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EXPLORING THE ROLE OF INTERACTIVE TECHNOLOGY IN PROMOTING KINDERGARTENERS' PHONEMIC AWARENESS SKILLS

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This thesis is submitted in partial fulfilment of the requirements for the degree of Master of Education (Curriculum and Instruction)

Under the Supervision of Dr. Negmeldin Alsheikh

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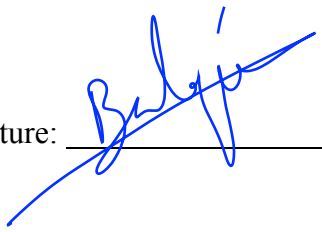
Declaration of Original Work

I, Balqis Abdulla Albreiki, the undersigned, a graduate student at the United Arab Emirates University (UAEU), and the author of this thesis entitled "*Exploring the Role of Interactive Technology in Promoting Kindergarteners' Phonemic Awareness Skills"*, hereby, solemnly declare that this thesis is my own original research work that has been done and prepared by me under the supervision of Dr. Negmeldin Alsheikh, 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 Any materials borrowed from other sources (whether published or unpublished) and relied upon or included in my thesis have been properly cited and acknowledged in accordance with appropriate academic conventions.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.

Student's Signature:  Date: **26/11/2020**

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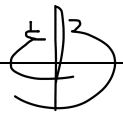
Signature  Date May 30, 2020

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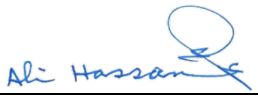
Signature  Date 26/11/2020

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Abstract

This study aimed at exploring the role of interactive technology in promoting phonemic awareness skills for Emirati kindergartners. An explanatory mixed method design was employed to achieve the purpose of this study. The quantitative phase of the study featured a pre and a posttest after an implementation of an interactive program for six weeks. The qualitative phase of the study featured a collection of qualitative data of actual work of kindergarteners during the implementation of the program by means of documents. The participants of this study were KG2 students who were selected conveniently (n= 50) and were divided into two groups: experimental group (n= 25) and control group (n= 25). In general, the results gathered from the pre- and post-test revealed that there is a significant difference between the experimental group and control group in terms of letter-sound relationship and sight word recognition skills in favor of the experimental group. The qualitative results showed that the use of interactive technology in teaching phonemic awareness leads to gradual development in letter-sound relationship, and sight word recognition skills. The study discussed essential issues related to kindergartners' reading literacy skill including, raising phonemic awareness, and it offers some recommendations for teachers, curriculum planners and suggest some implications for future research.

Keywords: Phonemic Awareness, Interactive Technology, Letter-Round Relationship, Sight Words Recognition.

Title and Abstract (in Arabic)

استكشاف دور استخدام التكنولوجيا التفاعلية في تعزيز تعلم الاحرف وأصواتها وتمييز الكلمات البصرية لطلبة رياض الأطفال

الملخص

هدفت الدراسة إلى استكشاف دور استخدام التكنولوجيا التفاعلية في تعزيز تعلم الاحرف وأصواتها وتمييزاصوات الكلمات البصرية لطلبة رياض الأطفال. و قد اعتمدت الدراسة على استخدام المنهج المختلط للحصول على نتائج واضحة وقوية توضح لنا هدف الدراسة من خلال استخدام مواد و استراتيجيات تخدم التعليم الالكتروني التفاعلي. وقد اشتملت الدراسة على مرحلتين حيث كانت المرحلة الأولى من الدراسة تتمثل في الجانب الكمي للدراسة و الذي يتعلق بإجراء الإختبار القبلي لقياس مستوى الطلبة في مهارتي تعلم الاحرف وأصواتها وتمييز الكلمات البصرية بعدها تم تطبيق البرنامج القائم على استخدام التعليم الالكتروني التفاعلي لمدة استمرت ستة أسابيع و من ثم إجراء الإختبار البعدي لقياس المكتسبات المتحصلة للمهارتين. أما المرحلة الثانية من الدراسة تشتمل على الجانب الكيفي للدراسة و يتضمن تحليل الوثائق التقييم الاسبوعي لقياس تطور الطلبة خلال البرنامج.و قد تم اختيار العينة المتاحة (n= 50) من طلبة رياض الأطفال مرحلة الروضة الثانية حيث تم تقسيم العينة إلى مجموعتين: المجموعة التجريبية (n= 25) و التي تم تطبيق البرنامج عليها و المجموعة الضابطة (n= 25). و قد اسفرت النتائج الكمية على وجود فروق ذات دلالة احصائية بين المجموعة التجريبية و المجموعة الضابطة في أداء الطلبة لمهارتي تعلم الأحرف وأصواتها وتمييز الكلمات البصرية و كانت لصالح المجموعة التجريبية. كما اسفرت و أكدت النتائج الكيفية على ان استخدام التعليم الالكتروني التفاعلي قد أدى إلى تطور تدريجي في أداء الطلبة لمهاراتي تعلم الاحرف وأصواتها وتمييز الكلمات البصرية. فنرى أن الدراسة قد تناولت قضايا متعلقة بكيفية تطوير مهارتي تعلم الأحرف وأصواتها وتمييز الكلمات البصرية كمهارتين أساسيتين في تطوير مهارة القراءة لدى طلبة رياض الأطفال و التي استنتجت منها بعض التوصيات الموجهة للمدرسين والمختصيين في تعليم القراءة اللغة الانجليزية ومحاولة جذب الانتباه لها عند إجراء أبحاث اخرى مستقبلا.

مفاهيم البحث الرئيسية: الوعي الصوتي، التكنولوجيا التفاعلية، العلاقة بين الحروف والصوت، والتعرف على الكلمات البصرية.

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Dedication

To my beloved parents Abdulla and Noura

To my dearest husband Mabrook who supported me and be with my side

To my angels Zayed, Maitha, Alyazia and Hoor

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List of Abbreviations

ADEC	Abu Dhabi Education Council
CD	Compact Disc
MoE	Ministry of Education
NRA	Non Verbal Reading Approach
QUAN	Quantitative
Qual.	Qualitative
SPSS	Statistical Package for the Social Sciences
UAE	United Arab Emirates
ZPD	Zone of Proximal Development

Chapter 1: Introduction

1.1 Overview

The main focus of this research is exploring the effects of using interactive technology in promoting kindergartens' phonemic awareness with respect to letter-sound relationship and sight word recognition skills. The introduction chapter of this study serves as an outline that begins with a brief background of the study, then highlights the importance of reading for learning. Later, the use of interactive technology in promoting kindergarteners' essential skills for phonemic awareness are also discussed. More importantly, the problem statement that this study is pursuing stated, the purpose of the study, the research questions, significance of the study and imitations and delimitations of the study along with the definition of key terms are introduced. Finally, a brief description of the structure of the study is presented.

1.2 Background

The United Arab Emirates (UAE) recognizes the importance of education and has a clear vision with aspirations that a world-class education catering to every child will be ensured to have students which can compete the international ones in their abilities, skills and knowledge (MOE, 2008). Students have good competencies when they gain wide knowledge. Generally, what paves the way for gaining that knowledge and achieve one's potentials are reading. The UAE's leadership is persistent in developing the education systems especially in terms of reading skills, as they consider reading to be the key for knowledge. Sheikh Mohammed Bin Rashid emphasized on this point by urging stakeholders to "Help youngsters to read as it is a key to promote the development of nations. The love of reading is taught from an early age, and becomes a habit and culture

that you cannot live without," (United Arab Emirates Cabinet, 2019). Such strong words generate the urge to work hard to help in achieving the nation's long-term educational goals. Therefore, the work has to begin from the bottom of the ladder because the young readers in the kindergarten are considered as the most appropriate age, where the reading skills can be developed immensely by ensuring that a solid basic reading skills are established. According to science, the basic reading skills are best picked up between the time a child is born and until they reach grade three (Armbuster, Lehr and Osborne, 2006). Thus, the kindergarteners have to master the phonemic awareness skills that will be the concrete platforms of their life success. Good readers are described as phonemically aware with a high capability of understanding the alphabetic principal and then applying these skills in a quick and easy manner while reading. Also, they have a wide knowledge of the vocabulary of the specific language and are able to relate reading to their own experience. If there are any troubles in any of these areas, this can delay their reading development (Peregoy and Boyle, 2005). Coping with the worldwide tendencies in using technology in teaching and learning, it is necessary to implement the various kinds of technology that will help those kindergarteners improve in phonemic awareness skills; thus, shaping up a bright future reading performance (Jamshidifarasani, Garbaya, Lim, Blazevic and Ritchie, 2019).

Usually, measuring the progress and achievement of all students is done by performing continuous improvement and evaluation in all UAE schools. The improvement and enhancement of the schools' system and evaluation process is done to improve the literacy skills of students within the country through applying 'Irtiqaa', which is a comprehensive evaluation system that measures the quality of education in all schools in Abu Dhabi. This is performed by official inspectors who are trained by the Abu Dhabi

Department of Education and Knowledge (ADEK), in order to evaluate the schools according to international standards to confirm that they have got the desired criteria.

1.2.1 The Role of Phonemic Awareness on Promoting Reading

Reading is an essential skill that students must master by the end of the early childhood education level. The progress and attainment of skills by the young learners in the early years are shaped by numerous factors, such as literacy skills, numeracy, and personal and social development (MOE, 2008). Hence, educators must find resources and strategies that ensure that the students within this age group are progressing in reading, otherwise, future difficulties will be attributed to the weakness of phonemic awareness skills. Typically, Phonemic awareness is considered a listening skill that can be taught without print. It is essential to learning to read (Hougen, 2012). Therefore, kindergarteners must understand that spoken language is made of separate sounds, and they should be able to identify (Armbruster et al., 2006). As some researchers such as Catts, Herrera, Nielson and Bridges (2015) and Armbruster et al. (2006). stated that the initial predictions of reading conceptions have highlighted the strong relationship between word recognition and future comprehension abilities.

Furthermore, Catts, Herrera, Nielson and Bridges (2015) and Storch and Whitehurst (2002) link the deficiency of letter-sound relationship and sight word recognition skills to possible shortages or learning and reading difficulties. For example, Storch and Whitehurst (2002) analyzed the link between word recognition and phonemic awareness in pre-school, kindergarten, and elementary school. The researchers found that the ability to read in the initial stages has a direct relationship with the kindergarten phonemic awareness knowledge. Therefore, the findings suggested indirect causal relationships between initial language development skills and later reading ability. Hence,

it is imperative that teachers are able to assess, monitor and constantly develop letter-sound, word recognition and other phonemic awareness skills by implementing technology as instructional method.

1.2.2 The Role of Using Interactive Technology in Promoting Phonemic Awareness

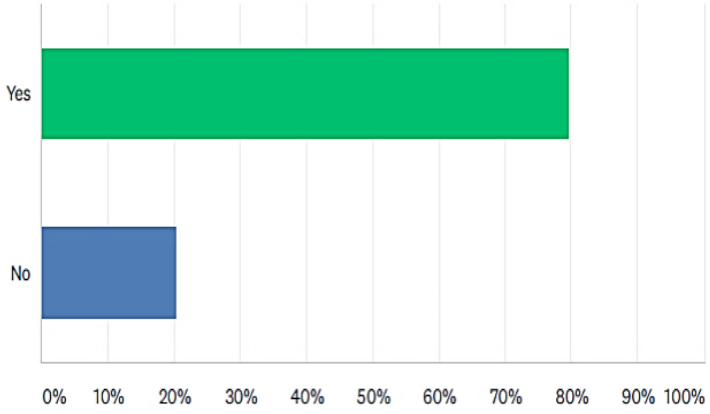
Technology is a stimulus and an approach that enhances learning and provide opportunities for enriching school experiences (McGuinn, 2006). The benefits of technology are uniquely recognized such as: promoting technological skills, changing the role of students and teachers, stimulating more collaboration and establishing effective resource application (McGuinn, 2006). Generally, technology has been widely used in all facets of contemporary life and has become a dynamic tool for creating effective learners. Definitely, technology has been increasingly used to support and enhance literacy learning (Ahmed, 2017; Jamshidifarasani et al., 2019; Papastergiou, 2009). The influence of technology enhances pedagogical practices and increase students' interaction in learning, especially reading (Leu, McVerry, O'Bryne, Zawilin ki, Castek, and Haltman, 2009). Additionally, a considerable body of research in the UAE context has investigated using technology in teaching reading skills in undergraduate and high schools' levels. This greatly encourages the integration of technology to enhance the educational process and students' learning (Ahmed, 2017; Ismail, AI-Awidi and Almekhlafi, 2012; Ismail, Almekhlafi, and Almekhlafy, 2010; Patronis, 2014). Therefore, it is not only an encouragement but it is a demand to investigate the role of using technology in teaching reading skills to kindergarteners. More specifically, the phonemic awareness skills aspect.

1.3 Statement of the Problem

The UAE's government has strongly emphasized the importance of reading, especially for young learners (United Arab Emirates Cabinet, 2019). Those young learners have to be able to read fluently and accurately at the end of the third grade (Armbuster et al., 2006). Teachers should be keen to assist their students in mastering their phonemic awareness skills, otherwise, future difficulties in reading will be detected and those students will be steps behind their colleagues. As proved by studies such as Armbuster et al. (2006), Catts et al. (2015) and Walsh et al. (2006) that there exists a strong relationship between phonemic awareness mastery and reading comprehension abilities.

