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Effects of using iPad on First Grade Students' Achievements in Arabic Language Classes In Saudi Arabia

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ABSTRACT

Although the iPad device has become a new trend as a teaching and learning tool in schools, using it in Saudi schools is still relatively new. So, the purpose of the study was to investigate whether the iPad enhances the teaching and learning styles in Arabic language classes for first grade in Albushra primary school. It also examined how this new educational tool affects students' skills and achievements, how teachers and students use it in their Arabic language classes, and what are advantages and disadvantages of using it in a class and at home. The study data was collected by conducting (1) the pre-and-post tests on two groups: Technology group taught by using iPad in Arabic language classes and Traditional group taught by using traditional teaching methods in order to know students' progress in reading, writing, and cognitive skills; and (2) interviews with Arabic teachers and parents whose children were taught by using iPad. The results of the study shows that the iPad is an effective teaching and learning tool in Arabic language classes, especially as it created very notable progress in students' cognitive and reading skills. However, it may weaken handwriting skills of students if they learned writing Arabic by using their fingers on iPads instead of using stylus the most of the time, especially when they are at young age and need to learn how to hold pencil to write properly. As well, providing the iPad for each student might lead to less communication and cooperation between students in classrooms.

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Chapter 1

Introduction

Technological advances have entered in all fields, regardless of its shape or its kind, and education has the largest share of this development and progress. Since the beginning of the 20th century, many educational researchers have encouraged using technology within the classroom (Pettit, 2014; Neaves, 2015). In recent years, teachers have used many handheld technologies such as laptops, smart phones, iPods and others in order to increase student engagement and learning motivation as well as improve their learning skills (Neaves, 2015). The latest, most popular technology tool being used these days are iPads and tablets, which have become the focus of educators interested in the educational process within schools and colleges (Murray & Olcese, 2011; Gasparini & Culen, 2011). These devices are considered to be one outcome of scientific and technical progress. The history of the iPad began in April 2010 when the first generation of it was released in the United State. Since then, it has been introduced into classrooms more extensively than any other device (Henderson & Yeow, 2012; Swicegood, 2015; Singer, 2015). Consequently, educators and teachers have become focused on the development and improvement of teaching methods using this new technological tool. This development would contribute in the investigation and support the goals of the curriculum (Barrett-Greenly, 2013). This new trend is considered to be a new method to teach in Saudi Arabian schools, thus the main goal of this study is to investigate the impact of using iPad on students' achievements in an Arabic language class within a primary school. This study also aims to better understand how teachers and students use iPads in the Arabic language classroom.

Definition of the iPad

The iPad is a touch screen tablet computer developed by Apple, which runs on iOS operating system and has a capability to access the Internet via Wi-Fi as well as 3G. It is also a relatively small device, measuring approximately 7 x 9 inches, thus it is quite mobile (Henderson & Yeow, 2012; Pettit, 2014). The iPad's interface is easy to use by both children and adults due to how they can interact easily and directly via finger strokes. This device can be used to browse websites, watch movies, read news and eBooks, play games, and many others things. The iPad in education means providing this device to each student and teacher or to a group of students with their teacher within classrooms in the school as a teaching and learning tool (Gasparini & Culen, 2011; Henderson & Yeow, 2012; Kardell, 2013).

The Purpose of this Study

The study seeks to get a better understanding of how teachers and students use iPad in Arabic language classes, to know what benefits and challenges that both students and teachers face while using iPad inside and outside class, and to investigate the impact of using iPad on first grade students' skills and achievements. In particular, to know:

- How quickly and easily can first grade students read Arabic language words (one word, two words, full sentence) when taught by using iPad?
- How quickly and easily can first grade students write Arabic language words (one word, two words, full sentence) when taught by using iPad?
- How easily and quickly can young students think and perform in Arabic by using their cognitive skills when taught by using iPad?

Research Hypotheses

The proposed research hypotheses are:

$H_{1a:}$ The percentage of first grade students in the Technology group who answered correctly reading tasks in post-test and were taught by using iPad in Arabic language classes would be higher than the percentage of students in the Traditional group who were taught by using traditional teaching methods.

$H_{1b:}$ The percentage of first grade students in the Technology group who answered correctly writing tasks in post-test and were taught by using iPad in Arabic language classes would be higher than the percentage of students in the Traditional group who were taught by using traditional teaching methods.

$H_{1c:}$ The percentage of first grade students in the Technology group who answered correctly cognitive tasks in post-test and were taught by using iPad in Arabic language classes would be higher than the percentage of students in the Traditional group who were taught by using traditional teaching methods.

H_{2a}: First grade students in the Technology group taught by using iPad in Arabic language classes would read Arabic words in post-test faster than other students in the Traditional group taught by using traditional teaching methods.

H_{2b}: First grade students in the Technology group taught by using iPad in their Arabic language classes would write Arabic words in post-test faster than other students in the Traditional group taught by using traditional teaching methods.

H_{2c}: First grade students in the Technology group taught by using iPad in Arabic language classes would answer cognitive tasks in post-test faster than other students in the Traditional group taught by using traditional teaching methods.

H_{3a}: There would be a significant difference between the post-test scores of the Technology group and the Traditional group in reading tasks.

H_{3b}: There would be a significant difference between the post-test scores of the Technology group and the Traditional group in writing tasks.

H_{3c}: There would be a significant difference between the post-test scores of the Technology group and the Traditional group in cognitive tasks.

H_{4a}: There would be a significant difference between the time taken to complete a task for the Technology and Traditional groups in reading tasks in post-test.

H_{4b}: There would be a significant difference between the time taken to complete a task for the Technology and Traditional groups in writing tasks in post-test.

H_{4c}: There would be a significant difference between the time taken to complete a task for the Technology and Traditional groups in cognitive tasks in post-test.

Chapter 2

Literature Review

This section will briefly review the literature on the study of different types of technology devices used in education. It also include examples of using the iPad in different learning and teaching situations, and popular iPad applications used in the teaching and learning process as well as some benefits and challenges of using it in classrooms.

Technologies Used for Education

A broad group of technology devices have been used in both teaching and learning processes to improve education. However, technology devices might be effective or ineffective in education based on the quality of the instructional strategies used, and the effectiveness of technology devices depends on how well it helps teachers and students to achieve the desired instructional goals (Lee, 2011). Also, teaching and learning can be more effective if both teachers and students get the proper training on the new technology. However, if they are not trained sufficiently, teaching and learning methods may not be effective (Sankar & Abdallah, 2015).

Not long ago, the Reading Reels, which consisted of video segments, were used by English teachers in their classrooms to support the teaching and learning process. When comparing the reading reel with the capacity of a book to deliver the detailed explanation in few minutes, the reel won because of its ability to stimulate the student's engagement in the material and also help with the student's understanding of the material. Because it had the ability of redundancy the content as much as needed (Phillips & Teasley, 2010).

Additionally, television and videotape were used as a tutorial instrument in the teaching and learning process to provide high quality educational materials, stimulate the interest of students, and assist them to increase their understanding of lessons easily. They were considered to be an effective method in learning especially when students were able to replay and repeat an instructor's explanation as much as needed. In addition, the students retained the information that they heard and saw better than lessons learned without the videotapes (Betsy, 1999). The videotape could be also an effective tool to provide performance feedback to students in some classes, such as physical education class in order to enhance the learning process (Darden, 1999).

For many years, computers and overhead projectors were used and considered to be the best audiovisual media devices for classroom use. The combination of computers and overhead projector systems provided multimedia lessons; presentation that consisted of a blend of words, pictures, graphics, and animation, designed to enhance meaningful learning. Using multimedia in the classroom gave teachers a great opportunity to improve the quality of lessons by designing their own presentations which could focus on a specific subject, thus helping students to learn more deeply and increase their ability of retention of information as well as improve their performance on tests (Szaboa, & Hastingsb, 2000; Savoy,Proctor, & Salvendy, 2009; Lai, Tsai, & Yu, 2011).

Computers have been used in schools to provide software that could tutor and operate as a teaching and learning tool. These software products were known as Computer-Assisted Instruction and Computer Aided Instruction (CAI). CAI software provided tutorial lessons and

practice exercises adapted to students' needs. These lessons were more interesting and engaging than textbooks because of immediate feedback and the animation and graphics features. However, CAI could be tedious and dull if the lectures were disorganized, but overall was considered to be a good tool to support regular classroom instruction (Barrow, Markman, & Rouse, 2009).

Another example of technology in the classroom, which appeared as a result of the emerging technology innovation, was the interactive whiteboard (IWB). This whiteboard (also known as a smart board) allowed the teacher to engage in an interactive teaching style (Kennedy, 2010). Its main feature is that of allowing both teachers and students to write on the touch whiteboard with the use of special writing pads (via local area network connection), and it also allowed teachers to organize exciting and enjoyable lessons and manage content (Andrus, 2013). Furthermore, teachers could preload elements of a lesson such as PowerPoint, video and pictures, and they could create and store digital content in order to use and reuse it in the classroom. If the classroom was connected to the Internet, teachers could also use multimedia applications such as YouTube and Google Video. The use of the smart interactive whiteboards has resulted in integrating interactive technology into classrooms and has shown to help students become more engaged with the course material, and has increased student engagement (Rukljač & Draženović, 2015).

With the pervasiveness of the Internet in the classroom, online courses have become a new teaching style in colleges in recent years. This has given students the opportunity to learn online even if they are not in the same place. However, the quality of teaching and instructor's

performance in online courses decreases and becomes less effective as the number of students in the class increases (Sorensen, 2014).

Currently, the iPad has become the most common teaching and learning tool. The iPad educational applications designed specifically for classroom instruction are expected to be the best new tool to help improve students' skills and increase their knowledge of material covered (Swicegood, 2015; Wang, Teng, & Chen, 2015).

The Importance of Using iPad in Classrooms

The iPad or computer tablet is slowly becoming as ubiquitous as the mobile telephone. It is used in Doctor's offices, sales offices and the restaurant business. It is also used in education in order to facilitate ways to deliver information easily (access and watch videos, read PDF's and eBooks, do research online, and others) with its mobility, friendly interface, and easy-to-load applications. With the spread of this technology and information dramatically among students these days, they may use it everywhere in their daily lives and become conscious on how to use this modern technology. Therefore, it is necessary to take advantage of that in education (Pettit, 2014).

Technology such as iPad can assist in providing a variety of information delivery methods with ease. As mentioned earlier, the iPad is characterized by its small size and light weight. These characteristics make it easy to carry and enhance its mobility for use both inside and outside the classroom. It also provides many free or low cost applications which can be used in the educational process. Thus, using iPad in education could be considered to be a qualitative leap in

information delivery due to its ease in ability to provide distinctive educational methods of instruction, which are expected to replace traditional methods (Henderson & Yeow, 2012).

Some research promotes this belief that it has become necessary to move from the indoctrination phase in the classroom to the empowerment phase that allows our sons and daughters to develop their abilities and empower them to use their energies in their own discovery of knowledge. The iPad may be an effective teaching and learning tool in elementary schools, if teachers and students take advantage the iPad's functions and features in the teaching and learning process. (Gasparini & Culen, 2012).

Some Examples of Using iPad in Education

The new classroom ecology is a system which consists of teachers, students, practices and technology. This kind of educational environment means educators use the technology devices within classrooms (Gasparini & Culen, 2012). On other hand in the past, the educational environment was defined as the place where teaching and learning happens (Haley-Oliphant, 1989). However with the appearance and spread of mobile learning devices such as iPads and tablets, students can learn through their own iPads from any location and at any time (Pettit, 2014). Besides that, some research shows that with the use of iPad devices in classrooms, the teaching and learning process has become better, easier and more interesting for both teacher and their students. However, this hypothesis may not be verified yet, as there are many studies which are being conducted throughout the world to test this hypothesis or other similar hypotheses.

Below is a short summary of some examples of using iPad in different learning and teaching situations.

According to a study which was implemented on college students, from three universities in Pennsylvania state in United States, who used the mobile assisted language learning (MALL) application on their mobile technology devices such as iPad, iPhone and others in order to improve their Arabic learning. The study found that most students loved to use MALL apps to learning Arabic as a second language because these applications were very convenient and helpful for them. Students also reported that MALL apps played a big role in their Arabic learning due to they enhance active learning, helped them to understand learning materials better, and improved their Arabic learning skills and speaking proficiency (Abedalla, 2015).

The iPad was also used by some students as one of the mobile technology learning tools in a study conducted on forty adult students to enhance Arabic language skills at the Defense Language Institute Foreign Language Center. The study showed that after conducting interviews and questionnaire, the iPad and other mobile tech devices such as iPod could assist students to develop their own language skills and improve their capabilities of language learning. It indicated that when compared with traditional teaching styles, this technology is considered to be a better tool to improve students' language skills and their comprehension (Saleh, 2014).

In two pilot studies, the iPad was used for active reading in a learning or teaching situation. The studies were conducted on twenty-six fourth-grade students in elementary school and forty university students. The findings related to the acceptance of technology were widely different in

both studies. The university students did not accept the iPad as a learning platform in their Geology courses and felt that it would take too much time for them to learn all applications and to get used to work with iPads while they were under academic pressure. On the other hand, elementary students were not under any academic pressure and showed an interest to explore and to learn from many applications, thus the iPad played a big role to boost their learning (Gasparini & Culen, 2011).

Additionally, the iPad was used in a study to determine whether the use of three iPad writing applications could improve writing skills of students and their attitudes about writing. The study conducted on two students in seventh grade for six-week in an English-language arts class. Students used applications both in class and at home to complete writing assignments for that class. The study showed that using writing applications enriched and improved students' writing skills along with attitudes toward writing when they have access to iPad anytime and anywhere (Kardell, 2013).

The iPad was also introduced in an English language classroom in a private Taiwanese university to teach and learn English vocabulary. In the experimental group, the teacher used the iPad, while in the control group the teacher used the traditional teaching methods to teach British English vocabulary. Seventy-four students were involved in this study for eighteen weeks. Students in the control group who used iPad were able to learn vocabulary by seeing words, pictures describing the word and examples of sentences containing a certain word. When asked about their attitudes toward teaching by using iPad within classroom, the experimental group agreed that using this mobile device could significantly help learning English language in

classrooms. The study also found that these students performed better in post-test than students in the control group, which indicates that using iPad and its applications in language teaching can increase the learning motivation of students and enhance their learning outcomes (Wang, Teng, & Chen, 2015).

In another study, the preferences of students about using iPad versus using traditional pencil and paper to answer test questions was used. Two groups of students were involved in tests: one group was tested with iPads while another group was tested with papers and pens. The study shows that there is no difference in students' behavior in the test between groups, but the paper points to 64% of students prefer using iPad over pen and paper to perform the test (Castro, 2015).

In a year-long pilot study in Norwegian elementary school classrooms, the iPad was introduced in fourth and fifth grade classrooms. The purpose of the study was to observe students' interactions with their iPads. This study showed that while the enthusiasm of using iPad existed at the beginning of year, the interest of using it significantly decreased by the end of the year. In other words, when using the same teaching and learning styles by iPad in classes for a long time, students may lose their interest in this technology and it may lose its novelty impact (Gasparini & Culen, 2012).

iPads were also adopted in New Zealand primary school classes with young students aged 9-12. These iPads made education more productive and accessible, so students could easily and quickly access any information at any location outside and inside the classroom. iPads also

supported collaboration between students in groups, generated high level of enthusiasm and engagement in the participating students, and increased the interest in learning specific subjects and skills (Henderson & Yeow, 2012).

In the United States, the iPad was integrated into two earth science classes as an educational tool in a study which assessed the effect of using iPad on courses through surveys and post-tests. The study found that iPad could increase productivity when students spent more time on certain educational activities. However, the post-test pointed that the iPad may not increase content knowledge when compared traditional teaching methods (Wallace & Witus, 2013).

In another experimental study in an American third grade math class, the iPad was integrated as an individual learning tool. Pre-and-post tests were taken by two groups: one taught by using traditional teaching methods while another taught by using iPad. The study showed that there was no significant difference between groups' tests scores. While this indicates that the iPad did not make any difference on students performance in mathematics classes (Singer, 2015), another study implementing the use of iPad in teaching mathematics for second-grade students showed different and opposite results. After collecting data from students' performance on these applications: Splash Math 2nd Grade and Addimal Adventure, and conducting interviews with two teachers and sex students, the study stated that students who use iPad for learning performed better on their quizzes than other students who use pencil and paper. Also, many students said they enjoyed doing math on iPad applications as opposed to using pencil and paper. Furthermore, teachers mentioned that iPad devices helped their students stay more engaged in math (Swicegood, 2015).

The Popular IPad Applications Used in Education

Many iPad applications can be used to support curriculum, facilitate the instructional process, and provide exciting learning styles for students. Here are examples of some common applications used in education:

- TeacherKit allows teachers to record the presence and absence of students and their grades as a follow-up book to assess student performance (Hakim, 2015).
- Nearpod allows teachers to guide an interactive presentation on their students' iPads (Khalid, Jurisic, Kristensen, & Ørngreen, 2014).
- Keynote lets teachers create and present their own presentations to students in classroom after linking their iPads to projector devices or interactive whiteboards (Henderson & Yeow, 2012).
- Dropbox and Showbie are both applications which provide a tool allowing both teachers and students to create, store and share assignments, but Showbie application provides another feature which let teachers create assignments for their students, review them, and provide feedback (Khalid, Jurisic, Kristensen, & Ørngreen, 2014; Gasparini & Culen,2012).
- iBooks is an Apple application for e-books which both teachers and students can read, carry and save e-books in the application from publishers and display the book when they need it (Johnston & Marsh, 2014).
- ShowMe provides a virtual whiteboard that allows teachers to explain challenging concepts and record and share whiteboard tutorials online. Similarly, SlideShark is used by teachers to convert and present PowerPoint presentations (Novello, 2012).

- iCardSort is used to visually organize, classify, and simplify many ideas centered on a specific topic by one student or a group of them together (Barrett-Greenly, 2013).
- Flashcardlet allows students to create flashcards about certain subjects to focus on areas which students need to study more. Some students can also organize their homework, projects and exams via some applications such as inClass and iStudiez (Novello, 2012).
- iMovies can be used by students to share digital stories as well as browse and share videos. Teachers also use it to provide excellent tutorials or feedback (Barrett-Greenly, 2013).
- BookCreator application enables young students to create and edit their own e-books including images, audio, text, and videos (Khalid, Jurisic, Kristensen, & Ørngreen, 2014).
- GeoMaster is geography application which provides a game used by students in geography class to learn and locate famous or historic places, cities, countries, and capitals (Barrett-Greenly, 2013).
- Remind is a communication tool which can be used by teachers to communicate instantly and send quick messages to students' parents to remind them of important information such as the date of field trip for their children (Rizzuto, 2015).
- Noteshelf allows students to take notes, sketch ideas, and draw shapes with their stylus or fingers. Also, they can easily share and print their notes (Eaton, 2013).

Arabic Language Learning Applications for Children

Learning Arabic letters is the first step to read and write the Arabic language, and this step is one of the most basic steps for children to start reading and writing (Hardwick-Smith, 2002). Letters

of the alphabet and simple words are the foundation of the Arabic language as is the case with other languages (Abedalla, 2015; Wang, Teng, & Chen, 2015). Young children are able to read books, write messages and convey ideas after learning how to write and read the alphabet and words. Many iPad applications can provide enjoyable and exciting styles that may allow children to achieve that goal efficiently inside or outside of the classroom (Noorhidawati, Ghazal Ghalebandi, & Siti Hajar, 2015).

There are many categories of Arabic learning applications for writing, reading and gaming. These applications could teach students Arabic in an engaging and fun way, give them the best chance to learn Arabic in easy way, and improve students' learning skills. They are also designed by native Arabic speakers, so their features such as the pronunciation of letters and words are in formal Arabic and in proper manner. First, Arabic writing applications can be used in Arabic language classes or at home to help students learn how to write the three forms (beginning, middle, and end of word shape) of Arabic letters. Applications enable learners to trace letters, press on words or letters to hear the sound or pronunciation. Additionally, these applications may enable teachers or parents to type a specific word for their students or children to learn. Examples of these writing applications in the Apple store are Nice Alphabet Lite, Play with the ARABIC words LITE, and Write With Me in Arabic (RecreARTion, 2016; Trade, 2016; Soliman, 2014).

