The Effectiveness of Using SCRATCH Applications in Developing Sixth Graders' English Vocabulary, Its Retention, and Self-Efficacy

Abstract:
This research aims to investigate the effectiveness of using applications in developing sixth graders' English language vocabulary, its retention, and self-efficacy. To achieve this aim, the researchers adopted the experimental approach and recruited a sample of (44) EFL (English as a Foreign Language) male learners researching at Belal Ben Rabah Elementary School for boys (A) in the middle area of Gaza Strip. The researchers chose two out of four classes in the school and purposively assigned one class as the experimental group consisting of (22) students and the other as the control group consisting of (22) students. The traditional method was used in teaching vocabulary to the control group, while the applications were used with the experimental one in the second term of the school year (2016-2017). As a main tool for the research, the researchers used an achievement test of four questions designed and validated to be used as pre- and post-test. The test was applied in the beginning to ensure the equivalence of the two groups’ achievement levels and then it was applied as a posttest to detect any discrepancies attributable to using Applications. In addition, the researchers used the same test to measure the vocabulary retention after using applications then a self-efficacy scale to investigate the level of self-efficacy beliefs to the students gained towards learning English in general and vocabulary in particular. The findings of the research revealed that there were significant differences in learning English vocabulary between the experimental and control groups in favor of the experimental group, and this was attributed to using applications. Based upon the previous findings, the research recommends the suitability of using applications in teaching and learning English vocabulary to bring about better results in students' achievement. Also, the researchers suggested that further research should be carried out on the effectiveness of using applications on teaching different English language approaches as well as other school subjects such as science.

Keywords: SCRATCH, Vocabulary, Retention

Keywords: فاعلية فاعلية استخدام تطبيقات برمجة سكراتش في تطوير مفردات اللغة الإنجليزية واستبقائها وفعالية الذات لدى طلبة الصف السادس

الملخص:
هذ النوع من البحث يستهدف فاعلية استخدام تطبيقات برمجة Sкрatch في تطوير مفردات اللغة الإنجليزية واستبقائها وفعالية الذات لدى طلبة الصف السادس. من أجل تحقيق هذا، تم تقييم النتائج على عينة من (44) طالبًا من مدرسة بلال بن رباح الأهلية في وسط القطاع. وقد اختار الباحثان بناءً على نتائج مقاييس المعادلة الكميّة بين طلبة الصف السادس، لإعداد بيئة تكنولوجيا برمجة Sкрatch في دراسة اللغة من خلال استخدام تطبيقات برمجة Sкрatch في الصف السادس. وقد تم استخدام اختبار الأداء كأداة رئيسية لقياس التأثير، وتمّ هو كأداة مراقبة للتحديد من صدق الاختبارات. وقد اختار الباحثان استخدام النظرية التكيفية كأداة لقياس الفائدة من الاختبارات المعادلة، تم استخدام اختبارات تطوير النظريات، إذ تمّ اتخاذ نتائج لهذه الاختبارات لقياس فاعلية تطوير مفردات اللغة الإنجليزية، وذلك من خلال تطبيق نتائج اختبارات اللغة الإنجليزية والنتائج المستدامة. وتعد هذه النتائج أداة مراقبة للاتجاه بحرية تطبيقات برمجة Sкрatch في مجال اللغة الإنجليزية فينان، أنشئ الاستبانة لغة اللغة الإنجليزية ومشاركة النتائج. في هذه النتائج, أخذت الباحثان مراقبة لدراسة تأثير استخدام تطبيقات برمجة Sкрatch في تطوير مفردات اللغة الإنجليزية. وفي هذه النتائج, أخذت الباحثان في دراسة تأثير استخدام تطبيقات برمجة Sкрatch في تطوير مفردات اللغة الإنجليزية، وقادراً على إجراء المزيد من الدراسات للعثور على أن تطبيقات برمجة Sкрatch على مدار أخرى في اللغة الإنجليزية والمواد الأولى مثل العلوم المشتركة، باستثناء ما سبقه من الدراسات للعثور على أن تطبيقات برمجة Sкрatch على مدار أخرى في اللغة الإنجليزية والمواد الأولى مثل العلوم المشتركة، باستثناء ما سبقه من الدراسات للعثور على أن تطبيقات برمجة Sкрatch على مدار أخرى في اللغة الإنجليزية والمواد الأولى مثل العلوم المشتركة.
**Introduction**

English language is considered as one of the most commonly languages which used among foreign language speakers all over the world. Throughout the world, when people from various countries, whose mother tongue is not English, want to contact, speak and communicate with each other’s, they generally use English language. That is why it is called “the language of communication”. Moreover, speaking English language will enable people to contact other people worldwide and to travel more easily among countries and that by using the English language.

Performance, according to Kara (2009), is also affected by the learners’ conceptions and ideas regarding what they learn. Hence, students’ unfavorable image towards the English language and its basic skills may have a role in their low achievement. Students who are optimistic about learning a language may –indeed- develop positive attitudes towards it. This, in turn, will encourage them to find the best learning methods, and willingly give the time, effort and research necessary for effective learning. On the other hand, pessimistic conceptions towards language learning may cause class anxiety and low performance (Victori& Lockhart, 1995). As such, learners’ attitudes are arguably a main factor of language learning outcomes.

While receptive vocabulary is the words that students recognize upon reading or hearing, expressive vocabulary refers to the words students actually use in their speaking or writing. Joshi (2005) stresses on the students’ need of space and convenient climate for practicing the words they learn, rather than the mere focus on teaching them more words. It is the teachers’ responsibility to bridge the gap between the two concepts through offering the students the chance to use their receptive vocabulary. This should reinforce their vocabulary, which will help them to further expand it and retain the words they learn for very long and use them when needed.

