

Using Digital Games to Develop English language Vocabulary Learning and Retention of kindergarten Children

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Abstract:

The present research aimed at investigating the effectiveness of using digital games to develop English language vocabulary learning and retention of kindergarten children. The research followed the quasi experimental design of two groups (control and experimental), whereas the researcher designed and used the materials and instruments of the research, which were applied on (20) children of kindergarten second level, Hamed Gouhar Governmental Distinguished Language School at Hurghada city and included: an English language vocabulary learning test, and a suggested digital games based unit. The results of the research showed the statistically significant differences between the mean scores which were obtained by the experimental group in the pre/posttest of the English language vocabulary learning (in favor of the posttest). Moreover, there were statistically significant differences between the mean scores of the experimental and the control groups in the post test of the English language vocabulary learning (in favor of the experimental group). In addition, there were no statistically significant differences between the mean scores of the experimental group in the post and follow up test of the English language vocabulary learning. Therefore, the impact of using digital games on developing English language vocabulary learning and retention of kindergarten children has been verified.

Keywords: *Digital games, Vocabulary learning, Vocabulary retention*

استخدام الألعاب الرقمية لتنمية تعلم مفردات اللغة الإنجليزية والاحتفاظ بها لدى أطفال الروضة

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مستخلص

هدف البحث الحالي إلى التحقق من فعالية استخدام الألعاب الرقمية لتنمية تعلم مفردات اللغة الإنجليزية والاحتفاظ بها لدى أطفال الروضة. اتبعت الدراسة التصميم شبه التجريبي ذو المجموعتين (الضابطة والتجريبية)، وقامت الباحثة بتصميم واستخدام مواد و أدوات البحث والتي تم تطبيقها على (20) طفل من أطفال المستوى الثانى بمدرسة حامد جوهر الرسمية المتميزة للغات بالغرندقة، والتي تضمنت: اختبار تعلم مفردات اللغة الإنجليزية، و وحدة مقترحة قائمة على استخدام الألعاب الرقمية. وقد أشارت نتائج البحث الى وجود فروق ذات دلالة إحصائية بين متوسطات الدرجات التي حصلت عليها المجموعة التجريبية فى التطبيق القبلى والبعدى لاختبار تعلم مفردات اللغة الإنجليزية (لصالح التطبيق البعدي)، كما أسفرت أيضاً عن وجود فروق ذات دلالة إحصائية بين متوسطات درجات المجموعة التجريبية و المجموعة الضابطة فى التطبيق البعدي لتعلم مفردات اللغة الإنجليزية لصالح المجموعة التجريبية، كما أكدت أيضاً عدم وجود فروق ذات دلالة إحصائية بين متوسطات درجات المجموعة التجريبية فى التطبيق البعدي لاختبار تعلم مفردات اللغة الإنجليزية واختبار المتابعة. بناءً على ذلك، تم التحقق من فعالية استخدام الألعاب الرقمية لتنمية تعلم مفردات اللغة الإنجليزية والاحتفاظ بها لدى أطفال الروضة.

الكلمات المفتاحية:

الألعاب الرقمية ، تعلم مفردات اللغة الإنجليزية، الاحتفاظ بمفردات اللغة الإنجليزية

1. Introduction

English is one of the major and influential languages in the world. It also has become the crucial language of communication and the method of expressing people's requests, feelings and thoughts. During the act of communication words play an important role in expressing feelings, emotions, and ideas to others. Vocabulary is one of the most important components of successful and meaningful communication both in a mother tongue and in a target language (Yudintseva, 2015).

Vocabulary serves as the foundation of reading, writing and communication in any language. Therefore, learning vocabulary is at the core of learning English; teachers should give special attention to how it could be most effectively taught to their students (Ketola, 2019). Vocabulary is one of the problems confronted by English language learners. Because of the limited vocabulary, the learners cannot communicate to others clearly. With a limited vocabulary, anyone will also have a limited understanding in terms of speaking, reading, listening, and writing. It is true that it might be impossible to learn a language without mastering vocabulary (Baharuddin, 2017).

Vocabulary is the most important vehicle in learning a language. "No learning can be achieved completely if the learner lacks sufficient vocabulary knowledge" (Özkiraz, 2015). Similarly, (Ouazeta, 2016, P. 38) viewed that vocabulary is a basic element in learning a language. Moreover, Laraba (2007, P.55) pointed out that vocabulary enrich learner's knowledge, open the academic settings for learners and affect fluency and comprehension. He illustrated that

"Vocabulary is the glue that holds stories, ideas and contents together and that facilitate reading comprehension.

Vocabulary learning has been a key aspect of acquiring a second language for many years. It is an ongoing process that takes time and practice. It has always been one of the most important issues relating both teachers and learners of foreign languages. Many scholars and linguists claimed that learning languages cannot be successful without a wide range of vocabulary (Allanazarova, 2020).

Although, one of the most important issues in second language teaching and learning is vocabulary learning, the retention of learned vocabularies is one of the most difficult aspects of learning a second language (Holden, 1999). English as a Foreign Language (EFL) learner frequently encounter difficulties in applying disparate strategies or techniques in order to recall the unfamiliar vocabularies. Language learners use vocabulary as a means of reception and expression to acquire and convey meaning. Therefore, being able to remember new and unfamiliar words is outstanding for their success (Beniss & Moghadam, 2016).

However, some students are brave enough to use their own means of understanding the new words, these students may look up words in a bilingual dictionary to search for the meanings or definitions of the new vocabulary. They copy the new words in their exercise books without knowing how to use them in context. After a period of time, students often forget the meanings of the new words. The students become discouraged in learning vocabulary and eventually blame themselves on their poor memorization as the cause of their lack of vocabulary retention. This method of learning

new vocabularies without engaging activities can be very boring to many students (Huyen & Nga, 2003).

Herman & Dole (1988) argued that while dictionaries are good for understanding the meanings of new words, the use of dictionaries alone does not necessarily provide long term knowledge for the learner's skill. Students need several exposures to words in various contexts before they can recognize, comprehend, remember, and apply them (Nagy, 2005). Although the traditional teaching of vocabulary using dictionary definitions can be particularly short and brief, it is often difficult to grasp a word's meaning or apply those meanings in context (Beck, McKeown & Kucan, 2002). When the meanings of new words are not clearly understood, vocabulary retention becomes difficult and problematic for many young ESL learners.