Also, Arabic reading applications can help students memorize and read the Arabic Alphabet, words and sentences by hearing the sound of the words or letter after touching them as many times as they want such as in Arabic Alphabet Room application (Arappdev, 2016). Also, with

using interactive stories, applications which provide Arabic stories using beautiful cartoons and audio narration, students' reading skills could improve. Examples of Arabic reading applications are Lamsa and the Birds Stories: Children's Stories (Lamsa FZ-LLC, 2016; Asafeer Education Technologies FZ LLC, 2015). Finally, Arabic game applications can play a big role to encourage students to learn reading and writing without boredom, for example, ABC Arabic for Children (Simri, 2016).

The Benefits of Using iPad in Education

The iPad device is considered by educators and instructors as a powerful educational tool which can improve teaching and learning methods, and increase the productive learning and use inside and outside classrooms because of its many impressive benefits. The main benefit is that the immediate content of all academic levels can be readily provided by iPad for both teachers and students at anytime and from any location. Also, there are many iPad applications that have diverse methods and styles for delivering information and instructions easily and in a fun and exciting manner which can attract students to study the content more, thus this device can provide a mobile learning environment to students (Shepherd & Reeves, 2012).

Another benefit, obtaining immediate corrective feedback from educational applications, can help students to learn faster and more efficiently. Before using this modern technology, there were some situations delaying feedback to students for a few days. This kind of delay could negatively affect student achievement especially when they often forget why they chose a specific answer or how they wrote their homework. However, by using the iPad they will

immediately be able to know if they chose the right answer or not (Khalid, Jurisic, Kristensen, & Ørngreen, 2014; Franklin & Smith, 2015).

Additionally, the iPad device, used as a communication tool, can provide the immediate communication for both teachers and students. For instance, teachers can easily communicate with their students' parents in order to inform them about their children's performance and show their progress, and students can also immediately communicate with their teachers and other students inside or outside classrooms to ask questions and share information and experiences (Pettit, 2014; Shepherd & Reeves, 2012). Beside immediate communication, the iPad also allows students to easily search, access and view variety of information at anytime and from anywhere to promote their learning (Gasparini & Culen, 2012).

Another advantage, using iPads to replace textbooks could make paperless classrooms which would save paper and reduce the large percentage of the school budget earmarked for purchasing textbooks in the past (Pettit, 2014). Additionally, teachers and their students can easily access many low-cost and free educational applications to use in learning and teaching processes. Not only that, but it also allows them to access many educational resources online such as e-books, videos, educational broadcast, and others. Through iPad applications, teachers can easily share information and educational resources with each other (Henderson & Yeow, 2012).

Furthermore, this mobile device can also be an assessment tool which can be easily used to evaluate students' performances in tasks and as follow-up book to record attendance and grades of students and share them with their parents easily in order to see their children's progress in

classes through using some of its applications (Franklin & Smith, 2015). Also, it can improve not only reading skills for the learners of languages and young students with reading difficulties (Barrett-Greenly, 2013), but also the writing and organizational skills of adult students and their attitudes about writing. So, it can be a vital tool to improve reading and writing skills of students (Pettit, 2014; Kardell, 2013).

Challenges and Problems of Using iPad in Education

Although iPad devices have been broadly welcomed in education in both colleges and schools, educational organizations, instructors and students may face some problems and challenges which may lead to some negative impacts on the teaching and learning process. Recently, many educational organizations, ministries of education, and benevolent associations have specified some financial sources for equipping schools with iPads in order to provide high quality educational methods and an exciting manner of teaching and learning (Henderson & Yeow, 2012; Garwood, 2013). However, this amount of money is not enough for providing an iPad to each student and teacher in schools, thus there are a limited number of iPad devices in classrooms (Blume, 2015; Garwood, 2013), so in some cases only one iPad is used in each group or team of students in order to involve their lessons and give each student a chance to work with an iPad (Henderson & Yeow, 2012). Also, many families of students cannot financially afford to buy iPads and educational applications for their children because these iPads are very expensive. These limitations in many situations may negatively affect young students and enter them into a swirl of questions which, in some cases, could result in psychological problems such as inferiority complex (Gudmundsen, 2011).

On the other hand, although many educational applications on iPad are provided and used by teachers in their teaching process, most of these applications are available only online. For that reason, if there is poor Internet service or the lack of this service temporarily, it may affect instructional process, instructional time and also prohibit teachers from getting the iPad benefit in education, especially if they entirely depend on it. Thus, this is the main challenge that teachers face when using iPad devices in classrooms (Franklin & Smith, 2015; Gasparini & Culen, 2011).

Another challenge for teachers is that students' activities performed on their iPads cannot be entirely monitored by teachers during lessons unless there is an application which provides this function to teachers. Therefore, teachers cannot see and know what their students are doing on their iPads as opposed to teachers using computers, which can monitor students' activities and control their devices easily via monitoring software (Henderson & Yeow, 2012).

Also, integrating iPads into classrooms without training teachers well could negatively affect the teaching process in class. For instance, during teaching, a teacher would interrupt their lessons in order to solve simple technical problems (Barrett-Greenly, 2013).

Another challenge, if students' iPads are not under full control by the school teachers during lessons, students would download and play gaming applications, thus there may not be room for activities on educational applications, and their attention would also be distracted in the classroom. Furthermore, in some cases, the iPad could frustrate students if their works on iPad

were deleted, so schools should lock students' access to delete or download new applications (Khalid, Jurisic, Kristensen, & Ørngreen, 2014).

Despite the challenges of using iPads in education, we should not abandon the technology, but take advantage of it as much as possible in the teaching and learning process. If teachers are aware of these challenges and are well trained on aspects of the technology, they can integrate iPads into classrooms in an effective way to stimulate students' interest to continue learning educational content in an exciting style (Gasparini & Culen, 2012; Barrett-Greenly, 2013).

Chapter3

Research Methodology

Saudi society like other societies live in a technological era that evolves and changes rapidly, and this requires Saudi educators to think seriously about what kind of education appropriate for students in this era. Consequently, Saudi schools have recently sought to introduce the iPad into classrooms. This modern technology (iPad) has created a new learning environment, so teachers have to develop their teaching methods to fit with this available technology and to meet the needs of students. So, this study sought to investigate the possible effects of implementing iPad as a teaching and learning tool on first grade students' skills and achievements in Arabic language classes. It also sought to get a better understanding of how this tool can be used in classrooms and to know what benefits and challenges of using it inside and outside a class.

Data Collection

Two methods were used to collect the quantitative and qualitative data for this study. The first method, pre-and-post tests were performed with the first grade students. The second method, interviews were performed with Arabic teachers and parents.

1. Pre-and-Post Tests

The pre-and-post tests were conducted on two groups of participants before and after teaching them Arabic language classes by using different teaching styles, and both groups consisted of fifteen young girls in the first grade. The group that was taught by using iPad and its applications within classrooms in Albushra School was named Technology group while another group that

was taught by using traditional teaching methods in Hundred-and-Fifteen Elementary School was named Traditional group. Before conducting the tests, the test questions were reviewed by the Saudi educational sector in Makkah in order to ensure that the tests fit with the curriculum for the students of the first grade. After that, students were tested from both schools at the beginning of the fall semester from September 10th to 14th, 2015 before teaching them anything. This was in order to get the initial evaluations of students' skills, in particular, to evaluate writing skill, reading skill and three cognitive levels: remembering, understanding, and applying. They were also tested again at the end of the semester from December 17th to 21th, 2015. The nature of the test explained below: each student was given three main tasks in the pre-and-post tests, the first task consisted of three sections to evaluate the cognitive skills, and each task consisted of four different pictures, words, and characters. Teachers asked students to draw a line between a picture and a word that describes it, and also to draw a line between the word and letter the word starts with as shown in Figures 1 and 2. See Appendix B that shows all three sections of the test in English language.

Figure 1. All three cognitive tasks in the first section of the test

Figure 2. One task of the test in first section, and it has four pictures are in the upper part (sun, kite, boy, and girl), four words in the box on the right side of the bottom part (sun, kite, boy, and girl), and four characters in the box on the left side of the bottom part (S, K, B, G).

In the second task, students were asked to read aloud some Arabic words in order to evaluate their reading skills. This task consisted of three parts that assessed the ability of students in the first grade on reading one word, two words, and a full sentence consisting of many words.

In the last task, they were also asked to write some Arabic words in order to evaluate their writing skills. This task also consisted of three parts that assessed their ability in writing one word, two words, and a full sentence consisting of many words.

The duration of the test was thirty minutes. Students were tested again with the same test at the end of the semester. After students took both tests, the results of pretest and post-test were compared in order to show the effects of using iPad on students' writing, reading and cognitive

skills, and whether the teaching method of using iPads could improve students' achievement to learn.

2. Interviews

Seven participants were interviewed, they included five teachers from Albushra School, and two parents. Five of interviews were conducted via Skype for one hour, and two others were conducted face to face. Both teachers who teach Arabic language by using iPad in their classrooms and parents who have children studying by using iPad in school and home were asked to answer a list of questions (see Appendix C). These questions inquired about how iPad is used in classrooms, and what were the benefits and problems of using it within a classroom and at home. Also, all related themes to the interview questions were reviewed and discussed by both the researcher and interviewees. Before conducting interviews with participants, they were provided the list of the questions and consent forms that state the purpose and potential benefits of these interviews, in order to ensure that they understand the main purpose of this study and felt comfortable being interviewed. All interviews were recorded and transcribed in order to analyze the data by classifying statements into one of five categories:

1. How to use iPad in Arabic language classes.
2. Benefits of using it in Arabic class,
3. Challenges and problems of using it in Arabic class,
4. Why it is important to use iPad in Arabic classroom,
5. Which applications do teachers use to teach and students use to learn.

In other words, statements that were repeated a lot were classified into one of categories mentioned above.

Procedures

Before implementing the study in Albushra School and Hundred-and-Fifteen Elementary School, the study was reviewed by the Institutional Review Board of Rochester Institute of Technology (Appendix A) in order to protect the privacy of the participants in the study. In cooperation with principals and teachers, recruitment flyers (Appendix K), screener questionnaire (short survey) and consent forms regarding the test were sent and emailed to the parents who have children in the first grade in both schools. Then, the parents who allowed their children to perform tests filled out the questionnaires (Appendix I), signed the consent forms (Appendix M), let their children also sign the consent form (Appendix N), and then sent them back to the school. The consent forms, recruitment flyers (Appendix L), and screener questionnaires regarding the interviews were also emailed and sent to the parents who have children in the first grade in Albushra School only, and then the parents who were interested to do the interview signed the consent forms (Appendix P), filled out the questionnaires (Appendix J), and then sent them back to the school. After that, participants were filtered according to the user profiles (Appendix I and G) and their answers on the user screener questionnaires. So, thirty students in the first grade were selected, ages 6 through 8. They were also in good health without any physical disabilities, visual deficits or hearing loss. Seven of them got pre-primary education in the kindergarten: three from Albushra School while other four from the Hundred-and-Fifteen Elementary School. Also, all student participants were female because the schools are for girls only. Two parents were also selected to participate in interviews, they speak Arabic, are fully able and do not have any visual and hearing disabilities, thus results would not influenced by any health factors. Based on this user profile (Appendix H), five teachers were also selected to participate in interviews after signed the consent forms (Appendix O). Pre-and-post tests were performed during students'

regular school hours, while interviews were conducted with teachers and parents in different times near the end of the first semester after making appointments with them. To finish testing all students who participated in the pre-and-post tests, there was a need to three days in the beginning and at the end of the semester. While young students performing tests on papers in both schools, the observation sheets (Appendix E) were used by teachers to evaluate students' skills based on the used rating scales (Appendix D), record the time taken to perform task, and to add their own observations about students' behaviors in each task. Finally, after participants completed their roles in the study, they received gift cards for their participations and signed receipt forms (Appendix Q and R). After testing all students in both tests, the test data was inserted into an Excel file then analyzed by using *t*-test. For ensuring confidentiality and privacy in this study, the personal information of participants was coded by entering their records under a code number instead of by name. Thus, the used database was stripped of any personal information. Also, the findings of study were presented in an unidentifiable manner.

Chapter 4

Results

The purpose of this study was to investigate and explore the impact of using iPad on first grade students' skills and achievements in Arabic language classes. The Findings of this study were determined by using quantitative data collected through testing students the pre-and-post tests in two Saudi schools in order to answer twelve hypotheses that mentioned in Chapter 1. Also, five teachers and two parents were interviewed to collect qualitative data which was used as background information about how the iPad is used within first grade Arabic language classes, what applications that teachers use to teach and students use to learn, why choose the iPad instead of other modern technology to teach in classrooms, and what advantages, disadvantages and challenges of using iPad in Arabic language classes.

This chapter begins with the results of student achievement in both pre-and-post tests, followed by the comparison of both groups in tests. That is followed by the analysis of the test scores (descriptive statistics) by using *t*-test, then finally the results of analyzing the interviews (qualitative data).

Results of Student Achievement in Both Pre-and-Post Tests

As mentioned earlier, student participants were categorized into two groups based on the type of education received: Technology group (TG) and Traditional group (DG). In addition, they were tested at the beginning and end of the first semester of 2015 in order to evaluate their skills (writing, reading and cognitive) in pre-and-post tests. When they performed tests, their teachers

evaluated them in three main tasks by using the rating scale from one to seven, see Table 1 and Appendix D.

Extremely poor	Very Poor	Slightly poor	Neutral	Slightly Good	Largely Good	Extremely Good
1	2	3	4	5	6	7

Table 1: The rating scale used to evaluate student performance in tests

Pre-Test Scores

1.Traditional Group

Students in both groups performed the tests twice (pre-and-post tests). They did the pre-test before studying Arabic language in their classrooms in order to assess their cognitive, reading, and writing skills.

Participants	Cognitive tasks			Reading tasks		Writing tasks	
	Mean of student's scores	Total time (s)	Mean of No. correct answer	Mean of student's scores	Total time (s)	Mean of student's scores	Total time (s)
P1	1	147	1	1.33	365	1.33	703
P2	1	190	2	1	321	2	573
P3	1	161	5	1.33	295	1	639
P4	3	153	12	5	273	3	732
P5	1	189	2	1	220	1	626
P6	1.33	136	4	2.33	109	1	899
P7	1	242	1	1.33	572	2	641
P8	1	234	2	1	421	1	502
P9	1.33	170	3	1.66	332	1.66	673
P10	2	142	5	6	275	4.66	895
P11	3.33	184	12	4	412	4.33	492
P12	2	188	6	1.66	463	2.66	574
P13	1	273	0	2	382	1.33	693
P14	4.33	197	16	3.66	302	5	594
P15	1	210	1	2.33	494	1.33	734
The Average	1.6	187	4.8	2.37	349	2.2	664

Table 2: The scores of students in Traditional group in all tasks in pre test

Table 2 illustrates the mean scores of fifteen students in the Traditional group who would be taught Arabic using traditional educational teaching methods at the Hundred-and-Fifteen Elementary School in three main tasks and the time total taken to perform each task individually

- to see more details about students scores in the three cognitive tasks, reading tasks, and writing tasks, see Tables 22, 23, 24, and 25 in Appendix T. As well, it illustrates the mean scores and time of the Traditional group in all tasks.

2. Technology Group

Table 3 shows the mean scores of each student in the Technology group who would be taught using iPad in an Arabic language class in the three main tasks (cognitive, reading, writing) before studying Arabic language in their classrooms, and it shows the time total taken by them to complete each task, see Tables 26, 27, 28, and 29 in Appendix T for more details. It also illustrates the mean scores and time of the Technology group in all tasks.

Participants	Cognitive tasks			Reading tasks		Writing tasks	
	Mean of student's scores	Total time (s)	Mean of No. correct answer	Mean of student's scores	Total time (s)	Mean of student's scores	Total time (s)
P1	1	166	3	1.33	296	1	834
P2	1.66	142	6	5	376	6	594
P3	1	105	5	1.66	397	1.33	848
P4	1.66	275	4	1	196	1.66	735
P5	1.33	369	2	1	356	1	586
P6	1	201	0	3	344	1	804
P7	1	132	1	1	245	1	745
P8	1	207	9	4.66	407	5	843
P9	2	263	2	1.33	325	1.66	783
P10	2	173	1	2	476	2.33	684
P11	3.66	162	11	4.33	326	4	795
P12	1	289	0	2	183	1.33	624
P13	1	183	0	3.33	423	1	871
P14	1	195	2	2.33	372	2.66	664
P15	3	143	5	1.33	254	1.66	603
The Average	1.5	200	3.4	2.35	331	2.1	734

Table 3: The scores of students in Technology group in all tasks in pre test

3. The Comparison of Both Groups in Pre-Test

➢ The performance of Students on Tasks

Figure 3 presents the average scores of both groups in pre test in all tasks: cognitive, reading, and writing. When comparing the mean scores of students from both groups in cognitive tasks (DG M=1.68 Vs. TG M=1.55), reading tasks (DG M=2.37 Vs. TG M=2.35), and the writing tasks (DG M=2.22 Vs. TG M=2.17), it can be shown that the skills of students from both groups were very weak and poor when their scores were between this range from 1(Extremely poor) to 2(Largely Good). Also, Table 4 shows that, 66% of students in the Traditional group and 74% of students in Technology group got the lowest scores (Extremely poor) in cognitive tasks. 52% of students in the Traditional group and 47% of students in the Technology group got the lowest scores (Extremely poor) in reading tasks, and finally 52% of students in the Traditional group and 66% of students in the Technology group got the lowest scores (Extremely poor) in writing tasks. This can be suggested that the most students in both groups got very bad scores in the pre.

	No. of students in Traditional group						No. of students in Technology group					
	Cognitive tasks	%	Reading Tasks	%	Writing tasks	%	Cognitive tasks	%	Reading Tasks	%	Writing tasks	%
1-Extremely poor	10	66	8	52	8	52	11	74	7	47	10	66
2-Very Poor	2	13	3	20	3	20	2	13	3	20	2	13
3-Slightly poor	2	13	1	7	1	7	2	13	2	13	0	0
4-Neutral	1	7	1	7	2	13	0	0	2	13	1	7
5- Slightly Good	0	0	1	7	1	7	0	0	1	7	1	7
6- Largely Good	0	0	1	7	0	0	0	0	0	0	1	7
7-Extremely Good	0	0	0	0	0	0	0	0	0	0	0	0

Table 4: Rating students in all three skills in pretest

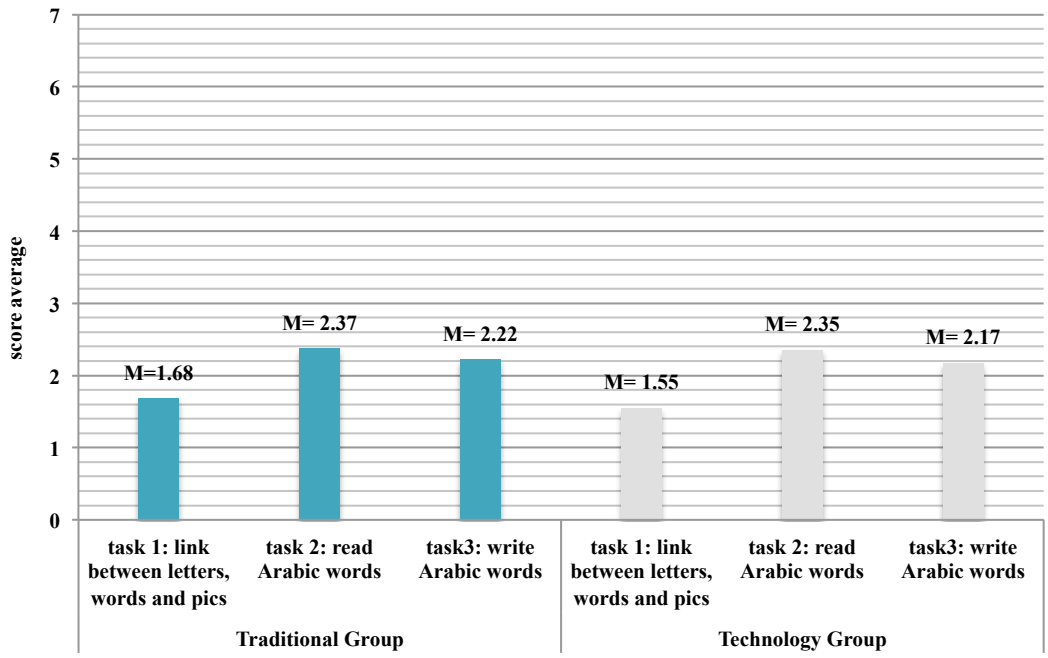

Figure 3: The average of students' scores in the pre test

This means that the levels of students from both groups in three target skills were very weak and bad before studying Arabic language lessons. However, there were a few students that performed better than others. As seen in Table 4, one student in the Traditional group got the largely good score (6) in reading task, and another student in the Technology group got the same scores in writing task because they likely got pre-primary education in the kindergarten.