Computer application such as SCRATCH Software in particular has been widely used in the educational process around the world. Their effectiveness has been an increasingly interesting topic for, who seek to provide the students with the ultimate learning experience. In order for the learning atmosphere to be convenient for the children, it needs to be constantly enthusiastic and vivid. The learning-teaching environment should provide these young students with abundant stimulating elements. Computers do offer such rich environment (Arslan, 2006). According to Donmus (2010), the spreading employment of computers in the educational process notifies us that students may actually benefit from computer programs in learning. It also boosts self-efficacy to the learners and learning process itself.

Many authors (e.g. Colby, 2008; Moberly, 2008; Owston, 2009) are convinced that computer programs can provide high self-efficacy scale and a better learning experience than the traditional methods, as they can offer the students an environment that matches their interests and attracts their attentiveness. Harb (2007) believes that using computers aims at enabling the students to practice the language they learn. “Computer programs are a good way for practicing language as they provide a model of what learners will use the language for in real life” (Zdybiewska, 1994: p.6). Computer programs, with their features and interactive nature, can strongly motivate students towards learning. They can provide a positive experience to learners at all ages even when the lesson is boring or difficult (Hong, 2002).

Therefore, aiming to introduce a new technique comprising several computer programs that will provide the students with a rich interactive environment to reinforce their vocabulary learning experience applications can be designed to provide activities that reinforce the school curriculum,
which will help both students and teachers and improve the educational process. The current research aims at investigating the effectiveness of applying Applications in teaching English language vocabulary to sixth graders.

**Statement of the Problem**
Throughout the researcher's experience in the field of teaching the English language, they have been noticed that students faced great difficulties in vocabulary learning and retention and showed an aversion to English. These problems—the believe may be attributed to teachers’ application of traditional techniques that might hinder students’ learning and retention of the English vocabulary. Thus, the researchers feel that there is an urgent need to use new strategies (such as SCRATCH application) to solve the problems faced by students in developing and retaining vocabulary and self-efficacy, which may positively affect their achievement in English language in the future.

**Research Questions**
The research problem can be stated in the following major question:
What is the effectiveness of using SCRATCH applications in developing sixth graders' English vocabulary, its retention and self-efficacy?

**Research Sub–questions**
The research is directed to answer the sub questions below, so as to meet the objective of the research:

1. Are there statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of the control group and those of the experimental one in learning English language vocabulary in the post-test?
2. Are there statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of the experimental group in English language self-efficacy scale in the pre-posttest?
3. Are there statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of the experimental group in English language self-efficacy scale in the post-delayed test?

**Research Hypotheses**
The research tests have the following Hypotheses:

1. There are no statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of the control group and those of the experimental one in learning English language vocabulary in the post-test.
2. There are no statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of the experimental group in English language self-efficacy scale in the pre-posttest.
3. There are no statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of the experimental group in English language self-efficacy scale in the post-delayed test.

**Limitations of the Research**
1. This research will be applied on sixth grade male students enrolled in the school year (2016-2017) at Belal Ben Rabah Elementary School for boys (A) and exclude female learners.
2. The research will be limited to teaching the English language textbook “English for Palestine 6B”, vocabulary lessons, in units (3 and 4) only.

**Previous Studies**
A) Previous Studies Related to SCRATCH Software
Korkmaz, (2016)
The purpose of this research was to examine the effects of SCRATCH-based game activities on students’ attitudes towards computer programming, self-efficacy beliefs and levels of academic achievement. The research adopted the quasi-experimental approach. The research used pre-posttest as the research tool. The research was conducted on (49) students who studied at the Faculty of Engineering in Turkey. SCRATCH-based game activities had no effects on students’ attitudes and self-efficacy perceptions.

Park & Shin (2014)
The research aimed at investigating the effect of using SCRATCH Software programming in math on problem solving ability of primary students. The research adopted the experimental approach using one sample as the experimental group consisting of (46) students in Korea. The research used a test of (34) questions for measuring the problem-solving skill. The research results showed that there was a positive effect on divergent thinking, decision making and planning ability. SCRATCH Software program was effective in helping students to solve problems.

Kobsiripat (2014)
The research aimed at defining the effects of media on promoting SCRATCH Programming capabilities and the creativity of elementary school students. The research adopted the experimental approach. The research sample consisted of one group consisting of (60) students. The research used pre-posttest. The experimental group was taught using lessons designed according to SCRATCH programming media. The results of the research showed that SCRATCH program could be used in the educational process. The research also showed that SCRATCH program was effective in enhancing creativity among elementary learners.

Papatga & Ersoy (2016)
The research examined the effectiveness of using SCRATCH program in developing reading comprehension skills among 4th graders. The research used the quasi-experimental approach on one group comprising (8) Turkish students. The experiment lasted for (15) weeks using various methods to develop reading comprehension skills. The research results showed that program was really effective in improving reading comprehension skills.

Commentary on the First Domain: Studies Related to SCRATCH
They reached the following comments

- SCRATCH Software is a program that is very suitable for young learners. It offers them an attractive environment.
- SCRATCH Software largely contributes to problem solving activities.
- SCRATCH Software could be used in different subjects. This gives the current research the strength to use SCRATCH Software in developing 6th graders English language vocabulary, its retention, and self-efficacy.
- Some of the studies proved the suitability of SCRATCH Software in improving self-efficacy among learners such as Korkmaz, (2016).

B) Previous Study Related to Vocabulary
Chen & Wang (2015)
The research explored the effectiveness of using iPad App in Taiwanese classrooms to assist learners to obtain English language vocabulary. The research adopted the experimental approach. The research sample was (74) students in a private university, (36) of which were in the
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experimental group and (38) in the control group. The research outcomes revealed that the students who used iPad got higher marks than the students taught by the traditional method. The research also concluded that using the iPad in teaching made students more motivated. The research recommended making interviews with more teachers to take their opinions about the use of iPad application.

Commentary on the Second Domain: Study Related to Vocabulary

It reached the following comments

1. Teaching vocabulary could be executed by presenting numerous new methods. This gives SCRATCH Software program a green light to be used as a new strategy to measure the vocabulary achievement among learners.