In language teaching, retention of what has been taught may depends on the quality of teaching, the interest of the learners, or the meaningfulness of the materials. However, most ESL learners are confronted with recalling difficulties as they tend to forget the word quickly that they learned recently. These challenges are commonly discussed and researched by cognitivists since they deem that there are several reasons for forgetting associated with memory and mental process (Richards & Schmidt, 2002, P. 457).

For many learners studying English as a foreign language, vocabulary learning is often perceived as boring , especially for those who grew up in the digital age, as they have to memorize unfamiliar words and be asked to complete various exercises (Nguyen & Khuat, 2003). Learners find it hard to engage in such rote learning of

vocabulary activities. Moreover, When English language young learners are acquiring new vocabulary, they need concrete methods to collect, store, and retrieve words for retention and future use. In traditional learning, vocabulary retention becomes a challenge. Therefore, it is necessary to find out effective methods to help young learners retain new words in long-term memory (Tuan, 2012).

However, learning vocabulary is the main challenge for learning a target language; most children sound to face the same problems in learning vocabularies because of a lack of motivation (Jung & Graf, 2008). Kindergarten children are exposed to new words daily in their classrooms through the use of stories, songs, and finger plays. Conversational and instructional interactions with teachers, peers, and family members also provide opportunities for young children to develop their vocabularies. If children do not learn the meaning of words and use them, they will struggle to interact with others and to understand subject matter in all areas of learning (Joyce, 2011).

Children should know the English vocabulary to master English skills. Vocabulary is significant in supporting children skills (Bakhsh, 2016). There is a close relationship between vocabulary and the four English skills. Children can practice all English skills well if they learn vocabulary and comprehend its link with all skills of English (Schmitt, 2010).

Developing children's vocabulary skills can be challenging. One of the primary problems is that teachers do not typically talk and engage young children in conversations that expand and develop their language (Dickinson, 2002). Specifically, teachers tend to spend a good deal of time giving directions and, when discussing

content, they often ask the children some questions that require only one or two words in response, while also providing just one or two words in response to children's questions and ideas (Zucker, 2010).

In order to enhance the vocabulary learning and retention, children need to be engaged in the learning activities. Using games is a good method to assist children in learning a lot of vocabularies in a short period. Games help and encourage many learners to learn target language more easily. They also help teachers to create contexts in which the target words are useful and meaningful; they also bring fun for learners, thus help them learn and retain new words more quickly. In other words, game-based learning can create a meaningful context for language learning process. After learning and practicing new vocabulary through games, learners have the opportunity to use language in a non-stressful way (Uberman, 1998).

As the use of technology is one of the most important factors for language teaching to be more effective, the role of technology as a resource for instruction of foreign language learners is increasing as educators recognize its ability to create both independent and collaborative learning environments (Butler-Pascoe & Ellen, 1997). As one of the outcomes of technology, computer assisted language learning (CALL) increased the popularity of using computers in the classroom environments as a tool for learning languages. Along with the development of internet, the games started to appear in the form of online games. Whereas, learners can easily connect to the internet and sign into specific kinds of net games in order to participate actively in interactive games (Kayaaltı, 2018).

The use of online games in vocabulary learning has attained much attention, where different studies from many researchers globally have provided data that online games are able to gain attention and interest in vocabulary learning. The increasing rise of interest in online games in learning is due to its conceptualization as an enjoyable factor in language learning (Hasram, 2020). Ashraf (2014) also supported that online games create fun learning environment, especially for younger learners to be interested in learning process. As vocabulary building is a long process, engaging learners in fun, relaxing and motivating learning experience could ease learners to learn new words.

Digital games play a significant role in the life of the new generation. Thus they are used for entertainment and facilitating the process of learning (Ilomaki & Kankaanranta, 2009). For Liu (2011), a digital game can help EFL children learn vocabulary by providing them with animated graphics and impacts of audio and a good motivation to learn a foreign language vocabulary. Thus, it is important that teachers are encouraged to use digital environment materials.

2. Context of the problem

- As a lecturer in the curriculum and instruction department (TEFL) at Hurghada Faculty of Education, the researcher observed the low level of the second year kindergarten (KG 2) children while learning English language vocabulary and recalling them. While training those children, the following points were observed:
 - About seventy percent of the children suffered from learning English language vocabulary.

- About eighty percent of them suffered from recalling English language vocabulary.
- Most children lack a new method for developing their English language vocabulary learning and retention.

Some researchers such as Nguyen & Khuat (2003) have shown that students are tired of learning vocabulary in traditional methods such as rehearsing, writing words on papers or learning passively through teacher's explanations, and this has created severe problems with learning skills. As a result students have limited opportunities to engage in meaningful learning activities when listening to their teacher. This does not assist in vocabulary retention. Teachers believed that learners prefer to learn language in a relaxed environment such as vocabulary games. In addition, they assured that in an interesting and communicative class learners can learn eighty percent of what they are exposed to.

Afzal (2019) also found that the majority of teachers still employ the traditional teaching methods which are outdated. Mohammad's findings (2018) indicated that many of the teacher-centered strategies are irrelevant to learners of today generation as they are heavily dependent on memorizing unfamiliar words with their definitions (Derakhshan & Khatir, 2015) and paired translations (Nejati, 2018). These learners who are also known as the digital natives, are more fluent in the usage of technology and there is a growing demand of gamified teaching and learning in education (Chapman & Rich, 2018).

- Various studies declared the benefit of using digital games to develop English language vocabulary learning and retention of kindergarten

children, such as: Luan & Azizie (2021), Stavy (2019), and Stephan (2016).

Based on the previous observations and studies, the present research used digital games to develop English language vocabulary learning and retention of kindergarten children.

3. Aims of the research

The present research aimed to:

- Investigate the effectiveness of using digital games to develop English language vocabulary learning of kindergarten children.
- Investigate the effectiveness of using digital games to develop English language vocabulary retention of kindergarten children.

4. Questions of the research

The present research attempted to answer the following main question:

- *What is the effectiveness of using digital games to develop English language vocabulary learning and retention of kindergarten children?*

This major question branched out into the following sub-questions:

1. What is the effectiveness of using digital games to develop English language vocabulary learning of kindergarten children?
2. What is the effectiveness of using digital games to develop English language vocabulary retention of kindergarten children?