Although there is great emphasis on the need for promoting English reading skills, the UAE students are still struggling to achieve good results particularly when it comes to performing standardized tests such as the Program for International Students Assessment (PISA). In reference to PISA, the UAE students obtained (432) in reading, which is located between level 2-3, indicating low inferences abilities (OECD, 2019). Referring to Catts et al. (2015) and others, the solution for this problem must be dealt with from the roots, which is the early stages of acquiring reading basic skills (kindergarteners). Usually, children in their first period of coming into the kindergarten encounter the difficulty of matching letters to their sounds or recognizing the sight words, which are basic skills in phonemic awareness. Furthermore, they feel shy to interact with the teacher and peers, that's why it is preferred to use technology to encourage them to interact and simultaneously get the full benefit of this learning resource, despite the fact of the limited technological resources in some cases. In order, not to make it a personal opinion, the researcher conducted a survey with some questions to crystalize the problem that this study is investigating. There were 64 participants in the survey who are English teachers of kindergartens. The survey consists

of four main questions, which were close-end type of questions (Yes/No). The first one was "*Do children face any difficulty in matching between letter symbols and their sounds?"* As shown in Figure (1), 79% of the participants answered with yes, which formulated 51 out of 64 of the teachers assuring that the kindergarteners encounter a problem regarding letter-sound relationship and sight word recognition skills. This problem is not due to reading failure but because they do not know them and are in need of acquiring these skills.

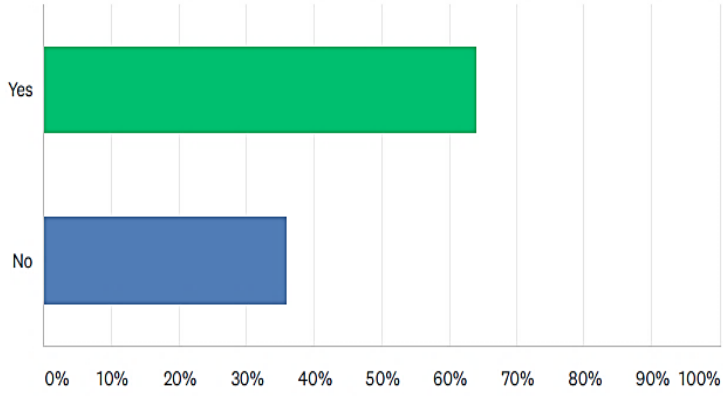


ANSWER CHOICES	RESPONSES	
Yes	79.69%	51
No	20.31%	13
TOTAL		64

Figure 1: Answers for question one in the survey

For the second question which asked for the benefit of the limited resources available "*Do you find using the assigned technological applications like (song of sounds CD) beneficial in developing students' phonemic awareness regarding letter-sound relationship?",* 85% of the teachers answered positively, forming 55 out of the total 64 teachers asked. This is considered to be a huge percentage and a very important finding because admitting that they can make use of this simple resource shows just how much these teachers can improve the kindergarteners experience if these resources were

advanced and made readily available. Another limited resource available is Labeeb the robot, based on which the researcher posted this question *"Do you find using Labeeb the robot beneficial in developing students' phonemic awareness letter-sound relationship and sight words recognition?"*. As revealed in Figure (2), 57% of the teachers (36 out of 64) were not satisfied with the use of Labeeb the robot in letter-sound relationship and sight word recognition. Most of the teachers agreed on the limitedness of the technological resources available in the classroom according to their answer for the fourth question *"Do you think that technological resources are limited in the classroom when teaching phonemic awareness and sight words recognition?"*. The results of this question turned out to be 46% (41 out of 64).



ANSWER CHOICES	RESPONSES	
Yes	64.06%	41
No	35.94%	23
TOTAL		64

Figure 2: Answers for question two in the survey

The researcher used all the available pieces together including the interactive PowerPoint she made to build up her program to be comprehensive and beneficial to serve the current study purpose.

1.4 Purpose of the Study

The purpose of this study is to explore the effect of using interactive technology program regarding two essential phonemic awareness skills, namely letter-sound relationship and sight words recognition. Furthermore, it investigates the way in which this technological program contributes to promoting kindergarteners' reading skills of these subset skills. Finally, it examines the way in which the qualitative results explain the quantitative results.

1.5 Research Questions

1. Does the use of interactive technology program promote kindergarteners' recognition of letter-sound relationship?
2. Does the use of interactive technology program promote kindergarteners' recognition of sight words?
3. How does the use of interactive technology program in actual practices contribute to promoting kindergartners' letter-sound relationship and sight word recognition?
4. In what way do the qualitative data explain the quantitative data?

1.6 Significance of the Study

Responding to the need of more research in the role technology play with respect to reading and phonemic awareness skills specifically in the early stages. This study may add a humble piece to the research body. In terms of pedagogy, this study may draw the attention to the use of technology and encourage teachers especially in the early stages to employ it. This study may change the view that technology programs are used for the weak readers and those who suffer from special needs disabilities as intervention programs. They can be used as important resources of learning and social interaction.

1.7 Limitations and Delimitations

To obtain the aim of the study, the researcher conveniently and purposively selected the sample of the study meaning that upon availability. The number of the sample is small especially in conducting the quantitative phase. The time of conducting the study –six weeks- is short in comparison with purpose of measuring acquired skills. Longer time may reflect stronger results. Despite the fact of conducting the study in one school, for generalizability it is still possible due to the research design used.

Additionally, some delimitations were identified which include: the participants of the study were selected according to the availability. As a result, they were limited to kindergarten students (KG2) in one of the public schools in the UAE context. Furthermore, this study aimed to investigate the phonemic awareness which is only one component in the phonological awareness skills that form a requisite to reading literacy. The study was guided by pre and post-tests and a designed program for six weeks, which was applied to explore the role of using technology in promoting kindergartners' letter-sound relationship and sight word recognition skills. The scope of the study included the kindergarteners' performance and excluded the teachers or the principals' perceptions.

1.8 Definition of Terms

Phonemic Awareness: Phonemic awareness is defined by (Armbruster, et al., 2006, p 3) as the "the ability to hear, identify, and manipulate individual sounds – phonemes – in spoken words. It also refers to one's "awareness of the sound structure of language" (Morrow, 2012)

Letter-sound relationship: Letter-sound relationship is defined by speech-language-development, (2008) as the correspondence between the letter and the sound that refers to the identification of sounds associated with individual letters and letter combinations. This is the point in a child's development of literacy

Sight Words: Sight Words recognition is an essential skill of reading literacy skills which is featured by instantly recognizing words as wholes (Reutzel and Cooter, 2013). It enables kindergarteners to become “fast and accurate readers” (Yellin et al., 2008).

Interactive Technology: Interactive technology is defined by Weiser (2008) as the use of electronic devices, which connected with a computer or work by its own so that images, are displayed where they can be used interactively (Notes can be written, important points highlighted, and programs manipulated. It is a method of communication in which the program's outputs based upon the operator's inputs, and the operator's inputs, sequentially, impact the program's outputs. It refers to the different means in which individuals practice and share information, or how they connect with one another. This connection or communication must have the following elements: Moving pictures and illustrations, Computer graphics, Digital Script, Video, and Audio. Additionally, interactive technology also has an educational constituent, making it a very influential learning device. It lets (and encourages) individuals—especially students—to become

more active in their learning experience, more collaborative (Investopedia, 2019).

1.9 Organization of the Study

This study consists of five chapters. Chapter 1 provides an overview of the research focus, statement of the problem, purpose of the study, research questions, significance of the study, the limitations of the study, some definitions of the key terms and the ends up with organizational plan of the study. Chapter 2 contains the conceptual framework, theoretical framework and previous studies relevant to the purpose of the study. Chapter 3 portrays the research design, the sampling, the instruments, the data collection and data analysis procedures. Chapter 4 reveals the main findings that answered the research questions. Finally, Chapter 5 introduces the discussion chapter of the results in relevance to the theoretical framework and the previous studies. Finally, recommendations and implications for future research are presented.

Chapter 2: Literature Review

2.1 Introduction

This chapter addresses in details the conceptual framework, the theories and previous studies in order to provide a solid background, which enriches the purpose of this study aiming at investigating the role of interactive technology in promoting two phonemic awareness skills, mainly the letter-sound relationship and sight word recognition. This chapter introduces the conceptual framework that includes phonemic awareness, letter-sound relationship, sight word recognition and interactive technology. Additionally, the literature review consists of the theoretical framework developed for this study, by concentrating on specific theories such as Vygotsky's sociocultural theory and the active learning approach. Furthermore, the chapter investigates the previous research relevant to the use of technology in promoting letter-sound relationship, the use of interactive technology in promoting sight word recognition and the studies that dealt with the same topic with Arabic native speakers.

2.2 Conceptual Framework

2.2.1 Phonemic awareness

Phonemic awareness is well-defined by Pemberton et al. (2006) as the capability of recognizing and manipulating sounds in a language, where the phoneme is the tiniest unit of sound in language that brings a difference on what it means. Phonemic awareness skills play an essential role in the reading skills for the children and subsequently brings success to their life in the future (Robinson, 2003; Catts et al., 2015). Usually, several phonemes are hard to be heard or manipulated by children and normally they mainly focus on the

meaning transferred, rather than on the form since these phonemes are linked together rapidly in daily speech. Teachers need to find their ways to help their students differentiate them. Therefore, for one to assist kindergarteners know how to read, it is imperative to use technology, which allows them to detect phonemes easier and eventually develop their phonemic awareness (Pemberton et al. 2006; Magnat, 2012; McManis, Gunnewig, and McManis, 2010). Positively, it was found out that the visualization that the technology offers helps the students become aware of the importance of phonemes and allows them to pay attention to sound differences whilst listening to the English Language (Magnat, 2012). In phonemic awareness, there are many skills, but for this study the researcher dealt with the two types of skills that need to be given a priority as they form the basis for learning how to read. These two types are letter- sound relationship and sight word recognition.

2.2.2 Letter-Sound Relationship

Generally, when kindergarteners are communicating in their daily life, they do not pay attention to the symbols of the sounds they pronounce. However, when it comes to learning how to read, they develop a difficulty in matching letters with their sounds (Gunderson and D'Silva, 2016; Miles, McFadden, and Ehri, 2019). That is why these kindergarteners need to master the skills that are linked to letter sound knowledge and be aware of the relationship between spoken sounds and written letters in the English language. Therefore, letter-sound knowledge is the awareness of the letters or groups of letters which symbolize the individual speech sounds in a language. It is worth mentioning here that the letters and the letter patterns that stand for speech sounds are termed 'graphemes', while the speech sounds of a language are called 'phonemes' as mentioned earlier. In this sense, kindergarteners need to have the ability to recognize this relationship clearly to be a good reader in the future (López, 2010). An important study was conducted

by Castles, Coltheart, Wilson, Valpied and Wedgwood (2009) to examine the impact of phonemic awareness and letter awareness of a six-week period program on learning letter-sound correspondences of 76 Australian kindergarteners of 4 years age. All the participants were unable to name any of the sounds of the printed letters exposed to them so that the researchers can measure the influence of the training without any external factors effect. The results revealed that phonemic awareness could be successfully taught to kindergarteners over a 6 week period and the learning outcome generalize to the items that were not included in the program; however, there was no solid proof suggesting that prior knowledge in phonemic awareness or letter awareness assisted the consequent learning of letter-sound correspondences. Despite the fact that training students may give tangible results, O'Leary, Cockburn, Powell, and Diamond (2010) postulate that the instruction concerning sound-letter correspondence is challenging to help kindergarteners understand that some sounds do not have a unique letter that is associated to it. There is not one most applicable instructional way of teaching the students. Furthermore, there is no best order of teaching letter sounds and letter names or a definite sequence for the alphabet to be taught in according to O'Leary et al. (2010). In this sense, teachers must try their best to help their students acquire the early literacy skills. Using interactive technology with various activities has a positive effect in promoting letter-sound relationship, as the kindergartener will be in a better position of knowing how sounds and letters are related to each other and to detect the matching relationship of phonemes of the words they are not familiar with (López, 2010).

2.2.3 Sight Word Recognition

Sight word recognition is the ability to read isolate, recurrent sight words quickly and accurately (Catts et al., 2015). Specifically, there are numerous words that re-appear

many times while using the language; for instance, words list that includes: the, a, is, of, to, in, and, I, you, and that. These words are repeated number of times in a piece of reading material. Additionally, sight words are critical to read not only because they are used so repeatedly, but also because many of them cannot simply be sounded out or illustrated and pictures cannot be complementary to a text to assist interpreting the word. Automatic recognition of some words, or on sight, contributes to promote effortless reading and with understanding (Riva et al, 2012; McArthur et al., 2015). It is a praiseworthy to mention here that, there are two types of sight words: the decodable words that regularly occur in printed texts for example ("and," "like," "get"). These words can be read by sounding them out, but they appear so often in reading texts that learning to read them on sight will increase kindergarteners' reading fluency (Ehri, 2014; Joseph, Nation, & Liversedge, 2013). The second type of sight words is the non-decodable words that do not follow typical letter-sound correspondences for example ("have," "there," "of"). Therefore, they cannot be identified, they must be recognized automatically by sight and dealt with as whole unit accessed them in memory. This process was called by Ehri (2005) as unitization. However, these high frequency and irregular words are only one constituent of a comprehensive literacy program for kindergarteners and they should be given in small doses. Initially, sight words should be taken from research-based lists and be implemented directly to reading related text (Hinzman, and Reed, 2018). For example, a study conducted by Edward Dolch, from which he concluded that there are 100 words that construct 50 percent of the words in reading texts. Dolch collected the one hundred list of sight words by considering all popular children's books at the time of conducting the research (Dolch, 1936). Another research-based list of sight words was collected by Fry (2000) that included 1000 sight Words. The key difference between the two lists that Dolch's list was not revised

or updated while Fry's list has been revised and updated several times. One more thing to be mention about these two lists that Fry's included all Dolch's words.

This can be achieved with the help of using technology. As the use of interactive technology applications and activities has a positive impact in promoting sight word recognition. The interactive technology will enhance the overall reading abilities of the kindergarteners. It also enhances their confidence in reading (Riva et al., 2012; Mechling, Gast, and Thompson, 2009).