2. Most of the previous studies used the experimental approach to teach vocabulary, which conforms with the research approach.

C) Previous Studies Related to Self-Efficacy

El Qisi (2014)

The research aimed at exploring the personality traits and their relationship with the self-efficacy of social workers in Oman's schools. The research sample consisted of (75) male and (125) female social workers from different schools in Oman. A scale of self-efficacy was prepared to be distributed on the research sample. The research results showed that the level of self-efficacy among social workers was as low as (68%). The research also showed that there were no differences attributed to gender in terms of self-efficacy.

Commentary on the Third Domain: Study Related to Self-Efficacy

They reached the following comments

- Self-efficacy is raised among learners after they experience a new learning strategy that affects their performance.

- Self-efficacy may also rise among teachers, as proven by Hasona, (2009) research.

SCRATCH Software Program

![SCRATCH Software Interface](image)

Figure (1): SCRATCH Software Interface
Ford (2008) confirmed that SCRATCH Software program is one of the Educational Programming Languages (EPL) which is adopted to enhance creativity and problem-solving methods to learners. Problem-solving methods could be simply grasped by programming language based on numerous blocks.

![Image of SCRATCH game](image.png)

**Figure (2) Images of Games Sample**

**How to Use SCRATCH**

It is easy to begin with SCRATCH. Lero, (2014, p9) clarified the steps of starting SCRATCH, “Once the offline editor is installed, start it and click on Tips, Getting Started. The SCRATCH Software Project Editor is described under Tips, Getting Started, and Map of Project Editor. Click on this to view the details of the Project Editor. Next, start the Step-by-Step introduction. Step through each of the 13 steps in the Step-by-Step introduction. This Step-by-Step guide introduces fundamental programming concepts and allows participants become familiar with the SCRATCH Software programming environment.”
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Figure (3): How to Start With SCRATCH

Communicating in SCRATCH
SCRATCH Software uses Broadcast to contact between different parts of the program and spirits. Broadcast is a beneficial tool to take control of the stream of the program. It is designed to send messages from one spirit to another. It is like radio signal. The following are the steps of how we can communicate using SCRATCH.

1. Choose two spirits from the spirits folder.
2. Code each spirit to face the other. (See the figure(4))

3. Name your spirits and make sure that the spirits are highlighted in blue. (See the figure below)
4. Use the purple Looks Palette. (See the figure)

5. Sending a signal indicates that the first spirit has finished speaking in order to make the second spirit speak.

6. Click on the Events Palette.

7. Pull out the “broadcast” block. Click on the black dropdown arrow. Select message (1) or make a dissimilar name of your choice to name the message.

8. Broadcast your work on the code. Please, do not make it appear on the stage.

9. Program your second spirit.

10. Click on the second spirit in the Spirit Area.

11. Drag “When I receive message 1” block from the Control Palette or use the dropdown arrow to choose the name of your broadcast message. Student can then answer and ask something else.
12. Student can add a second broadcast to this piece of code.

13. Student can continue this way until the conversation is complete, Lero, (2014, pp19-21).

**SCRATCH Software Program in Learning**

The use of programming in education is not a modern tendency; back in the 1960s, Seymour Papert created the LOGO programming language. He allowed young learners to use computers to make their music, games and drawings (Papert & Solomon, 1971). Yet in the recent years, new visual programs such as: SCRATCH, Alic and Kodu have enhanced the attentiveness of the educational process. Those programs aimed to improve learning products and motivation among students (Resnick, 2013).

European School net Report (2014) announced that many governments all over the world were trying to incorporate computer programming as an integral part of their educational system. The report affirmed that there were already nine European countries implementing that idea. Those countries were Denmark, England, Poland, Ireland, Greece, Estonia, Bulgaria, Cyprus and Portugal. There are many endeavors in order to effectively make computer programs and games easy for learners’ use in different grades and ages. In this regard, many computer programs have been developed to suit students’ levels and attention. SCRATCH Software is one of those programs that were invented to address students’ levels and education aims. SCRATCH Software can easily attract students’ attention to the lesson being explained (Papatga & Ersoy, 2016, p. 126).

SCRATCH Software has many benefits in the learning process. First, it enhances collaborative work. In this respect, Lewis (2011) conducted a research in order to use SCRATCH Software in designing learning environments. The research aimed to assess students when they worked in programming in pairs. The research showed that using SCRATCH Software supported collaborative and pair learning.

SCRATCH Software is a way for creating entertainment among learners. Lee (2011) made a research in which he concluded that learners could get many benefits from SCRATCH Software such as entertainment and becoming creative workers involved in interdisciplinary curriculum materials. He commented on SCRATCH Software efficacy that it unleashed students’ imagination in their tasks to produce more meaningful activities.

SCRATCH Software enhances students’ problem solving strategies. Shin and Park (2014) confirmed that SCRATCH Software was an interactive tool to develop students’ problem-solving activities. In a research titled “A Research on the Effect Affecting Problem Solving Ability of Primary Students through the SCRATCH Software Programming.”, they proved that SCRATCH Software confirmed and expressed students’ thinking – especially for primary students. In the same vein, Calder (2010) made a research to prove the efficacy of SCRATCH Software to develop...
problem solving in math. He argued that SCRATCH Software played an integral role in enhancing students in problem-solving skills and in making students engage actively in motivating programming environment.

Obri, (2014) mentioned that there were many beneficial uses for SCRATCH Software in the learning process. He said that

1. SCRATCH’s importance was derived from the way it reduced the difficulty of the programming language.
2. It offered learners the opportunities to be innovative and creative.
3. It helped learners to design their own projects and apply them on the ground.
4. It prepared learners in the secondary learning stage to understand the language of programming, especially Object Oriented Programming.
5. It assisted students to learn programming core concepts such as frequency and conditions.
6. It enhanced students’ fundamental skills such as analysis, cooperation and lifelong learning.