5. Hypotheses of the research

The present research tested the following hypotheses:

- There are statistically significant differences between the mean scores of the experimental group in the pre/posttest of English language vocabulary learning favoring the post application.

- There are statistically significant differences between the mean scores of both the experimental and the control groups in the posttest of English language vocabulary learning favoring the experimental group.
- There are no statistically significant differences between the mean scores of the experimental group in the post and follow up test of English language vocabulary learning.

6. Significance of the research

The research was supposed to be significant for:

1. Kindergarten children: as the digital games are supposed to develop their English language vocabulary learning and retention.
2. Teachers: as it may develop their awareness of the benefits of using digital games as a supporting tool for improving their methods of teaching.
3. Course designers: as it may attract their attention to design valuable activities based on digital games that can develop the children's English language vocabulary learning and retention.

7. Delimitations of the research

The research was delimited to:

1. A sample of (20) children of the second level Hamed Gouhar Governmental Distinguished Language School at Hurghada because they lack a new method to develop their English language vocabulary learning and recalling them, as this stage precedes more complicated one and need the children to be prepared for the next stage (primary).
2. The first semester of (2021/2022).

8. Materials and instruments of the research

The researcher designed and used the following:

1. An English language vocabulary learning test.
2. A suggested unit based on digital games.

9. Definition of terms

• Digital game

- Al Fatta (2019) defined it as any game executed on digital equipment and covers the large variety of games played at game console, mobile phone, tablet computer, over the internet, and even at the arcades.
- It can be defined operationally as a game that can be played in interactive environment by using electronic devices to develop English language vocabulary learning and retention of kindergarten children.

• Vocabulary learning

- Al-Qahtani (2015) defined it as the total number of words that are needed to communicate ideas and express the speakers' meaning.
- It can be defined operationally as recognizing new words by using a stimulating way to easily interact with others.

• Vocabulary retention

- Stavy (2019) defined it as the ability to store or remember as many words as possible.
- Richards & Schmidt (2002) defined it as the ability to recall or remember things after an interval of time.
- It can be defined operationally as the ability to retain new words by using electronic devices in interactive learning environment.

10. Review of literature

10.1. Vocabulary Learning

- **Steps of teaching vocabulary:**

Marzano (2004) has developed a six step process for teaching vocabulary to students of all ages. While the vocabulary needs of students increase over time, these same procedures can be used on a frequent basis with all students of varying abilities across all content areas. Marzano's six steps for teaching new words can be used with all students (K 12); the first three steps introduce new words to students. The next three steps give students multiple exposures to the new word for review and retention.

1) **Explain:** provide a student-friendly description, explanation, or example of the new term.

2) **Restate:** ask students to restate the description, explanation, or example in their own words.

3) **Show:** ask students to construct a picture, symbol, or graphic representation of the term.

4) **Discuss:** engage students periodically in structured vocabulary discussions that help them add to their knowledge of the terms in their vocabulary notebooks.

5) **Refine and reflect:** periodically, ask students to return to their notebooks to discuss and refine entries.

6) **Apply in Learning Games:** involve students periodically in games that allow them to play with new terms.

In addition, Calvo–Ferrer (2017) investigated the game impact in learning vocabulary. A number of participants were exposed to the vocabulary of the foreign language by using games while the others

learned the foreign vocabulary by practicing vocabulary exercises in their textbooks. Their results in pre/post-tests showed that the outcomes of the participants who were taught vocabulary with using games in the short period were better than those who learned vocabulary by using traditional means. In addition, using games was more attractive for children and motivated them to improve their English vocabulary.

Ashraf (2014) explored the effects of online games on vocabulary learning among EFL intermediate learners. The participants, (24) low-intermediate EFL learners, were randomly assigned to experimental and control groups. The experimental group learnt some new words via online computer games in (15) weeks. A vocabulary-based test, acting as pre/posttest, was conducted in the first and 15th weeks. The findings of the analyzed data indicated that the experimental group outperformed the control group statistically significant in the post-test. Therefore, online games proved to be more effective in learning English vocabulary.

Bytheway (2014) investigated the role of online games on using vocabulary for children in learning processes. The findings have reflected that using online games help the children in learning vocabulary in meaningful contexts. So, the process of learning is more affected and successful.

Besides, Sundqvist & Sylvèn (2014) emphasized the significant role of games in increasing children's motivation to learn the vocabulary of English. Seventy-six EL children were in the fourth stage of primary school. According to the study results, most of the

children were more confident and motivated to learn English vocabulary as well as bring a fun element to the children's class.

Ab. Kadir (2013) employed a qualitative method to observe vocabulary learning using the online vocabulary game called the Word Confusion game. In this study, observation was conducted on Seven Year (5) primary school students. They were asked to learn new words and list all new vocabulary that they had learned from it. The findings showed that students were able to engage, learn, acquire and increase their vocabulary with the help of the online vocabulary games.

Vahdat & Behbahani (2013) showed that, using digital games has a significant impact in learning vocabulary on EFL children. The children who participated in that research were forty at intermediate stage who conducted TOEFL test. According to the study results, the participants who practiced games in their vocabulary learning got better achievements than others. In addition, they emphasized that digital games provide children with a meaningful context that enables them to discuss and facilitate their comprehension of other objects and can improve their English abilities as well as their vocabulary.

Aghlara & Hadidi- Tamjid (2011, P 555) conducted a study on the effects of using a digital computer game on improving Iranian children's vocabulary learning. The participants were (40) six to seven year old girls with no prior knowledge of English which were divided into two groups of experimental and control; in the experimental group, they used the SHAIEx digital game, whereas in the control group, English vocabulary was taught through traditional methods. The result indicated that the mean score of the children in

the experimental group was higher than that of the control group. This indicated the positive effect of using digital games in teaching English vocabulary to children; therefore, they suggested that "Using games in young learner's class smooth their learning because the games capture their attention and motivate them".

Similarly, Yipa & Kwan (2006) conducted a study on the usefulness of online games in vocabulary learning for some undergraduate students. The experimental group learnt some vocabulary from two carefully selected web sites with games, while the control group learnt the same vocabulary through activity-based lessons. Pre/posttests were conducted in the first and ninth weeks. The findings indicated that the experimental group outperformed the control group statistically in the post-test. The students in the experimental group generally preferred online learning supplemented with digital educational games to conventional activity-based lessons.