➢ The Time Taken to Complete Tasks in Pre Test

Table 5 illustrates that the average time taken to complete pre test by both groups in cognitive tasks (DG M= 187 S, TG M= 200 S), reading tasks (DG M = 349 S, TG M= 331 S), and writing tasks (DG M= 664 S, TG M= 734 S). When comparing the average time, it seems that the Traditional group spent less time than the Technology group in cognitive and writing tasks, but

more time in reading tasks. The researcher does not take that into account because students' scores in both groups were very poor. Additionally, while conducting the test, many students did not pay attention for a long time on tasks, or they tried to abandon answering some tasks. Also, there were some behaviors of students that slightly slowed the process of the test, for instance, asking for feedback on their performances and asking questions after starting the task.

	Average time taken to complete tasks in Traditional group (second)			Average time taken to complete tasks in Technology group (second)		
	Cognitive tasks	Reading tasks	Writing Tasks	Cognitive tasks	Reading tasks	Writing Tasks
Pre test	187	349	664	200	331	734

Table 5: Average time taken to complete tasks in the pre test for both groups

Post-Test Scores

1.Traditional Group

After students in the Traditional group were taught Arabic language in their classroom by using traditional educational teaching methods for one semester, they were tested the post-test.

Participants	Cognitive tasks			Reading tasks		Writing tasks	
	Mean of student's scores	Total time (s)	Mean of No. correct answer	Mean of student's scores	Total time (s)	Mean of student's scores	Total time (s)
P1	6	84	19	3.33	84	5.33	421
P2	4	82	16	4	75	5	398
P3	5.66	101	18	1.33	132	6	287
P4	6.33	98	20	7	97	7	452
P5	4	94	18	4.33	88	7	400
P6	6.66	51	22	2.66	109	4.33	527
P7	4	39	14	7	83	5.33	305
P8	3.33	54	12	2.66	97	3	243
P9	6.33	69	20	6	64	6.33	398
P10	7	64	24	7	51	7	513
P11	7	81	24	6.33	46	7	204
P12	5.33	97	19	7	32	2.33	410
P13	4	75	14	3.33	73	7	264
P14	7	69	24	7	49	5.66	402
P15	6.66	94	22	3.33	82	5.66	524
The Average	5.5	76	19.06	4.82	77	5.6	383

Table 6: The scores of students in Traditional group in all three tasks in post-test

Table 6 shows that the mean scores of each student in the Traditional group and the time total taken to perform each task individually - for more details see Tables 30, 31, 32, and 33 in Appendix T. Also, it illustrates the mean scores and time of the Traditional group in all tasks.

2.Technology Group

Table 7 presents the mean post-test scores of fifteen students in the Technology group who were taught by using iPads in their Arabic classrooms in the three main tasks and the time total taken to complete each task individually - for more details about students' scores in tasks, see Tables 34, 35, 36, and 37 in Appendix T. It also shows the mean scores and time of the Technology group in all tasks.

Participants	Cognitive tasks			Reading tasks		Writing tasks	
	Mean of student's scores	Total time (s)	Mean of No. correct answer	Mean of student's scores	Total time (s)	Mean of student's scores	Total time (s)
P1	6.66	57	21	5.66	37	1.33	573
P2	7	74	24	7	45	7	428
P3	7	63	24	6.66	71	1.66	632
P4	7	93	24	7	38	2.33	621
P5	7	91	24	7	94	3	476
P6	6.33	51	22	5.66	42	2.33	494
P7	6.66	39	22	7	36	1.66	584
P8	7	54	24	7	56	5.33	723
P9	6.66	47	22	6.33	58	3	492
P10	7	58	24	2.66	73	5.33	617
P11	7	70	24	4	82	6.33	701
P12	7	83	24	6.33	52	5.33	410
P13	6.66	46	23	3	74	2	743
P14	6.33	61	20	5.66	47	4.33	397
P15	7	53	24	7	36	3.33	552
The Average	6.8	62	23.06	5.86	56	3.6	562

Table 7: The scores of students in Technology group in all tasks in post-test

3. The Comparison of Both Groups in Post-Test

➢ The Performance of Students on Each Tasks

o Cognitive Tasks

One of the main purpose of these cognitive tasks is to test the research hypothesis H_{1c} stated that "The percentage of first grade students in the Technology group who answered correctly cognitive tasks in post-test and were taught by using iPad in Arabic language classes would be higher than the percentage of students in the Traditional group who were taught by using traditional teaching methods."

	Rating students in cognitive skills			
	No. of students in Traditional group	**%**	**No. of students in Technology group**	**%**
1-Extremely poor	0	0%	0	0%
2-Very Poor	0	0%	0	0%
3-Slightly poor	0	0%	0	0%
4-Neutral	4	27%	0	0%
5- Slightly Good	3	20%	0	0%
6- Largely Good	5	33%	6	40%
7-Extremely Good	3	20%	9	60%

Table 8: Rating students' scores from both groups in cognitive skills in post-test

Table 8 shows that 60% of student participants from the Technology group got the highest score 7 (extremely Good) in cognitive tasks while only 20% of them from the Traditional group got that score. Also, the rest of students (40% of students) in the Technology group obtained a largely good score (6) while the rest of students in the Traditional group obtained different scores. 33% of them got a largely good score (6), 20% of them got a slightly good score (3), and 27% of them got a neutral score (4). All this indicates that students' cognitive skills in the Technology group were better than the skills of the Traditional group. In other words, most

students in the Technology group got high scores in cognitive tasks, and this reflects that the Technology group performed better than the Traditional group as visually shown in Figure 4, TG M=6.8 vs. DG M=5.5.

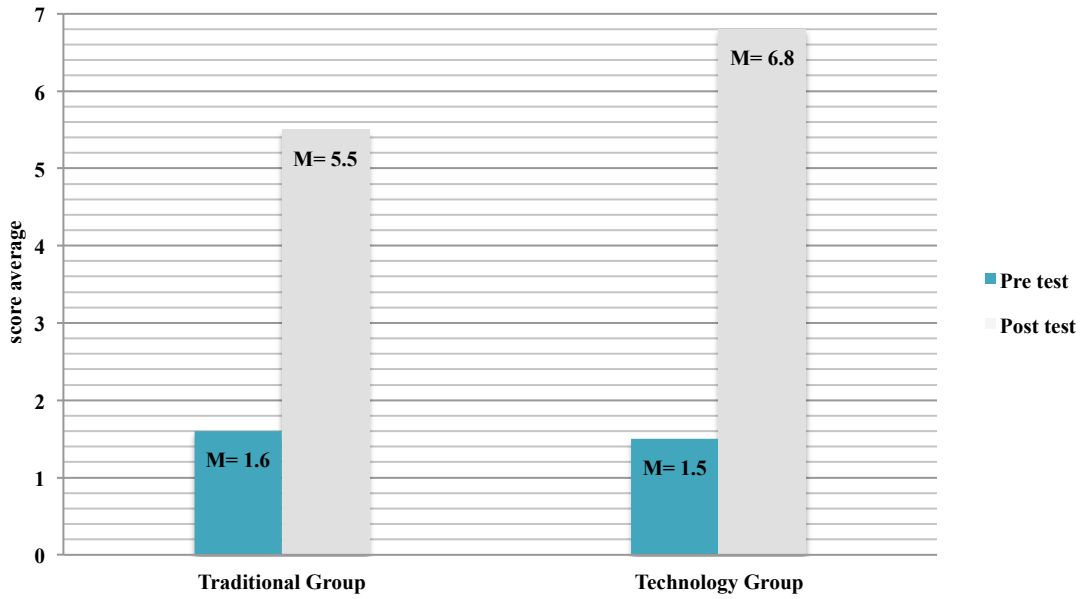

Figure 4: The average of students' scores in cognitive tasks in pre-and-post tests

In Figure 4, the average scores of both groups in pre-and-post tests were compared in cognitive tasks (DG M=1.6 vs. TG M=1.5) vs. (DG M=5.5 vs. TG M=6.8) to show that although the average scores of students in both groups were very poor in the pre test, their performances in the post-test were at a higher level, thus indicating that an average both group made great progress in their cognitive skills. However, the cognitive skills of Technology group were better and stronger in the post-test as shown in Figure 4. Also, Figure 5 shows and confirms that the cognitive skills such as remembering and understanding of first grade students who were taught by using iPad in their Arabic language classes were better and stronger than skills of students taught by using traditional teaching method when comparing between the average of the number of the correct answers of Technology group (M= 23.06) and Traditional group (M= 19.06).

Based on all these positive points discussed above and supported this research hypothesis H1c, the researcher accepted it.

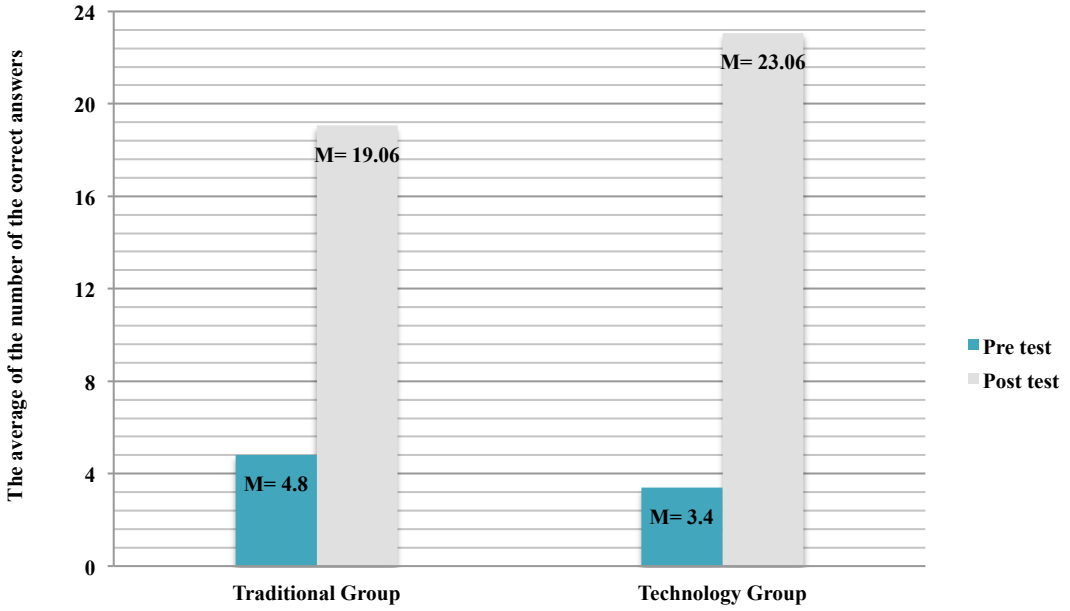

Figure 5: The average of the number of the correct answers in cognitive tasks in pre-and-post tests

○ Reading tasks

These reading tasks were used to test the research hypothesis H_{1a} which states that "The percentage of first grade students in the Technology group who answered correctly reading tasks in post-test and were taught by using iPad in Arabic language classes would be higher than the percentage of students in the Traditional group taught by using traditional teaching methods."

	Rating students in reading skills			
	No. of students in Traditional group	%	No. of students in Technology group	%
1-Extremely poor	1	6%	0	0%
2-Very Poor	2	13%	1	6%
3-Slightly poor	3	20%	1	6%
4-Neutral	2	13%	1	6%
5- Slightly Good	0	0%	3	20%
6- Largely Good	2	13%	3	20%
7-Extremely Good	5	33%	6	40%

Table 9: Rating students' scores from both groups in reading skills in post-test

Table 9 presents that 40% of students in the Technology group got the highest score 7 (extremely good) in reading tasks while 33% of them in the Traditional group got that score. 20% of students in the Technology group got the largely good score (6) while 13 % of them in the Traditional group got that score. 6% of students in the Traditional group got the lowest score 1 (extremely poor) while there was no student in the Technology group getting that score. Also, as visually shown in Figure 6, when comparing the mean scores of students from both groups in post-test, the Technology group performed better than the Traditional group in these reading tasks (TG M=5.86 vs. DG M=4.82). This indicates and reflects that first grade students in the Technology group taught by using iPad in Arabic language classes can read Arabic words in post-test more fluently and correctly than other students in the Traditional group taught by using traditional teaching methods. Thus, the research hypothesis H_{1a} was supported based on the results discussed above.

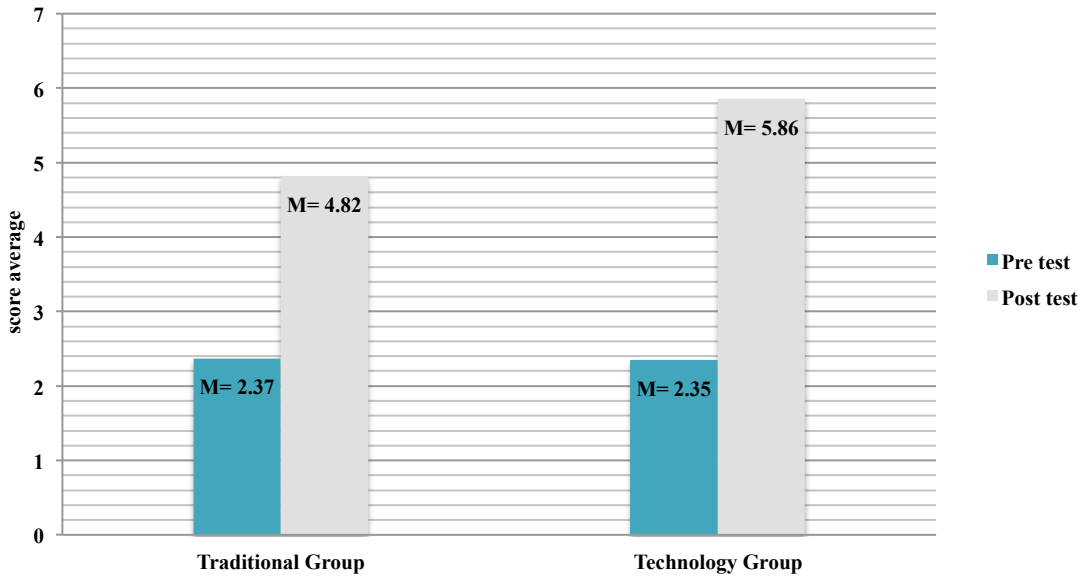

Figure 6: The average of students' scores in reading tasks in pre-and-post tests

○ Writing tasks

Writing tasks were used in order to test research hypothesis H_{1b} when states that "The percentage of first grade students in the Technology group who answered correctly writing tasks in post-test and were taught by using iPad in Arabic language classes would be higher than the percentage of students in the Traditional group who were taught by using traditional teaching methods."

In Table 10, 20% of students in the Technology group got the lowest score 1 (extremely poor) while there were no students in the Traditional group earned that score. Also, 33% of students in the Traditional group got the highest score 7 (extremely good) while only 6% of them in the Technology group got that score. This points that the Traditional group performed better in writing tasks than the Technology group as Table 10 illustrates and visually shown in Figure 7, DG M= 5.6 Vs. TG M = 3.6.

	Rating students in writing skills			
	No. of students in Traditional group	**%**	**No. of students in Technology group**	**%**
1-Extremely poor	0	0%	3	20%
2-Very Poor	1	6%	3	20%
3-Slightly poor	1	6%	3	20%
4-Neutral	1	6%	1	6%
5- Slightly Good	5	33%	3	20%
6- Largely Good	2	13%	1	6%
7-Extremely Good	5	33%	1	6%

Table 10: Rating students' scores from both groups in writing skills in post-test

Both Table 10 and Figure 7 illustrate the results of testing this research hypothesis H_{1b}. Although the researcher expected the first grade students who were taught by using iPad in their Arabic language classes could outperform students taught by using traditional teaching methods in answering writing tasks easily and correctly, the results show that writing skills of students in the

Traditional group were better than students in the Technology group. Also, they show that most students in the Traditional group got high scores in writing tasks. Thus, the research hypothesis H_{1b} was not supported and accepted.

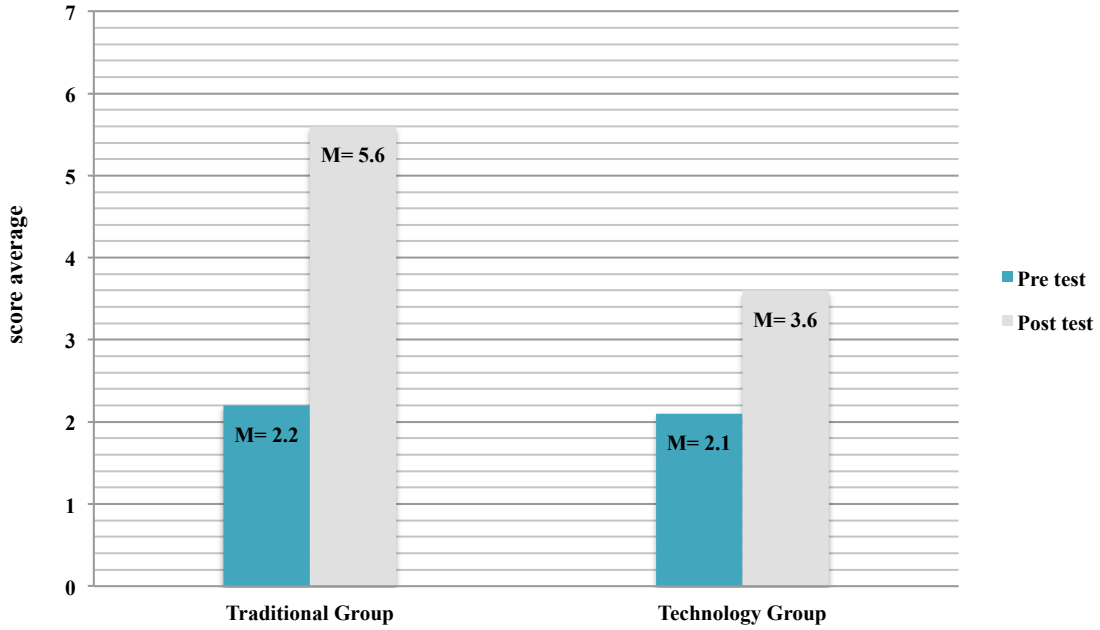

Figure 7: The average of students' scores in writing tasks in pre-and-post tests

➢ Time Taken to Complete Tasks in Post-Tests

The time taken to complete each task in post-test was measured to assess how fast students performed tasks in order to test those three research hypotheses H_{2a}, H_{2b}, and H_{2c} which stated that students in the Technology group would read and write Arabic words and answer cognitive tasks in post-test faster than students in the Traditional group. However, post-test time may not reflect an accurate time of students' performances when it was notable that there were some behaviors of students that slightly slowed the process of the test. For example during the test, some students asked questions, and it took time for teachers to answer. Also, when they asked

for feedback, they stopped completing a task. In addition, they changed their answers, so they erased what they wrote and tried answering the task again.

	Average time taken to complete tasks in Traditional group (in second)			Average time taken to complete tasks in Technology group (in second)		
	Cognitive tasks	**Reading tasks**	**Writing tasks**	**Cognitive tasks**	**Reading tasks**	**Writing tasks**
Post-test	76	77	383	62	56	562

Table 11: Average time taken to complete tasks in post-test for both groups

Figure 8 and Table 11 show that when comparing the average time of both groups, it seems that the Technology group spent less time than the Traditional group to answer cognitive tasks (DG M=76 second vs. TG M=62 second), and reading tasks (DG M=77 second vs. TG M=56 second) while the Traditional group answered faster than the Technology group in writing tasks (DG M=383 second vs. TG M=562 second) as illustrated in Table 11.

After examining the results in Figure 8 and Table 11, two hypotheses H_{2a} and H_{2c} were supported, thus we can say that first grade students who were taught by using iPad in their Arabic language classes can read Arabic words and perform on cognitive assignments faster than other students who were taught by using traditional teaching methods. On the other hand, this hypothesis H_{2b} which states "First grade students in the Technology group taught by using iPad in their Arabic language classes would write Arabic words in post-test faster than other students in the Traditional group taught by using traditional teaching methods" was not supported. Thus, it was not accepted because the Technology group wrote Arabic words slower than the Traditional group in writing tasks.