Calao et al. (2015) affirmed that SCRATCH Software was a useful tool to develop students’ learning. They added that the research literature confirmed the usefulness of SCRATCH Software when it is used in many subjects such as English, Science, Mathematics and writing. Genç and Karakuş (2011) stated that a great number of SCRATCH Software users reported that it was simple, pleasurable and appropriate to be used in classrooms.

**English Vocabulary**

In this section, the researchers will elaborate on vocabulary definition, types, benefits in language, teaching, nature of acquisition, strategies and testing.

**Vocabulary Definition**

Vocabulary can be defined related to many views in the English Language. There researchers will explain vocabulary in the following definitions.

**The researchers view the definition of ‘vocabulary’ in famous dictionaries as follows:**

1. Merriam-Webster Online Dictionary (2010) presents three definitions for 'vocabulary': first, “a list or set of words or phrases usually alphabetically set up and explained or defined.” The second definition is that vocabulary is “A group or stock of words used by a language, collection, separate, or work or in a field of knowledge. The third definition is that “A set of terms or puzzles obtainable to be used.”
2. The Longman Dictionary (1995) defines it as, “All the words that people know, learn or use”.

**Benefits of Vocabulary in Language**

Vocabulary is an alienable part of the language and the learning process, especially in learning a foreign language such as English or any other language. Vocabulary is interrelated to other four main skills of English language: listening, speaking, reading and writing. Thus, the incapability to use vocabulary means failure in learning the four skills of English language. If students lack vocabulary, they will not be able to communicate. Students will not be able to understand English conversations or English documents if they fail to collect and understand a considerable number of words. In this respect, Wei (2007) noticed that vocabulary is a very important section in teaching English as a foreign language. Vocabulary studies are conducted to find suitable ways of better vocabulary learning. Learners’ inadequate vocabulary causes them to encounter difficulty when
they want to receive or produce information. In addition, (Folse, 2008) points out that English language learners are invited to have permanent understanding of vocabulary to better develop their cognizance of a foreign language. Vocabulary ought to be taught throughout every activity and exercise. Rivers, (1981, p28) adds, “Vocabulary cannot be taught. It can be presented, explained, included in all kinds of activities, but it must be learnt by individuals.” Learning vocabulary is one of the basic stages in learning any language. Contact and communication depend on words that are meaningful to the receivers’ ears. Lin (2002) said that learning vocabulary considered as the first step to master any language. He stated that the four skills of English language; listening, speaking, reading and writing will be immediately affected by the amount of vocabulary the learners have. Wilkins (2002, p13) stated that communication could take place without grammar, but it cannot without vocabulary. This is a very important opinion that indicated the importance of vocabulary in any language. In the same respect, Laufer (1997) stated that vocabulary is the key point and the vein of learning any language. All these opinions confirm the high importance of learning vocabulary. Some wrote about the mistakes that learners made in writing and speaking. Davies and Pearse, (2000, p 59) establish that vocabulary mistakes and errors make misperception and confusion in the communication process and make it tough and more problematic to be done properly. They added that mistaken choice of words leads to incorrect understanding that hampers the message to arrive and thus communication would not take place. Bromley (2002, p7) suggested that there are a number of benefits for learning vocabulary as follows:

1. Vocabulary establishes 80% of any test produced by learners.
2. Vocabulary raises students’ attainment.
3. Vocabulary helps to reinforce learners’ writing.
4. Since vocabulary is a tool for analyzing and evaluating materials, it constitutes thinking.

Wikins (1972) adds that vocabulary is a powerful conveyor of meaning such as the case among beginner users of the language who always communicate without using grammar. They succeed only when they use vocabulary -and not grammar-, which functions to produce good and sound English. He adds that vocabulary has more importance than grammar and communication could occur without using grammar.

To sum up the benefits of vocabulary, some new benefits for vocabulary in English language introduced:

1. Vocabulary simplifies the communication process since it is the core of any communicative context.
2. Vocabulary makes reading texts easier and helps students understand comprehensions easily.
3. Vocabulary facilitates listening and makes the words pronunciations familiar.
4. Vocabulary aids in the process of writing which is totally dependent on vocabulary.
5. Vocabulary facilitates translation.

Vocabulary eases the whole process of learning English language. The more vocabulary the learner knows, the more he/she masters different points and skills in the language.
Teaching Vocabulary

Vocabulary teaching is one of the most indispensable parts of language teaching. Vocabulary teaching supports the four main skills of English language. Teachers have stopped teaching vocabulary through the process of memorization or translation. They now use more professional techniques to teach vocabulary to students more effectively. El Farrah, (2014, p 9) indicates that it is believed that vocabulary is learnt arbitrarily (as the case in most schools). He adds that teaching vocabulary to students is one of the most difficult procedures encountering teachers in the class. The process of teaching vocabulary is not as simple as many people think. It has procedures, methods and techniques, which ought to be implemented in the class.

El Farrah, (2014, p 10) explains that there are two chief styles for teaching vocabulary that provoked argument among vocabulary scholars. The first trend is direct instruction of vocabulary. Direct and explicit instruction of vocabulary means that teachers are aware of students’ needs and the words that are suitable for learners to know and learn. Once the teacher defines the vocabulary that students need to know, he/she tries to grow fluency among learners with the previously learnt words. Teachers will present direct learning to students through certain procedures. The second trend is teaching vocabulary incidentally. This means developing vocabulary through other skills than listening, speaking, reading and writing.

Some argumentations developed among the proponents of the two opinions about their validity. Nation (2002) defends the direct and explicit method of teaching vocabulary. He expresses that teaching vocabulary systematically is better than teaching it randomly. He does not agree to teach vocabulary indirectly through the four skills of English. He says that vocabulary ought to be taught in separate courses. Many different views have tried to come in the middle of the two points. He adds that students ought to learn how to learn and know vocabulary through contexts when they encounter them.