Segers & Verhoeven (2003) conducted a study to determine the extent to which intensive vocabulary training on a computer can enhance young children's vocabulary learning. In the intervention, (67) children in the first and second years of kindergarten played vocabulary games on the computer. A control group of (97) kindergartners followed the regular curriculum. In a pretest-training-posttest-retention test design, positive effects of the computer training were found on a curriculum-dependent vocabulary test. A trend was found towards positive effects of the computer training on a curriculum-independent test for children. The results present an

alternative and relatively teacher independent method to enlarge children's vocabularies.

10.2. Vocabulary Retention

● **Strategies for vocabulary retention**

Weiser (2013) indicated some strategies for retention of important vocabulary words:

- Focus on the words that are the most critical for understanding the text. Make sure to provide clear explanations of the words as they will appear in the text, but also give examples of the meaning in various other contexts.
- Select words that students will most likely come across in future readings or other courses.
- Allow students many opportunities to discuss, analyze, use, and compare words to encourage retention.
- Provide multiple exposures through reading, writing, listening, and talking for new words to become part of students' vocabularies.
- Have students paraphrase definitions to evaluate their understanding of a word's meaning; allowing students to use their own words, increases connection making and retention.
- Supply pictures or short videos for unknown or more difficult words, especially with English Language Learners and students requiring visuals, to aid in both vocabulary and background knowledge.

● **Vocabulary Retention Tips**

The TEFL Academy (2018) declared some tips for vocabulary retention:

➤ **Contextualization**

Teachers come across words during the lessons which are not clearly related. These may not be the vocabulary items that are set out to teach during the lesson but they end up teaching them anyway. In these cases it becomes necessary to find a way to put the words into context. In other words, spend some time on the usage of the words in order to help the learners find hooks to connect the new words with those they already know.

➤ **Visualization**

Give the students some time to visualize the word as they see fit. In this way every learner comes up with their own interpretation of the word which will help them remember the meaning. What can be useful for this activity is to bring in elements of sight and sound as well. Color and sound have been shown to improve recall so if your students can add color and sound to their images so much the better.

➤ **Repetition**

Repetition is the key to vocabulary retention. Teachers need to come up with interesting games and activities to motivate learners to engage with vocabulary on a regular basis.

Shabaneh & Farrah (2019) figured out the efficiency of using games inside classrooms. The researchers collected data using pre/posttest and class observation. Twenty (20) students were introduced to unfamiliar vocabulary through games. The findings of the research revealed the efficiency of utilizing games in the educational process. Accordingly, games helped students to retain unfamiliar vocabulary, to associate new information with their

surroundings and to develop their language and communicative skills.

Moreover, Stavy (2019) examined the impact of using language games on students' vocabulary retention. The pre/posttests were used to measure the vocabulary retention of the students. Prior to the pre-test, all (64) participants were taught for two weeks using the conventional teaching method by getting students to look words up in the dictionary, write definitions, and use the words in sentences. The findings revealed that there was a significant difference in vocabulary retention between the pre/posttest. The participants were able to retain significantly more words in the posttest than in the pre-test. This study revealed that language games could help to boost the students' vocabulary retention if they were given a chance to learn and practice English language in a fun learning environment.

Stephan (2016) assured that simulation games might be useful tools for supporting foreign language education. A treatment group used an online vocabulary learning application (Quizlet) in conjunction with a simple simulation game (3rd World Farmer), and a control group used the vocabulary learning application alone. Although using the simulation game showed no short-term benefit, the experimental group outperformed the control group on a delayed post-test administered (11) weeks after the treatment. As a result, the effect of simulation games could be used in foreign language learning to improve long-term retention of target language vocabulary.

Taheri (2014) investigated the effect of using language games on (32) elementary students' vocabulary retention. For the control

group, a traditional method of teaching vocabulary namely drills, and definitions were used while for the experimental group, language games were used. The treatment was conducted once a week and the study took four weeks. Three post-tests were administered for both groups during the study, following the specified number of weeks after the treatments. The third posttest was administered to determine the participants' vocabulary retention in both groups. The study revealed that the effect of the game like activities was more significant in the delayed time than the immediate one. It was concluded that using language games has very significant effect on vocabulary retention and recall of the participants.

10.3. Vocabulary learning and retention activities

Sam & Innaci (2017) mentioned some activities:

1. Using Image Cues: Using image cues in an activity designed to help students understand a word by decoding a series of images. This activity is primarily used to help students think of words what the images signify.

2. Four Pictures, One Word: This activity was derived from the smart phone game called 4 Pic 1Word developed by LOTUM GmbH for android phones. Similar to using the image clue activity, students have to guess the word that is in common with the four given pictures. This is an effective activity to help students learn new words and also, retain them. Students in course of doing this activity, recall all the words they have learned to arrive at the correct answer. This helps them to remember the words for a longer duration.

3. Connections: Images play a vital role in the process of vocabulary learning and retention. This is an activity where students

were exposed to a series of images placed in a particular order which implies a word or a phrase. Students have to understand the images and also the sequence in which they are placed and identify the word or phrase they imply. This was an effective activity as it motivated the students to participate in the learning.

10.4. Digital games

- **Game-based learning environments**

Processes of language learning have become more engaging by means of educational games which are believed to add fun to classrooms where students would feel more relaxed and comfortable. Games create an environment where education is mostly learner-centered, with a good opportunity for socialization when well organized, and awakening the will to win and competitive desire inside people. Freiermuth (2002) has stated that games are learner-centered since they give students the opportunity to resolve problems without the intervention of a teacher.

Game-based learning can make learners become the center of learning, make the learning process easier, more interesting and effective (Cheng & Su, 2012). According to many studies conducted to investigate the effects of games in language learning, it is seen that these entire studies highlight that game-based learning method can bring competition, motivation and relaxed or stress-free atmosphere in language learning environment, so students can learn and retain target vocabulary more quickly.

According to Kuzu & Ural (2008), when games and education are combined, it can be educative and education environments can be

entertaining. The learners who learned with the use of games, gain positive attitudes and can be more motivated while learning.