2.2.4 Interactive Technology

Commonly, teachers are strongly advised to use interactive technology as a tool to promote kindergarteners' reading skills, specifically, letter-sound and sight word recognition. It is apparently known that, children learn in different ways. Some require visual experiences while others need auditory cues (Guthrie and Carlin, 2014). Besides, technology offers teachers new exciting ways to deal with certain issues in kindergarteners while encouraging them to handle the hard tasks in being phonemically aware (Guthrie and Carlin, 2014).

Interactive technology is a kind of technology that digitally enhances interaction while learning and paves way for students to manipulate content (Kennewell et al., 2018). In the United Arab Emirates (UAE), teachers have to use interactive technology, as it adds range and dimension to learning phonemic awareness, which can be useful to every individual student (Miller, 2018; MOE, 2019). It will enable kindergarteners to be capable of hearing and matching sounds to letters. When a kindergartener is capable of hearing phonemes, and linking them to their spellings, this means that he or she are heading down the right path to excelling in spelling and reading.

Currently in the UAE, there are various kinds of technology being established in the programs of early reading, which are created to assist the kindergarteners in their journey of learning reading. By linking technology with a powerful curriculum, it assists kindergarteners to detect letters and link them to their sounds, by engaging their senses effectively in the process of reading. Besides that, the use of interactive technology supports an active and hands-on approach to learning (Miller, 2018). Additionally, kindergartners benefit from an immediate feedback while they are practicing in the interactive activities, which provides a fast response mechanism for mistakes detection (Hess, 2012; Kennewell and Morgan, 2013; Sherman, Kleiman, and Peterson, 2007; Ybarra and Green, 2003). Using interactive technology also promotes engagement, supports conversation and interaction among students in the class via collaboration with each other (Kennewell and Morgan, 2013). The researcher employed all the devices available in the school to be included in the program, mainly the smart board, the listening kit, Labeeb robot, song of sound kit and the starfall website. It is important to mention here that the smart board is limited and blocked from websites that can be used by the teachers to support their teaching. Therefore, it was activated in the program by using interactive PowerPoint presentation done by the researcher.

2.3 Theoretical Framework

2.3.1 Vygotsky's Sociocultural Theory

Constructivism is a learning theory found as an extent evolution of Cognitivism and Behaviorism theories. Constructivism focused a lot on the essential roles of the existed experiences and beliefs in constructing new knowledge. Constructivism also goes back in the work of Piaget, Brunner, von Glasersfeld, and Vygotsky (Siemens, 2014). Constructivism is a philosophy of learning that exclusively emphasizes on learning from

experiencing. Furthermore, knowledge is gained by reflecting on personal experiences, through which understanding is constructed about the world we live in (Funderstanding, 2008). Besides, constructivism focuses on the importance of the knowledge and the skills that student improves through different experiences throughout their learning process. It identifies the formation of new understanding from the blending of prior knowledge and new information (Education Broadcasting Cooperation, 2004). In this sense, constructivism help students to acquire knowledge that incorporate the new concepts and perceptions into their pre-established information. Simply, learning, is the process of modifying our cognitive models to accept new experiences (Funderstanding, 2008). Therefore, constructivism appreciates that learning is an active and social construction unrestricted by stage or age, while also putting emphasis on the importance of engaging learners in the setting up of various important activities (Zevenbergen and Lerman, 2008),

In the classroom, Constructivism takes the idea of joining what the students already know, with what they newly learn. Accordingly, students are encouraged through active learning techniques (e.g. using interactive technology) to create more knowledge and understanding (Education Broadcasting Cooperation, 2004). This kind of learning is defined as a "Constructive process in which students attempt to recognize the relationship between letters and sounds and the sight word recognition that recurrently occur while practicing in the classroom through using interactive technology" (Anderson, Reder and Simon, 2000, p.102). Therefore, Constructivism in the literacy classroom is learning reading by experiencing active or engaging activities while applying this current study.

Constructivism was furtherly developed by Vygotsky (1978). His contribution to the theory was when he introduced the learning social aspect. He emphasized that the significance of generating a motivated milieu for students in which their abilities and interests must be taken into consideration to gain achievement and development. In this

sense, identifying the types of materials and activities presented for the students should be based upon the students' actual levels. The provided activities must be well-selected to serve in the development of their language because they must include some difficulty but still be achievable at the same time. Moreover, they must be interactive and meaningful (Liu and Matthews, 2015). Reflecting on Vygotsky's theory that the kindergartener gains knowledge in a meaningful manner by concentrating on the type of activities given to them; another issue was addressed by Vygotsky's theory in learning is the Zone of Proximal Development (ZPD). It is the difference between the actual level and the potential level of the students' development, as it was defined by Vygotsky (1978) as:

> "It is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving adult guidance or in collaboration with more capable peers". (p. 33)

According to the ZPD concept, Vygotsky (1978) contended what students can achieve when they got support. Furthermore, Vygotsky (1978) asserted that the importance of ZPD is in defining the actual development level that reveals the future progress of the students rather than measuring their potential levels. Additionally, Shayer (2003) confirmed that the ZPD added a dynamic feature in the process of learning in which the students' skills move from the interpersonal to the intrapersonal functioning. This shifting is called by Vygotsky (1978) as the "internalization process" in which the interaction with various exterior sources is "reconstructed and begins to occur internally" (p. 57). Hence, interacting within the technological context will lead to internal development for kindergartners; thus, they become independent learners. This shows how the selection of activities and materials as types of learning sources strongly develop kindergartners' ways of acquiring phonemic awareness skills. The purpose here is not focused on the amount of development, but the activities and applications used to reach that development.

The ZPD concept lead to the Scaffolding concept, both of which turn around the type of guidance or support provided to the students to help them in shifting towards the development of new levels (Ormrod, 2011). The Scaffolding idea was first initiated by Wood, Bruner and Ross (1976), who clarified it as a type of control over the activities presented by a teacher, where students focus in completing them with the teacher's or peers' guidance. Usually these activities are suitable for their levels. Therefore, Scaffolding meant to be any kind of support provided to the students to help in developing their knowledge and skills.

The main target of using Scaffolding in Vygotsky's theory is activating the Zone of Proximal Development concept in the learning process (Wells, 1999). Vygotsky (1978) specified particular characteristics for the Scaffolding type delivered to the students including: the interactive context in which Scaffolding provided where knowledge is co-constructed; the supportive nature of activities and materials that fit the students' levels; and they should have some challenge that leads to the future progress. McKenzie (1999) pointed out that some of the advantages of Scaffolding are: giving clear guidance for students, keeping students busy on tasks, motivating students and providing praiseworthy sources. Hence, the internalization phase occurs when Scaffolding is provided till the point where students take more responsible positions while implementing the tasks after getting benefits from the external support and guidance.

In this sense, interactive technology is normally assumed to be as the facilitator of new change as students learn collaboratively in an interactive way. Furthermore, technology has positively impacted Constructivism in a significant way through the investment in effort and time the teacher uses to set up a successful interactive environment for learning. The utilization of interactive technology helps the kindergartener to enhance

their confidence and self-worth, as they have the opportunity to reinforce the skills and ideas they have already learnt.

2.3.2 Active Learning Approach

Active Learning is defined as a process in which students are actively engaged in developing understanding of ideas and skills through the participating of activities provided by the teacher. Furtherly, asserted by Johnson, Johnson, Holubec, and Roy, (1984) active learning is the instructional method in which students work together to affect each other's learning in a positive way. Moreover, it is a type of learning based on different activities practiced by the student in an educational situation. Pedagogically, it is student-centered learning process. Usually, active learning provides numerous opportunities for students to gain knowledge. The students use repetition and trial and error to understand new information (Bell and Kahrhoff, 2006; Shaheen, 2010, p. 104)

The research done by Chandler and Hanrahan, (2010) indicated the advantages of active learning approach through using interactive technology. It makes the kindergarteners engaged as they enjoy using the technological activities. Additionally, Chandler and Hanrahan, (2010) demonstrated that the use of technology paves the way for students to construct their knowledge through acquiring more skills and information. Therefore, integration of technological activities enhances active learning that contributes largely in students' development.

Active learning integrates technology in handling materials that help kindergartner learn in a meaningful and effective way. As kindergartners do more than just listening, they are actively engaged in exploratory and structured activities that enhance their current levels of abilities and knowledge (Marzano, 2009). Furthermore, students engaged in active tasks through technological facilities are in a better position of constructing knowledge

together, exchanging ideas, working collaboratively, evaluating the ideas of each other and sharing knowledge (Alsumait and Al-Musawi, 2013). Also, the effort of the student will be focused more on acquiring and developing competencies and skills (Alsumait and Al-Musawi, 2013). It is important to mention here that teachers still bear more responsibility for cultivating spaces where active learning is being heavily used and ensure that students can enjoy while learning.

2.3.2.1 Active Learning through the Sociocultural Theory perspective

Active learning is mainly rooted in Vygotsky's sociocultural theory, which considers learning as a social process that formulate the basis of the students' intelligence socially and culturally. The major concept of this framework is that social interaction has a vital role in the construction and development of understanding. In this domain, Vygotsky (1978) believed that learning takes place on two levels: through social interaction with others and through the person's inner interaction that happens within their mind. Vygotsky elucidated that the development of students achieved within their Zone of Proximal Development (ZPD) is resulted by the interaction that happens among students, teachers, or/and peers. Supporting the same idea, Perry (1970) indicated in his pattern of cognitive development that peer interaction helps a student to show progress in the cognitive developmental levels. Other psychologists, such as Piaget urged for the active contribution of students in their own learning within a social interactive context, as Piaget (1932) strongly disapproved the traditional educational systems that only offer class instruction for all the students in the way of lecturing, competitive assessments and individual homework, which he considered as "contrary to the most obvious requirements of intellectual and moral development" (p. 412). Burner had the same view on the importance of socialization, which is a common idea with Vygotsky, Piaget, and Perry; nevertheless, he mainly asserted the usefulness of interaction in language acquisition. The views

gathered by different scholars and theorists contend the positive social gains that the student obtain from working within an active learning context, which encourage them to develop socially, cognitively, and academically (Ashman & Gillies, 2003). Accordingly, active learning is not only a milieu of interaction, but it is a platform for cognitive development.

2.4 Relevant Studies

2.4.1 The Effect of Using Interactive Technology in Promoting Letter-Sound Relationship

A considerable body of research emphasized on the benefit of using technology in promoting literacy skills and showed a good potential in using technology to support phonemic awareness, mainly, letter-sound relationship (Beschorner & Hutchison, 2013; Caplovitz, 2005; Garcia, 2016; Jones, 2016; Lynch and Redpath, 2014; Mioduser, Tur-Kaspa and Leitner, 2000; Mitchell and Fox, 2001; Morgan, 2013; Parette, Quesenberry & Blum, 2010; Patchan and Puranik, 2016; Van Daal and Reitsma, 2000). Studies demonstrate that letter-sound relationship is a basic skill kindergartners have to master because it will be the platform on which future success will be built upon; for example, a study that was conducted in a pre-school setting with 17 students in Greece who participated in a technological program that lasted six weeks for an hour daily. Results revealed that the students developed in terms of literacy, especially in letter-sound connection (Parette, Quesenberry and Blum, 2010). Furthermore, a study conducted by Garcia (2016) who found that using interactive technology through employing the smart board raised 20 kindergarteners' knowledge about letter-sound relationship. She started her study with a pre-assessment and end it with a post-assessment to show the statistical difference in favor of using technology over the printed-based instructions.

Looking from another perspective, some researchers agreed on the positive effect of interactive technology as a remedial intervention for students at risk of learning difficulty in reading, specifically when it comes to letter-sound relationship. A study conducted by Mioduser, Tur- Kaspa and Leitner (2000) ascertains this theory. In this study, 46 kindergarteners having an age range between 5 and 6 years old, where at a high risk of encountering learning difficulties, participated in the study. They were divided among three study groups that had different treatments. The study addressed the student's phonological awareness, word recognition skill and letter recognition skill which were measured by using pre- and post-tests. Results indicated that the students who received the reading intervention program with computer-based materials significantly outperformed in their phonological awareness, word recognition and letter recognition skills compared to other groups who received a reading intervention with printed-based program and those who received no reading intervention program (Mioduser, Tur- Kaspa and Leitner, 2000). Another study done by Campbell and Mechling (2009) aimed at using smartboard, as an interactive technology technique, to increase letter and sound recognition within a group of three kindergarteners with learning difficulties. Each student was given a different set of six letters and sounds. They were allowed to see, say, hear and touch the letter sounds simultaneously. The results revealed that all three students recalled some of each other's letters and sounds in addition to their own target letters and sounds.

Despite the fact that the previous studies dealt with the early literacy acquisition focusing on the letter-sound skill, they all used one tool to be applied such as smart board or IPad as a technological device. Furthermore, the advantages of technology extend to its ability in helping treat a difficulty encountered by the students.

2.4.2 The Effect of Using Interactive Technology in Promoting Sight Words Recognition

Learning how to read is arguably a very difficult process. Phonemic awareness is a fundamental early literacy skill which act as an essential role to reading acquisition (Carson, Gillon and Boustead, 2013). One of the most important skills that the kindergartener has to acquire is learning to read by sight which is learning to recognize specific and frequent words and read them quickly without decoding (Blackwell and Laman, 2013) There are many studies that prove technology has the power to positively impact students' sight word recognition awareness (Beechler and Williams, 2012; Meaden, Stoner, and Parette, 2008; Mechling, Gast, and Thompson, 2009; Shannon, 2012). An example would be the study conducted by Shannon (2012). The study was about the effect of using technology in promoting 9 first graders skill of sight word recognition. Those students are classified to have reading difficulties. They were divided into two groups, one used the IPad and the other used the flash cards in presenting the words. The experimental group that used the IPads recorded the greater percentage. Another study was conducted by Zipke (2017) who included 25 preschoolers with an age range between 4 and 5 years old in two experiments. In the first experiment, the students' word recognition scores were revealed to be significantly increased when the students explored a digital storybook and played the read-aloud option. These scores where comparatively higher than when they were read to them from a comparable print book. However, in the second experiment the students explored a digital storybook but a teacher guided the talk about the story. Opposing to expectations, the students' word recognition was higher in the independent use of the IPad than in the guided by teacher condition.