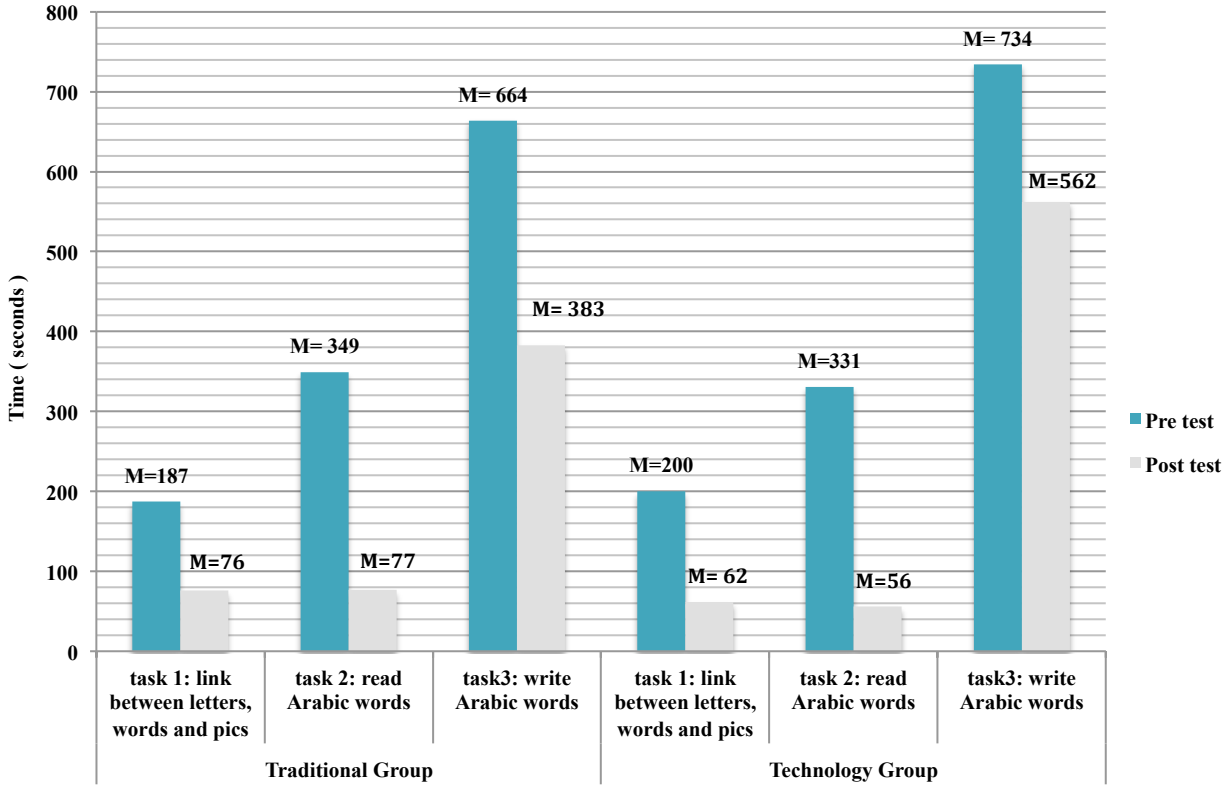

Figure 8: The average time taken by students to complete tasks in both tests

The Analysis of the Test Scores (Descriptive Statistics)

The Following are the analysis of each group individually (Technology group and Traditional group) and the analysis of each test individually (pre-test and post-test).

1. The Analysis of Scores and Time for the Traditional Group

Table 12 shows that, four paired *t*-test were conducted on the scores of students in the Traditional group in all tasks in pre-and-post tests in order to determine if there would be a difference between the scores of students in both tests. The results of *t*-test showed that there was extremely statistically significant difference between Traditional group's scores before and after

teaching Arabic language lessons by using traditional teaching methods within classrooms in cognitive tasks (t (14) = 9.553, $p > 0.0001$) & (t (14) = 7.595, $p > 0.0001$) and in writing tasks (t (14) = 5.666, $p > 0.0001$), and very statistically significant difference in reading tasks (t (14) = 3.897, $p = 0.0016$). This indicates that the Traditional group performed better in the post-test than in the pre test.

Also, three paired *t*-test were conducted on time that the Traditional group took to complete tasks in both tests in order to determine if there was a difference between time taken to complete tasks in the pre-and-post tests. The results of *t*-test showed that there was extremely statistically significant difference between time taken to complete all tasks in both tests: cognitive tasks (t (14) = 9.513, $p > 0.0001$), reading tasks (t (14) = 8.898, $p > 0.0001$), and writing tasks (t (14) = 6.221, $p > 0.0001$). This suggests that students in the Traditional group spent more time to answer all tasks in the pre-test.

		Pre test		Post-test		95% CI for Mean		
	Outcome	**M**	**SD**	**M**	**SD**	**Difference**	**t**	**df**
Scores	Cognitive tasks (scores)	1.68	1.05	5.55	1.33	-4.73, -2.99	9.553	14
	Cognitive tasks (the number of correct answers)	4.80	4.81	19.07	3.83	-18.30, -10.24	7.595	14
	Reading tasks	2.37	1.56	4.82	2.00	-3.78, -1.09	3.897	14
	Writing tasks	2.22	1.40	5.59	1.46	-4.68, -2.11	5.666	14
Time (Seconds)	Cognitive tasks	187.7	39.30	76.80	18.96	85.92, 135.94	9.513	14
	Reading tasks	349.0	115.2	77.47	26.34	209.0,334.2	8.898	14
	Writing tasks	664.67	119.6	383.20	102.35	184.4, 378.5	6.221	14

Table 12: Descriptive statistics (*t*-test results) for Traditional group's scores and time taken to complete tasks, * (The significance level is 0.05)

2. The Analysis of Scores and Time for Technology Group

As shown in Table 13, four paired *t*-test were conducted on the scores of students in the Technology group in all tasks in pre-and-post tests in order to determine if there would be a

difference between the scores of students in both test. The results of *t*-test showed that there was extremely statistically significant difference between Technology group's scores before and after teaching Arabic language lessons by using iPad within classrooms in cognitive tasks (t (14) = 25.2, $p > 0.0001$) & (t (14) = 21.9, $p > 0.0001$) and reading tasks (t (14) = 5.997, $p > 0.0001$), and statistically significant difference in writing tasks (t (14) = 2.483, $p = 0.0263$). They also indicate that the Technology group performed better in the post-test than in the pre test.

Also Three paired *t*-test were conducted on time that Technology group took to complete tasks in tests in order to determine if there would be a difference between time taken to complete tasks in the pre-and-post tests. The results of *t*-test showed that there was extremely statistically significant difference between time taken to complete cognitive and reading tasks in both tests: cognitive tasks (t (14) = 8.677, $p > 0.0001$) and reading tasks (t (14) = 12.213, $p > 0.0001$), and very statistically significant difference in writing tasks (t (14) = 3.9001, $p = 0.0016$). This indicates that student in Technology group spent less time to answer all tasks in the post-test.

		Pre test		Post-test		95% CI for Mean		
	Outcome	**M**	**SD**	**M**	**SD**	**Difference**	**t**	**df**
Scores	Cognitive tasks (scores)	1.55	0.82	6.82	0.24	-5.71, -4.81	25.22	14
	Cognitive tasks (the number of correct answers)	3.40	3.31	32.07	1.33	-21.59, -17.74	21.90	14
	Reading tasks	2.35	1.38	5.86	1.48	-4.76, -2.25	5.997	14
	Writing tasks	2.17	1.58	3.62	1.84	-2.69, -0.19	2.483	14
Time (Seconds)	Cognitive tasks	200.3	70.7	62.67	16.40	103.64,171.69	8.677	14
	Reading tasks	331.7	84.0	56.07	18.63	227.26, 324.08	12.213	14
	Writing tasks	734.20	101.0	562.87	111.90	77.11, 265.55	3.9001	14

Table 13: Descriptive statistics (*t*-test results) for Technology group's scores and time taken to complete tasks, * (The significance level is 0.05)

3. The Analysis of Pre-test Scores and Time for Both Groups

As shown in Table 14, four unpaired *t*-test were performed on two groups to determine if there would be a difference between the scores of both Technology group and Traditional group in the pre test. The results of *t*-test showed that there was no statistically significant difference between the two groups in cognitive skills (t (28) = 0.385, $p = 0.702$ & t (28)= 0.927, $p = 0.361$), reading skills (t (28) = 0.041, $p = 0.967$), and writing skills (t (28) = 0.081, $p = 0.935$). Which indicate the scores of students from both groups were convergent and comparable levels before studying Arabic language lessons.

Six independent groups *t*-test were also performed to determine whether there would be a significant difference between the time taken to complete tasks for the Technology group and the Traditional group. After the *t*-test was conducted in order to compare time taken to complete tasks from both groups, the test showed that there was no a significant difference between time taken by both groups to finish tasks in pretest: in cognitive tasks (t (28)=0.6031 $P= 0.551$), reading tasks (t (28)=0.4707 $P= 0.641$), and writing tasks (t (28)=1.720 $P = 0.096$).

Pretest	Test tasks	95% CI for Mean Difference	t	Traditional Group		Technology Group	
				M	SD	M	SD
Scores	Cognitive tasks (scores)	-0.57, 0.84	0.385	1.68	1.05	1.55	0.82
	Cognitive tasks (the number of correct answers)	-1.69, 4.49	0.927	4.80	4.81	3.40	3.31
	Reading tasks	-1.08, 1.12	0.041	2.37	1.56	2.35	1.38
	Writing tasks	- 1.07, 1.16	0.081	2.22	1.40	2.17	1.58
Time (Seconds)	Cognitive tasks	-55.3, 30.1	0.6031	187	39.30	200	70.73
	Reading tasks	-58.1, 92.7	0.4707	349	115.24	331	84.03
	Writing tasks	-152.3, 13.2	1.720	664	119.60	734	101.05

Table 14: The *t*-test conducted with using scores and time of both groups in the pre test. * (The significance level is 0.05)

4. The Analysis of Post-Test Scores and Time for Both Groups

The statistical analysis of the quantitative data was performed by using the unpaired *t*-test in order to test those hypotheses H_{3a}, $H_{3b,}$ and H_{3c} stated that there would be a significant difference between the post-test scores of the Technology group and the Traditional group in cognitive, reading, and writing tasks. It also used to tests those hypotheses H4a, H4b, and H4c stated that there would be a significant difference between the time that takes to complete a task for the Technology and Traditional groups in cognitive, reading, and writing tasks in post-test.

Post-test	Test tasks	95% CI for Mean Difference	t	Traditional Group		Technology Group	
				M	SD	M	SD
Scores	Cognitive tasks (scores)	-1.98, -0.55	3.622	5.55	1.33	6.82	0.24
	Cognitive tasks (The Number of correct answers)	-6.14 to -1.86	3.823	19.07	3.83	23.07	1.33
	Reading tasks	-2.36, 0.27	1.620	4.82	2.00	5.86	1.48
	Writing tasks	0.73, 3.22	3.249	5.59	1.46	3.62	1.84
Time (Seconds)	Cognitive tasks	0.87, 27.39	2.183	76	18.96	62	16.40
	Reading tasks	4.34, 38.46	2.568	77	26.34	56	18.63
	Writing tasks	-259.87, -99.46	4.588	383	102.35	562	111.90

Table 15: The *t*-test conducted with using the scores and time of both groups in post-test, * (the significance level is 0.05)

Table 15 shows that after two independent groups *t*-tests were performed to compare the scores of both groups in cognitive tasks in post-test to test this hypothesis H_{3c} stated that "There would be a significant difference between the post-test scores of the Technology group and the Traditional group in cognitive tasks," it seems that the result of *t*-test showed there was an extremely statistically significant difference between two groups in cognitive tasks ($t(28) = 3.6226$, $P = 0.0011$). It also indicates that students in the Technology group (M= 6.82, SD = 0.24) performed better than students in the Traditional group (M= 5.55, SD= 1.33) in cognitive tasks when comparing between the mean of scores. Two independent groups *t*-tests were also

performed to compare the number of correct answers of the Technology group and the Traditional group in cognitive tasks in post-test. The test showed and indicated that the difference between two groups was extremely statistically significant (t (28) = 3.823, *P* = 0.0007). Based on these results, the hypothesis H_{3c} was supported and accepted.

Furthermore, two independent groups *t*-tests were performed to compare students' scores in both groups in reading tasks in order to test this hypothesis H_{3a} stated this "There would be a significant difference between the post-test scores of the Technology group and the Traditional group in reading tasks." As unexpected, there was no a statistically significant difference between the performance of students in the Technology group and Traditional group in reading tasks (t (28) = 1.620, *P* = 0.1164) although the mean scores of the Technology group (N = 15, M= 5.86, SD = 1.48) was higher than the mean scores of the Traditional group (N = 15, M= 4.82, SD = 2.0). As a result, the research hypothesis H_{3a} was not supported.

Additionally, an unpaired *t*-test was conducted to compare students' scores between two groups in writing tasks in post-test in order to test also research hypothesis H_{3b} stated "There would be a significant difference between the post-test scores of the Technology group and the Traditional group in writing tasks." The *t*-test showed that there was a very statistically significant difference between the scores of students in the Technology group (M= 3.62, SD= 1.84) and the Traditional group (M = 5.59, SD= 1.46); t (28)= 3.249, *p* = 0.0030). The results of the *t*-test suggest that students in the Traditional groups performed better than students in the Technology group in writing tasks. This supports hypothesis H_{3b}, thus it was accepted by the researcher.

Also Table 15 shows that six independent groups *t*-tests were performed to test the research hypothesis $H_{4a,}$ H_{4b}, and $H4_{c}$ stated that there would be a significant difference between the time taken to complete a task for the Technology and Traditional groups in post-test in all three tasks: cognitive, reading, and writing. After conducting *t*-tests, it appears that there was a statistically significant difference between both groups in the time taken to complete each task: in the cognitive tasks (t (28)= 2.183 P = 0.0375), the reading tasks (t (28)= 2.568 P = 0.015), and the writing tasks (t (28)= 4.588 P > 0.0001). Based on results that indicate this significant difference, those research hypotheses H4a, H4b, and H4c were supported and accepted. Also the results of *t*-test suggest that the Traditional group spent more time than the Technology group to answer cognitive tasks (DG M=76 second vs. TG M=62 second), and reading tasks (DG M=77 second vs. TG M=56 second) while the Technology group took more time than the Technology group in writing tasks (DG M=383 second vs. TG M=562 second).

The Results of Analyzing the Interviews (Qualitative Data)

Interviews were conducted to get a better understanding of how both teachers and students use iPad in their Arabic classes. The interviews sought to discover the importance of using iPad in Arabic classroom, the preparation and management of classroom, iPads, and applications in the pilot program, what applications are used in teaching and learning process, and the advantages and disadvantages of using iPad in class and at home. Five teachers who teach using iPads in their first-grade Arabic classes (three of them taught during the Fall of 2015, and two of them taught using it before in 2014) were interviewed. Two parents whose children are taught by iPad in their classrooms and who use it at home were also interviewed. In order to protect the privacy of the participants, the names of interviewees have been changed (Appendix O and P).

The Importance of Using iPad in Arabic Classroom

> *"Before using iPads in classroom, I needed many devices such as a laptop and multimedia projector to present my presentation"*- teacher "Samira"
>
> *"It's amazing how I can present presentations by iPad and its apps only"* - teacher "Norah"

Before using the iPad in classrooms, teachers have used many technology devices such as desktop computer, laptops, projector, and others. However, they preferred to use the iPad device as an educational tool in their classes instead of other modern technology for many reasons. In the first place, they have sought to keep up with educational evolution in order to provide many great learning opportunities for the current generation students who prefer modern devices. Additionally, teachers were more comfortable with iPad because they can teach and deliver

information to students by using fewer devices and often only one device (iPad) and its applications.

> *"It's very lightweight…laptop computer and textbooks are heavier than iPad"* - teacher "Norah"
>
> *"Both iPad and laptop computer are mobile devices, but the iPad is lighter and thinner*" - teacher "Fatima"
>
> *"It's more than wonderful how my daughter can carry a small and light device 'iPad' which can loads many textbook, notes, and e-books instead of heavy bags"* - parent "Manal"

All teachers and parents agreed that when comparing iPad with other educational technology methods, the iPad seems very thin as well as lightweight and does not have peripherals, thus it is an easy device to carry and handle while storing all textbooks materials. Additionally, some teachers said that the size of it is largely similar to the size of school textbooks. They also believed that although iPhone is similar to iPad in its functions and applications, it is not fit to perform the educational tasks because of its small size and display screen. They preferred iPad more because it is a device consists of combination of many technology devices such as camera, voice recorder, and timer, and it can be connected easily and wirelessly via Wi-Fi or Bluetooth to other iPads to be used as virtual interactive whiteboard or a presentation tool.

> *"My students spend more time learning when they use iPad more than using laptops within the classroom"*- teacher "Hanan"
>
> *"My young students most often use the iPad more than half the class time*"- teacher "Shreya"
>
> *"Even though most students are not familiar with how to use iPad devices in first days of the semester, they have learned how to use it faster than I thought.*" - teacher "Fatima"

Last but not least, most teachers mentioned that students often used iPads for over half of the class time in Arabic classes, and that may be enough time to use iPad when comparing with other educational technologies. Last, they also said that the iPad is a device not requiring a prior high level of technology knowledge due to its easy use and simplicity of design. Also, because the iPad provides touch screen which provides high quality of view and countless educational applications which are very simple, easy, and effective for young students, this device can significantly help to implement enjoyable and educational environment more than using other technology.

The Preparation and Management of Classroom, iPads, and Applications

> *"Our school has provided an iPad device for each enrolled student on the experimental program in the beginning of the semester, and on the iPad there are many pre-installed apps that students may need to use in their classes and wherever they are"*-teacher "Norah"
>
> *"Every student has gotten her own iPad in this program."* - teacher "Shreya"

As teachers stated the school provided each student in first grade iPad to use inside and outside classes, and this iPad device came loaded with many educational applications installed by the IT department of school before starting classes. Although teaching by using iPad in classrooms is still an experimental program in the school, teachers were trained before starting using iPads in their classes. The school worked on saturating its facilities and classrooms with Wi-Fi access to allow students to access high-speed Internet wherever they are in the school, and it equipped classes with all desirable technology equipment such as smart interactive whiteboards,

headphones, and mobile carts. The class equipment was checked by the IT department as needed and before the beginning of the semester.

> *"Our IT department is responsible for maintaining iPads and solves any tech problem if it happens."*- teacher "Samira"

> *"We have gotten an Apple Configurator system which help us to set up iPads, install all needed iPad apps, and manage settings, as well as allow us to set restrictions such as disabling the option of changing the email account for student and disabling some particular apps like iTunes and Facetime."* - teacher "Hanan"

Students and teachers who enrolled in the program were not responsible for purchasing iPads and applications since the school has done it with the support of the Saudi ministry of education. However, if the student's iPad became damaged or broken, the parents of student would be responsible to fix damages because the parents' approval was obtained on that before giving their child a new iPad with a protected by cover and screen protector. Furthermore, students' iPads were maintained and received updated systems and applications in the beginning of study year, and these iPads were also managed by the IT department of the school, thus students could not purchase, download and delete any applications.

> *"The school bought the large quantity of some apps at a low cost by using Apple's Volume Purchasing Program"* - teacher "Shreya"

One of the greatest features of the iPad is that there are many impressive educational applications available for both students and teachers. These apps were purchased under supervision of the IT department of school based on the teacher's selection, and this selection depended on student and curriculum needs. For example, the teacher did not forget there might not be the Internet in some

students' homes, so the teacher tried to choose some extra apps did not require Internet in order to give students opportunity to use iPad in their learning if they were at their homes. Also, there was a specific budget to cover the cost of purchasing apps, so the school tried to control the cost of applications by using Apple's Volume Purchasing Program to reduce the cost.