- **The benefits of using games in teaching English language**

Different scholars, linguists, and teaching approaches support untraditional teaching methods in which novel ways are applied inside and outside the classroom. These ways may include internet, online games or online assignments. It is to be mentioned that there is a consensus on the benefits of using games as a tool for teaching English language:

First, games create an interesting and fun learning atmosphere in which students are motivated to learn and participate in class (Quispe, 2016). Since games are based on actions rather than explanations, they capture attention and sustain motivation (Schifter, 2013). According to Garris (2002), games succeed in increasing students' interest in subjects which enhances their concentration during class. In addition, games usually have a clear and specific goal, for this reason; they trigger critical attention and motivation (Saha & Singh, 2016). Thus, whenever the outcome does not meet the aims of the game, learners would put more effort or attention, and attempt to reduce the fault and achieve what is required.

Second, according to Milczynski (2011), when learners play games, they learn to evaluate, synthesize, analyze and organize information. Furthermore, when students are interested in the games and feel the sense of friendly competition, they “grasp the complexity of problem-solving” and become more encouraged to think of different ways to solve the game.

Third, while playing games, learners do not think of their worries and escape a daily routine, which gives them space to enjoy themselves (Wechselberger, 2013). As stated by Giannakos (2013), enjoyment measures how the game helps achieve the objectives of the lesson and the usefulness of the game.

- **Game as a natural part of children's life**

Early childhood education has a serious impact on the child's personality, upbringing, education, socialization, development, and academic success from the preschool period to the university and beyond. In general, traditional teaching methods usually have a fixed learning structure which disables the child to be motivated, creative and innovative. Learners receive theoretical rather than practical instructions, which discourage them from keeping and recalling concepts and information more quickly.

Moreover, traditional teaching usually lacks attracting the full attention of learners which decreases their interaction, engagement and investment in the content. Thus, the development of innovative approaches offering better education is an effective way to address this problem. On the other hand, recent researches in the fields of cognitive science and educational neuroscience show that play-based learning is a promising approach to use in early childhood education (Lamrani & Abdelwahed, 2020).

Children are not expected to sit down or do the same activity for a long time because they lose interest after several minutes (Harmer, 2001). Due to their short attention span, they need variety of learning activities. Children talk about what they know in their mother tongue which helps them to learn. Due to the imaginative language

skill young learners bring into the classroom, English teachers need to provide them with a learning environment where they could express themselves effortlessly. At the same time, teachers can encourage them to actively construct language for themselves. That is why games are essential and useful for vocabulary retention. Since young learners have a short attention span, their vocabulary learning activities need to be as engaging as possible or they may lose interest after ten minutes (Bakhsh, 2016).

One method of learning for children is by playing while learning. Actually, recent educational neuroscience researches show that the best way to teach children is through playing, getting their attention, their engagement, receiving feedback and consolidating their skills. Early year's education should provide children with a rich variety of play activities and challenging experiences in a stimulating environment. Indeed, play is an essential activity for children to enhance their creativity and learning skills.

For children, playing is the natural way to improve their future skills starting from their early age. When they play, they use plenty of their senses to capture and acquire diverse information and extend their knowledge about their environment. Moreover, children will develop new skills and abilities (e.g., talking, thinking, etc.) through playing. In fact, learning through playing is a pedagogical strategy that is increasingly used in education (Lamrani & Abdelwahed, 2020).

Kalaycioglu (2011, P. 11) suggested that:

Among foreign language teaching techniques, educational games are seen as appropriate and powerful for very young children because the nature of the games fits the nature of the children.

Games are fun for children and they include interaction, physical and cognitive activity, socialization, competition and cooperation. Moreover, children learn individual and group work, their motivation and interest increase in games. Also, games are child-centered, they can be adjusted according to the educational aims and the age levels of the children.

In recent years, the computer has become very common in schools. The use of computers and the internet and its multimedia capacity are natural for children. This is why schools should employ them as often as possible to increase their learners' achievement (Sütteő, 2004). Labbo (2000) has mentioned that teachers have concerns about the use of this kind of software in the class. Learning via computer games can be considered as surreal and outrageous. Computer can be an effective tool for enhancing learning even though they pass much time by playing online games. Recently, a movement has been a foot to examine how online games work as pedagogical devices.

The most important reason to focus on teaching vocabulary through digital games, or gamified learning more generally, was that the use of technology as well as games, gamification and playfulness in learning are seen as part of the ongoing change in school culture. Nowadays digital games have such an important part in the lives of children and adolescents, and games are also an excellent way to implement participatory pedagogy (Krokfors, 2014, P. 13). According to Whittton (2014, P. 15), digital games facilitate learning in several ways, the four main ways being the following: "1) games instigate

active learning; 2) they create motivation; 3) they allow for meaningful play; and 4) they act as learning technologies”.

- **The role of games in vocabulary learning**

Learning vocabulary through games had attained a lot of attention. Donmus (2010, P.1497) believed that "The value of educational games has been increasing in language education since they help to make language education entertaining ". The learners who learned with the use of games, gain positive attitudes and can be more motivated while learning". Using educational games for teaching vocabulary has been very popular for several decades. Different studies revealed that games are beneficial in vocabulary learning because they enhance students' ability to memorize words, encourage student's interaction, improve their communicative skills and enhance students' motivation. Games also can help the teachers to create contexts in which the language is useful and meaningful.

Riahipour & Saba (2012) mentioned that traditional activities such as memorization of long vocabulary lists, derivations, repetition of words, translation, fill-in-the-blank exercises are boring for students. They also stated that using long list of words and their translation items make no guarantee that remembering will take place. By using vocabulary games, learning process is going to be more valuable, this method can make vocabulary learning more enjoyable, so it can help students to retain target words more quickly.

- **The role of games in vocabulary retention**

In order to learn and retain new words, learners should participate in different task-based activities in their classroom. Such activities

include vocabulary games which especially focus on helping learners develop and use words in different contexts by making the lessons enjoyable. Therefore, it is necessary to explore whether students learn vocabulary effectively through games and how they learn it. Many experts of language teaching methodology agree that playing games is a good way to learn vocabulary, especially in communicative language teaching classes. Games, in the learning process, help students to retain vocabulary more quickly and easily (Bavi, 2018).