Furthermore, many studies used technology as intervention program to help those who have reading failures and those who suffer from learning disabilities (Bliss, Skinner and Adams, 2006; Beechler & Williams, 2012; Coleman-Martin, Heller, Cihak, and Irvine, 2005; Fasting, and Lyster, 2005; Meaden, Stoner and Parette, 2008; Mechling, Gast and Thompson, 2009). For example, Fasting and Lyster (2005) conducted a study on primary students with the aim of evaluating the effect of MultiFunk, a computer program that was designed to help in promoting reading proficiency of struggling readers. 52 below-average readers in grade 5 were randomly assigned as experimental and control groups (n = 26 + 26). Additionally, 114 classmates were included to compare changes after the intervention. A pre-test, intervention, post-test and design was implemented to evaluate the impacts of the program by using texts that suits the pupils' own choices and interests. The findings indicated that computerized assistive reading has the greater effect to aid and support the development of basic literacy skills in a large group of struggling readers. Another study was conducted by Coleman-Martin, Heller, Cihak, and Irvine, (2005) about using technology to assist special needs students as the study inquired whether the use of computer-assisted instruction would be an effective way to develop word recognition by using the Nonverbal Reading Approach (NRA). 3 students suffering from severe speech impairments and physical disabilities or autism were provided two phonemic awareness skills, the decoding and sight word recognition instruction using the NRA across three conditions. The three conditions were: (a) teacher instruction only, (b) teacher and computer-assisted instruction, and (c) computer-assisted instruction only. All participants reached criteria in each of the three conditions. Results indicated that the NRA can be effectively delivered through computer-assisted instruction, providing the students with the ability to practice decoding and word identification independently.

Most of the previous studies tackled the idea of sight recognition from the perspective of using technology to promote certain skills for reading strugglers in kindergarten and early primary stages. It is important not to forget that using technology in the classroom should not be limited to one device or program, nor should it be limited to specific individuals with certain circumstances. Every student should have the opportunity to use technology in their learning process. It is the teachers' responsibility to get to know what their students' abilities, needs, and interests are, in order to promote their potentials.

2.4.3 Technology in Phonemic Awareness Studies in the Arab Context

Phonological awareness is a pre-requisite for success in reading achievement in English (Ehri, 2005; Lesaux and Siegel, 2003). Coming to the Arabic native speakers, specifically in the UAE setting, an important study was conducted by Taylor (2008) in the UAE investigating if direct phonics instruction using the Get Reading website, would promote the pronunciation of female Emirati students aged between 18 and 25 years old. The female Emirati students were enrolled in an English language diploma foundation program. Quantitative pre-test and post-test comparison group with quasi-experimental design was used in the study, which lasted over a 16-week. The results showed that the percentage of students in the treatment group increased their phonological awareness from 36.8% to 44.7% after a post-test of phonological awareness. Another study conducted in the Arab context was by Shoukry, Sturm and Galal-Edeen (2012). The researchers employed teachers' survey and analytical evaluation to assess the nature of Egyptian preschoolers' use of technology in promoting early literacy. The analysis includes many points such as: support writing; the development of phonological awareness; enabling independent reading; nurturing social interaction; enhancing instruction and introducing

literacy awareness. The main focus of this study was on the preschoolers' ability to identify letter-to-sound relationship (Shoukry, Sturm & Galal-Edeen, 2012).

2.5 Summary

The use of interactive technology helps kindergarteners improve on internalizing the concepts of reading, specifically when it comes to acquiring essential phonemic awareness skills. The main focus of this study is to explore the use of interactive technology in teaching letter-sound skill and the sight word recognition. In this chapter, the theoretical background on which the whole study relied on was discussed in detail. The main concepts of the study where introduced and the sociocultural theory together with the active learning approach was discussed in depth and the relation that connected them was disclosed thoroughly. The relevant research was discussed by including important studies related to the topic of the study. The studies conducted in the Arab context was presented too.

Chapter 3: Methodology

3.1 Introduction

The aim of this study is to investigate the role of using interactive technology on promoting kindergarten phonemic awareness regarding letter-sound relationship and sight word recognition.

This chapter introduces and discusses the methodological design best appropriate to the present study. It opens with a restatement of the research purposes and research questions, as they are determiners of the methods adopted in the study. Then, an overview of the design is presented, followed by an introduction to the participants. Subsequently, the data collection procedure is debriefed, and ethical issues related in the research process are clarified as they are connected to the quality of data collected. After that, the data analysis methods are introduced, containing a discussion of the choice of the methods, which play a role in the findings. Finally, this chapter concludes with a summary of the methodological issues discussed previously.

All the instruments used in the study, aimed at answering the research questions.

1- Does the use of interactive technology program promote kindergarteners' recognition of letter-sound relationship?
2- Does the use of interactive technology program promote kindergarteners' sight word recognition?
3- How does the use of interactive technology program in actual practices contribute to promoting kindergartners' letter-sound relationship and sight word recognition?
4- In what way do the qualitative data explain the quantitative data?

3.2 Research design

Mainly, the researcher employed the explanatory sequential mixed method research design, in which the annotation was (QUAN→qual) as the study is more quantitative-oriented than qualitative (Creswell & Clark, 2011). The study was conducted into two phases: the quantitative phase in which quasi-experimental design was employed, where the participants were divided into two groups 25 students each, one as an experimental group on which the program was applied and the other was the control group where the ordinary way of teaching was used. Before applying the program, a pretest was conducted and at the end of the program a posttest was made. After which the results of the two tests were analyzed and compared to show the difference in the students' knowledge regarding phonemic awareness. While carrying out the program the researcher used a checklist evaluation to assess the students' progress throughout the weeks which gave a rich data about following up the students from the beginning to the end of the program. Obviously, this data when analyzed would be of great help to clarify the findings gained from the quantitative phase. In this sense, the qualitative phase followed. The researcher decided to use the mixed method design for various reasons: to have in depth interpretations for the findings; having generalizable results; using different tools helped in strengthen the way in which the research was conducted as it pursued the phonemic awareness in two skills the sound-letter relationship and the sight words recognition.

3.3 Participants

As the researcher working as an English teacher for kindergarten, it was preferred to have the students as participants in the study. Therefore, the sample was chosen conveniently and purposively according to availability and willingness of the students (Bryman, 2012). Totally, 50 students were involved in the study, they were divided in two classrooms which made it easy to have them as experimental (n= 25) and control (n= 25)

groups. All the students were Emiratis, their first language is Arabic, their age range between 4.5-5 years. Both groups were heterogeneous in terms of their abilities and gender.

3.4 Instrumentation

According to the research design, the researcher used three instruments and the unit program in conducting the study. Regarding the pre and posttests (Appendix A) they were taken from the school as they are used to assess the students' progress at the beginning of the semester and at the end of it. For the letter-sound assessment (Appendix B) and the sight words assessment (Appendix C), they were designed by the researcher depending on many resources like assessment books for the kindergarten, and personal and colleagues' experience. Concerning the unit program, the researcher employed a weekly lesson plan adapted from the thematic weekly plan provided by the school. The researcher enriched the plan with the interactive technological activities especially for the experimental group.

3.4.1 Pre-and Post-Test

The pre and posttest was adopted from the school, it consists of four pages including the cover page and at the end the result page that contains the scores for the three concepts: the letters; sounds and the sight words as shown in the Appendix (A). The second page all the sights selected for the program are listed to be covered in the six weeks period. The words were selected from the school list because all the sight words to be covered in the whole semester listed there. While the third page there are two charts the first one for the letter recognition and the second one for the sound recognition. The way these tests used, explained by the researcher in the data collection procedures.

3.4.2 Document Analysis

3.4.2.1 Letter Sounds Assessment

The letter-sound assessment checklist was designed by the researcher as shown in (Appendix B) consists of columns that divided the sheet into six weeks that also furtherly subdivided into two columns for the two letters or two sounds that were taught in that week. To distinguish the checklist whether it was for the letters or for the sound, the researcher used the blue color for the letters and the red color for the sounds. In addition, the names of the students (pseudonyms) were also included to track their progress. All the six weeks were enlisted in the same sheet.

3.4.2.2 Sight Words Assessment

The sight words assessment checklist was designed by week as shown in the (Appendix C). Generally, the researcher selected five sight words to be covered throughout the whole week. The sheet is divided also into columns where the pseudonyms were listed and the sight words each in one column to be ticked if it was known by the students while assessing.

3.4.2.3 Description of the Unit Program

The program used in a period of six weeks was consists of the following parts:

Song of sounds kit: provided by ADEC in which it contains CD sound song and a book that represents like a teacher guide for the use of the CD. The song introduced in the CD is sung by two voices one with children's voices and the other version is by a woman voice as a teacher. The song main focus is sound of the letter and the letter itself is not presented. Limited examples are provided, three examples (pictures) maximum. Furthermore, limited sight words are presented.

Letter-sound interactive PowerPoint by using smart board: in which the teacher invented some matching games that the kindergartener interacts with it in terms of finding the letter and its sound according to the teacher's instructions. The two games included in the PowerPoint are the matching and circling for both skills of letter-sound and the sight word recognition.

Labeeb Robot: is a robot provided by MOE as a technological tool to be used the classroom. This robot is designed to move according to three maps that suits the general themes which provided by the MOE (the Emirates map, animals, and occupations) see the Appendix (H). Labeeb does not produce any sounds it just moves and whenever it passes over a letter the students have to read. Moreover, it has two operational options: the code status in which it is controlled by the remote control where it follows the instructions given by the teacher or the students. The other option is the line status where it moves on a line drawn by the teacher along it the teacher puts letters and asks the about them and the sounds they give or asks the students to read the sight words.

Listening Kit was provided by ADEC see Appendix (I). It is a box that includes two headphones sets, a CD recorder, A5 four recording boards, four smaller recording boards, and six small recorders of very small capacity of recording may take seconds. The researcher used the small recorders and the A5 recording board in carrying out her program.

Website application was also used by the researcher. Star fall website includes many activities and games that enable the kindergarteners to match and say the letters and their sounds interactively and joyfully. The website contains activities regarding letter-sound relationship skill not the sight word recognition skill.

Smart board morning messages were used by the researcher to emphasize the two skills practices for the experimental group.

3.5 Data Collection Procedures

The data of the study was collected over a period of six weeks in the second semester from 13th of January till 24th of February 2020. This time includes all the pretest, the weekly assessments and the posttest.

Commonly, at the beginning of the program all the students in the two groups underwent a pretest regarding the letter-sound relationship and the sight words recognition. The researcher showed flash cards that contains the letter and she asked the students "what letter is this?" and "what sound it gives?" then if the student knew what letter was, the researcher put a red tick in the letter box on the pretest checklist and a red tick in the sound box in the pretest checklist if the kindergartener recognized the right sound of the letter. For the sight words recognition, the same was done when the kindergartener successfully recognized the sight word showed in the flash card a red tick put in the sight words recognition assessment checklist.

The researcher selected two letters and their sounds and five sight words to be practiced and repeated by using technological activities throughout the whole week. Basically, she used same lesson plans for her applications of the program for all days from Sunday to Wednesday. For Thursday, she had only 1 hour and 15 minutes to meet her students in which she made revision to what she covered in the week by using Starfall website and rapid pass on the PowerPoint, revising the letters and their sound and the sight words selected for the week.

In the mornings of Sunday and Monday, the researcher activated the activity of the morning message using interactive smart board, for example the letters and the sounds selected for the first week were (S, /s/; A, /a/) and the sight words (a, I, can, see, an).

Through the morning message the researcher wrote “Good morning KG2 E.” then she read it aloud for them, later she selected students to say good morning for those whose names begin with these two letters (S,A) and later she wrote “ I can see….. , while showing the kindergarteners a flash card of a girl picture with the word and a flash card with a boy picture with the word and the kindergarteners tried to count and repeat the whole sentence with the number e.g. “I can see 15 girls, or I can see 10 boys”. Normally, the morning messages are given before the assembly.

Usually, the school administration plays the song of sound in the morning assembly in an alternative way once in English and another in Arabic. For this bath, some teachers consider this as a revision for the students that’s why they, most of the time, do not play it again in the classroom. For the researcher, after the assembly, the researcher tells her students about the specific letters and the sounds they are going to cover for the whole week, later directly plays the song of sounds for the students with emphasis upon the two selected letters. As she played the whole song in the first time then she stopped the song on the letter selected and asked the kindergarteners about them and about their sounds and then replayed it for them to reinforce their knowledge. This activity is repeated every day to help kindergarteners strongly match the letter with its sound.

Through using the PowerPoint on the smartboard, the researcher showed the kindergarteners the letter while telling them the name of the letter and its sound then she led the kindergarteners to practice the letter and its sound with support of pictures accompanied with the word of it, example the picture of the sun with its word. Then the researcher introduced the sight words with the letters e.g. a star; a school; an apple; an airplane. To help the kindergarteners recognize these sight words, the researcher showed them on the smart board the following beginning of the sentence that contain the sight words they have to recognize “I can see …..” then the students could finish the sentence

with words from the examples that were given before with the letter or they could give their own example if they can.

When finished with the PowerPoint the kindergarteners left for the centers in which the researcher recorded the letters taken with their sounds by her sound on the small round recorder at the same time the student would look for the letters included in the box together with one more letter. For the sight words, she wrote on the recording board the word and the student press the button and hear the researcher sound saying the word and he tries to imitate pronouncing it. Later the student looks for the word in flash cards and write it on a small white board. As a result, the student will have the sound and the shape of the word and then he tries himself to write it independently.