How the iPad is Used in First Grade Arabic Language Classes

> *"Children love playing games without boredom"*- teacher "Samira"
>
> *"I was amazed how my students learn faster and their reading skills have hugely improved in a short time after using iPad apps"*- teacher "Shreya"

Teachers believe that teaching by using iPad in classrooms depends on two main aspects: subjects that are taught and the age of students who use iPad. The first aspect is that learning Arabic language seems easier with using iPad applications that provide the exciting methods of learning in these days. The second aspect is the younger students probably like to play more than study. When turning learning Arabic language into an enjoyable and exciting game, children would love playing games more and more while they are learning. According to Arabic teachers' perceptions, the iPad can play a big role in teaching younger students the Arabic Alphabet, especially when there are many impressive educational applications providing easy and enjoyable styles in teaching and learning. So, this could help students learn to read, speak, and write Arabic.

As teachers also mentioned, students used two main applications: Abjad and The Alphabet Letters with Naan & Lily in order to learn how to read and write the Arabic alphabet by providing two educational categories: learning and playing. In the learning category, students

were able to learn how to write Arabic letters by connecting dots to draw the letter and how to read letters by playing short song showing the letter followed by a word starting with that letter, see Figures 9,10, and 11. In the playing category, there are many different interactive games such as a game for arranging Arabic letters to build one word based on the displayed picture, a game for connecting letters to their appropriate pictures, a game for selecting the appropriate letter from many letters based on the displayed picture and word, see Figures 12, 13 and 14. The Lamsa and Nasser stories applications were mainly used in Arabic classes to provide two types of stories for students in the first grade. The first type is cartoon stories displayed in short video formats that contain text, animations, and audio. The second type is interactive stories that interact with the students to complete stories. The example of interactive stories as a teacher stated,

> "*The student can hear the full story by answering questions asked by the story, and if the correct answer is chosen, student will be stimulated by wonderful words like excellent and well done then the student can hear the rest of the story.*" - teacher "Fatima"

Figure 9: The Alphabet Letters with Naan & Lily application allowed students to learn how to read and write the Arabic alphabet

Figure 10: The learning category on Abjad application which helps students learn how to read letters by playing short song showing the letter followed by a word starting with that letter

Figure 11: The learning category on Abjad application which helps students learn how to write Arabic letters by connecting dots to draw the letter

Figure 12: The game on Abjad application for arranging Arabic letters to build one word based on the displayed picture

Figure 13: The game on the Abjad application for connecting letters to their corresponding pictures - with increasing difficulties of levels in the game

Figure 14: The game on Abjad application for selecting the appropriate letter from many letters based on the displayed picture and word - with increasing difficulties of levels in the game

It is amazing not only how this Lamsa app (see Figure 15) interacted with students but also changed the voices of people during the story, for example, the voice of a young child, an old man, woman, animals and other human sounds like crying and laughing and grunting. So, teachers thought that this kind of interactive stories promoted students' listening skills, enriched their cognitive and linguistic knowledge, developed their language, intellectual and creative abilities, and helped also students with dyslexia or reading challenges.

Figure 15: The example of one part of interactive story in Lamsa application: students can hear the story, see the text of story, and interact with displayed items if touched

All teachers agreed that the Eye Bag application (IEN) was used to provide Arabic language textbook in a PDF format "electronic copy" for both teachers and students, and it enabled them to highlight the text and add any page into the list of favorite pages. This textbook was used in classroom every day in order to keep teaching based on Arabic curriculum, discuss a few points of the lesson, do reading activities, and answer questions in activities with students. The Arabic textbook was also available for students on their iPads through this IEN application after downloading it, even if their iPads were not connected to the Internet, see Figure 16.

Figure 16. The Arabic language textbook available on the Eye Bag application (IEN)

Additionally, Nice Alphabet Lite and Write with me in Arabic applications were used by students to learn how to write Arabic alphabet in all forms and Arabic words too. The Write with me in Arabic application provided the fabulous feature that teachers or parents could type a specific word or sentence in the textbox and press on a write button. Then the word would appear grayed out in the writing board to allow students to learn how to write it, see Figure 17.

Figure 17. The pictures of Write with me in Arabic application allowed students to write Arabic Alphabet in all forms, words, and sentences.

Besides that, teachers said that gaming applications were used to encourage students to continue learning how to read and write Arabic alphabets as well as developing their cognitive skills and knowing the names of animals, colors, fruits, and vegetables. Examples of these gaming applications were Zee's Alphabet, Zee's Alife Ba, Yalla Huroof, Fun Arabic Learning For children, My Cheerful Letters, Haza Farkh, Nadia, and Kalematy. Furthermore, students could learn to spell Arabic words in interactive manner without even noticing it via the Iqraa Ma'a Momo application, see Figure 18.

Figure 18: Iqraa Ma'a Momo that is gaming application lets students to learn how to spell words by choosing the letters in order

Many helpful applications were used to keep track of student behaviors, actions, and achievements in the classroom, As well as, allowed teachers to record students' attendance and to communicate easily and quickly with students' parents via email, for instance, Teacher's Assistant Pro, iDoceo, and TeacherKit. Additionally, Casper Focus application was used by teachers to manage and have control over students' iPads during lessons in classrooms. Through

using that application, teachers easily restricted their young students to a particular application or website on their iPads. Thus, teachers easily got their students' attention and ensured that their students stayed and focused on particular websites and applications during class. As some teachers mentioned,

> *"This Casper Focus app gives me certain level of control over my students' iPads and makes the teaching process more effective"*- teacher "Fatima"
>
> "*it is pretty good when I am able to lock my students' iPads into a particular app…Before using the Casper Focus app, my classrooms sometimes turned into chaos and it was not easy to control classes for younger students with this modern technology."*- teacher "Hanan"

Furthermore, Microsoft PowerPoint, keynote, Nearpod and Prezi applications were used by teachers to create and view their interactive presentations including videos, quizzes, animations, and more. Besides that, Nearpod application was used to allow teachers to use the iPad as a presentation tool delivering the interactive content of the lessons which are synchronized across all students' iPads. Teachers also used cartoon applications such as Gulf Talk, Tellagami and Sock Puppets in order to create short videos with animated pictures, and these videos can be used to clarify some certain concepts in their lessons. They also played videos on YouTube for some lessons and browsed some interactive websites for children with students to support their learning such as Birds site and Alif-Ba-Ta educational site for children. Those sites provide for children many interactive stories in their libraries, many educational games to teach the alphabet in various forms and also the basics of reading and writing, with the ability to form short sentences.

Teachers used iPad applications not only for teaching but also for organizing and controlling activities and the classroom. For example as some teachers mentioned, the Classroom Timer Lite

application was used as a timer for tasks in an exciting and fun way, and the Too Noisy Pro application was used to keep the noise level in the classroom under teacher's control. The app would show a smiling face to the class if the level of noise is admissible, and if not, the sad face would be displayed.

Two teachers described how students were tested on short quizzes once every week on Nearpod or sometime on Socrative application which enables teachers not only to create test but also immediately see their students' answers and grades. Teachers also could give immediate feedback to their students by Nearpod applications. Often, many applications were used in one activity in the classroom for example as mentioned,

> "*After my students hear the story on the Lamsa app, they express their thoughts and feelings about the story in one sentence by typing it and shared via Splashtop Whiteboard app"* - teacher "Hanan"

> *"My students have a homework assignment to repeat letters in different forms every week. I asked my students to rewrite a sentence three times"*- teacher "Shreya"

> *"Paper tasks are given each week in order to write few sentences about their opinions and feeling regarding the particular topic"* - teacher "Hanan"

Additionally, teachers did not use iPad only but also some traditional teaching activities such as using paper tasks each week in order to give their students opportunities for writing one or two sentences, repeating words or Arabic letters in different forms: the letter in the beginning of word, the middle of word, and the end of word.

In addition to teaching and organizing lessons, teachers also used Dropbox, Google Drive, and Box applications on their iPads to store and view any kind of files, such as photos, videos and

others for lessons, and assignments at any time from any location while the Internet was available. They were also able to share with other teachers if needed. To see the list of all applications used by both teachers and students for the first grade Arabic language class, see Table 21 in appendix S.

The Advantages of Using iPad in First Grade Arabic Language Classes

Teachers said that immediate feedback was provided continuously and in different manners for first-grade students by many educational applications, such as Zee's Alif Ba, The Alphabet Letters with Naan & Lily, Iqraa Ma'a Momo and others. This kind of feedback encouraged students to revise their answers to get correct answers in order to seamlessly move to the next level of a game or challenge, thus young students efficiently and correctly learned how to read, spell and write Arabic alphabets without for waiting feedback from their teachers or parents. Here are examples given by teachers,

> "*When students tried to write a certain letter such as A, and in case they've not written it incorrectly, the Zee's Alphabet app would keep telling them to try again in a positive and enthusiastic manner until they've done it well and correctly. Students were then rewarded with playing a game or song about that letter"*- teacher "Fatima"
>
> *"When my students played the game on Abjad app on how to spell one word by choosing appropriate letters to create the word, if they chose the wrong letter, the immediate feedback was given to students (it is the wrong character, try to find the correct one), so they tried with other letters.*" - teacher "Hanan"

All teachers agreed that the use of interactive educational applications helped to keep young students totally encouraged to learn reading and writing easily during playing time without boredom, thus their linguistic and writing skills developed faster due to interactive learning. For example, as a teachers said,

"*My students have used Lambs or Nasser-stories app which read aloud an interactive story. While they were using these apps to hear a story, they were paying more attention to the story and bent towards their iPad screens when it was glowing, or to follow story characters via the narrative, and to choose and press on characters and items to move and hear audio clips such as laughter, crying and other voices."* - teacher "Hanan"

"IPad is an effective way allowing my students to access the educational content anytime, for example, the IEN app can provide the electronic version of the school books" -teacher "Shreya"

"Students can play how to arrange Arabic letters of one word by Abjad app or by other games which support their learning process at anytime and anywhere" - teacher "Hanan"

Another benefit that teachers pointed out was that students got immediate access to the educational content of applications and Arabic-language textbook at anytime and from any location at school. So, this encouraged students to learn more when the learning content was available to them. Two teachers said that the providing gaming applications on the iPad played a big role not only to improve and develop students' reading and writing skills but also other important skills such as eye-hand coordination by tracing or linking Arabic letters with appropriate pictures. Along with improving students' skills, shy students became more confident while they proceed to higher levels in the gaming applications by themselves, as mentioned by one teacher. Teachers have also used many applications during lessons to improve their teaching strategies and provide many fun styles for delivering information and getting students' attention such as playing animation videos, showing interactive stories, and playing games. In other words, because of the diversity of educational applications, teachers use many different entertaining styles for delivering desired information readily as well as reducing students' distraction during the lesson.

"*Instead of turning pages, I can easily search for the wanted information in the textbook on iPad"*- teacher "Norah"

"By using the IEN app, my students can reach and read their school textbooks everywhere in classroom, at home, or on the bus even if without access of the Internet"- teacher "Fatima"

"No worry again about carrying a heavy bag"- parent "Amjad"

Finally, both teachers and parents agreed that providing an electronic copy of the Arabic textbook helped all of students, teachers, and the school. For students, there was no need to carry school textbooks anymore, especially when the iPad replaced all of them. As for the school, it saved more money when it stopped providing the physical copies of textbooks. Not only that, but both teachers and students could easily access the electronic copies of textbook from any place at any time on their iPads.

The Challenges and Disadvantages of Using iPad in First Grade Arabic Language Classes

"*My students can type and spell words on iPad, but when they try to write on paper, they face a hard time ... Most students cannot easily write by using a pencil and paper"*- teacher "Fatima"

"My daughter has been taught by using iPad in her Arabic class. Her handwriting looks so bad, and she usually takes a long time even if with a short sentence" - parent "Amjad"

"I feel that my daughter's reading skill is pretty excellent after using iPad apps, but if we talk about her writing skill it seems very poor" parent - "Manal"

Both teachers and parents agreed that the greatest drawbacks of using iPads in Arabic classes might be creating a generation of young students unable to write Arabic easily and fluently when writing on paper because they usually use their fingers to interact and write on iPad applications. So, they may lose many opportunities to learn and practice how to hold a pencil and write by it properly at that young age, or they may learn to hold the pencil incorrectly when they may not have enough practices handwriting. As it will likely be harder for them to change the pencil grip when they are older, they need to start learning handwriting early.

Another problem is that the number of educational iPad applications for Arabic language class is limited. Although some applications are used to learn how to read and write the Arabic Alphabet and spell Arabic words, there are not enough applications that provided a feature allowing students to learn to write full Arabic sentences. Also, there is not an application designed based on the Arabic curriculum, thus teachers spent more time to prepare for their lessons and chose appropriate strategies and applications which support their lessons within classroom as teachers mentioned below,

> "*Usually I spend around two to three hours to prepare for my lessons, and choose certain apps to use during class because there is no particular app for this class"*- teacher "Shreya"
>
> *"If there was an application that totally support the Arabic class, it would be better."* - teacher "Fatima"

As teachers mentioned, young students preferred playing on their iPads more than talking and playing with classmates even if during break time. So, teachers believed that although young students learned Arabic Alphabet and words enthusiastically on iPad applications while playing, without even noticing it, the iPad might reduce the social communication and deprive students of

experiences that develop the physical skills. Thus they may lose the opportunity to learn the needed skills at their ages. Parents also agreed with teachers when one of them expressed that her daughter seldom played with her toys after getting the iPad. Another problem, parents also expressed their concerns about negative health effects of using iPad on their children who love using iPad the most time at home and school. For example as one parent said after her daughter used the iPad for long time during school days, her daughter's vision became weak, so she had to wear glasses to see better. Another example as one parent said,

> *"I'm really concerned about staying my daughter a long time on iPad. Although she learned Arabic Alphabet when she spent the most of her time on her iPad without boredom, but she suffered sometimes from headache."* - parent "Amjad"

Last, teachers expressed their opinions about how a lack of getting adequate training on how to use the iPad device or some new iPad applications could cause a real problem for teachers who did not have enough experience using iPad. As all teachers reported, they got training on how to use some iPad applications, but if the school assigned a new application to use, and they did not know how to used it. They may keep using other applications which they familiar with. For example, as one teacher said, she usually used the Keynote and Prezi applications to teach, but after the school asked teachers to use Nearpod app, she faced a difficulty to teach by using the application because she did not know how to use it in the first place. Additionally, as mentioned by three teachers, one challenge that school faced is that it cannot send many teachers to get training in the same time, especially when there are classes need to be taught. In other words, it seemed a problem for school if it decided to train many teachers in the same period because there would be a lack of teachers who usually teach students in classes. Also based on teachers' perceptions, teacher's role and experience in teaching by iPad play an important role in adopting

the iPad as a teaching tool in education within classrooms. So teachers need to train well how to used iPad and its applications. Otherwise, this kind of teachers untrained well could negatively affect the educational progress and, thus both teachers and students would fail achieving the study goals and to get the desired benefits of using iPad.

Chapter 5

Discussion

The purpose of this study was to explore and investigate the impact of using iPad on first grade students' skills and achievements in Arabic language classes, to explore the teaching strategies used by teachers, to know the advantages and disadvantages of using iPad inside and outside an Arabic classroom, and to know also the challenges of using it in a classroom. After the researcher addressed and studied twelve research questions, (Nine of them were supported while three were not supported as seen in Table 16 below,) the study findings revealed the following:

The iPad and its Applications Created Very Notable Progress in Students' Cognitive and Reading skills

This study intended to understand how first grade students progressed in their reading, writing, and cognitive skills in an Arabic language classes while using iPad as a teaching and learning tool. The findings of the study showed that students in the Technology group who were taught and learned Arabic through using iPad applications performed better and faster than students in the Traditional group in reading and cognitive tasks in the post-test. Figure 8 shows that the mean time taken to complete cognitive and reading tasks of the Technology group (cognitive M= 62 and reading M=56) in post-test was lower than the mean time taken to complete cognitive tasks of the Traditional group (cognitive M= 76 and reading M=77). Also, the sample *t*-tests showed that there was a statistically significant difference between the time taken to complete tasks of both groups in cognitive and reading tasks (cognitive $P = 0.03$ and reading $P = 0.01$).

Figures 4 and 6 show that the average scores of the Technology group in post-test (cognitive M=6.8 and reading M=5.86) was higher than the average score of the Traditional group (cognitive M=5.5 and reading M=4.82). Additionally, most students in the Technology group got the highest scores in cognitive and reading tasks. Table 8 showed that 60% of student participants from Technology group got the highest score in cognitive task while only 20% of them in the Traditional group got that score. Table 9 showed that 40% of students in the Technology group got the highest score while 33% of them in the Traditional group got that score. Beside this, 6% of students in the Traditional group got the lowest score 1 (extremely poor) while there was no student in the Technology group getting that score. Additionally, the sample *t*-tests showed that there was a very statistically significant difference between the scores of both groups in cognitive tasks $P = 0.0011$, and not in reading tasks $P = 0.1164$. Although there was no very significant difference between the scores of students in both groups in reading tasks, Both teachers and parents agreed that reading skills of young students who were taught using iPad were good, and they also noticed that students continued learning how to read Arabic without boredom with this new tool. Beside that, the percentage of students in the Technology group who answered correctly reading tasks in post-test was higher than the percentage of students in the Traditional group.

Most results indicate that the Technology group performed better and faster than the Traditional group in reading and cognitive tasks. We can say that using the iPad and its Arabic language learning applications improved students' reading skills and cognitive skills (such as remembering, understanding, and applying) in a better and more convenient method within classrooms and at home. So, young students could think and apply cognitive skills in Arabic and

read Arabic vocabulary well because they had many opportunities to practice with many various applications on how spell and pronounce words, link between letters with pictures and words, place a letter in correct shape in beginning, middle, or end of word, and others learning styles. That also helped students to memorize and remember the countless number of Arabic vocabulary at their own practices. In other words, the iPad applications largely helped students to know the basics of how to read Arabic and improved their cognitive skills in Arabic properly.

Hypothesis		The result
H_{1a}	The percentage of students in the Technology group who get the highest scores in reading tasks in post-test is higher the percentage of students in the Traditional group.	Supported
H_{1b}	The percentage of students in the Technology group who get the highest scores in writing tasks in post-test is higher the percentage of students in the Traditional group.	Not-Supported
H_{1c}	The percentage of students in the Technology group who get the highest scores in cognitive tasks in post-test is higher the percentage of students in the Traditional group.	Supported
H_{2a}	Technology group reads Arabic words faster than Traditional group in post-test.	Supported
H_{2b}	Technology group writes Arabic words faster than Traditional group in post-test.	Not-Supported
H_{2c}	Technology group answers Arabic cognitive tasks faster than Traditional group in post-test.	Supported
H_{3a}	Significant difference between the post-test scores of both groups in reading tasks.	Not-Supported
H_{3b}	Significant difference between the post-test scores of both groups in writing tasks.	Supported
H_{3c}	Significant difference between the post-test scores of both groups in cognitive tasks.	Supported
H_{4a}	Significant difference between the time taken of completing a task for both groups in reading tasks in post-test.	Supported
H_{4b}	Significant difference between the time taken of completing a task for both groups in writing tasks in post-test.	Supported
H_{4c}	Significant difference between the time taken of completing a task for both groups in cognitive tasks in post-test.	Supported

Table 16: The summary of hypotheses based on results of the study

The Teaching and Learning Styles that Completely Depended on the Use of the iPad may Weaken Writing Skills of First Grade Students

Figures 7 and 8 showed that students in the Traditional group performed better and faster than students in the Technology group in writing tasks in the post-test according to their average scores (Traditional group M= 5.59 vs. Technology group M= 3.62) and average performance

time (Traditional group M=383 second vs. Technology group M=562 second). As well, Table 10 showed that 20% of students in the Technology group got the lowest score 1 (extremely poor) in writing tasks while there was no a student in the Traditional group earned that score. Also, 33% of students in the Traditional group got the highest score while 6% only of them in the Technology group got it. Moreover, the sample *t*-test showed that there was a significant difference between mean scores of both groups ($p = 0.0030$) in writing tasks. This means that writing skills of students who use papers and pencils are better than skills of students who use the iPad primarily to learn writing. On other hand, although using the iPad and its educational applications in an Arabic language class can improve some skills of students such as how to spell and read Arabic words properly, it may negatively affect their handwriting skills because of two main reasons. First, students used their fingers to write Arabic letters and words on iPad applications that supported handwriting. Second, it may seem that teachers did not give their students enough writing exercise requiring writing by hand. In other words, students taught by using iPad may face a difficulty to use pencils to write on papers because they do not have enough practice holding a pencil and writing with it. So, teachers should use iPad along with some traditional teaching styles for some writing activities, such as the use of paper and pencil in writing assignments. As a result, this could improve young students' handwriting skills.