To add more controversial opinions to the previous points of view, many academics such as Nation (2001, p232) and Twaddell (1973), affirm that learning vocabulary through texts is a very active method towards better understating of vocabulary. They add that teachers giving direct meanings of words out of their context would be considered an infertile process. They also argued that teachers had to pay attention to the plurality of words. In this regard, Craik and Tulving (1975) assert that guessing a word from a context leads to a better retention of vocabulary since it would be kept in learners’ minds for a longer period of time.

Thornbury (2002, p 22) supposes that educators should inspire students to learn vocabulary and teach them how to better learn it through various methods. In the same vein, Bromely (2002, p 11) proposes different pieces of advice for teaching vocabulary efficiently as follows:

1. Words should not be taught separately but ought to be taught in connection to other words. Teaching collocations is better.
2. Words may be presented to students reflecting the outer world through using realia.
3. Teachers ought to motivate students to learn vocabulary and show them the importance of learning it.
4. Teachers have to effectively let learners involve in the vocabulary learning process. Learners should be strongly involved in activities.
5. Learned words should be discussed among students in order to become familiar to them.
In addition to the previous suggestions, Marzan (2004) explained that there are six steps that might enhance the vocabulary teaching process as follows:

- Explaining words with pictures.
- Asking learners to use the new learned word in a meaningful sentence.
- Asking students to draw a picture of the new word.
- Teachers make students participate in activities that enhance learning the new vocabulary.
- Asking learners to discuss the new learned vocabulary with their classmates.
- Using games to activate the new words.

They added that there are a lot of procedures that may be used in class to familiarize students with new words. Familiarizing students with new words depends on many factors such as: the difficulty of words, students’ educational level, and sources offered to the teacher and the suitability of the procedure.

**The Nature of Vocabulary Acquisition**

One of the features that vocabulary has is the incremental nature of vocabulary knowledge. Schmitt (2002) asserts that the nature of vocabulary is gradual since the process of learning vocabulary begins from single word. He adds that no one could learn full sentence without knowing and learning separate words first. Learners first know the direct meaning of the word and then search for other meanings of the same words in other contexts.

Melka, (2001) adds that there is another aspect of vocabulary pertaining to the way of its use – receptive and productive. Vocabulary is distinguished by acquisition. This means that some people understand and use different words. This is divided into two kinds of the process itself. Some vocabularies are used in speaking and writing (productive), while others are understood by learners but not used in speaking or writing.

**Strategies of Learning Vocabulary**

Teachers may largely facilitate the process of teaching vocabulary to students if they simply follow the right methods and techniques taking into their consideration the students’ educational level. In this regard, Renatha (2009, p 45) states that learners do better when their teachers implemented appropriate strategies for teaching them vocabulary. She adds that suitable strategies helped students keep the words in their minds (words –retention).

**Self-Efficacy**

Self-efficacy is one of the most important concepts in amending human behavior. In this respect, El Megdadi& Abu Zaytoon (2010) points out that self-efficacy development is the key for learners’ learning and training to control themselves to reduce anxiety and develop their ability to defend their rights and face problems. They confirm that self-efficacy improved the way of positive communication with others and that helped students not to be trapped in the same circumstances. They argue that the need for developing self-efficacy is a must in the light of the changes in this life. Additionally, the social acceptance of one learner is highly impacted by his/her academic achievement.

**Self-Efficacy Definition**

One of the concepts that are much related to human achievements in all fields is self-efficacy. The concept first appeared in an article published by Bandura, (1997) and titled “Self-Efficacy toward a Unifying Theory of Behavioral Change”. In that article, Bandura reveals that self-efficacy helps in
defining the behavior of insisting and preserving among individuals. Bandura asserted that self-efficacy was a knowledgeable mediator of individual anticipations towards his/her self-efficacy. It is the tool for deciding the nature of the behavior that individuals do (Bandura, 1997, p 191).

**Elements of Self-Efficacy**

Ellwan, (2009, p 16) reports that self-efficacy is something raw and could not be noticed except by some elements that would show whether a person have high or low levels of self-efficacy. Ellwan assures that there were three elements: Self-confidence, self-assurance and mental toughness.

**Self-Confidence**

Vocabulary Online Dictionary defines self-confidence as “To be self-confident is to be secure in yourself and your abilities. When you are giving a presentation or a speech, it helps to be self-confident or at least to pretend that you are”.

Assad, (1997, p5) considers self-confidence to be an image for the internal character of a person; one who is confident always welcomes criticism. He explains that if the criticism was positive, the person who criticizes would build a new progress and take new steps based on that criticism. If the criticism is negative, the person would not deal with it out of conviction in his/her confidence.

**Self-Affirmation**

Self-affirmation is one of the most important concepts that have been investigated. This concept first appeared by Salter (1994), who called self-affirmation, as a consultant behavior. The self-affirmation concept was widely spread by Wolpe (1998) to express self and its reassurance. She confirmed that self-affirmation was the spontaneous response by a person to others, responding to questions and acts. (El Qatan, 1986, p73).

**Mental Toughness**

Mental toughness is a set of personal traits that work as protection against tough life and constitute a belief or tendency among persons that they can use their potential power. Mental toughness helps people understand the tough life logically, and makes them face it positively (Kobasa, 1997, p67) Maddi,(2004) states that Kopasais the first one to pave the way for the emergence of mental toughness. Meddia noticed that some people could achieve their goals even when they were exposed to high levels of pressure and depression. Mddia added that specialists ought to focus on the people who look forward to developing themselves since they already had the motivation to be developed.

**Importance of Self-Efficacy**

The importance of self-efficacy begins to depend on the capability of humans. El Sayed, (2001, p 165) affirms that self-efficacy have a fundamental role in fronting work pressures and making decisions. He mentions that self-efficacy is very important to exist among the high officials who would take the right resolutions for the country.