The robot Labeeb is fixed on the line option where the researcher let it move over a zigzag thick black line on a big white paper where the small flash cards of the selected letters fixed repeatedly and randomly beside the line. The kindergartener should be focused on what is the coming letter that Labeeb will pass over it to read it aloud. While the other subgroup will be reading the sight words fixed along the line. The sight words arranged in sequence (I, can, see a, an). It is trustworthy to mention here that the two subgroups were initially one group divided into two. Each subgroup has a leader usually the clever student under the supervision of their teacher.

As a final stage the kindergartners go back to the smart board where they match the letters with their sounds, as they hear the sound and they see five pictures with the words. They have to find the letter of the sound in the words. Regarding the sight words, the sight words are written randomly and some of them are repeated more than two times. So, the kindergarteners have to circle the word when they hear it. Of course, they have to circle all the words written e.g. if they heard the word “I” they have to circle all the “Is” there. For the closing, the researcher uses Starfall website to help the kindergarteners enjoy the

interactivity of the website as there are many things presented together such as the letter, the sound, and animation of the word given as an example. The researcher already activated the website on the smartboard that the kindergarteners can easily use it.

On Thursday, due to the limits of the time, the researcher revises the selected letters and the sight words by using the PowerPoint on the smart board and Starfall website. Additionally, Labeeb robot is used but differently. The robot is on the coding option where the kindergarteners control it by using the remote. There are many flash cards distributed on the ground for the letters, sight words and pictures with words on which the letters selected are highlighted. There is a paper clip fixed on each flash card so that Labeeb can get it by the magnets in its hands. Furthermore, the flash cards are repeated for more than two times. Subsequently, the researcher uses the assessment checklists to evaluate the students' knowledge regarding the letters and the sight words of the week while they are playing or sometimes with showing these flash cards to the students to say the letter and the sound or the sight words according to the time available.

The content of the program was mainly designed depending on theoretical and practical frameworks. The theoretical base in the program was applied while identifying the actual levels of the kindergarteners by using the pre-test, in which the design of activities was based upon the participants' ZPDs (Vygotsky, 1978). Therefore, the activities included was structured in a way that facilitate the development as a kind of scaffolding by the help of the teacher and the knowledgeable student leading to let the students apply by themselves independently. Vygotsky (1978) contended that the scaffolding provided for students must be supportive in which development can be gained. The practical base in the program featured by the quality and the types of activities introduced. The introduction of the activities focuses on developing the implicit knowledge, however, not neglecting the explicit knowledge.

At the end of the program all the students in the two groups underwent a posttest regarding the letter-sound relationship and the sight words recognition. The researcher showed flash cards that contains the letter and she asked the students “what letter is this?” and “what sound it gives?” Then if the student knew what letter was, the researcher puts a blue tick in the letter box on the posttest checklist and a blue tick in the sound box in the posttest checklist if the kindergartener recognized the right sound of the letter. It is important to mention here that the researcher used the blue color here to distinguish it from the pretest. For the sight words recognition, the same was done when the kindergartener successfully recognized the sight word showed in the flash card a blue tick was put in the sight words recognition assessment checklist.

3.6 Data Analysis

Both, quantitative and qualitative data were collected to serve the main purpose of the study. The quantitative phase of the study was conducted first which followed by qualitative data as a second phase. The following section describes the stages of data analysis for the two phases.

3.6.1 Analysis of the Pre-Test and the Post-Test Grades

At the end of the program the posttest was conducted for the two groups the control and the experimental. At this stage, the researcher had all the final grades of the pre and posttests ready for analysis see Appendix (D). After that, the grades were analyzed by employing basic descriptive statistics including the mean scores and the standard deviations which were taken out from the Statistical Package of Social Science (SPSS). The researcher used the same package to compare the mean scores and standard deviations of the pre-test with the mean scores and standard deviations of the post-test to understand the difference between the results regarding the performance of the kindergarteners in both tests. The main justification for using basic descriptive statistics is to provide a clear

distinction between their performances in the pre-test as compared to the post-test. Additionally, the researcher found it the most suitable way to be used in analyzing and comparing. While, the standard deviation was used to ensure the reliability of the test and the program by viewing the dispersion of the values among the participants. For more clarification, the data analysis of the pre and post-test was visualized in graphs.

3.6.2 Documents Analysis (Letter-Sound Assessment, Sight Words Recognition Assessment)

Document analysis was employed in this study to enhance and explain the quantitative results occurred in the program and the grades are ready at this stage to be analyzed, see Appendix (E). Document analysis was defined by Coffey (2014) as "a sedimentation of social practices" (p. 368). They are artifacts made to serve the purpose of the research by providing more information that found in different practices (Coffey, 2014). In this study, the researcher used the analytical steps given by Coffey (2014) to analyze the documents in terms of the process of production, the process of production characterizes the number of assessments throughout the program. To quantify the documents, descriptive analysis was gained through extracting the mean scores and comparing them form one assessment to another for each one of the six weeks which shows the process of production. Then for further clarification the results were visualized in graphs.

3.7 Validity

The pre and post tests were adopted from the school assessment system, therefore, their content validity was already established. For the assessment checklists, they were designed by the researcher based on the assessments used by the school. As a result, their content validity was established by evaluating them by a panel of experts in the field, five of my colleagues (Arabs and Foreigners) who have different years of experience and my

supervisor. These checklists were modified and refined more than one time according to the experts' feedback.

The constructs in this study were the letter-sound relationship and the sight words recognition skills. So, Gay, Mills and Airasian (2011) suggested that the construct validity could be achieved by gathering some evidence to establish validity. Furthermore, construct validity was demonstrated by Popham (2014) as the construct-related evidence of validity. To get the construct validity established in the pre and post-test, the researcher employed a technological program as intervention which is defined by Popham (2014), the different responses of the students to the assessment instrument after having some type of intervention. In this sense, the kindergarteners' scores in the post-test were higher than their scores in the pre-test after finishing the program which demonstrated the various responses. Henceforth, part of the construct-related-evidence of validity was achieved. Additionally, the content validity of the program was established by exposing the program to a panel of experts in the field of teaching in the kindergarten who have different years of experience range between 5-15 years and IT teachers. Their feedback was of value to modify and refine the program and the sequence of its activities.

3.8 Reliability

The reliability degree was also established in this study. The researcher checked the internal consistency reliability that is demonstrated by Popham (2014) as "the extent to which items in the assessment instrument are functioning in a consistent fashion" (p. 82). Built on the structure of the instrument (pre and post-tests) in which the kindergarteners were required to answer according to what the researcher employed, the use of Cronbach's coefficient alpha was suitable as it is the most well-known internal consistency approach (Miller, Linn & Gronlund, 2013). Cronbach's alpha reliability

coefficient measure ranging between 0 and 1. “The closer Cronbach’s alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale” (Gliem & Gliem, 2003, p. 87). In this study, the Cronbach’s alpha coefficient was extracted by using SPSS for the pre and post-tests as shown in the following Table (1) which shows that Cronbach’s Alpha coefficient for test items of the control and experimental and for the document analysis are reliable.

Table 1: Cronbach’s Alpha Reliability

Instrument	Cronbach’s Alpha	Number of Items
Test Items of Control Group	0.669	8
Test Items of Experimental Group	0.756	8
Document Analysis: letter-sound relationship recognition.	0.773	28

3.9 Ethical Considerations

The researcher obtained an official approval from the Ministry of Education to conduct the study in one of the KG schools, see Appendix (F). After getting the approval the researcher informed the principal who already received an acceptance email from the ministry, about the time of conducting the study. Furthermore, parents’ consent form also was emailed by the researcher to gain the parents’ approval on their children’s participation in the study, see Appendix (G). Moreover, pseudonyms were used to ensure privacy and confidentiality. Furthermore, the researcher made her best to avoid bias in the data collection and interpretation. Additionally, confidentiality of data was considered by keeping all relevant documents in a safe place and it will be damaged at a later date.

3.10 Summary

This chapter explicitly covered the methodology. The main areas of study in the methodology section, such as research design, sampling, instrumentation, description of the program, data collection and data analysis. Moreover, the establishment of validity and reliability together with the ethical considerations were discussed in this chapter.

Chapter 4: Results

4.1 Introduction

This study aimed at exploring the role of interactive technology in promoting phonemic awareness skills for Emirati kindergarteners. Particularly, the study featured a program that focuses on using technology for the sake of developing letter-sound relationship and sight word recognition skills through using different adopted lesson materials and activities. This chapter reveals the major findings of this study. The study employed an explanatory sequential mixed method design in two phases. The first phase was quantitative, where the researcher conducted the pre-test then applied the designed program for six weeks and finally retested the participants again by using a post-test. The second phase was qualitative by applying document analysis. The study attempted to answer the following research questions:

1- Does the use of interactive technology program promote kindergarteners' recognition of letter-sound relationship?
2- Does the use of interactive technology program promote kindergarteners' sight word recognition?
3- How does the use of interactive technology program in actual practices contribute to promoting kindergartners' letter-sound relationship and sight word recognition?
4- In what way do the qualitative data explain the quantitative data?

4.2 Results

Q1. Does the use of interactive technology program Promote kindergarteners' recognition of letter-sound relationship?

To answer this question, a paired sample t-test was carried out to examine whether there is a significant difference between the control group and experimental group in terms of the letter- sound relationship skill based on the posttest scores. The results shown in Table 2 revealed that there is a significant difference between the control group and experimental group in terms of letter-sound relationship skill measured in the posttest. The posttest score in the experimental in respect of letter recognition (*M*= 3.84; *SD*= 1.14) is higher than the posttest score in the control group (*M*= 2.52; *SD*= 0.82) at (t= -4.194, df= 24, p≤0.05). Moving on to the sound recognition skill, a statistically significant difference is found between the experimental group's posttest score (*M*=3.20; *SD*=.96) and the control group's posttest score (*M*= 2.20; *SD*= 0.58) at (t= -4.082, df= 24, p≤0.05).

Table 2: Results of Control and Experimental in Letter-Sound Relationship

Category	M	SD	T	df	Sig. (2-tailed)
Letter Recog. Post/Control-	2.52	0.82			
Letter-Recog. Post/Experimental	3.84	1.14	-4.194	24	0.000
Sound Recog. Post/Control-	2.20	0.58			
Sound Recog.Post/Experimental	3.20	0.96	-4.082	24	0.000

Q2. Does the use of interactive technology program promote kindergarteners' sight word recognition?

To answer this question, a paired sample t-test was carried out to examine whether there is a significant difference between the control group and experimental group in terms of sight word recognition skill based on the posttest scores. The results

demonstrated in Table 3 showed that there is a significant difference between the control group and experimental group in terms of sight word recognition skill. The posttest score in the experimental (*M*=2.96; *SD*=.84) is higher than the posttest score in the control group (*M*= 2.32; *SD*= 0.80) at (t= -2.426, df= 24, p≤0.05).

Table 3: Results of Control and Experimental in Sight Word Recognition

Category	M	SD	t	df	Sig. (2-tailed)
Sight Word Post-Control-	2.32	0.80	-2.426	24	0.023
Sight Word Post-Experimental	2.96	0.84			

Generally, the results shown in Table 4 signify that statistically significant difference is not found between the control and the experimental groups in the total pre-test (*M*= 3.04, *SD*= 0.20) for both groups at (t= 0.000, df= 24, p≥0.05). Whereas, in terms of the total posttest, the results show that there is a significant difference between the control and the experimental groups, where the experimental group is in favor with a mean score of (*M*= 7.52, *SD*= 2.37) and (*M*= 10.00, *SD*= 2.78) respectively at (t= -2.869, df= 24, p≤0.05).

Table 4: Results of the Total Mean Scores between Control and Experimental Group

Category	M	SD	t	df	Sig. (2-tailed)
Total Pre-Control-	3.04	0.20	0.000	24	1.000
Total Pre-experimental	3.04	0.20			
Total Post-Control-	7.52	2.37	-2.869	24	0.008
Total Post-Experimental	10.00	2.78			

Q3. How does the use of interactive technology program in actual Practices contribute to promoting kindergartners' letter-sound relationship and sight word recognition skills?

To answer this question, students' performances were tracked over six weeks and quantified to show whether there is a significant difference between the control and the experimental groups or not. Table 5 and figure 3 indicate that statistically significant difference is found between the control and the experimental groups in terms of their total weekly practice for sight recognition skill (M= 9.44, SD= 3.15) and (M= 21.88, SD= 4.59) respectively at (t= -10.179, df= 24, $p \leq 0.05$). As illustrated in Figure 3 that there is an incremental progress in students' sight word recognition skill.