The iPad is an Effective Educational Tool in Arabic Language Classes

The effectiveness of iPad teaching depends on the applications and teaching methods used. This study revealed that when students' iPads were under control by their teachers during lessons, students focused on particular applications and websites. This reduced the distraction of students and made them more engaged in the lesson. Additionally, when blocking students from

downloading new applications on their iPads, they used and focused on particular applications within classrooms and at home. This made students likely spend their time using appropriate applications which enhanced their education and what they needed to learn in first grade.

Also, teaching by using iPad created an exciting learning environment due to the used educational applications which provided the teachers diverse teaching styles for delivering information easily and getting students' attention within classrooms. Furthermore, when Arabic language learning applications (such as, Abjad, Naan & Lily, Zee's Alif Ba, Iqraa Ma'a Momo and others) provided immediate feedback continuously for young students in first grade, they efficiently and properly learned how to read and spell Arabic alphabets and words at their own pace. As well, they understood Arabic vocabulary and words better when they were often able to see a picture for each word through applications used.

In addition, students learned faster and easier how to read and spell Arabic letters and words when they could easily and immediately access the content of educational applications at anytime and from anywhere, whether at home or school. Also, using interactive educational applications that provide immediate feedback and immediate educational content resulted in increasing the learning motivation of students and encouraging them to develop their self-study habits. This means that learning has become not limited to in-class lessons with using iPad in education.

Providing the iPad for Each Student Resulted in Less Social Interaction

While the iPad is an effective tool in teaching and learning, it may lead to weakening communication and cooperative skills. These skills are very important for students to exchange information and knowledge, share opinions about specific subjects, and communicate with their teachers and classmates. In other words, providing iPads to young students to use from anyplace and at anytime could reduce students' relationships with others, thus they become less socially interactive, and may lead to a pattern of isolation at school and home. So, teachers should take into consideration that the social interaction and communication with others are patterns of behavior that should be encouraged and developed at early an age. Also, early behavioral intervention (such as, putting students in small groups and letting them work together on one iPad) can help young students to improve communication and cooperative skills.

Chapter 6

Conclusion and Future Work

Using the iPad in education has become more prevalent these days due to its many enticing features that motivate many educators and teachers to integrate this device into the classroom environment. In fact, the effective use of the iPad in classrooms depends on the age of students who are using iPads, and on the subjects taught in classes. So, the iPad device was found to be to be an effective tool in teaching and learning in Arabic language classes for young students in this study, and it had a positive impact on their performance and their skills such as reading, spelling, and comprehension. On the other hand, it may not improve students' handwriting skills well if they learned writing letters and words by using their fingers on iPads instead of using a stylus most of the time, especially when students are at young age and need to learn how to hold pencil to write by it properly. Finally, the iPad may also result in less social interaction between students. However, the results of this study may not be generalized because of some limitations.

The Limitations of the Study

There were a few limitations in this study. The first limitation was the geographical aspect where the study focused on one school which used the iPad in the western region of Saudi Arabia. The second limitation was small sample size; only fifteen students taught by using iPad as a teaching and learning tool were involved in the study. Another limitation was that all teachers who were interviewed were from one school. The last limitation was the tight time frame that was used to conduct the study (13 weeks - in the first semester) in order to collect the data. After highlighting the limitations of the study, it can be clear that the results of this study are limited to involved

student participants and the school environment in which the study took place. It is worth noting that all students who participated in the tests were fully able and in good health without any physical disabilities, visual deficits or hearing loss, thus the results of the study are not to be generalized on students with disabilities. Also, all these limitations should take into consideration when running similar future research. It is important to note that their results might vary as a result of the change of the applications used in instruction, school environment, and student participants. However, if there were specific applications developed and designed to the first grade Arabic language curriculum, and used by teachers in Saudi schools that have a similar environment, their results may be generalized.

Recommendations

The following are recommendations that may improve using iPad in first grade Arabic language classes:

1. Students should be provided Apple pencils or styluses and be asked to use those pencils while writing Arabic on iPad applications that support handwriting. This would help young students to have more practice holding a pen and writing with it.

2. Teachers should use more traditional teaching styles along with using iPad for some writing activities, such as giving students handwriting assignments to finish in class and at home everyday, so their handwriting skills would improve.

3. Teachers should sometimes use collective teaching and learning activities (such as dividing students into small groups to work together on activities). This would help to create the kind of communication and conversations between students thus their communication and cooperative skills would improve.

4. Online training to teachers should be provided by using video tutorials on how to use iPad for certain applications in classrooms before using it in the teaching process. This may train many teachers without leaving their jobs, classes, and students.

5. The school should work to provide interactive textbooks that can encourage elementary students to learn without boredom.

6. Finally, the Saudi educational ministry and the school should take into account that before adopting the iPad as a teaching and learning tool within Arabic language classrooms in schools, they should conduct more research to determine guidelines in order to design and create the interactive educational applications that fit with the Arabic language curriculum and students' needs. This research would also help developers and designers to know what they should focus on when building those applications for Arabic language classes. As well, they should conduct more research about the impact of using the iPad on long term learning outcomes.

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Appendix A – IRB Form C

R·I·T

Rochester Institute of Technology

RIT Institutional Review Board for the
Protection of Human Subjects in Research
141 Lomb Memorial Drive
Rochester, New York 14623-5604
Phone: 585-475-7673
Fax: 585-475-7990
Email: hmfsrs@rit.edu

Form C
IRB Decision Form

TO: Jawaher Alsulami

FROM: RIT Institutional Review Board

DATE: **August 11, 2015**

RE: **Decision of the RIT Institutional Review Board**

Project Title – Effects of Using iPad on Studnets' Achievements in Arabic Language Classes in Saudi Schools

The Institutional Review Board (IRB) has taken the following action on your project named above.

☒ Approved, no greater than minimal risk

Now that your project is approved, you may proceed as you described in the Form A. **Note that this approval is only for a maximum of 12 months; you may conduct research on human subjects only between the date of this letter and August 11, 2016.**

You are required to submit to the IRB any:

- **Proposed** modifications and wait for approval before implementing them,
- Unanticipated risks, and
- Actual injury to human subjects.

Return the Form F, at the end of your human research project or 12 months from the above date. If your project will extend more than 12 months, your project must receive continuing review by the IRB.

Continuing review of research and approval of research studies is required so long as the research study is ongoing, that is, until research-related interactions and interventions with human subjects or the obtaining and analysis of identifiable private information described in the IRB-approved research plan have been completed.

Investigators are responsible for submitting sufficient materials and information for the IRB to meet its regulatory obligations, and should follow the institutional policies and procedures for continuing IRB review of research that are required by HHS regulations at (45 CFR 46.103(b)(4), 45 CFR 46.109(e), 45 CFR 46.115(a)(1)) as appropriate to the research activity.

Heather Foti, MPH
Associate Director
Office of Human Subjects Research

Revised 02.09.2011

Appendix B – The Test

The Test (Three Tasks)

Task 1:

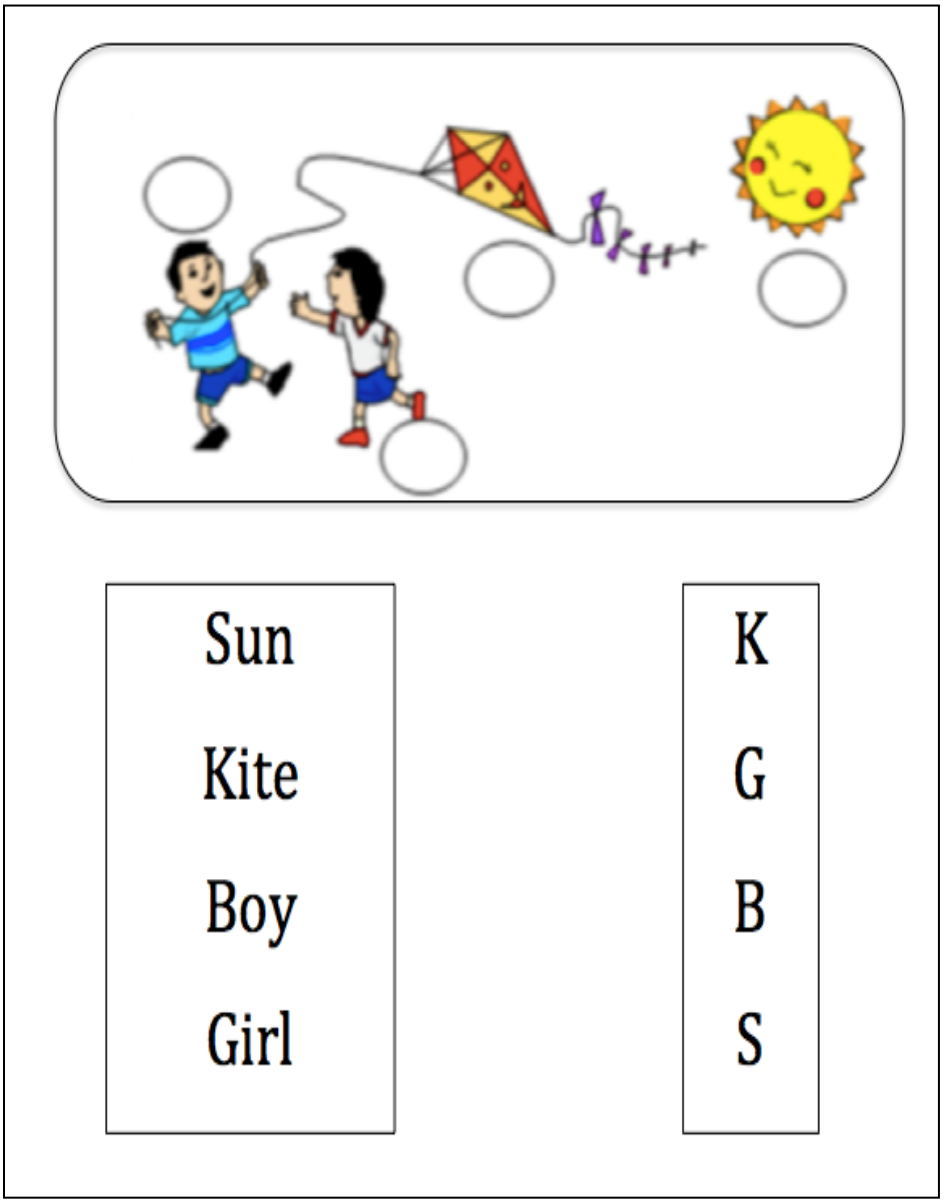
The first section:

Script: in this task you can see there are four pictures in the upper part, four words in the box on the left side of the bottom part, and four characters in the box on the right side of the bottom part in each section. Now Put the first letter from the word that describes the picture on the circle that is beside the picture and draw a line between each word and character that the word starts with it.

Questions:

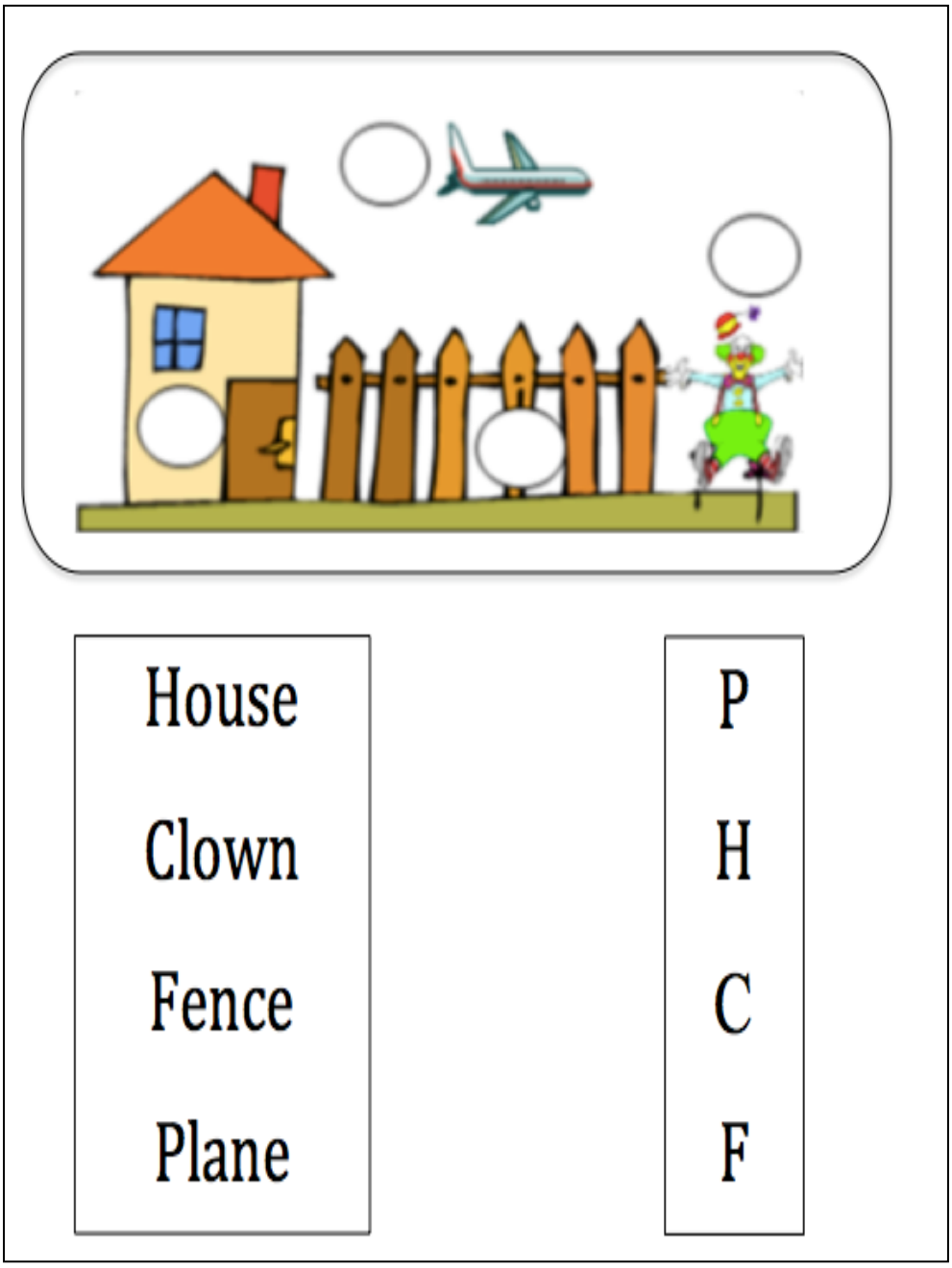
Do you understand this task?

Do you have any questions before starting?



The second section:
Script: in this task, you can see there are four pictures in the upper part, four words in the box on the left side of the bottom part, and four characters in the box on the right side of the bottom part in each section. Now Put the first letter from the word that describes the picture on the circle that is beside the picture and draw a line between each word and character that the word starts with it.

Questions:
Do you understand this task?
Do you have any questions before starting?



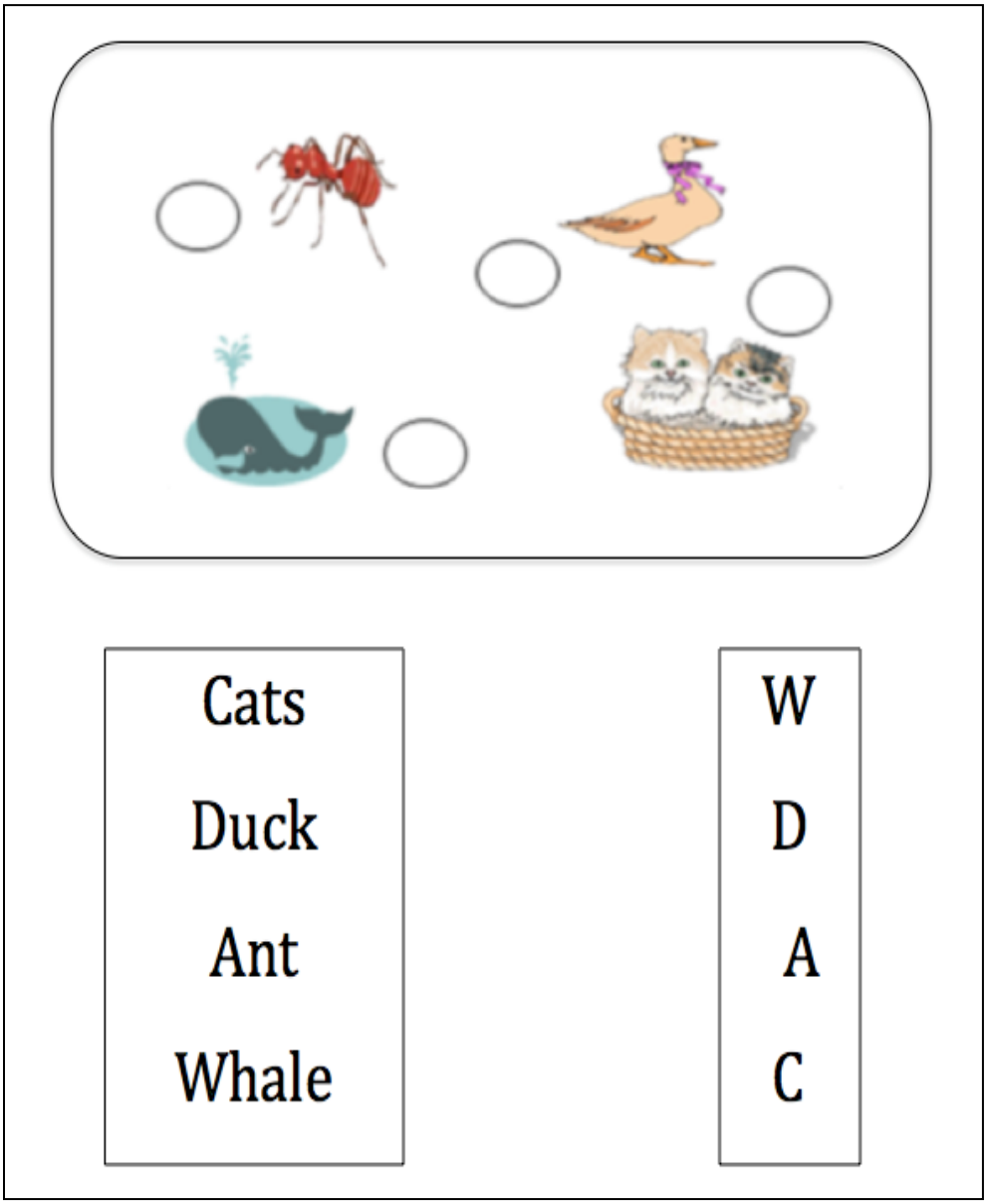
The third section:

Script: in this task you can see there are four pictures in the upper part, four words in the box on the left side of the bottom part, and four characters in the box on the right side of the bottom part in each section. Now Put the first letter from the word that describes the picture on the circle that is beside the picture and draw a line between each word and character that the word starts with it.

Questions:

Do you understand this task?

Do you have any questions before starting?



Task 2:

Script:
In this task you will read some words loudly: one word, two words, and then a couple of words in one sentence.

Questions:
Do you understand this task?
Do you have any questions before starting?

- Books.
- Happy life.
- The shiny sun is in the sky.

Task 3:

Script:
In this task you will write some words as you can them below: one word, two words, and then a couple of words in one sentence.

Questions:
Do you understand this task?
Do you have any questions before starting?

- Books.

- Happy life.

- The shiny sun is in the sky.

Appendix C – Interview questions

Interview questions

Interview questions for Arabic teachers:

1. Since when have you been used the iPad in your classes?
2. Why did you choose iPads to teach in classrooms and not laptops or other devices?
3. Which model of iPad do you use?
4. How do you usually use iPad to teach students in your class?
5. Which applications do you use regularly to teach and control students within class?
6. How are you going to manage that many devices in classrooms?
7. Do your students abandon Arabic textbooks completely? If not, which subjects and tasks are continued to use textbooks?
8. How are you going to store things on the iPad?
9. How are you going to communicate with your students on the iPad?
10. How do you and your students obtain iPads at home?
11. What do you do with students who do not have Wi-Fi at home, so they do not have chance to use iPad in order to learn? In other words, what are you able to do for students who do not have Internet access at home?
12. How can you afford all of this technology?
13. How are you going to buy iPads and apps?
14. How do you control the cost of apps?
15. Who is going to pay for the iPads if they break?
16. Do we need insurance for iPads?
17. What benefits of using the iPad in Arabic language class?
18. What problems that you and your students may face when using iPad in classes?
19. What are the greatest drawbacks of using iPads instead of conventional textbooks?
20. What is the biggest challenge you have faced since you teach by using iPad in classes?
21. What stuff do you like about using iPad?
22. What advices you would give other teachers who starting using iPad in class?