Abu El Ula, (2006, p27) claims that self-efficacy affected peoples’ future plans. He adds that people who have high levels of self-efficacy made successful plans that encouraged them to be very successful in their life. He adds that people with lower levels of self-efficacy always had negative plans.
Methodology
It introduces a complete description of the research methodology in terms of its population, sample, instrumentation, pilot research and research design. Moreover, it introduces the statistical treatment of the methods used to answer the research questions, and the hypotheses.

Type of Research Design
The researchers will adopt the quasi-experimental approach. Two groups will be assigned as the participants of the research: the experimental group, and the control group. Acquiring Vocabulary will be taught via SCRATCH Software Applications to the experimental group, whereas the traditional methods will be used with the control group.

Sample of the Research
The sample of the research consists of (44) students have been chosen purposively from Belal Ben Rabah Elementary School for boys (A) and equally divided into two groups; an experimental group of (22) students and a control group of (22) students.
Both groups were all in the sixth grade aged nearly (10-11) years old. They were equivalent in their general achievement in accordance with the statistical treatment of their results in the first term exam of the school year 2016-2017 and so, naturally, all classes were equivalent in their achievement as they were distributed according to their achievement in equivalent classes by the school administration beforehand. A pre-test was used to check the equivalence of achievement between the two groups.

Variables of the Research
The research included the following variables:
A- The independent variables represented in
   1- SCRATCH Software applications
   2- The traditional method.
B- The dependent variable represented in
   Vocabulary, its retention, and self-efficacy.

Instrumentation of the Research
Two different instruments used to achieve the aims of the research:
A- Pre-posttest: used to measure the vocabulary achievement.
B- Retention test: used to measure the retention of Vocabulary achievement.
   Both pre-posttest and retention test are the same.
   Self-efficacy scale to assess the students’ self-efficacy beliefs regards to learning English, enjoying learning English, teacher-teaching style, and learning English using SCRATCH Software applications.

The Internal Consistency Validity
Al Agha (1996: 121) asserts that the internal consistency validity indicates the correlation of the score of each item with the total average of the test. It also indicates the correlation of the average of each domain with the total average. This validity was calculated using Pearson Formula. Table (1) shows the correlation coefficient of every item of the writing achievement test.
Table (1): Correlation Coefficient of Every Item of the Vocabulary Test

<table>
<thead>
<tr>
<th>No.</th>
<th>Activity</th>
<th>Pearson Correlation</th>
<th>No.</th>
<th>Pearson Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Listening</td>
<td>0.763**</td>
<td>1</td>
<td>0.761**</td>
</tr>
<tr>
<td>2</td>
<td>Matching</td>
<td>0.599**</td>
<td>2</td>
<td>0.590**</td>
</tr>
<tr>
<td>3</td>
<td>Listening</td>
<td>0.801**</td>
<td>3</td>
<td>0.777**</td>
</tr>
<tr>
<td>4</td>
<td>Matching</td>
<td>0.570**</td>
<td>4</td>
<td>0.779**</td>
</tr>
<tr>
<td>5</td>
<td>Filling gap</td>
<td>0.424*</td>
<td>5</td>
<td>0.892**</td>
</tr>
<tr>
<td>6</td>
<td>Matching</td>
<td>0.413*</td>
<td>6</td>
<td>0.920**</td>
</tr>
<tr>
<td>7</td>
<td>Filling gap</td>
<td>0.627**</td>
<td>7</td>
<td>0.640**</td>
</tr>
<tr>
<td>8</td>
<td>Re-writing</td>
<td>0.452*</td>
<td>8</td>
<td>0.789**</td>
</tr>
<tr>
<td>9</td>
<td>Re-writing</td>
<td>0.430*</td>
<td>9</td>
<td>0.870**</td>
</tr>
<tr>
<td>10</td>
<td>Re-writing</td>
<td>0.521**</td>
<td>10</td>
<td>0.854**</td>
</tr>
<tr>
<td>1</td>
<td>Filling gap</td>
<td>0.419*</td>
<td>1</td>
<td>0.786**</td>
</tr>
<tr>
<td>2</td>
<td>Re-writing</td>
<td>0.472**</td>
<td>2</td>
<td>0.786**</td>
</tr>
<tr>
<td>3</td>
<td>Filling gap</td>
<td>0.528**</td>
<td>3</td>
<td>0.477**</td>
</tr>
<tr>
<td>4</td>
<td>Re-writing</td>
<td>0.720**</td>
<td>4</td>
<td>0.820**</td>
</tr>
<tr>
<td>5</td>
<td>Re-writing</td>
<td>0.443*</td>
<td>5</td>
<td>0.691**</td>
</tr>
<tr>
<td>6</td>
<td>Filling gap</td>
<td>0.423*</td>
<td>6</td>
<td>0.721**</td>
</tr>
<tr>
<td>7</td>
<td>Filling gap</td>
<td>0.774**</td>
<td>7</td>
<td>0.774**</td>
</tr>
<tr>
<td>8</td>
<td>Re-writing</td>
<td>0.721**</td>
<td>8</td>
<td>0.774**</td>
</tr>
</tbody>
</table>

* r table value at df (28) and sig. level (0.05) = 0.361
** r table value at df (28) and sig. level (0.01) = 0.463

The table shows that correlations of the test items are significant at (0.05) and (0.01), which indicates that there is a consistency between items. This proves that the test was highly valid for the research.