Table 5: Results of Differences among Students' Weekly Performance in terms Sight Word Recognition

Category	M	SD	T	df	Sig. (2-tailed)
Week 1Sight Word/Con. – Week 1Sight Word/Exp.	1.40 2.28	0.50 1.28	3.156	24	0.004
Week 2Sight Word/Con. – Week 2Sight Word/Exp	1.44 2.68	0.51 1.22	4.359	24	0.000
Week 3Sight Word/Con. – Week 3Sight Word/Exp	1.64 3.68	0.70 1.07	7.292	24	0.000
Week 4Sight Word/Con. – Week 4Sight Word/Exp	1.52 4.28	0.77 0.84	10.887	24	0.000
Week 5Sight Word/Con. – Week 5Sight Word/Exp	1.76 4.48	0.83 0.59	12.813	24	0.000
Week 6Sight Word/Con. – Week 6Sight Word/Exp	1.68 4.48	0.80 0.50	13.451	24	0.000
Total Sight Word Con- Total Sight Word Exp	9.44 21.88	3.15 4.59	-10.179	24	0.000

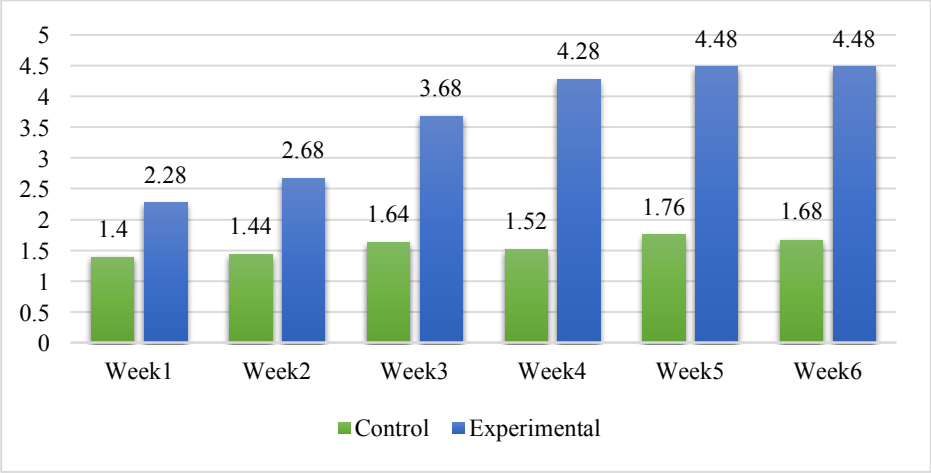


Figure 3: Tracking of Students' Performances Every Week for Sight Word Recognition

In terms of letter-sound relationship skill, Table 6 and figure 4 demonstrate that statistically significant difference is found between the control and the experimental groups in terms of their total weekly practice (*M*= 8.20, *SD*= 2.94) and (*M*= 17.20, *SD*= 3.15) respectively at (t= -10.462, df= 24, p≤0.05). As illustrated in Figure 4 that there is a gradual development noticed in students' letter-sound relationship skill.

Table 6: Results of Differences among Students' Weekly Performance in terms of Letter-Sound Relationship

Category	M	SD	T	df	Sig. (2-tailed)
Week 1Letter-Sound/Con. – Week 1 Letter-Sound/Exp.	1.32 1.72	0.48 0.84	-2.000	24	0.057
Week 2 Letter-Sound /Con. – Week 2 Letter-Sound /Exp	1.28 2.56	0.54 1.04	-5.628	24	0.000
Week 3 Letter-Sound /Con. – Week 3 Letter-Sound /Exp	1.36 2.64	0.64 0.91	-5.297	24	0.000
Week 4 Letter-Sound /Con. – Week 4 Letter-Sound /Exp	1.44 3.28	0.58 0.46	-11.500	24	0.000

Table 6: Results of Differences among Students' Weekly Performance in terms of Letter-Sound Relationship (continued)

Category	M	SD	T	df	Sig. (2-tailed)
Week 5 Letter-Sound /Con. – Week 5 Letter-Sound /Exp	1.48 3.44	0.92 0.51	-9.246	24	0.000
Week 6 Letter-Sound Con. – Week 6 Letter-Sound /Exp	1.32 3.56	0.75 0.51	-14.379	24	0.000
Total Letter-Sound Con- Total Letter-Sound Exp	8.20 17.20	2.94 3.15	-10.462	24	0.000

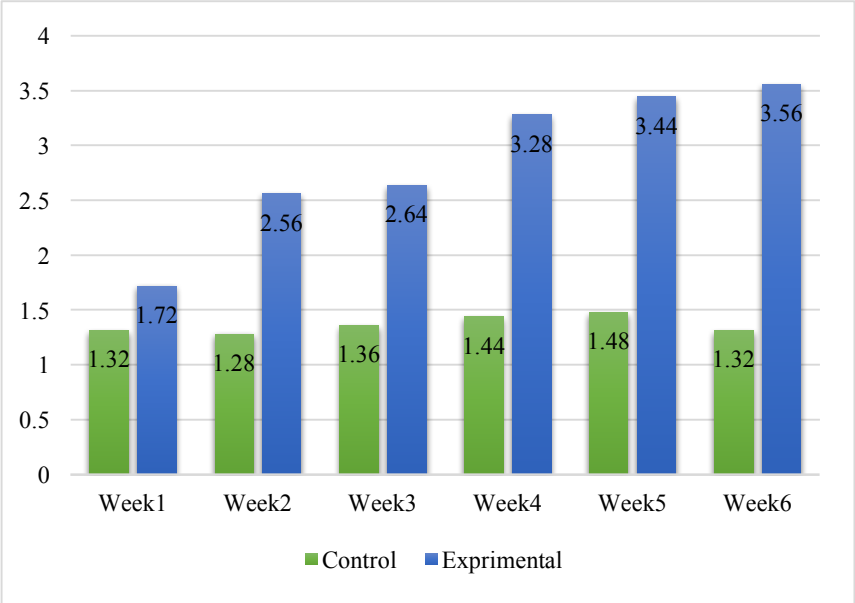


Figure 4: Tracking of Students' Performances Every Week for Letter-Sound Relationship

Q4. In what way do the qualitative data explain the quantitative data?

To answer this question a comparison was conducted between the results of the quantitative that were extracted from the findings of the pre and posttest through using t-test analysis with the results of the qualitative obtained from document analysis of the weekly assessments for the students' performance. The posttest revealed that interactive technology promoted the phonemic awareness skills for the Emirati kindergarteners. That

was obvious, in the significant difference between the posttests scores of the experimental and the control groups for the letter-sound relationship and the sight word recognition skills, (*M*= 3.84; *SD*= 1.14) and (*M*= 2.20; *SD*= 0.58) respectively. Regarding the document analysis, it showed an incremental progress throughout the six-week period. It is clearly demonstrated by the difference between the total mean scores for the control and the experimental group for the letter-sound relationship (*M*= 9.44, *SD*= 3.15) and (*M*= 21.88, *SD*= 4.59) respectively and the sight word recognition (*M*= 8.20, *SD*= 2.94) and (*M*= 17.20, *SD*=3.15) respectively. As clearly illustrated by tables and figures that the results of the two phases the quantitative and qualitative showed no variations. Conversely, they were strongly supporting each other in favor of the use of interactive technology in promoting phonemic awareness skills.

Chapter 5: Discussion, Recommendation, and Implications for Future Research

5.1 Introduction

This study aims at exploring the role of using technology in promoting phonemic awareness kindergartners' letter-sound relationship and sight word recognition skills. The study employed the explanatory mixed method design in which both quantitative and qualitative results were extracted and furtherly discussed in this chapter in terms of the theories and the previous research included in the current study. The recommendations and the implications of the study were also discussed.

5.2 Discussion

Q1. Does the use of interactive technology program Promote kindergarteners' recognition of letter-sound relationship?

The major result associated to this question was that an evident overall increase in the participants' letter-sound relationship skill in the experimental group was detected. This increase appeared from the comparison of the mean scores of the results extracted from the posttests for the experimental and the control groups. This indicates that the use of technology in phonemic awareness instructions resulted an improvement of the kindergartners' letter-sound skill. This result comes to be consistent with other opinions argued by (Garcia, 2016; Beschorner & Hutchison, 2013; Caplovitz, 2005; Jones, 2016; Lynch & Redpath, 2014; Mioduser, Tur- Kaspa & Leitner, 2000; Mitchell & Fox, 2001; Morgan, 2013; Parette, Quesenberry & Blum, 2010; Patchan & Puranik, 2016; Van Daal & Reitsma, 2000) who found that the use of technology in teaching phonemic awareness to students promote their reading skills through constructing letter-sound relationship awareness. Additionally, this major result agrees with Garcia (2016) who found that using interactive technology through employing the smart board raised the knowledge about

letter-sound relationship. Furthermore, she argued that interactive technology helps the kindergarteners recognize the relationship between letters and there sounds by seeing, hearing, saying and practicing provide numerous opportunities for students to gain knowledge to achieve a gradual development. When they are able to realize the shape of the letter with and the sound it gives by error and trial, repeating, practicing with teacher and peers in an interactive context to move a step ahead in their zone proximal development towards their potential level (Bell & Kahrhoff, 2006; Shaheen, 2010).

Q2. Does the use of interactive technology program Promote kindergarteners' sight word recognition?

The result related to this question was that a significant improvement in the participants' sight word recognition skill in the experimental group was noticed. This gain occurred from the experimental group's results in the posttest as compared to the control group. The total mean scores of the experimental group for both letter-sound relationship and sight word recognition skills in the posttest were higher than the mean scores of the control group. This shows how the use of interactive technology in phonemic awareness instructions led to the development of letter-sound relationship and sight word recognition skills for kindergartners. This result is in line with Beechler and Williams (2012), Meaden, Stoner and Parette (2008), and Shannon (2012). A clear agreement was found between the results of this study regarding sight word recognition skill with Shannon (2012) who found that the use of interactive technology contributes to improving kindergarteners' sight word recognition skill through showing the functional relationship between the use of interactive technology and the development of learners' sight word recognition in a way, which incrementally leads to promote phonemic awareness subsequently, for reading proficiency. Additionally, this goes in line with the ZPD concept of Vygotsky (1978) as he assured that students can achieve when they got support from adult or peers. Furthermore, the result

confirmed the importance of ZPD in defining the actual development level that reveals the future progress of the students rather than measuring their potential levels. Therefore, when the teacher scaffolds students through using interactive technology students will act independently after a while of practicing with the teacher of interacting with their peers. Furthermore, active learning by incorporating interactive technological activities in handling materials that support kindergartner learn in a meaningful and effective way. As kindergartners do more than just listening, they are actively engaged in exploratory and structured activities that enhance their current levels of abilities and knowledge (Marzano, 2009).

Q3. How does the use of interactive technology program in the Actual Practices contribute to promoting kindergartners' letter-sound relationship and sight word recognition skills?

The major finding related to this question was that a gradual development in the participants' performances in the experimental group was noticed. This development was observed during their regular participation in the letter-sound relationship and the sight word recognition interactive activities, which measured both skills. The findings show that the correct mixture of the activities serves in scaffolding the participants' phonemic awareness for the sake of fostering letter-sound relationship and sight word recognition skills. This result is in tandem with Chandler and Hanrahan (2010) who showed the advantages of active learning approach through using interactive technology. It engages the kindergarteners as they enjoy using the technological activities. Additionally, Chandler and Hanrahan (2010) confirmed that the use of technology paves the way for students to build their knowledge through attaining more skills and information. Therefore, integration of technological activities increases active learning that contributes too much in the students' development. As Vygotsky (1978) highlights on the importance of crafting helpful and supportive sources that must be well-chosen based on learners' actual levels;

yet, they have to be exciting and challenging but at the same time attainable to construct a sense of development.

Q4. In what way do the qualitative data explain the quantitative data?

A remarkable agreement between the quantitative and the qualitative results was noted in this study. The key agreement was confirmed in the participants' letter-sound relationship and sight word recognition skills, where a general improvement in the experimental group was observed. This improvement was made when using interactive technology and it was revealed in the results of the posttest as compared to the control group, which is in line with the document analysis' results. The data gathered from the document analysis exposed that the participants' performances in the letter-sound relationship assessment increased gradually throughout a frequent assessment conducted over the six weeks, which serves in nurturing both the letter-sound relationship and sight word recognition skills as an important stage for future development of the reading skill kindergarteners. These consistent results are supported by Marzano (2009) and Alsumait and Al-Musawi (2013) who indicated that the use of interactive technology as part of the teacher instruction in early stages, students are in a better position of constructing knowledge together in a collaborative way, while being on task the kindergarteners can exchanging ideas by scaffolding as they monitor each other or by the teacher guidance, and they are sharing knowledge when they are practicing the interactive technological activities before each other. Also, they will be able to do these activities independently, after they made them many times with the teacher and the other students practice. Here the internalization of the knowledge happens, when the information moves from the interpersonal status to the intrapersonal. Furthermore, the teacher succeeded in activation of the ZPD through scaffolding her students from a stage they do with her to a better one when they apply by themselves by using interactive technology.

Apparently, the consistency of results between the quantitative and the qualitative phases indicated that the use of interactive technology is beneficial in the kindergarten classrooms in teaching phonemic awareness kills, namely the letter-sound relationship and the sight word recognition. This can be explained by the high mean scores the experimental group got in the posttest and the noticeable gradual increase of the students' knowledge regarding the two skills in the analysis of the weekly assessment done by the researcher over six times over the period of the program implementation.

5.3 Recommendations

This study has some recommendations for teachers, instruction and curriculum planners and research as the following:

1. Teachers of English in kindergarten stage should consider the use of interactive technology in order to help the kindergarteners acquire phonemic awareness skills specifically, the letter-sound relationship and the sight word recognition as basic steps in learning reading.
2. Teachers in kindergarten should be supported with different types of technological devices and they should be trained on using these devices in order to help students in constructing up their knowledge and raising their phonemic awareness skills.
3. Curriculum designers in the kindergarten stage should include materials that must be introduced by using interactive technology specifically in teaching phonemic awareness skills as technological kits in the content of the curriculum in order to be used by all the teachers.
4. Teachers should use frequent assessments preferably technological one to monitor their students' development and try to diagnose strengths and

weaknesses in terms of phonemic skills as an important tool for constructing the students' literacy skill.

5. A future research should consider a mixed method study where more participants will be included for a length of time, particularly in the area of phonemic awareness skills.

5.4 Implications for Future Research

As promoting literacy skills is one of the MOE priorities in the UAE. Furthermore, the ways of implementing the interactive technology in teaching phonemic awareness skills must be taken into considerations in the UAE. Therefore, researchers should conduct studies like this study in nature and topic, but with a large number of participants employed in various kindergarten schools in the UAE context within a longer period of time. Furthermore, researchers can also conduct studies to investigate the views of the teachers regarding the use of interactive technology in their kindergarten classrooms. To enrich the scarcity of research in the area of kindergarten and in the UAE context.