According to Carter & McCarthy (1988, p. 67), new words are forgotten if they are not recycled in some way and make them into long-term memory. In order to learn vocabulary, words have to be recycled numerous times. Through regular recycling, children can be given opportunities to meet the same vocabulary, embedded in different contexts, languages and activities types. This not only improves their recall and develops memory processes, but also extends their understanding and associations of vocabulary in an ever expanding network of meaning and use. As games provide another encounter with the target words, they have the advantage of being fun, competitive, and consequently, memorable (Sökmen, 1997, P. 242).

Methodologists agree that games can help students review vocabulary effectively. According to Hadfield (1999, p. 91), in order to retain a word, students have to go through three distinct processes: (1) fix the meaning of the word in their mind, (2) make the word their own, (3) use the word to communicate with others. He added that games can help the learner through these three

processes. It can be said that games are very effective in helping students increase exposure to vocabulary.

For many children between four and twelve years old, language learning will not be the key motivational factor; games can provide this stimulus. Using games helps the students to relax; they remember things faster and better. Moreover, games can lower anxiety, thus making the acquisition of input more likely. Nguyen & Khuat (2003, p. 11) assured that students tend to learn and retain new vocabulary better when it is applied in a relaxed environment like playing vocabulary games. In short, games are very effective in motivating students in learning vocabulary.

Nowadays, there is an increasing interest in using technology in different fields of human life, particularly, in education. In addition, the use of technology has a significant effect in various social and cultural contexts, as it helps in improving the language of children as well as increasing their cultural awareness. The integration of educational online games in teaching vocabulary has a growing popularity due to the widespread belief on its potential to enrich the learning process. Online games are potential tools in vocabulary learning as they raise learners' learning satisfaction, and foster autonomous learning among learners (Hasram, 2020).

- **Online games in learning and retaining new vocabulary**

The integration of online games in vocabulary learning has given opportunities for learners to practice, learn and acquire multiple skills simultaneously. Barab (2009) confirmed that online games could facilitate learning experience through the use of games elements, games thinking and games mechanics which make learning more fun

and rewarding in comparison to less attractive and passive traditional learning (Letchumanan, 2015). Fun and motivating learning environment raises learners' satisfaction in learning, thus, promotes high engagement among learners (Khalid & Quick, 2016) and increase their level of English proficiency (Nejati, 2018).

According to Donmus (2010, p.1499) "using computers and web in language teaching provides more effective learning compared to traditional methods, increases the motivation of the learner, develops positive attitudes in students, and increases the retention process". According to (Turgut & Írgin, 2009) online computer games show potential in promoting learning. They also suggested that young learners who are playing online games can promote their language learning and especially vocabulary skills.

Yip & Kwan (2006), in their study entitled "Online vocabulary games as a tool for teaching and learning English vocabulary", sound that learners playing online vocabulary games tend to learn more appropriately and could retain the new words for a longer period of time and retrieve more words compared to those who aren't provided with vocabulary games. Vocabulary instruction is a long-time process. If the games are fun, relaxing, motivating and confidence boosting, the learners' interest will increase.

Derakhshan & Khatir's (2015) study provided a literature review on the implementation of games as a language learning platform. With the use of vocabulary games, ESL and EFL learners' learning processes are enhanced as digital games help them to retain target words (Riahipour & Saba, 2012). Aghlara & Tamjid (2011) further suggested that digital games were beneficial in helping young English

learners in vocabulary acquisition as these games were able to capture their attention.

- **Types of Digital Games**

Noraddin & Kian (2014) classified digital games into two main types:

The first kind is instructional games. Educators use this kind to achieve certain educational goals with fun elements. Doing exercises can help the players of these games to learn a foreign language vocabulary. Preschool children use instructional games to help them in memorizing vocabulary.

The second kind of games is commercial-off-the shelf. Connolly (2012) showed that educators or teachers use these games without any instructional considerations or objectives. These games are used for the fun element only. However, other scholars indicated that all games (COTS) can be used to achieve instructional and entertainment goals (Ellaway, 2016).

- **Benefits of Digital Games**

The effect of using technology in issues such as student success, attitude, motivation and retention, have been investigated in different fields. One of these fields is language learning. When looked at the studies conducted to investigate the effects of computer and web in language learning, it is seen that all these studies highlight that using computers and web in language teaching provides more effective learning compared to traditional methods, increases the motivation of the learner, develops positive attitudes in students, and increases the retention process (Donmus, 2010). Many studies have emphasized that games have positive impacts on learning vocabulary, especially on children (Prensky (2003), Gee (2012), Van Eck, (2006)).

Games can be used to strengthen the communicative approach in language teaching since it can help the teacher to create a meaningful context for students to communicate in the second language. Moreover, as digital gaming becomes part of everyday lives today, it can be an alternative in making language learning more enjoyable and practicable. Digital games provide an actual learning environment in which students collaborate with each other (Derakhshan & Khatir, 2015). Kalaycioglu (2011) stressed the importance of digital games, as these games make the students the center of activities in the class. That is why games can be altered in line with children's instructional goals, their age as well as their level.

Luan & Azizie (2021) illustrated the role of online gaming in motivating ESL learners to learn English words in an immersive digital environment. In addition, the findings also showed that the immersive and multidimensional attributes of online games can enhance the learning capabilities of ESL learners as this learning platform is learner-centered, as opposed to the teacher-centered approach used in a conventional classroom setting. Amidst the present global COVID (19) pandemic, the findings of the current study have demonstrated how online games can enhance English language learning experience of learning beyond the classroom context.

Letchumanan (2015) compared the effects of two language games – paper based or computer-based on vocabulary size of Form Four students especially at the (2000) word-level. Seventy students were involved in this study i.e. thirty-five in each group. The results showed a significant gain for the computer-based

games. This study provides evidence that the computer-based games had better influence on students' vocabulary enhancement than the paper-based games.

Aslanabadi & Rasouli (2013) investigated the effect of games on improvement of Iranian EFL vocabulary knowledge in kindergartens. The aim of their study was to find a way to help young EFL learners fix the novel vocabulary in their minds. The study was conducted at two kindergartens. They divided the students into the experimental and control groups. The experimental group was given an online language teaching game and the control group was given regular teaching. The result revealed that games not only bring fun for learners, but they also motivate learners and improve their confidence.