Table (2): Pearson Correlation Coefficient for Every Skill in the Vocabulary Test

<table>
<thead>
<tr>
<th>Skill</th>
<th>Pearson Correlation</th>
<th>Sig. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening</td>
<td>0.733**</td>
<td>sig. at 0.01</td>
</tr>
<tr>
<td>Matching</td>
<td>0.928**</td>
<td>sig. at 0.01</td>
</tr>
<tr>
<td>Filling gap</td>
<td>0.645**</td>
<td>sig. at 0.01</td>
</tr>
<tr>
<td>Re-writing</td>
<td>0.740**</td>
<td>sig. at 0.01</td>
</tr>
</tbody>
</table>

* r table value at df (28) and sig. level (0.05) = 0.361
** r table value at df (28) and sig. level (0.01) = 0.463

As shown in table (2), there is a correlation between the scopes and the total score and each scope with the other scopes at sig. level (0.01). This shows a high internal consistency of the vocabulary test which reinforces the validity of the test.
Data Analysis and Results

Answering the First Question

The first question was formulated as follows:

Are there statistically significant differences at (α≤ 0.05) in the mean scores of the control group and those of the experimental one in learning English language vocabulary in the post-test?

To answer the question, the researchers tested the following null hypothesis:

There are no statistically significant differences at (α≤ 0.05) in the mean scores of the control group and those of the experimental one in learning English language vocabulary in the post-test

To examine the hypothesis, means and standard deviations of the experimental groups’ results on the pre-post test were computed. Independent Samples T-test was used to measure the significance of the differences. Table (3) describes those results.

Table (3)

<table>
<thead>
<tr>
<th>Scope</th>
<th>group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t</th>
<th>Sig. value</th>
<th>sig. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening</td>
<td>experimental</td>
<td>22</td>
<td>8.727</td>
<td>1.882</td>
<td>6.287</td>
<td>0.000</td>
<td>sig. at 0.01</td>
</tr>
<tr>
<td></td>
<td>control</td>
<td>22</td>
<td>5.000</td>
<td>2.047</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matching</td>
<td>experimental</td>
<td>22</td>
<td>8.364</td>
<td>2.498</td>
<td>4.538</td>
<td>0.000</td>
<td>sig. at 0.01</td>
</tr>
<tr>
<td></td>
<td>control</td>
<td>22</td>
<td>4.000</td>
<td>3.754</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finishing</td>
<td>experimental</td>
<td>22</td>
<td>7.000</td>
<td>1.543</td>
<td>8.270</td>
<td>0.000</td>
<td>sig. at 0.01</td>
</tr>
<tr>
<td></td>
<td>control</td>
<td>22</td>
<td>2.591</td>
<td>1.968</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-writing</td>
<td>experimental</td>
<td>22</td>
<td>5.545</td>
<td>1.625</td>
<td>10.808</td>
<td>0.000</td>
<td>sig. at 0.01</td>
</tr>
<tr>
<td></td>
<td>control</td>
<td>22</td>
<td>0.727</td>
<td>1.316</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUM</td>
<td>experimental</td>
<td>22</td>
<td>29.636</td>
<td>6.723</td>
<td>8.341</td>
<td>0.000</td>
<td>sig. at 0.01</td>
</tr>
<tr>
<td></td>
<td>control</td>
<td>22</td>
<td>12.318</td>
<td>7.047</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“t” table value at (42) d f. at (0.05) sig. level equal 2.02
“t” table value at (42) d f. at (0.01) sig. level equal 2.70

As shown in table (3), the T. computed value is larger than T. table value in the test, which means that there are significant differences at (α ≤ 0.01) in the total mean score of the post-test between the experimental and control group in favor of the experimental group. The mean of the post-test in the experimental group reached (29.636), whereas the mean of the control group was (12.318). This result indicates that using SCRATCH Software applications is more effective than the traditional method in developing the students' vocabulary skills.
To show the extent to which **SCRATCH Software applications affect** the experimental group’s achievement in the **vocabulary** skills, the research applied the "Effect Size" technique (Affana, 2000, p. 42). The computed $\eta^2$ using the following formula:

$$\eta^2 = \frac{t^2}{t^2 + df}$$

And the "d" value using the following formula:

$$D = \frac{2t}{\sqrt{df}}$$

### Table (4)
The Table References to Determine the Level of Effect Size ($\eta^2$) and (d)

<table>
<thead>
<tr>
<th>Test</th>
<th>Effect volume</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small</td>
</tr>
<tr>
<td>$\eta^2$</td>
<td>0.01</td>
</tr>
<tr>
<td>D</td>
<td>0.2</td>
</tr>
</tbody>
</table>

The results of $\eta^2$ and "d" values found in Table (4) indicate a large effect size of using SCRATCH Software applications in the post-test Table (4) shows the effect size of SCRATCH Software applications of the vocabulary learning test is large.

**Answering to the Second Question**
The second Question was formulated as follows:

Are there statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of the experimental group (pre-post test) in English **self-efficacy scale**?

To answer this question, the tested the following null hypothesis:

There are no statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of the experimental group (pre-post test) in English **self-efficacy scale**.

To investigate the fourth hypothesis, the means and standard deviations of the experimental group results were computed. T. Test Paired Sample was used to measure the significance of the differences.

### Table (5)
**T.Test paired Sample Results of the Differences Between the pre-post Test of the Experimental Group in Self-Efficacy Scale**

<table>
<thead>
<tr>
<th>Skill</th>
<th>t value</th>
<th>$\eta^2$</th>
<th>D</th>
<th>Effect volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening</td>
<td>6.287</td>
<td>0.485</td>
<td>1.940</td>
<td>Large</td>
</tr>
<tr>
<td>Matching</td>
<td>4.538</td>
<td>0.329</td>
<td>1.401</td>
<td>Large</td>
</tr>
<tr>
<td>Filling Gap</td>
<td>8.270</td>
<td>0.620</td>
<td>2.552</td>
<td>Large</td>
</tr>
<tr>
<td>Re-writing</td>
<td>10.808</td>
<td>0.736</td>
<td>3.335</td>
<td>Large</td>
</tr>
<tr>
<td>Total</td>
<td>8.341</td>
<td>0.624</td>
<td>2.574</td>
<td>large</td>
</tr>
</tbody>
</table>