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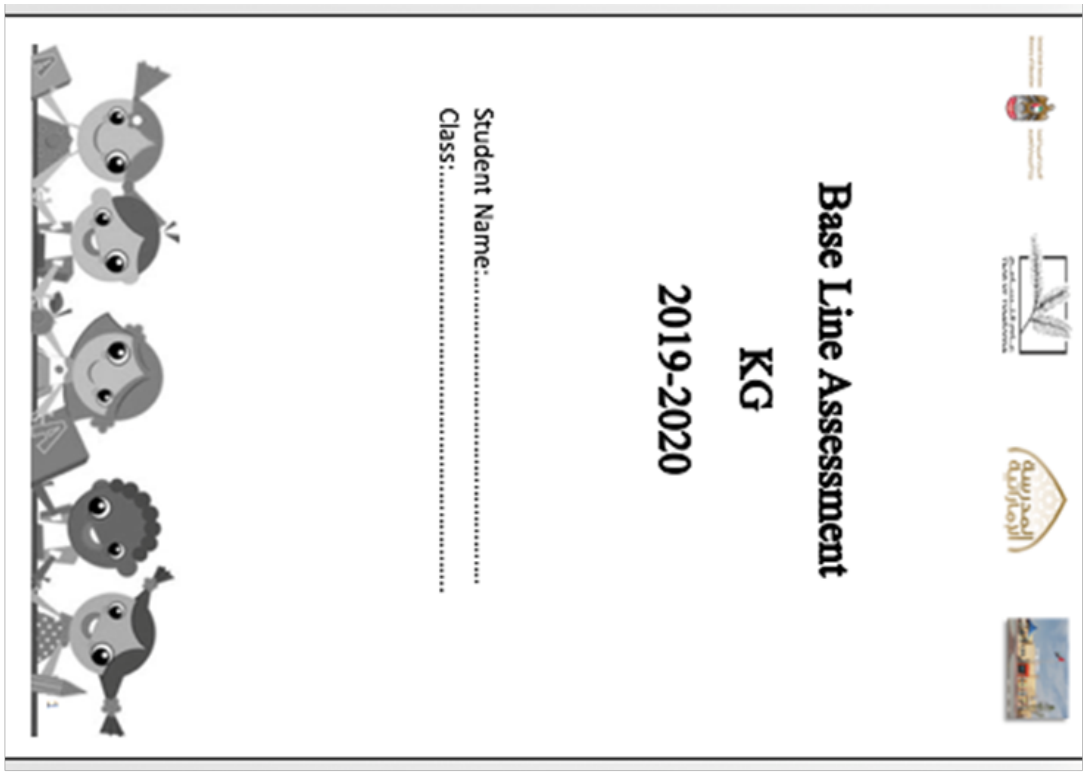
Appendices

Appendix (A): Pre and Post test



Base Line Assessment

KG

2019-2020

Student Name:.....

Class:.....

Read the Sight Words :

the	up	and	I	to
is	in	you	that	it
her	what	for	see	when
an	this	a	we	not
go	can	here	do	was
she	by	he	but	on
one	all	were	they	are
at	his	be	had	how
each	will	words	other	about

Please select the following colors when selecting the word that has been read !

Pre test: Red

Post test: Blue

	Pre test	Post test
Score		

Rubric				
1	2	3	4	5
0	1-10	11-25	26-40	1-50

Recognizes Letters

Aa	Bb	Cc	Dd	Ee	Ff	Gg
Hh	Ii	Jj	Kk	Ll	Mm	NN
Oo	Pp	Qq	Rr	Ss	Tt	Uu
Vv	Ww	Xx	Yy	Zz		

Recognizes Sounds

Aa	Bb	Cc	Dd	Ee	Ff	Gg
Hh	Ii	Jj	Kk	Ll	Mm	NN
Oo	Pp	Qq	Rr	Ss	Tt	Uu
Vv	Ww	Xx	Yy	Zz		

Please select the following colors when selecting the word that has been read

Pre test: Red
Post test: Blue

	Pre test	Post test
Score		

Rubric				
1	2	3	4	5
0	1-7	8-15	16-24	1-26

The Result

	Pre	Post
Read the Sight Words		
Recognizes Letters		
Recognizes Sounds		

Appendix (B): Letter-sound Assessment

KG2

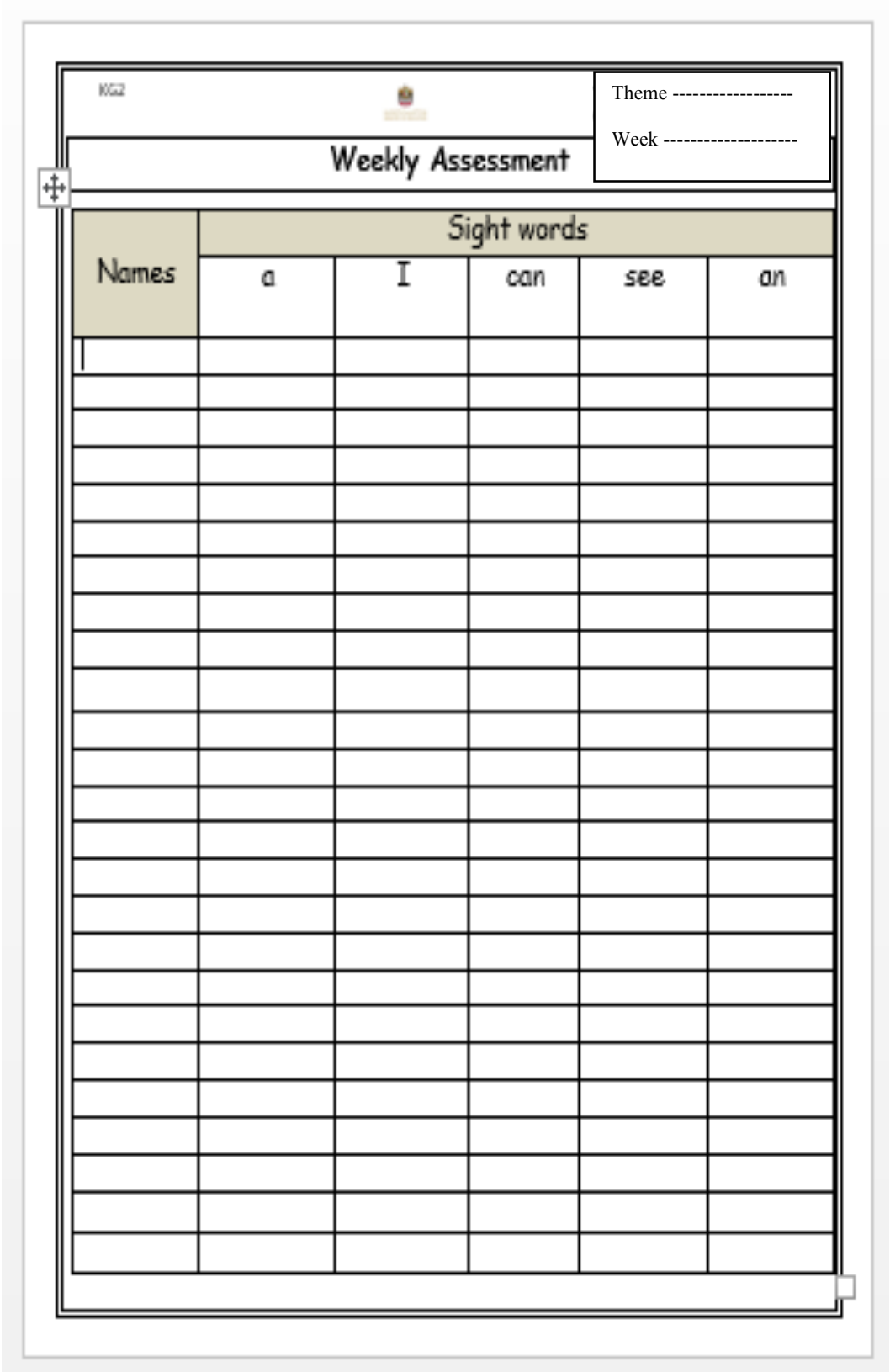
Letter: blue color

Sound: red color

Weekly Assessment

weeks	Letter & it sound											
	1		2		3		4		5		6	
Names	Ss	Aa	Tt	Pp	Nn	Mm	Dd	Oo	Cc	Ee	Hh	Rr

Appendix (C): Sight Word Recognition Assessment



KG2

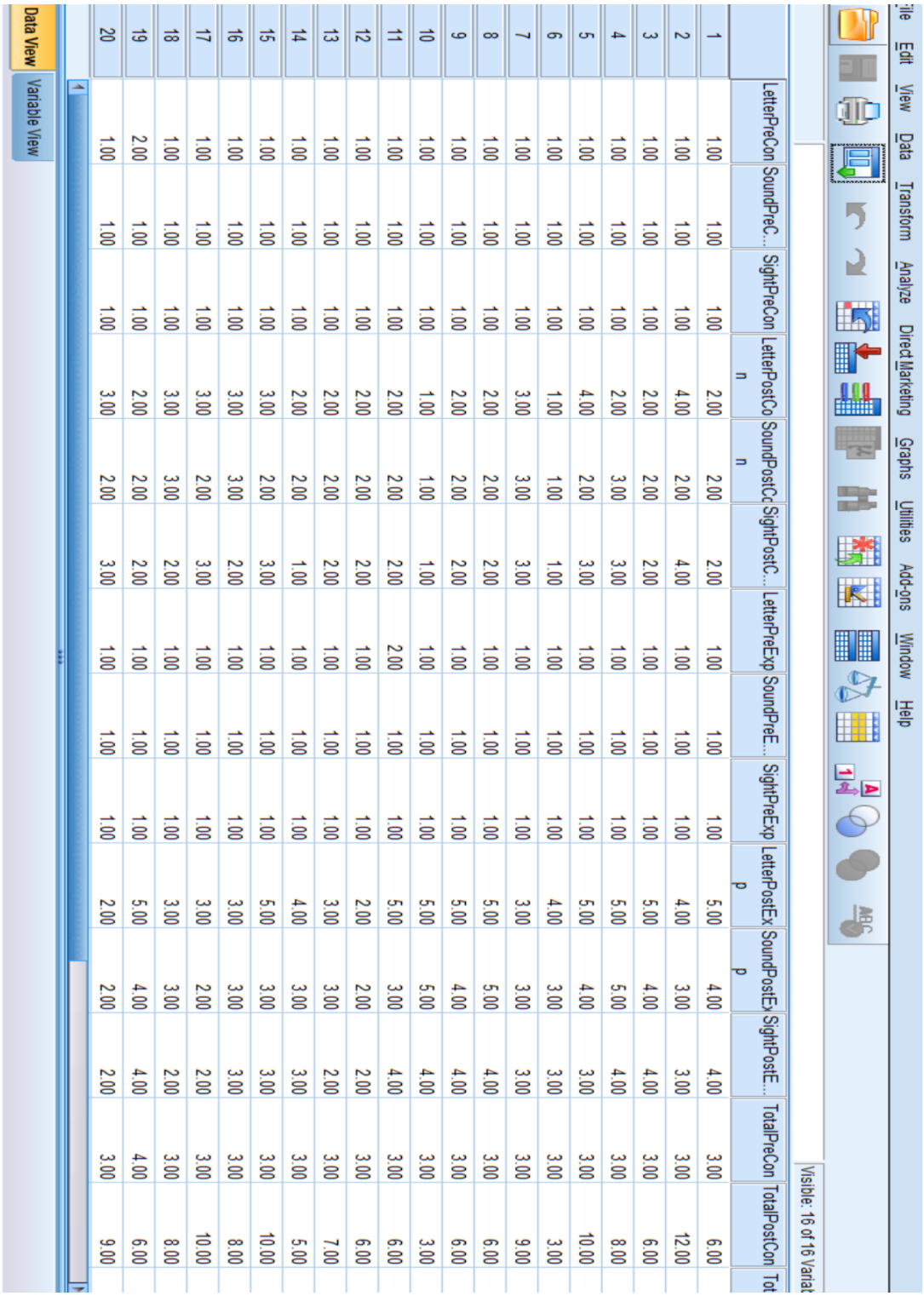
Theme ----------

Week ----------

Weekly Assessment

Names	Sight words				
	a	I	can	see	an

Appendix (D): Final Grades of pre and post tests



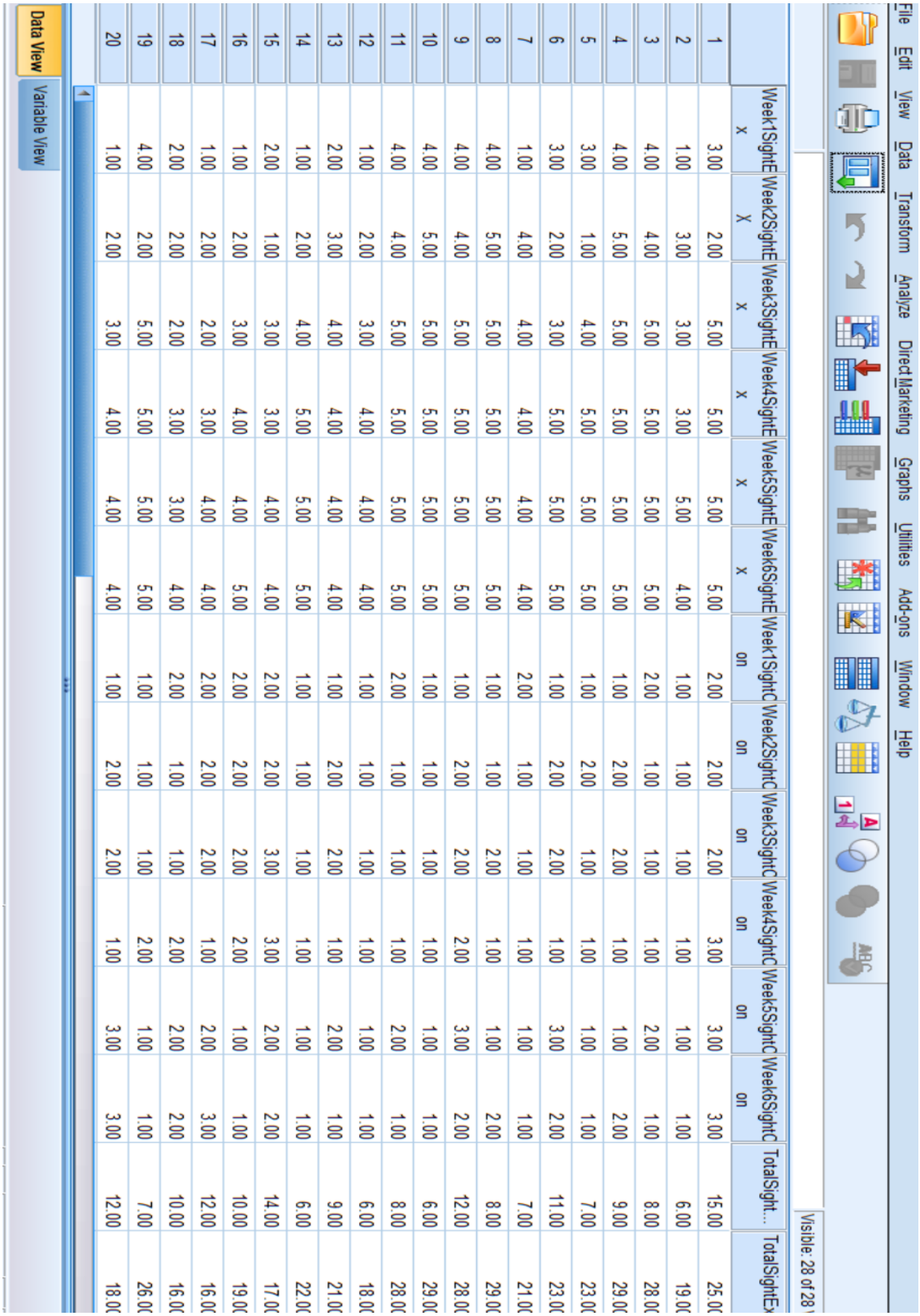
File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Visible: 16 of 16 Variables