Moreover, Saffarian & Gorjian (2012, P 44) investigated the role of computer-based video games on facilitating children's cognitive learning. Their study investigated the effect of the varied types of instructional delivery strategies on children's learning achievement. The subjects were comprised of (418) EFL teachers and learners. The students' received two different instructional treatments: (1) traditional computer-assisted instruction (CAI) programs; and (2) a computer-based video game. The results revealed that "the experimental group who used computer games outperformed the control group who did not use it as a teaching aid in foreign language classroom. As a result, computer games can play a facilitative role in teaching and learning the second language.

11. Design of the experiment

The present research used the quasi experimental design of a control and an experimental group of pre/posttest application to study the impact of using digital games on developing vocabulary learning and retention of kindergarten children. The experiment lasted for two weeks, a class period for three days a week. The course selected for this experiment was presented from English Connect Book (I) of KG 2.

12. Participants of the research

Twenty male and female children of the second level (KG 2) were chosen voluntarily from Hamed Gouhar Governmental Distinguished Language School at Hurghada city. The participants of the experimental group were instructed by using digital games, while twenty male and female children were chosen as the participants of the control group who were instructed by using the traditional method.

13. Variables of the research

➤ The independent variable is:

Using digital games in teaching the suggested unit

➤ The dependent variables are:

English language vocabulary learning

English language vocabulary retention

14. Materials and instruments of the research

1. Designing the digital game based unit:

➤ Objective of the unit:

The suggested unit aimed at developing kindergarten level (2) vocabulary learning and retention by using digital games.

➤ **Procedures of designing the digital game based unit:**

- Reviewing previous studies related to digital games in the EFL classroom, the process of vocabulary acquisition in the kindergarten level, the procedures of teaching vocabulary.
- The researcher analyzed the content of unit one included in KG 2 EFL textbook of the first term, to extract the vocabulary items that should be taught in this unit. By analyzing the selected unit, it was revealed that the unit included (14) words that were:
 - Numbers from one to nine (nine words).
 - Action verbs (run – kick – jump – climb – skip).
- The researcher selected digital games. They were at the linguistic level of children and were easy to use by children in KG 2. They aimed at helping the children to learn and use the vocabulary items.
- The researcher submitted the digital games to the jury members who affirmed their simplicity and appropriateness to the linguistic level of KG 2.

➤ **Content of the unit:**

The digital games based unit consisted of six lessons, each lesson included a digital game that helped in achieving the objectives of the lesson. Each lesson was targeted to teach the children a group of vocabulary items. The following issues were put into consideration:

1. The book handled mainly vocabulary learning activities and procedures; connect plus English book focused mainly on learning vocabulary items and sounds of letters. Accordingly, each lesson included presentation of the new vocabulary items through video tubes, songs, drawing and flash cards, analyzing each word to its

letters and sounds, and then the children were exposed to practice activities through digital games. Thus, the teaching procedures in each lesson included objectives, presentation, description of the game, practice and an evaluation of the unit.

2. Digital games require every child to sit on a computer or have a smart phone and practice the suggested game.
3. The digital games were available online for the experiment. The researcher made sure the availability of the internet for every child.
4. Children were trained to play the game by the teacher.

2. Designing Vocabulary learning test

1. Reviewing literature related to measuring and assessing vocabulary learning in Kindergarten classrooms.
2. Setting up the objectives of the test that include:
 - a. Identifying words of numbers.
 - b. Identifying action verbs (kick – skip– jump– climb– run).
3. Developing a table of specifications. The table specified the content and number of items, guaranteed that all the learning intended outcomes were measured, and assured that the numbers of questions were suitable for assessing all the objectives.
4. Selecting the types of the questions included in the test. The test included (25) questions of two types: multiple choices and matching. The choice of such types of questions was due to their high degree of objectivity, their high indices of validity and reliability and their easiness of scoring and children's linguistic level.
5. Preparing the instructions of the test. They were easy, clear and short.

6. Scoring the test. The maximum test score was (25) marks; (1) mark per question.
 7. Judging the initial form of the test. To determine the validity, appropriateness and suitability of the test, it was submitted to a jury of EFL teachers, supervisors and staff members who approved its validity and recommended changing some pictures as they weren't clear enough. In light of the modifications, the test was adapted and prepared for the pilot study.
 8. Piloting the test: the test was piloted to a group of (30) kindergarten children using the test–retest method with two weeks as a breaking time.
 9. Preparing the final form of the test. In light of the jury modifications and the results of the pilot study, the test was built in its final form to be used in the basic experiment.
- **The reliability of the vocabulary learning test:**

The reliability of the test was determined by using two ways:

1. Cronbach Alpha formula:

The reliability coefficient of the test was (0, 927) and it was found to be significant at (0,01) level which is acceptable by Allam (2000).

2. Test Re/test method:

The test was administered to a randomly chosen sample of (30) KG 2. The pilot study was conducted two weeks prior to the administration of the research. Correlation between children's total scores of the test in the two administrations was calculated using Pearson Product Moment correlation. The reliability coefficient of the

test (0,864) was found to be significant at (0,01) level which is acceptable by Allam (2000).

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Table (1)

Applications	Mean	SD	Correlation	Sig.
First	10.73	1.81	0.864	0.01
Second	12.6	1.77		

3. Item analysis:

After scoring the test, an item analysis was done to evaluate the effectiveness of the items. The analysis was used to determine:

- How far the test items were difficult
- How far the test items discriminated between high and low achievers

4. Difficulty index:

An analysis of children's responses to individual items was conducted to determine the item difficulty index of this test. The value of difficulty was ranged from (0.33) to (0.7). Thus, these values are very suitable and within the acceptable level.

Table (2)
Difficulty Index

Question	Difficulty Index	Questions	Difficulty Index
1	43.3	16	56.67
2	46.67	17	56.67
3	36.33	18	46.67
4	33.33	19	60
5	33.33	20	53.33
6	33.33	21	60
7	36.67	22	56.67
8	43.33	23	33.33
9	53.33	24	33.33
10	50	25	40
11	40		
12	50		
13	56.67		
14	56.67		
15	50		

Discrimination Power Indices:

An analysis of students' responses was done to determine how well each item discriminates between high and low level achievers. The discrimination indices were found to be acceptable as they ranged from (0.46) to (0.86).

