and skills do you use for helping students with SEND to learn through technology in the classroom?

6.   What do you think about the use of iPad in teaching students (EFL Skills)?

7.   Some of your students have been taught through iPad to learn basic skills. Are there any benefits?

Appendix 12: T1 Responses to Interview

1.   Special Needs students receive individualized instruction from Special Needs teachers (SEN), as well as guidance from mainstream teachers who are informed about the particular needs of said students. Teachers see students' need through assessment in the classroom and teachers can modify students' lessons.

2.   Smart boards consider as a big iPad, manipulate, students see videos, animations, many different apps, and Listening Stations can aid with students who have hearing and sight disabilities. These are making students interactive.

3.   The Smart board can project images and help students see more clearly. The listening stations can help students with auditory difficulties.

4.   I try and find ways to include all students in the curriculum, through differentiated activities based on skill and learning ability. We are trying to follow the standards of ADEC (mastered, developed, emergrd)

Teacher design the lessons according to the learners' style.

5.   I have no special knowledge, but try to bring this technology to the aid of my teachers in the instruction of SEN students. The teacher can choose the best way to teach students.

6.   I think the iPad could be useful in the classroom, given the right application. If the iPad is used correctly, it will be an attractive tool as it helped students (video, audio) and so much they can do by it.

        7.   I am not aware of the effects of the iPad on our students. But when I asked the main teacher, she told me that students get some improvement of the intervention program especially in spelling and reading skills.

Appendix 13: T2 Responses to Interview

1.   students receive five sessions in a resource room; they receive special programs only for Arabic language

2.   There is some activities- smart board- computer-essential skills used PowerPoint- CD-use internet. All of these are only for Arabic language.

3.   The benefits of the activities; like;

a-attract students' attention

b- When students see the word-voice, these will effect on and attract their attentions

c- Support our aim for learning

d- Imitate the vowels screen

students with dysgraphia, for instance, they see the letters, written in more than one color and this will help students with dyslexia too as the letter has more sounds in Arabic and this is a great challenge for SEND

4.   We are trying to make learning individually through IEP and skills of each student.

In my point of view, multisensory approach is the best as students use more than one sense especially with SEND

5.   The main skills, know letters, how to combine letters, how to read words.

Writing, for example, is the reflection of the authority of reading.

How to distinguish among letters, we try to depend on multisensory approach to learn these skills. Originally, we depend on how to help students to combine letters.

6.   All students in this age have iPad at home. It is a means to acquire the skills (multisensory approach) one of my students can't spell any word at absolutely and after I used the iPad with SEND, now he can spell some words

IPad helps students to read, it is a hand, attractive tool for SEND, students use it to learn by themselves and the reinforcement is coming automatically.

7.   The program was successful.ofcourse, some students were difficult to them to learn.as I said before, and one of my students can't spell at all …

After intervention program, students try to read, spell and write some words.

Most of them have achieved the tasks. If we use iPad to learn, it will be very effective as I used iPad with SEND and it was beneficial and very good. The students become aware and differentiate among letters like b and p, d and b, they can distinguish among at least 50 % and can write some simple words and this evidence that this program is beneficial.

Appendix 14: T3 Responses to Interview

1.   Yes, the special educational Needs Teacher works with students for Math.

2.   The teacher uses interactive programs and websites on the interactive white board

3.   They are visually, auditory and kinesthetically stimulating. Teacher prepares the lessons according to the learning style of the learners.

4.   I prepare lessons for visual , auditory and kinesthetically learners

5.   Unfortunately we have only one computer in the classroom but I let them listen to stories on the CD player and hope to record their oral work soon.

6.   Very beneficial- it is the way forward; however, they also need to develop their motor skills and their handwriting.

7.   I don't have access to iPad in my school, however, the students who got learned by using iPad during this period of time, they got improved especially in spelling skills and reading some simple words…. (I think They become more active than before…).

Appendix 15: To whom it may concern of the commitment of the research study 2014/2015

Abu Dhabi Education Council
Al ___ School Circle 1
Al Ain

Education First

مجـلـس أبـوظـبـي لـلـتـعـلـيـم
مدرسة
العين

لمن يهمه الأمر

تفيد مدرسة _____ للتعليم الاساسي بأن الباحث/ العزب محمد العزب الشاذلي قام بتطبيق البرنامج

الخاص برسالة الماجستير بعنوان/ A case Study of an Intervention Program For
Students with Dyslexia in a Primary School in the UAE

وذلك خلال الفصل الدراسي الثالث للعام الأكاديمي 2014/2015 مع طلاب الصف الثالث الإبتدائي

وتفضلوا بقبول فائق الشكر والاحترام ،،،

You Tube

Abu Dhabi Education Council
Al Sadara School Circle 1
Al Ain

Education first التعليم اولاً

مجلس أبوظبي للتعليم
مدرسة الصداره ج1
العين

لمن يهمه الأمر

تفيد مدرسة الصدارة للتعليم الاساسي بأن الباحث/ العزب محمد العزب الشاذلي قد قام بعمل مقابلات مع المعلمين وأولياء أمور الطلبة موضوع الدراسة وكذلك استخدام الإيباد داخل الحصة الدراسية خلال تطبيق البرنامج .

وتفضلوا بقبول فائق الشكر والاحترام ،،،

مدير المدرسة
ناصر الوحدي

Appendix 16: Pretest and Posttest Dyslexia Final

<u>**Part I: Spelling**</u>

Put a tick (√) under <u>one</u> face.