Interview questions for parents:

1. Since when has your child used iPad in classes and at home?
2. Which model of iPad does your child use?
3. Which applications does your child use regularly to learn Arabic language and do homework?
4. How does your child use the iPad at home?
4. What challenges and problems that your child may face when using iPad in learning and may affect their education skill negatively?
5. If there is no Wi-Fi at your home, how does your child get benefits of the iPad?
6. What do you think about your child's cognitive, writing, reading, and skills when learned by using IPad?
7. Who is going to buy the iPad and its apps? School or you?
8. If you are responsible to buy iPad, how can you afford this technology?
9. Who is going to pay for the iPad if it breaks?
10. What are benefits of using the iPad to learn Arabic language in general?
11. What are the greatest drawbacks of using iPads instead of conventional textbooks?

Appendix D– The Assessment Guideline (rubric)

	Extremely poor (1)	Very Poor (2)	Slightly poor (3)	Neutral (4)	Slightly Good (5)	Largely Good (6)	Extremely Good (7)
Cognitive (Task 1)	Unable to recognize an Arabic letter, word, and picture and link between them	Able to recognize one Arabic letters, word or picture and link between them	Able to read two Arabic letters, word or picture and link between them	Able to recognize a few Arabic letters, word and picture, and link between them	Able to recognize some Arabic letters, word and picture and link between them.	Able to recognize most Arabic letters, word and picture, and link between them.	Able to recognize all Arabic letters, word and picture, and link between them.
Reading (Task 2)	Unable to read any Arabic letter	Able to read few Arabic letters only	Able to read some Arabic letters only	Able to read all Arabic letters and not able to read a Arabic word	Able to read all Arabic letters fluently but not a Arabic word	Able to read Arabic words but with hesitation and not fluently	Able to read Arabic words fluently without hesitation
Writing (Task 3)	Unable to write any Arabic letter	Able to write few Arabic letters In the basic form only	Able to write some Arabic letters In the basic form only	Able to write Arabic letters in some forms (beginning, middle, or end of word shape)	Able to write Arabic letters in all forms and word (in slightly good shape)	Able to write Arabic words (in largely good shape)	Able to write Arabic words correctly (in extremely good shape)

Table 17: The used Assessment guideline of the evaluation

Appendix E – Observations and Notes Sheet

Participant ID: _____ **Date: _____**

Observation and Note Sheet

Task 1:

The first task is consisted of three parts, and in each part, students will be asked to draw a line between each image and a word which describes that picture and to also draw a line between the word and character which the word starts with it.

1. How would you rate the student's cognitive skill to link between picture, word and character?

Extremely poor	Very Poor	Slightly poor	Neutral	Slightly Good	Largely Good	Extremely Good
1	2	3	4	5	6	7

Task results:

Number of mistakes	Time to perform task	Outcome (Success/failure)	Notes (e.g. reasons for failure)

Reliance on asking help to perform task: ___ Low ___ Moderate ___ High

Participant's comments/questions:

_____

_____

_____

Notes/Observations:

_____

_____

_____

2. How would you rate the student's cognitive skill to link between picture, word and character?

Extremely poor	Very Poor	Slightly poor	Neutral	Slightly Good	Largely Good	Extremely Good
1	2	3	4	5	6	7

Task results:

Number of mistakes	Time to perform task	Outcome (Success/failure)	Notes (e.g. reasons for failure)

Reliance on asking help to perform task: ___ Low ___ Moderate ___ High

Participant's comments/questions:

_____
_____
_____

Notes/Observations:

_____
_____
_____

3. How would you rate the student's cognitive skill to link between picture, word and character?

Extremely poor	Very Poor	Slightly poor	Neutral	Slightly Good	Largely Good	Extremely Good
1	2	3	4	5	6	7

Task results:

Number of mistakes	Time to perform task	Outcome (Success/failure)	Notes (e.g. reasons for failure)

Reliance on asking help to perform task: ___ Low ___ Moderate ___ High

Participant's comments/questions:

_____
_____
_____

Notes/Observations:

_____
_____
_____

Task 2:

In the second task, young students will be asked to read loudly some Arabic words in order to measure their reading skills. This task is consisted of three parts that measure how the ability of young students in the first grade on reading the one word, two words, and full sentence consisted of many words.

1. **How would you rate the student's reading skill to read the Arabic word (Books) in task 2 part 1?**

Extremely poor	Very Poor	Slightly poor	Neutral	Slightly Good	Largely Good	Extremely Good
1	2	3	4	5	6	7

Task results:

Attempt #	Time to perform task	Outcome (Success/failure)	Notes (e.g. reasons for failure)

Reliance on asking help to perform task: ___ Low ___ Moderate ___ High

Participant's comments/questions:

_____

_____

_____

Notes/Observations:

_____

_____

_____

2. How would you rate the student's reading skill to read the two Arabic words (Happy life) in task 2 part 2?

Extremely poor	Very Poor	Slightly poor	Neutral	Slightly Good	Largely Good	Extremely Good
1	2	3	4	5	6	7

Task results:

Attempt #	Time to perform task	Outcome (Success/failure)	Notes (e.g. reasons for failure)

Reliance on asking help to perform task: **___ Low** **___ Moderate** **___ High**

Participant's comments/questions:

_____
_____
_____

Notes/Observations:

_____
_____
_____

3. How would you rate the student's reading skill to read the Arabic sentence in task 2 part 3?

Extremely poor	Very Poor	Slightly poor	Neutral	Slightly Good	Largely Good	Extremely Good
1	2	3	4	5	6	7

Task results:

Attempt #	Time to perform task	Outcome (Success/failure)	Notes (e.g. reasons for failure)

Reliance on asking help to perform task: **___ Low** **___ Moderate** **___ High**

Participant's comments/questions:

_____
_____
_____

Notes/Observations:

_____
_____
_____

Task3:

In the third task, young students will be asked to write some Arabic words in order to measure their writing skills. This task is consisted of three parts that measure how the ability of young students in the first grade on writing the one word, two words, and full sentence consisted of many words.

1. **How would you rate the student's writing skill to write one Arabic word (Books) in task 3 part 1?**

Extremely poor	Very Poor	Slightly poor	Neutral	Slightly Good	Largely Good	Extremely Good
1	2	3	4	5	6	7

Task results:

Attempt #	Time to perform task	Outcome (Success/failure)	Notes (e.g. reasons for failure)

Reliance on asking help to perform task: ___ Low ___ Moderate ___ High

Participant's comments/questions:

_____

_____

_____

Notes/Observations:

_____

_____

_____

2. **How would you rate the student's writing skill to write two Arabic words (Happy life) in task 3 part 2?**

Extremely poor	Very Poor	Slightly poor	Neutral	Slightly Good	Largely Good	Extremely Good
1	2	3	4	5	6	7

Task results:

Attempt #	Time to perform task	Outcome (Success/failure)	Notes (e.g. reasons for failure)

Reliance on asking help to perform task: ___ Low ___ Moderate ___ High

Participant's comments/questions:

_____
_____
_____

Notes/Observations:

_____
_____
_____

3. **How would you rate the student's writing skill to write the Arabic sentence (The shiny sun is in the sky) in task 3 part 3?**

Extremely poor	Very Poor	Slightly poor	Neutral	Slightly Good	Largely Good	Extremely Good
1	2	3	4	5	6	7

Task results:

Attempt #	Time to perform task	Outcome (Success/failure)	Notes (e.g. reasons for failure)

Reliance on asking help to perform task: ___ Low ___ Moderate ___ High

Participant's comments/questions:

_____
_____
_____

Notes/Observations:

_____
_____
_____

Appendix F – User profile for test participants

	Technological Group	Traditional Group
Characteristic	Young students who are children	Young students who are children
Age	Range from 6 to 8	Range from 6 to 8
Gender	Female	Female
Culture	All	All
Language	Various, but all must know Arabic.	Various, but all must know Arabic.
Physical Abilities	• Must be fully able, Also they: - Do not have physical limitations such as dependence on a wheelchair or limited use of hands. - Do not have some possible problems such as vision impairments. - Do not have any hearing and visual disabilities.	• Must be fully able, Also they: - Do not have physical limitations such as dependence on a wheelchair or limited use of hands. - Do not have some possible problems such as vision impairments. - Do not have any hearing and visual disabilities.
Education	• Studying at elementary school in the first grade.	• Studying at elementary school in the first grade.
Comfort level with technology	• Typically low to high tech-savviness.	• Typically low to high tech-savviness.
Motivation	• They want to learn how to read and write in Arabic language as educated people.	• They want to learn how to read and write in Arabic language as educated people.
Hardware	• Have iPad or tablet.	• Do not need to use any tech devices.

Frequency of use	Various	No need

Table 18: User profile for involved students in pre-and-post tests

Appendix G – User profile for interview participants (Parents)

	Participants
Characteristic	● Parents who have children taught by using iPads in Arabic class
Gender	Female
Culture	All
Language	Various, but all must know Arabic.
Education	● Various levels of education (High school, Undergraduate, Graduate, & PhD).
Physical Abilities	● Might be fully able, or have physical limitations, but do not have any visual and hearing disabilities.
Work experience	Various
Motivation	● They want their children are taught very well by using good way with new tech tool, like iPad.
Comfort level with technology	● Typically low to high tech-savviness.

Table 19: User profile for interviewee (parents)

Appendix H – User profile for interview participants (Teachers)

	Participants
Characteristic	● Teachers who teach Arabic-language classes by using iPad in classrooms
Gender	Female
Culture	All
Language	Various, but all must know Arabic.
Education	● Various levels of education (Undergraduate, Graduate, & PhD).
Physical Abilities	● Should be fully able and do not have any visual and hearing disabilities.
Work experience	Various
Motivation	● They want to improve teaching styles by using iPad
Comfort level with technology	● High tech-savviness.

Table 20: User profile for interviewee (teacher)

Appendix I – Participant screener questionnaire (students)

PARTICIPANT SCREENER QUESTIONNAIRE

Questionnaire
Please fill this survey which has a few questions that will help researchers to determine the fit student participants for the study. Please answer questions as honestly as possible. If any question does not apply to you, please skip to the next question.

1. What is your child age?
o 5 or less
o 6-8
o 9-10
o 11 and above

2. Does your child speak Arabic?
o Yes
o No

3. Did your child register in pre-primary program?
o Yes
o No

4. Your child _____.
o is fully able and without disabilities.
o has physical limitations such as dependence on a wheelchair or limited use of hands.
o has hearing disabilities
o has visual disabilities
o has a health problem such as vision impairments.

5. Do you allow to your child to participate in evaluation tests?
o Yes
o No

6. Are your child comfortable being recorded (video) during the study?
o Yes
o No

Please provide us at least your email, so we can contact you.
o Email (Required) _____
o Mobile (Optional) _____

*** Skip the Participant ID because researchers and teachers will fill it out.**

_____ _____
Print your child s' Name Participant ID

Thank you for your responses. If your child meets the needed requirements for this study, you will be contacted with further information.

Appendix J – Participant screener questionnaire (the parents of students)

PARTICIPANT SCREENER QUESTIONNAIRE

Questionnaire
Please fill this survey which has a few questions that will help researchers to determine the fit student participants for the study. Please answer questions as honestly as possible. If any question does not apply to you, please skip to the next question.

1. Does your child speak Arabic?
o Yes
o No

2. I _____.
o am fully able and without disabilities.
o have physical limitations such as dependence on a wheelchair or limited use of hands.
o have hearing disabilities.
o have visual disabilities.
o have a health problem such as vision impairments.

3. Do you want to participate in an interview?
o Yes
o No

4. Are you comfortable being recorded (voice) during the interview?
o Yes
o No

Please provide us at least your email so we can contact you.
o Email (Required) _____
o Mobile (Optional) _____

*** Skip the Participant ID because researchers and teachers will fill it out.**

_____ _____
Print your Name **Participant ID**

Thank you for your responses. If you meet the needed requirements for this study, you will be contacted with further information.

Appendix K – Flyer for test

Participants needed

What	Arabic language evaluation tests
When	The Pre test will be on September 10th, 2015 The post-test will be on December 17th, 2015.
Duration	One hour (30 minutes For Each test)
Where	In your child's school

Compensation

If you are eligible for the study, you will be compensated for your participation

Interested?

Fill out the short survey and sign consent forms and send them for your child's school, and contact us on this email: Jka3990@rit.edu if you have any question.

Appendix L – Flyer for interview

Participants needed

What	Interview about how your child study by using iPads in school and at home, and what benefits and challenges may your child face when using this technology tool.
Duration	One hour.
Where	In your child's school or through Internet app such as Skype, FaceTime, or Line.

Compensation

If you are eligible for the study, you will be compensated for your participation

Interested?

Fill out the short survey and sign consent forms and send them for your child's school, and contact us on this email: Jka3990@rit.edu if you have any question.

Appendix M – The informed consent form to participate in tests (parents approval)

THE INFORMED CONSENT FORM (PARENTS APPROVAL)

INFORMATION

Your child is invited to participate in educational skill tests. The purpose of this test is to find out how newer educational tools such as tablet and iPad affect students' achievements in Arabic language classes in primary schools and to know what potential benefits and problems of using the iPad in the classroom, and what challenges that both teachers and students could face when they use this new tech tool. A student who will take the tests needs to be healthy without any physical disabilities, visual deficits or hearing loss in order to get correct results that are not influenced by any healthy factors. In the test there are three main tasks.

The nature of the test explained below: each student will be given three tasks in the test, the first task contains on three sections to measure the cognitive skills, and each task consists of four different pictures, words, and characters. Students will be asked to draw a line between an image and a word that describes that picture, and to also draw a line between the word and character that the word starts with it.

In the second task, young students will be asked to read loudly some Arabic words in order to measure their reading skills. This task is consisted of three parts that measure how the ability of young students in the first grade on reading the one word, two words, and full sentence consisted of many words.

In the last task, young students will be asked to write some Arabic words in order to measure their writing skills. This task is consisted of three parts that measure how the ability of young students in the first grade on writing the one word, two words, and full sentence consisted of many words.

Your child will take about an hour (30 min for each test) to complete all tests that will be recorded by video equipment. She has the right to stop the test at any time, and if she stop it and cannot complete it, for sure she will not face any problem and lose any benefit.

RISKS

There are no psychological or physical risks which would threaten your child's daily life if she participate in this test.

BENEFITS AND INCENTIVES

You and your child will get some potential benefits from these tests, including knowing your child's educational level in Arabic classes and what your child's skills are strong or weak to read and write in Arabic language. Once the student completes the both tests, parents will get a $10 gift card after you sign on the receipt form demonstrated that your child got this incentive after her participation.

CONFIDENTIALITY

Your child's personal information in the study will be kept secret to the extent permitted by law by following these procedures: the researcher will keep her records under a code number instead than by name and store them in locked folder. Only the authorized staff can look at them. Your child's name and any other information which may point to her will not appear when the results of the study are published or presented. To make sure this research being done in the proper manner, The Institutional Review Board of Rochester Institute of Technology and The Office of Human Research Protections might review and look at the records of the study.

PARTICIPATION

Your child's participation in the tests is voluntary. If she change her mind and decides not participate in the study, please notify her teacher. There will not be any penalty, but your information contacts will be removed from the list of contacts, thus there will not be future communication and information regarding this study.

CONTACT

If you have any questions about the procedures or the tests, you can contact us via Jka3990@rit.edu or Dr. Deborah M. LaBelle via Deborah.LaBelle@mail.rit.edu. As well, If you have any questions about the rights of participants in this research, contact Heather Foti, the Associate Director, via hmfsrs@rit.edu or visit this website: https://www.rit.edu/research/hsro.

CONSENT

After I have carefully read above information and understand it, I agree that my daughter participates in this study, and I have received a copy of this form also.

*** Skip the Participant ID because researchers and teachers will fill it out.**

Print Name	**Signature**	**Date**	**Participant ID**

Appendix N – The informed consent form to participate in tests (student approval)

THE INFORMED CONSENT FORM FOR STUDENT TAKE THE EVALUATION TEST (CHILD APPROVAL)

INFORMATION

You are invited to participate in educational skill tests. The purpose of this test is to find out how the iPad affects your achievements in Arabic language classes. If you will take these tests, you have to be healthy without any physical disabilities, visual deficits or hearing loss in order to get correct results. In the test, there are three main tasks.

- In the first task: you will be asked to draw a line between an image and a word that describes that picture, and to also draw a line between the word and character that the word starts with it.
- In the second task: you will be asked to read loudly some Arabic words (one word, two words, and full sentence).
- In the tried task: you will be asked to write some Arabic words (one word, two words, and full sentence).

Keep in your mind; the tests will be recorded by voice and video equipment. It will take you about an hour to complete the both tests. We aim at testing your education skills. Also, you have the right to stop this test at any time, and if you stop the test and cannot complete it for any reason, you will not lose any benefits.

RISKS

There are no psychological or physical risks which would threaten your life if you participate in this test.

BENEFITS AND INCENTIVES

You will get some potential benefits from the tests, including knowing your educational level in Arabic classes and what your skills are strong or weak to read and write in Arabic language. Once you complete both tests, you will get a $10 gift card. A receipt will be required to sign by your parents to demonstrate that you have gotten this incentive after your participation.

CONFIDENTIALITY

Your personal information in the study will be kept secret to the extent permitted by law by following these procedures: the researcher will keep your records under a code number instead than by name and store them in locked folder. Only the authorized staff can look at them. Your name and any other information which may point to you will not appear when the results of the study are published or presented. To make sure this research being done in the proper manner, The Institutional Review Board of Rochester Institute of Technology (RBI) and The Office of Human Research Protections might review and look at the records of the study.

PARTICIPATION

Your participation in the tests is voluntary. If you change your mind and decide not participate in the study, please notify your teacher. There will not be any penalty, but your parents' information contacts will be removed from the list of contacts, thus there will not be future communication and information regarding this study.

CONTACT

If you have any questions about participating in this tests or procedures, you can ask your Arabic teacher or parents while they have been asked to be a part of the study.

CONSENT

After I have carefully read above information and understand it, I agree that I participate in this study, and I have received a copy of this form also.

*** Skip the Participant ID because researchers and teachers will fill it out.**

_____	_____	_____	_____
Print Name	**Signature**	**Date**	**Participant ID**

Appendix O -The informed consent form to participate in interviews (teacher's approval)

THE INFORMED CONSENT FORM
(TEACHER PARTICIPATING IN THE INTERVIEW)

INFORMATION

You are invited to participate in interview. The purpose of this interview is to find out how newer educational tools such as tablet and iPad affect students' achievements in Arabic language classes in primary schools and to know what potential benefits and problems of using the iPad in the classroom, and what challenges that both teachers and students could face when they use this new tech tool. It will take you about an hour to complete the interview that will be recorded by voice. You have the right to stop this interview at any time, and if you stop it and you cannot complete it, for sure you will not face any problem and lose any benefit.

RISKS

There are no psychological or physical risks which would threaten your life if you participate in this interview.

BENEFITS AND INCENTIVES

You will get some potential benefits from this interview, including improving the educational methods in teaching and knowing the good way to teach with using iPad. Also, you will get a $10 gift card after you sign on the receipt form demonstrated that you got this incentive after your participation.

CONFIDENTIALITY

Your personal information in this interview will be kept secret to the extent permitted by law by following these procedures: the researcher will keep your records under a code number instead than by name and store them in locked folder. Only the authorized staff can look at them. Your name and any other information which may point to you will not appear when the results of the study are published or presented. To make sure this research being done in the proper manner, the Institutional Review Board of Rochester Institute of Technology (IRB) and The Office of Human Research Protections might review and look at the records of the study.

PARTICIPATION

Your participation in the interview is voluntary. If you change your mind and decide not participate in the study, please notify the researcher. There will not be any penalty, but the scheduled appointments will be cancelled, and your information contacts will be removed from the list of contacts, thus there will not be future communication and information regarding this study.