"t" table value at (21) d f. at (0.05) sig. level equal 2.08
"t" table value at (21) d f. at (0.01) sig. level equal 2.8
The Effectiveness of Using SCRATCH Applications in Developing Sixth Graders’ English Vocabulary, Its Retention, and Self-Efficacy

Ahmad Iseifan El Sourani
Muhammed Khamis Ihmaid

Table (6)
The Effect Size of SCRATCH Software Applications in the pre-post Test of the Experimental Group

<table>
<thead>
<tr>
<th>Scope</th>
<th>t value</th>
<th>$\eta^2$</th>
<th>d</th>
<th>Effect volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy towards learning English</td>
<td>71.589</td>
<td>0.996</td>
<td>31.244</td>
<td>Large</td>
</tr>
<tr>
<td>Self-efficacy towards enjoy learning English</td>
<td>155.00</td>
<td>0.999</td>
<td>67.648</td>
<td>Large</td>
</tr>
<tr>
<td>Self-efficacy towards English teacher and methodology</td>
<td>86.965</td>
<td>0.997</td>
<td>37.955</td>
<td>Large</td>
</tr>
<tr>
<td>Self-efficacy towards learning English vocabulary</td>
<td>57.424</td>
<td>0.994</td>
<td>25.062</td>
<td>Large</td>
</tr>
<tr>
<td>Total</td>
<td>125.56</td>
<td>0.999</td>
<td>54.801</td>
<td>Large</td>
</tr>
</tbody>
</table>

Table (6) shows that the effect size of SCRATCH Software applications is large on students' self-efficacy. This means that the effect of SCRATCH Software applications is significant.

Answering to the Third Question
The third question was formulated as follows:
Are there statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of the experimental group (post-delayed test) in English self-efficacy scale?
To answer this question, the researchers tested the following null hypothesis:
There are no statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of the experimental group (post-delayed test) in English self-efficacy scale.
To investigate the eighth hypothesis, the means and standard deviations of the experimental group results were computed. T. Test Paired Sample was used to measure the significance of differences.

Table (7)
T.Test paired sample results of the differences between the post-delayed test of the experimental group in self-efficacy

<table>
<thead>
<tr>
<th>Scope</th>
<th>group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t</th>
<th>Sig. value</th>
<th>sig. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy towards learning English</td>
<td>Post test</td>
<td>22</td>
<td>39.500</td>
<td>4.480</td>
<td>1.865</td>
<td>0.076</td>
<td>not sig.</td>
</tr>
<tr>
<td></td>
<td>Delayed test</td>
<td>22</td>
<td>39.955</td>
<td>4.359</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy towards enjoy learning English</td>
<td>Post test</td>
<td>22</td>
<td>43.636</td>
<td>4.541</td>
<td>1.116</td>
<td>0.277</td>
<td>not sig.</td>
</tr>
<tr>
<td></td>
<td>Delayed test</td>
<td>22</td>
<td>44.000</td>
<td>4.106</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy towards English teacher and methodology</td>
<td>Post test</td>
<td>22</td>
<td>37.636</td>
<td>5.368</td>
<td>1.821</td>
<td>0.083</td>
<td>not sig.</td>
</tr>
<tr>
<td></td>
<td>Delayed test</td>
<td>22</td>
<td>37.773</td>
<td>5.246</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Post test</td>
<td>22</td>
<td>37.409</td>
<td>4.758</td>
<td>0.568</td>
<td>0.576</td>
<td>not sig.</td>
</tr>
</tbody>
</table>
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Muhammed Khamis Ihmaid

<table>
<thead>
<tr>
<th>Scope</th>
<th>group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t</th>
<th>Sig. value</th>
<th>sig. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>towards learning English vocabulary</td>
<td>Delayed test</td>
<td>22</td>
<td>37.455</td>
<td>4.798</td>
<td></td>
<td></td>
<td>sig.</td>
</tr>
<tr>
<td>SUM</td>
<td>Post test</td>
<td>22</td>
<td>158.182</td>
<td>12.934</td>
<td>1.914</td>
<td>0.069</td>
<td>not sig.</td>
</tr>
<tr>
<td></td>
<td>Delayed test</td>
<td>22</td>
<td>158.818</td>
<td>12.172</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“t” table value at (21) d f. at (0.05) sig. level equal 2.08
“t” table value at (21) d f. at (0.01) sig. level equal 2.83

Table (7) shows that the T. computed value is less than T. table value in the delayed self-efficacy scale. That means there are no statistically significant differences at (\(α \leq 0.05\)) in the total mean score between the post-delayed self-efficacy scale of the experimental group. The mean of the self-efficacy scale was (158.182), while the mean score of the delayed self-efficacy scale was (158.818). This result indicates the long-term effect of using SCRATCH Software applications on the self-efficacy scale of the experimental group.

**Conclusions**

Based on the current research findings, the following conclusions were derived:

1) SCRATCH Software applications were more effective and had superiority over the traditional methods of teaching the English vocabulary.

2) SCRATCH Software applications provided students with a better learning environment, which affected their achievement and performance in learning vocabulary.

3) SCRATCH Software applications promoted a learning environment that provided opportunities for exploring and investigating ways for understanding new words.

4) SCRATCH Software applications increased students' motivation towards learning and raised the degree of cooperation among students.

5) By applying the SCRATCH Software applications and by seeing the acronym of strategy, students felt relaxed, amused and comfortable and this led to easier and better learning and acquisition of the language.

6) SCRATCH Software applications increased students’ motivation and communication, which provided fluency practice and reduced the dominance of the teacher.

7) SCRATCH Software applications strengthened the relationship between the teacher and the students and made the teacher a close friend, which facilitated the process of teaching and learning English vocabulary.

8) SCRATCH Software applications allowed the students and researchers to experience common activities, use and build on prior knowledge and experience, construct meaning, and continually assess their understanding of new words.

9) SCRATCH Software applications take into account the individual differences among learners with its various activities and techniques that were suitable for students of different levels of proficiency.
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