Table (3)
Discrimination Indices

Q	1	2	3	4	5	6	7	8	9	10
Disc	0.6	0.6	0.73	0.8	0.8	0.8	0.86	0.66	0.8	0.8
Q	11	12	13	14	15	16	17	18	19	20
Disc	0.8	0.8	0.73	0.66	0.66	0.6	0.53	0.6	0.53	0.6

Q	21	22	23	24	25					
Disc	0.53	0.46	0.8	0.8	0.73					

15. Procedures of the experiment

To execute the experiment, the following procedures were done:

➤ Pre testing

To achieve homogeneity between both experimental and control groups of the research, the researcher divided the participants into two equivalent groups based on the results of the vocabulary learning pre-test. Results of the pre-testing ensured that there were no statistically significant differences between the mean scores of the experimental group and the control group in the pre-test of the English language vocabulary learning.

Table (1) shows no statistically significant differences between the mean scores of both the experimental and control groups in the pre-test of vocabulary learning, as the "Z" value (0.867).

Table (4)
Z-test Results of the children in the Pre-Test of
English language vocabulary learning

Group	No.	Mean of ranks	Sum of ranks	(Z)	Sig
Exp.	20	20.20	404.00	0.867	NS
Control	20	20.80	416.00		

➤ Teaching

The researcher taught to the experimental group by using digital games, whereas every participant sat on a computer and practiced the suggested game to learn and use the vocabulary items.

➤ Post testing

After teaching the content, the vocabulary learning test was re-administered to the participants in order to measure the effectiveness of using digital games to develop English Language vocabulary learning and retention and to compare the performance of both groups. As a result, there is a correlation between the mean scores of the experimental group in the post and follow up testing of English Language vocabulary learning.

Table (5)

Mean scores of the experimental and control groups in the English Language Vocabulary learning test

Group	Pre		Post		Follow up	
	SD	mean	SD	Mean	SD	Mean
Exp.	1.429	8.40	1.276	22.45	1.182	22.65
Control	1.927	8.65	1.917	8.90		

16. Results and findings

The quasi experimental design of the research depended on comparing students' scores in the test before and after teaching by using digital games, and comparing the children's scores of both the control and the experimental groups in the English Language vocabulary learning test. The researcher analyzed the quantitative data using "Z" test formula.

➤ Testing Hypothesis (One):

There were statistically significant differences between the mean scores of the experimental group in the pre/posttest of the English Language vocabulary learning favoring the post application.

Table (6)
Wilcoxon Signed Ranks Test Analysis of Scores Obtained By the
Experimental Group in the Pre/Post Test of the English Language
vocabulary learning

Administration	No.	Mean rank	Sum of ranks	(z)	Sig	Effect size
Negative ranks	20	00	00	3.924	0.01	0.88
Positive ranks		10.50	210			

Maximum score= 25

The table indicates that the suggested unit based on digital games was effective in developing English Language vocabulary learning of KG 2. The effectiveness of the digital game based unit was calculated using Etta Squared formula. Effect size = (0.88), according to Yao (2003) these results indicate a high degree of effectiveness.

➤ **Testing Hypothesis (Two):**

There were statistically significant differences between the mean scores of both the experimental and control groups in the post-test of the English Language vocabulary learning favoring the experimental group.

Table (7)
Mann Whitney Test Analysis of Scores Obtained by the Control and
Experimental Groups in the Post-Test of English language Vocabulary
Learning

Group	No.	Mean rank	Sum of rank	(z)	Sig	Effect size
Control	20	10.50	210	5.444	0.01	0.86
Experimental	20	30.50	610			

Maximum score= 25

The table indicates that the suggested unit based on digital games was effective in developing English Language vocabulary learning of KG 2. The effectiveness of the digital game based unit was calculated using Etta Squared formula. Effect size = (0.86), according to Yao (2003) these results indicate a high degree of effectiveness.

➤ **Testing Hypothesis (Three):**

There were no statistically significant differences between the mean scores of the experimental group in the post and follow up test of the English Language vocabulary learning.

Table (8)

Wilcoxon Signed Ranks Test Analysis of Scores Obtained by the Experimental Group in the Post/Follow up Test of the English Language Vocabulary Learning

Administration	No.	Mean rank	Sum of ranks	(z)	Sig
Negative ranks	20	00	00	1.414	NS
Positive ranks		1.50	3.00		

Maximum score= 25

The table indicates that the suggested unit based on digital games was effective in keeping English Language vocabulary retention of KG 2.

17. Discussion

The traditional methods for learning unknown vocabulary have not been so successful and students as well as teachers are tired of the routine ways of teaching words. Whereas, Learning English has to be taught in creative and interesting methods, and computer-assisted language learning (CALL) systems often use to engage learners more in the learning process, using computer games inside the

classroom in one of these methods. Computer games taking its place in game culture with the advance of technology, provides surfing in the virtual environment in which rich discovering opportunities are available (Wheeler, 2009).

The participants' responses on the pre-test showed that they were at a low level of vocabulary learning. After being instructed by using digital games, the participants' English Language vocabulary learning and retention developed highly. These results may be due to several reasons: the children were exposed to enough activities; therefore, enough training for the children could be a reason for their ability to perform better. This research provided evidence that focused training in using digital games that can produce an observable development in English Language vocabulary learning and retention.

The findings of the current research are consistent with Nguyen's & Khuat's (2003) findings that students tend to learn and retain new vocabulary better when it is applied in a relaxed environment like playing vocabulary games. The results also resonate with Alemi (2010) who found that using games had positive effect on expanding learners' vocabulary.

Therefore, the impact of using digital games on developing English language vocabulary learning and retention of kindergarten children has been verified.

18. Recommendations of the research

In light of the research results, the researcher recommends the following:

- Vocabulary learning and retention in the pre-school stage need a real care.
- Integrating technology into the process of learning vocabulary is very important; as it creates a motivated environment for learning and helps the learners to recall the unfamiliar words more quickly and easily.
- Using digital games provide a good learning environment for expanding children's vocabulary.

19. Suggestions for Further researches:

- Using digital games to develop thinking skills of kindergarten children.
- Using digital games to develop pronunciation skills of kindergarten children.
- Using digital games to develop speaking skills of kindergarten children.

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