CONTACT

If you have any questions about the procedures or the tests, you can contact us via Jka3990@rit.edu or Dr. Deborah M. LaBelle via Deborah.LaBelle@mail.rit.edu. As well, If you have any questions about the rights of participants in this research, contact Heather Foti, the Associate Director, via hmfsrs@rit.edu or visit this website: https://www.rit.edu/research/hsro.

CONSENT

After I have carefully read above information and understand it, I agree that I participate in this interview, and I have received a copy of this form also.

*** Skip the Participant ID because researchers and teachers will fill it out.**

_____	_____	_____	_____
Print Name	**Signature**	**Date**	**Participant ID**

Appendix P– The informed consent form to participate in interviews (parent approval)

THE INFORMED CONSENT FORM
(PARENT PARTICIPATING IN THE INTERVIEW)

INFORMATION

You are invited to participate in interview. The purpose of this interview is to find out how newer educational tools such as tablet and iPad affect your child's achievements in Arabic language classes in primary schools and to know what potential benefits and problems of using the iPad in school and home as well as what challenges that your child could face when they use this new tech tool. It will take you about an hour to complete the interview that will be recorded by voice. You have the right to stop this interview at any time, and if you stop it and you cannot complete it, for sure you will not face any problem and lose any benefit.

RISKS

There are no psychological or physical risks which would threaten your life if you participate in this interview.

BENEFITS AND INCENTIVES

You will get a few potential benefits from this interview, including improving the educational methods in teaching and knowing the better manner to teach with using iPad. Also, you will get a $10 gift card after you sign on the receipt form demonstrated that you got this incentive after your participation.

CONFIDENTIALITY

Your personal information in this interview will be kept secret to the extent permitted by law by following these procedures: the researcher will keep your records under a code number instead than by name and store them in locked folder. Only the authorized staff can look at them. Your name and any other information which may point to you will not appear when the results of the study are published or presented. To make sure this research being done in the proper manner, the Institutional Review Board of Rochester Institute of Technology (IRB) and The Office of Human Research Protections might review and look at the records of the study.

PARTICIPATION

Your participation in the interview is voluntary. If you change your mind and decide not participate in the study, please notify the researcher. There will not be any penalty, but the scheduled appointments will be cancelled, and your information contacts will be removed from the list of contacts, thus there will not be future communication and information regarding this study.

CONTACT

If you have any questions about the procedures or the tests, you can contact us via Jka3990@rit.edu or Dr. Deborah M. LaBelle via Deborah.LaBelle@mail.rit.edu. As well, If you have any questions about the rights of participants in this research, contact Heather Foti, the Associate Director, via hmfsrs@rit.edu or visit this website: https://www.rit.edu/research/hsro.

CONSENT

After I have carefully read above information and understand it, I agree that I participate in this interview, and I have received a copy of this form also.
*** Skip the Participant ID because researchers and teachers will fill it out.**

_____	_____	_____	_____
Print Name	**Signature**	**Date**	**Participant ID**

Appendix Q– Compensation receipt form for tests

Participant No: _____

Compensation Receipt Form

By signing below, you acknowledge that your child has participated in Arabic language evaluation tests and has received a $10 gift card in compensation.

Print name:

_____.

Signature:

_____.

Date:

_____.

Appendix R– Compensation receipt form for Interview

Participant No: _____

Compensation Receipt Form

By signing below, you acknowledge that you have participated in interview and have received a $10 gift card in compensation.

Print name:

_____.

Signature:

_____.

Date:

_____.

Appendix S– List of all applications used in Arabic language classes for first grade

Category	Name of application	Description of the application
Controlling	Casper Focus	Control over students' iPads during class
	Classroom Timer Lite	It is used for timing tasks in exciting and fun way
	Too Noisy Pro	It keeps the noise level in the classroom under teacher's control
Recording	Teacher's Assistant Pro	These apps are used to record attendance of students, their behavior types, and communicate with their parents in order to inform them about their children's performance and show their progress.
	iDoceo	
	TeacherKit	
Teaching	Keynote	It allows teachers create and view their interactive presentations
	Nearpod	It allows teachers to create and view their own interactive presentations that can be synchronized and shared with students across all their devices.
	Socrative	It is app that allow teachers to test student on short quizzes
	ShowMe	It turns the iPad into virtual interactive whiteboard by teachers to explain challenging concepts to their students
	Splashtop Whiteboard	Teachers can turn their iPads into an interactive whiteboard in order to write, draw, and highlight on some points over presentations. Students can also interact with lessons without moving from their chairs.
	Pages apple	Writing Arabic words and sentences, can share them with others
	Microsoft PowerPoint	It allows teachers create and view their interactive presentations
	Prezi	It allows teachers create and view their interactive presentations
Learning	Abjad	This app is an entertaining game that allows students to learn reading and writing Arabic alphabets and stimulates their memories to remember and pronounce letters in many ways: connecting dots to draw letters, dragging letters to build words, playing short song that shows a letter followed by word starting with the letter, and connecting letters to their corresponding pictures. Also, it provides tests that display many pictures and letters, and students should connect appropriate letter with its appropriate and corresponding picture.
	The Alphabet Letters with Naan & Lily	App can help students to learn reading and writing the Arabic alphabet by hearing how to pronounce a letter and following gray points on the letter.
	Lamsa	This app is considered to be a library to learn and entertainment. It contains a lot of diversity: interactive stories, fun video clips, pages of coloring stimulating creativity, and educational games.
	Nasser stories	It is an app combining cartoon graphics, and an interactive story.
	Iqraa Ma'a Momo	It allows students to learn spelling Arabic words in exciting way, and has three levels of

		difficulty.
	Zee's Alife Ba	It is app provide an interactive Arabic Alphabet game (discovery game) which can help young students to learn Arabic alphabet. This app lets them learn the Arabic alphabet while it is taking them on a fun trip across the world.
	Yalla Huroof	It is game let students to learn writing Arabic alphabets and encourage them to keep learning writing letters with four levels
	My Cheerful Letters	Apps that let students to learn Arabic in very engaging method and teach them pronouncing letter in the proper way.
	Fun Arabic Learning For Kids	
	Zee's Alphabet	It is a game app provided an interactive manner, which helps young students to learn writing Arabic and teach writing concepts.
	Haza Farkh	The app provides an interactive story and teacher students the names of animals by using puzzles with three different levels.
	Kalematy	It is a game app that teaches students Arabic letters and words as well as how to spell words correctly.
	Nadia	An App provides a coloring game, puzzles and interactive story to learn how to read Arabic words.
	Nice Alphabet Lite	The app enables students to learn and write Arabic alphabet and words easily by a fun manner. Also, this app provides features such as listen and repeat the pronunciation of the letters, words, and name of the animal, write words by following a model, and rewrite letters to learn their shapes.
	Write with me in Arabic	An App which helps students to write Arabic letters in all forms and words, and it also provides features that students can press on any word or letter to hear it. Additionally, teacher or parents can type a specific word or sentence in the textbox and press on a write button, then the word will appear grayed out in the writing board to allow students to learn how to write it.
Teaching & Learning	IEN	It provides all Saudi student textbooks for all grades. There are many features such as reviewing books, highlighting text and adding bookmarks.
Storage	Dropbox	Apps for storing and viewing any kind of educational files, records of students, and others
	Google Drive	
	Box	

Table 21: The list of all applications used in Arabic language classes

Appendix T – Scores of students in each task in pre-and-post tests

1. Scores of Traditional group in pre test

- Cognitive tasks (the rating scores)

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	1	59	1	43	1	45	147	1
P2	1	72	1	61	1	57	190	1
P3	2	60	1	51	2	50	161	1
P4	3	57	4	53	2	43	153	3
P5	1	52	1	59	1	78	189	1
P6	1	51	1	46	2	39	136	1.33
P7	1	93	1	78	1	71	242	1
P8	1	89	1	76	1	69	234	1
P9	1	63	1	55	2	52	170	1.33
P10	2	55	2	46	2	41	142	2
P11	2	70	4	63	4	51	184	3.33
P12	2	72	2	61	2	55	188	2
P13	1	101	1	93	1	79	273	1
P14	4	83	5	53	4	61	197	4.33
P15	1	96	1	64	1	50	210	1
Average							187.73	1.68

Table 22: The scores of each student in Traditional group in cognitive tasks in pre test

- Cognitive tasks (The number of correct answers)

Participants	The first section	The second section	The third section	Total of student's correct answers
	N. Correct answers	N. Correct answers	N. Correct answers	
P1	0	0	1	1
P2	1	1	0	2
P3	2	1	2	5
P4	4	5	3	12
P5	1	0	1	2
P6	1	1	2	4
P7	1	0	0	1
P8	0	1	1	2
P9	1	0	2	3
P10	2	2	1	5
P11	3	4	5	12
P12	3	0	3	6
P13	0	0	0	0
P14	5	6	5	16
P15	0	0	1	1
Average				4.8

Table 23: The number of correct answers for each student of Traditional group in cognitive tasks in pre test

- Reading tasks

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	2	86	1	123	1	156	365	1.33
P2	1	96	1	94	1	131	321	1
P3	2	68	1	88	1	139	295	1.33
P4	6	64	5	86	4	123	273	5
P5	1	51	1	73	1	96	220	1
P6	3	27	2	39	2	43	109	2.33
P7	2	137	1	160	1	275	572	1.33
P8	1	99	1	128	1	194	421	1
P9	2	74	2	96	1	162	332	1.66
P10	7	64	6	90	5	121	275	6
P11	5	110	4	123	3	179	412	4
P12	2	127	2	145	1	191	463	1.66
P13	3	103	2	123	1	156	382	2
P14	5	87	4	95	2	120	302	3.66
P15	3	96	2	142	2	256	494	2.33
Average							349	2.37

Table 24: The scores of each student in Traditional group in reading tasks in pre test.

- Writing tasks

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	2	101	1	224	1	378	703	1.33
P2	3	99	2	177	1	297	573	2
P3	1	89	1	246	1	304	639	1
P4	4	93	3	264	2	375	732	3
P5	1	98	1	232	1	296	626	1
P6	1	172	1	289	1	438	899	1
P7	3	93	2	214	1	334	641	2
P8	1	94	1	121	1	287	502	1
P9	2	134	2	195	1	344	673	1.66
P10	6	164	4	284	4	447	895	4.66
P11	6	97	4	155	3	240	492	4.33
P12	5	118	2	165	1	291	574	2.66
P13	2	143	1	221	1	329	693	1.33
P14	5	128	5	174	5	292	594	5
P15	1	124	1	262	2	348	734	1.33
Average							664	2.2

Table 25: The scores of each student in Traditional group in writing tasks in pre test

2. Scores of Technology group in pretest

- Cognitive tasks (the rating scores)

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	1	130	1	89	1	70	166	1
P2	1	241	2	196	2	103	142	1.66
P3	1	246	1	214	1	203	105	1
P4	2	170	1	70	2	99	275	1.66
P5	1	102	1	112	2	155	369	1.33
P6	1	253	1	230	1	189	201	1
P7	1	160	1	194	1	183	132	1
P8	1	143	1	120	1	89	207	1
P9	2	206	2	170	2	186	263	2
P10	2	293	2	241	2	130	173	2
P11	3	108	4	95	4	61	162	3.66
P12	1	123	1	103	1	55	289	1
P13	1	166	1	108	1	79	183	1
P14	1	231	1	160	1	104	195	1
P15	2	140	3	103	4	101	143	3
Average							200	1.5

Table 26: The scores of each student in Technology group in cognitive tasks in pre test

- Cognitive tasks (The number of correct answers)

Participants	The first section	The second section	The third section	Total of student's correct answers
	N. Correct answers	N. Correct answers	N. Correct answers	
P1	2	0	1	3
P2	4	1	1	6
P3	1	3	1	5
P4	2	0	2	4
P5	0	0	2	2
P6	0	0	0	0
P7	1	0	0	1
P8	4	3	2	9
P9	0	2	2	2
P10	0	0	1	1
P11	3	4	4	11
P12	0	0	0	0
P13	0	0	0	0
P14	1	1	0	2
P15	2	1	2	5
Average				3.4

Table 27: The number of correct answers for each student of Technology group in cognitive tasks in pre test

- Reading tasks

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	2	51	1	96	1	149	147	1.33
P2	7	84	6	120	2	172	190	5
P3	2	93	2	131	1	173	161	1.66
P4	1	51	1	62	1	83	153	1
P5	1	86	1	94	1	176	189	1
P6	5	97	2	102	2	147	136	3
P7	1	58	1	75	1	112	242	1
P8	7	97	5	123	2	187	234	4.66
P9	2	62	1	75	1	94	170	1.33
P10	2	97	2	136	2	243	142	2
P11	6	75	4	110	2	141	184	4.33
P12	3	40	2	49	1	94	188	2
P13	5	98	3	129	2	196	273	3.33
P14	3	85	2	116	2	171	197	2.33
P15	2	57	1	94	1	103	210	1.33
Average							331	2.35

Table 28: The scores of each student in Technology group in reading tasks in pre test

- Writing tasks

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	1	123	1	279	1	432	834	1
P2	6	113	6	183	6	298	594	6
P3	2	194	1	286	1	368	848	1.33
P4	2	117	2	231	1	387	735	1.66
P5	1	121	1	167	1	298	586	1
P6	1	136	1	274	1	394	804	1
P7	1	142	1	234	1	369	745	1
P8	6	132	5	285	4	426	843	5
P9	2	117	2	277	1	389	783	1.66
P10	3	126	2	233	2	325	684	2.33
P11	6	141	4	265	2	389	795	4
P12	1	118	1	211	2	295	624	1.33
P13	1	173	1	262	1	436	871	1
P14	5	102	2	217	1	345	664	2.66
P15	2	106	2	213	1	284	603	1.66
Average							734	2.1

Table 29: The scores of each student in Technology group in writing tasks in pre test

3. Scores of Traditional group in post-test

- Cognitive tasks (the rating scores)

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	5	37	7	24	6	23	84	6
P2	3	33	7	26	3	23	82	4
P3	5	47	7	33	5	21	101	5.66
P4	6	41	6	28	7	29	98	6.33
P5	7	43	3	24	6	27	94	4
P6	7	26	7	14	6	11	51	6.66
P7	7	18	3	11	2	10	39	4
P8	5	21	2	17	3	16	54	3.33
P9	7	29	6	22	6	18	69	6.33
P10	7	26	7	21	7	17	64	7
P11	7	35	7	27	7	19	81	7
P12	2	41	7	31	7	25	97	5.33
P13	6	36	2	24	3	15	75	4
P14	7	31	7	21	7	17	69	7
P15	7	39	7	30	6	25	94	6.66
Average							76	5.5

Table 30: The scores of each student in Traditional group in cognitive tasks in post-test

- Cognitive tasks (The number of correct answers)

Participants	The first section	The second section	The third section	Total of student's correct answers
	N. Correct answers	N. Correct answers	N. Correct answers	
P1	5	8	6	19
P2	4	8	4	16
P3	5	8	5	18
P4	6	6	8	20
P5	8	4	6	18
P6	8	8	6	22
P7	8	4	2	14
P8	5	3	4	12
P9	8	6	6	20
P10	8	8	8	24
P11	8	8	8	24
P12	3	8	8	19
P13	7	3	4	14
P14	8	8	8	24
P15	8	8	6	22
Average				19.06

Table 31: The number of correct answers for each student of Traditional group in cognitive tasks in post-test

- Reading tasks

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	6	19	3	24	1	41	84	3.33
P2	5	13	4	23	3	39	75	4
P3	2	26	1	32	1	74	132	1.33
P4	7	17	7	28	7	52	97	7
P5	5	21	4	25	4	42	88	4.33
P6	5	19	2	28	1	43	109	2.66
P7	7	18	7	26	7	39	83	7
P8	5	21	2	34	1	42	97	2.66
P9	7	13	6	21	5	30	64	6
P10	7	9	7	18	7	24	51	7
P11	7	11	6	14	6	21	46	6.33
P12	7	8	7	10	7	14	32	7
P13	5	12	3	26	2	35	73	3.33
P14	7	9	7	19	7	21	49	7
P15	4	14	3	23	3	45	82	3.33
Average							77	4.82

Table 32: The scores of each student in Traditional group in reading tasks in post-test

- Writing tasks

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	6	98	5	125	5	198	421	5.33
P2	5	85	5	119	5	194	398	5
P3	7	76	6	86	5	125	287	6
P4	7	92	7	116	7	244	452	7
P5	7	96	7	121	7	183	400	7
P6	5	119	5	153	3	255	527	4.33
P7	5	83	6	98	5	124	305	5.33
P8	4	59	3	76	2	108	243	3
P9	7	98	6	116	6	184	398	6.33
P10	7	102	7	144	7	267	513	7
P11	7	52	7	65	7	87	204	7
P12	3	96	2	129	2	185	410	2.33
P13	7	61	7	87	7	116	264	7
P14	7	97	6	102	4	203	402	5.66
P15	6	106	6	127	5	291	524	5.66
Average							383	5.6

Table 33: The scores of each student in Traditional group in writing tasks in post-test

4. Scores of Technology group in post-test

- Cognitive tasks (the rating scores)

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	6	21	7	19	7	17	57	6.66
P2	7	32	7	22	7	20	74	7
P3	7	30	7	21	7	12	63	7
P4	7	41	7	29	7	23	93	7
P5	7	32	7	24	7	35	91	7
P6	6	23	7	19	6	9	51	6.33
P7	7	15	7	13	6	11	39	6.66
P8	7	20	7	18	7	16	54	7
P9	7	18	6	16	7	13	47	6.66
P10	7	22	7	20	7	16	58	7
P11	7	29	7	22	7	19	70	7
P12	7	34	7	26	7	23	83	7
P13	6	18	7	15	7	13	46	6.66
P14	7	28	6	19	6	14	61	6.33
P15	7	25	7	18	7	10	53	7
Average							62	6.8

Table 34: The scores of each student in Technology group in cognitive tasks in post-test

- Cognitive tasks (The number of correct answers)

Participants	The first section	The second section	The third section	Total of student's correct answers
	N. Correct answers	N. Correct answers	N. Correct answers	
P1	6	7	8	21
P2	8	8	8	24
P3	8	8	8	24
P4	8	8	8	24
P5	8	8	8	24
P6	7	8	7	22
P7	8	8	6	22
P8	8	8	8	24
P9	8	6	8	22
P10	8	8	8	24
P11	8	8	8	24
P12	8	8	8	24
P13	7	8	8	23
P14	8	6	6	20
P15	8	8	8	24
Average				23.06

Table 35: The number of correct answers for each student of Technology group in cognitive tasks in post-test

- Reading tasks

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	6	9	6	11	5	17	37	5.66
P2	7	10	7	14	7	21	45	7
P3	7	12	7	23	6	36	71	6.66
P4	7	5	7	11	7	22	38	7
P5	7	21	7	32	7	41	94	7
P6	7	9	6	12	4	21	42	5.66
P7	7	6	7	10	7	20	36	7
P8	7	11	7	18	7	27	56	7
P9	6	14	7	18	6	26	58	6.33
P10	3	13	3	26	2	34	73	2.66
P11	6	15	4	24	3	43	82	4
P12	7	11	6	18	6	23	52	6.33
P13	5	14	3	24	3	36	74	3
P14	6	9	6	17	5	21	47	5.66
P15	7	7	7	9	7	20	36	7
Average							56	5.86

Table 36: The scores of each student in Technology group in reading tasks in post-test

- Writing tasks

Participants	The first task		The second task		The third task		Total time	Mean of student's scores
	Student's scores	Time	Student's scores	Time	Student's scores	Time		
P1	2	104	1	177	1	292	573	1.33
P2	7	96	7	114	7	218	428	7
P3	2	106	2	215	1	311	632	1.66
P4	3	118	2	209	2	294	621	2.33
P5	3	122	3	156	3	198	476	3
P6	1	98	3	123	3	273	494	2.33
P7	1	112	2	189	2	283	584	1.66
P8	6	134	5	275	5	314	723	5.33
P9	5	101	2	131	2	260	492	3
P10	7	102	6	219	3	296	617	5.33
P11	7	117	6	247	6	337	701	6.33
P12	7	95	6	103	3	212	410	5.33
P13	3	163	2	254	1	326	743	2
P14	6	73	5	146	2	178	397	4.33
P15	5	114	3	149	2	289	552	3.33
Average							562	3.6

Table 37: The scores of each student in Technology group in writing tasks in post-test