	LetterPreCon	SoundPreC...	SightPreCon	LetterPostCo n	SoundPostCo n	SightPostC...	LetterPreExp	SoundPreE...	SightPreExp	LetterPostEx p	SoundPostEx p	SightPostE...	TotalPreCon	TotalPostCon	Tot
1	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	5.00	4.00	4.00	3.00	6.00	
2	1.00	1.00	1.00	4.00	2.00	4.00	1.00	1.00	1.00	4.00	3.00	3.00	3.00	12.00	
3	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	5.00	4.00	4.00	3.00	6.00	
4	1.00	1.00	1.00	2.00	3.00	3.00	1.00	1.00	1.00	5.00	5.00	4.00	3.00	8.00	
5	1.00	1.00	1.00	4.00	2.00	3.00	1.00	1.00	1.00	5.00	4.00	3.00	3.00	10.00	
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.00	3.00	3.00	3.00	3.00	
7	1.00	1.00	1.00	3.00	3.00	3.00	1.00	1.00	1.00	3.00	3.00	3.00	3.00	9.00	
8	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	5.00	5.00	4.00	3.00	6.00	
9	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	5.00	4.00	4.00	3.00	6.00	
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5.00	5.00	4.00	3.00	3.00	
11	1.00	1.00	1.00	2.00	2.00	2.00	2.00	1.00	1.00	5.00	3.00	4.00	3.00	6.00	
12	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	2.00	2.00	2.00	3.00	6.00	
13	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	3.00	3.00	2.00	3.00	7.00	
14	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00	4.00	3.00	3.00	3.00	5.00	
15	1.00	1.00	1.00	3.00	2.00	3.00	1.00	1.00	1.00	5.00	3.00	3.00	3.00	10.00	
16	1.00	1.00	1.00	3.00	3.00	2.00	1.00	1.00	1.00	3.00	3.00	3.00	3.00	8.00	
17	1.00	1.00	1.00	3.00	2.00	3.00	1.00	1.00	1.00	3.00	2.00	2.00	3.00	10.00	
18	1.00	1.00	1.00	3.00	3.00	2.00	1.00	1.00	1.00	3.00	3.00	2.00	3.00	8.00	
19	2.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	5.00	4.00	4.00	4.00	6.00	
20	1.00	1.00	1.00	3.00	2.00	3.00	1.00	1.00	1.00	2.00	2.00	2.00	3.00	9.00	

Data View | Variable View

Appendix (E): Final Grades in Document Analysis



	Week1SightE	Week2SightE	Week3SightE	Week4SightE	Week5SightE	Week6SightE	Week1SightC	Week2SightC	Week3SightC	Week4SightC	Week5SightC	Week6SightC	TotalSight...	TotalSightEx
	x	x	x	x	x	x	on	on	on	on	on	on		
1	3.00	2.00	5.00	5.00	5.00	5.00	2.00	2.00	2.00	3.00	3.00	3.00	15.00	25.00
2	1.00	3.00	3.00	3.00	5.00	4.00	1.00	1.00	1.00	1.00	1.00	1.00	6.00	19.00
3	4.00	4.00	5.00	5.00	5.00	5.00	2.00	1.00	1.00	1.00	2.00	1.00	8.00	28.00
4	4.00	5.00	5.00	5.00	5.00	5.00	1.00	2.00	2.00	1.00	1.00	2.00	9.00	29.00
5	3.00	1.00	4.00	5.00	5.00	5.00	1.00	2.00	1.00	1.00	1.00	1.00	7.00	23.00
6	3.00	2.00	3.00	5.00	5.00	5.00	1.00	2.00	2.00	1.00	3.00	2.00	11.00	23.00
7	1.00	4.00	4.00	4.00	4.00	4.00	2.00	1.00	1.00	1.00	1.00	1.00	7.00	21.00
8	4.00	5.00	5.00	5.00	5.00	5.00	1.00	1.00	2.00	1.00	1.00	2.00	8.00	29.00
9	4.00	4.00	5.00	5.00	5.00	5.00	1.00	2.00	2.00	2.00	3.00	2.00	12.00	28.00
10	4.00	5.00	5.00	5.00	5.00	5.00	1.00	1.00	1.00	1.00	1.00	1.00	6.00	29.00
11	4.00	4.00	5.00	5.00	5.00	5.00	2.00	1.00	1.00	1.00	2.00	1.00	8.00	28.00
12	1.00	2.00	3.00	4.00	4.00	4.00	1.00	1.00	1.00	1.00	1.00	1.00	6.00	18.00
13	2.00	3.00	4.00	4.00	4.00	4.00	1.00	2.00	2.00	1.00	2.00	1.00	9.00	21.00
14	1.00	2.00	4.00	5.00	5.00	5.00	1.00	1.00	1.00	1.00	1.00	1.00	6.00	22.00
15	2.00	1.00	3.00	3.00	4.00	4.00	2.00	2.00	3.00	3.00	2.00	2.00	14.00	17.00
16	1.00	2.00	3.00	4.00	4.00	5.00	2.00	2.00	2.00	2.00	1.00	1.00	10.00	19.00
17	1.00	2.00	2.00	3.00	4.00	4.00	2.00	2.00	2.00	1.00	2.00	3.00	12.00	16.00
18	2.00	2.00	2.00	3.00	3.00	4.00	2.00	1.00	1.00	2.00	2.00	2.00	10.00	16.00
19	4.00	2.00	5.00	5.00	5.00	5.00	1.00	1.00	1.00	2.00	1.00	1.00	7.00	26.00
20	1.00	2.00	3.00	4.00	4.00	4.00	1.00	2.00	2.00	1.00	3.00	3.00	12.00	18.00

Appendix (F): MOE Approval

Subject: تسهيل مهمة باحثة من جامعة الإمارات العربية المتحدة

[redacted]

السلام عليكم و رحمة الله و بركاته
تحية طيبة وبعد،

السيدة / مديرة [redacted] ة اليحر الإماراتية المحترمة

تقوم الباحثة بلقيس البريكي باستكمال الدراسة لنيل شهادة الماجستير من جامعة الإمارات العربية المتحدة، والتي تقوم بدراسة تحت عنوان:
" أثر استخدام التكنولوجيا التفاعلية في إدراك الوعي الصوتي لكلمات اللغة الإنجليزية لطلاب رياض الأطفال".

حيث تهدف الدراسة إلى التعرف على تأثير استخدام التكنولوجيا التفاعلية على تعزيز تعلم الأحرف وأصواتها والكلمات البصرية باللغة الإنجليزية لطلاب رياض الأطفال، حيث تود الباحثة بتطبيق الاختبار القبلي والمقارنة بعد التطبيق باختبار آخر أيضاً وقائمة التدقيق، وذلك لمعرفة اتقان الطلبة للحروف وأصواتهم باستخدام التكنولوجيا التفاعلية والتي ستشمل الدراسة التطبيق على طلاب رياض الأطفال بمدرسة رو[redacted] اليحر الإماراتية بإما[redacted]ي.

وعليه نرجو الإيعاز لما يلزم بتسهيل مهمة الباحثة المذكورة،

وتفضلوا بقبول وافر التقدير والإحترام.

UNITED ARAB EMIRATES
MINISTRY OF EDUCATION

الإمارات العربية المتحدة
وزارة التربية والتعليم

قطاع العمليات المدرسية
School Operations Sector

أبوظبي، الإمارات العربية المتحدة
Abu Dhabi, United Arab Emirates

www.moe.gov.ae

Appendix (G): Parents' Consent Form

روضة [redacted]

الموافقة على المشاركة في البحث

إن الغرض من هذا البحث هو دراسة تأثير استخدام التكنولوجيا التفاعلية في تعزيز تعلم الأحرف وأصواتها والكلمات البصرية لطلاب رياض الأطفال.

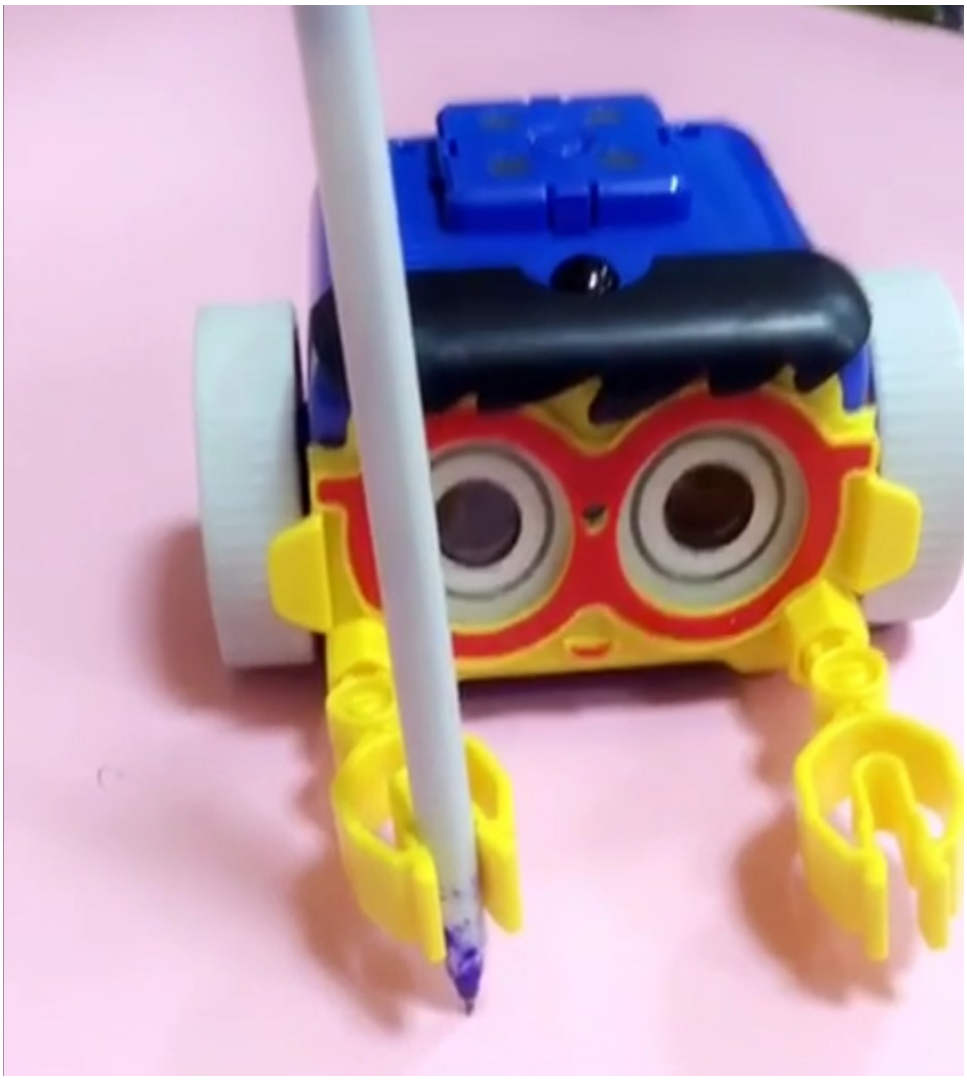
ستقوم بهذه الدراسة المعلمة: بلقيس عبد الله البريكي، لأسالتكم واستفساراتكم، يمكنكم التواصل مع المعلمة عبر الهاتف النقال 0503686668 أو عبر البريد الإلكتروني: balqis.albreiki@moe.gov.ae

ستعامل المعلومات في هذا البحث بسرية تامة وستستخدم فقط لأغراض البحث، كما أن مشاركة أطفالكم في هذا البحث ف محل تقدير.

- قرأت وفهمت كل المعلومات المقدمة أعلاه، وأوافق أن يكون طفلي جزءا من هذه الدراسة:

اسم ولي الأمر: _____ توقيع ولي الأمر: _____

Appendix (H): Labeeb Robot Picture



Appendix (I): ADEC Listening Kit Picture

Appendix (J): Students using Labeeb Robot 'Picture"