1-Short a /a/: Spell the following words:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	bag				
2	band				
3	camp				
4	act				
5	fact				
6	stand				

2- Short o /o/:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	job				
2	Prop				

3	drop
4	gone
5	cost

3- Short I /i/:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	bit				
2	win				
3	skin				
4	list				
5	trip				

4- Short u /u/:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	bug				
2	fun				
3	sum				

| 4 | rug |
| 5 | plus |

5-Short e /e/:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	led				
2	web				
3	yet				
4	felt				
5	west				

6- Long a /a_e/:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	base				
2	care				
3	lane				
4	safe				

7- Long a /ai/:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	tail				
2	fair				
3	Pain				
4	train				

8- Long a /ay/:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	bay				
2	Pray				
3	Stay				

9- Long o /o_e/:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	Dove				

2	Joke

3	Hope

10- Words with/sh/:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	Shop				

2	Share				

3	Crash

11- Words with /th/:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	Path				

2	Cloth				

3	Month

12- Words with /ck/:

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement

1	Kick
2	Sick
3	Rock

Part II: Writing: (jumbled sentences)

Drag the words into the correct boxes and make a correct sentence.

No	Sentence	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	the- is- snake- Where				
	?				
2	is-There-one-big- dolphin				
	.				
3	Tigers- long-have- tails				
	.				
4	Does- like-he- flowers				
	?				

5	Can-I-see-brown-two-puppies

.

Part III: Reading

Read the following correctly

Syllable Deletion:

No	Sentence	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	What is "rainbow" without "rain"?				
2	What is "goldfish" without "fish"?				
3	What is the first sound in the word "van"?				
4	What is the final or ending sound in the word "dog"?				
5	What is the middle vowel sound you				

hear in the word

"fat"?

6	What sound is the same in these words: fix, fall, fun?

Phoneme Categorization:

No	Sentence	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	Which word doesn't belong with the others: cat, mat, bat, and ran?				
2	Which word doesn't belong with the others: red, bed, ten, head?				

Phoneme Blending:

(Say each phoneme/sound in isolation. The forward slashes mean to pronounce the sound of that letter).

No	Sentence	Criteria			
		Mastered	Developing	Emerging	No Achievement

	Mastered 😄	Developing 😉	Emerging 🙂	No Achievement 😓
1	What word is /n/ /o/ /t/?			
2	What word is /m/ /a/ /d/?			
3	What word is /s/ /l/ /e/ /d/?			

Phoneme Segmentation:

No	Sentence	Criteria			
		Mastered	Developing	Emerging	No Achievement
		😄	😉	🙂	😓
1	How many sounds do you hear in "den"?				
2	How many sounds do you hear in "rob"?				
3	How many sounds do you hear in "grab"?				

Phoneme Deletion:

No	Sentence	Criteria			
		Mastered	Developing	Emerging	No Achievement
		😄	😉	🙂	😓
1	What is "jet" without /j/?				
2	What is "smile" without /s/?				
3	What is "glad" without /g/?				

Phoneme Manipulation:

No	Sentence	Criteria			
		Mastered	Developing	Emerging	No Achievement
		😄	😉	🙂	😓
1	What word would you have if you changed the /t/ in "fat" to /b/?				
2	What word would you have if you changed the /m/ in "jam" to /r/?				
3	What word would				

you   have   if   you

changed   the   /b/   in

"bag" to /r/?

Real Words:

Read the following words, YOU have about 10 seconds per word.

No	Word	Criteria			
		Mastered	Developing	Emerging	No Achievement
1	about				
2	warm				
3	try				
4	together				
5	today				
6	start				
7	small				
8	six				
9	show				
10	shall				
11	seven				

12	pick
13	own
14	only
15	never
16	light
17	laugh
18	keep
19	eight
20	gear
21	done

Note: the criteria are balanced as the following:

Mastered=3

Developing=2

Emerging=1

No achieving=0

Note: Each skill test will take place separately in one period (spelling test, reading test and writing test)

Appendix 17: Teacher feedback of the test and intervention program

Hello,Mr.ELazab

Please find my comments below in regards to the following criteria:

- Suitability for students with Learning Difficulties(students with dyslexia)
- Suitability for Learning Outcomes and ADEC Standards
- Suitability for Grade and Age
- Suitability for the iPad applications used in the intervention program

I found the Dyslexia Pre- and Post-Test to be suitable for students with Learning Difficulties (students with dyslexia) to undertake with assistance. The instructions are straightforward and easy to follow for all students at all grade levels. The targeted phonemes link with the ADEC's Learning Outcomes and covered all skills.

Relating to the intervention program:

The iPad applications are really amazing as matching with what included in both Learning Outcomes and ADEC Standards and Dyslexia Pre- and Post-Test.

I would make some slight changes to the test:

- Instead of "No Achieving" it should read "No Achievement"
- Instead of "Short a (a)", it should read "Short a /a/" and so on for each vowel
- All words should be in lowercase, e.g. "bag" instead of "Bag"
- The name of the test, "Dyslexia Pre-posttest" is slightly confusing. Perhaps it should read "Dyslexia Pre- and Post-Test"?

Thank you and if you have any questions, please don't hesitate to ask.

Best regards,

Head of Faculty
Al   School
13/04/2015

Hello,Mr.ELazab

Please find my comments below in regards to the intervention program (using iPad applications):

- 1/ Use of app is relevant to the purpose and student needs

- 2/ Content is appropriate for the students' learning outcomes

- 3/ Design of apps is functional and visually stimulating

- 4/ according to the history of Apps used, they have been updated.

- 5/ Apps used provide useful feedback

With regards,

EMT Teacher
14/04/2015

Hello,Mr.ELazab

Please find my comments below in regards to the intervention program (using iPad applications):

1. The apps used in the program are relevant and have a strong connection to the purpose for the apps and appropriate for the student.
2. According to my experience, these apps will motivate students and help them to engaged during the period
3. The apps are really related to the content of reading, spelling and writing skills.
4. I think they are easy to be used by students.

All the best,

EMT Teacher
13/04/2015