The impact of using problem-solving puzzles on Iranian intermediate EFL learners' lexical knowledge

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ABSTRACT

This study tried to investigate the impact of using problem-solving puzzles on Iranian Intermediate EFL learners' lexical knowledge. At first a homogenous sample of 30 Intermediate EFL learners attending in the third grade of Shahed high school in Lahijan were selected and they were randomly divided into two groups, as experimental group and control group. In the first session, the pretest was administrated to determine the significant differences between the two groups and revealed they were homogenous. The scores were kept being compared with the second set of scores in posttests. The control group received traditional and regular procedure. The experimental group was exposed with some different kinds of puzzles with some special training by using new techniques to learn L2vocabulary more effectively. The treatment lasted 10 sessions. At the end, the data was analyzed via calculating an Independent Samples T-test between post test scores of the experimental and the control group. The result of the test showed that the experimental group did not show a subtle improvement in lexical knowledge after the instruction. The students had fun but the analysis is proved that the null hypothesis was supported in this study because of the same results of both groups.

Key Words: Vocabulary, Language, Teaching L2vocabulary, Puzzles, Problem solving puzzles

INTRODUCTION

Language plays an essential role in making people communicate with each other. And as for English, it is considered one of the most important languages all over the world. It helps communicating with foreigners at home and abroad. Accordingly, The English language is widely used in science, technology, computer services, politics, commerce and internet. Hence, many countries emphasize the importance of teaching English to their citizens.

Richards (2001) believes that "Second and foreign language teaching is one of the world's largest educational enterprises and millions of children and adults worldwide devote large amounts of time and efforts to the task of mastering a new language". The English language has a special place in the world today. It has become an international language, both in the sense that it is now the native language of people from several continents and in the sense that many others have learnt to speak it as a second language (Graddol, Cheshire& Swann, 1987).

Vocabulary is of primary importance because of the role in moulding the four language skills: reading, writing, and speaking and listening.Vocabulary of a language is just like bricks of a high building. Despite quite small pieces, they are vital to the great structure. One cannot learn a language without learning vocabulary. Therefore, the study of vocabulary has occupied the central place in teaching – learning activities. Wilkins rightly says, "Without grammar very little can be conveyed….but without vocabulary nothing can be conveyed" (quotes in Lewis, 2000).Therefore the study of vocabulary is at the center while learning a new language.

Learning vocabulary has been considered a boring subject for a long time and the traditional way of learning vocabulary by mere copying and remembering has shown to be less than effective. Many experts of language teaching methodology also agree that playing games is a good way to learn vocabulary. Games are associated with a feeling of happiness. For this reason, most learners appreciate games and enjoy participating in them even if they are not familiar with their rules. Games can be found to give practice in all skills and components of language and can be used for different types of communication. To assess the effectiveness of learning vocabulary through games in the classroom, it is important to find out whether learners benefit from such experience. Moreover, it is crucial to see whether games can be effective in helping learners feel more comfortable and interested in the subject of vocabulary. (Huyen&Nga, 2003)

Harmer (2001) explains that games give learners a feeling of competition to participate in the process of learning vocabulary and motivates them to repeat them with enthusiasm. He also maintains that games which depend on an information gap encourage learners to negotiate with a partner to solve a puzzle, draw a picture, and find similarities and differenced between the pictures. Word-search-puzzle game is one of many instructional games that reinforce word-level onto a grid and persuades the class to make suggestions for the puzzle clues. A simpler but still popular alternative word puzzle is the word-search. The object of word-search-puzzle is to find the listed hidden words. This game is good to review general vocabulary, without ever tiring the students. In most of the puzzles, there are at least 40 words. The words may be hidden in any direction: horizontally, vertically, diagonally, and forwards and backwards.

Using a creative approach also implies that you have a courageous attitude; one that includes being open to new experiences, embracing ambiguity, and venturing into new and unfamiliar territory. This attitude is often necessary because creative approaches are about helping you move from a place with which you are familiar to one that is different and potentially unknown, and the results of your efforts are potentially uncertain.

Problem solving generally involves devising ways to answer questions and to meet or satisfy a situation which presents a challenge, offers an opportunity, or is a Creative Approaches to Problem Solving concern. It involves closing the gap between what you have and what you want. The search for answers is often based on your expertise or existing knowledge. Many times, the area of the challenge is well-defined, with clear pathways and methods for solution. The opportunity may also offer clear-cut boundaries, priorities, roles, and directions for effective or even "correct" answers. There are a number of highly effective approaches you can use for problem solving in situations with these characteristics. There are a lot of approaches can be

powerful in a variety of situations. However, when might you need a creative approach to problem solving?

According to Yongqi GU (2003), the problem-solving process is constrained by the learning context where the problem is being tackled. Language learning in general and vocabulary acquisition in particular are such problem-solving tasks at different levels of complexity. The strategies a learner uses and the effectiveness of these strategies very much depend on the learner him/herself (e.g., attitudes, motivation, prior knowledge), the learning task at hand (e.g., type, complexity, difficulty, and generality), and the learning environment (e.g., the learning culture, the richness of input and output opportunities).

STATEMENTOFTHEPROBLEM

Students who have a limited vocabulary are at risk of not becoming proficient in reading. Vocabulary is of primary importance to language teaching and learning because it plays a pivotal role in moulding the four skills: reading, writing, speaking and listening (Widaningsih, 2009).

Thornbury (2002) believes that lack of vocabulary knowledge impedes language comprehension and production. He opined (2002):" If you spend most of your time studying grammar, your English will not improve very much.You will see most improvement, if you learn more words and expressions.You can say very little with grammar, but you Can say almost anything with words.   Michael (2006) similarly holds that knowledge of vocabulary is the most important factor in showing a learner's abilities in listening and speaking.   Allen (1983) also states that in order to get native-like mastery over a language, learners must learn thousands of words. It can be concluded that that without words to express a wider range of meanings, communication in an L2 just cannot happen in any meaningful way (McCarthy, 1990).

As said by Vossoughi(2009), words are the tools we use to think, to express ideas and feelings, and tolearn about the world. Because words are the very foundation of learning, improving students' vocabulary knowledge has become an educational priority. Alemi(2010) claimed that the games are a form of teaching which may be used in circumstances where ordinary approaches are not well tolerated, When attention is hard to get and harder to keep . (Cited in Nicolson and Williams, 1975).

Those who are rich in vocabulary can speak and write English correctly. Vocabulary is needed for expressing meaning and in using the receptive (listening and reading) and the productive (speaking and writing)skills. English is a very important language because it is used in all areas of life,such as collage, government, business, tourism, entertainment, and others. Due to its importance, English language becomes the first foreign language that is taught in earlier stage since the early 90's. Harmer clearly states, "if language structures make up the skeleton of language, then it is vocabulary that provides the vital organs and the flesh". Playing vocabulary game is one of the techniques which require students to dynamically participates in the classroom activities and thus communicate with their classmates using their own language. If one wants to use language effectively, he must have good stock of vocabulary.

Alemi (2010) claimed ESL/EFL specialists often justified the use of games with reference to the motivation thatthey can provide for the students. Games can teach, and there might be no

reason why they cannot be included as a part of a lesson. The purpose of Alemi in her study is to evaluate and assess the probable use/role of various word games; i.e.: Twenty Questions, Charades, Definition Games, Passwords, and Crossword Puzzles in the development of vocabulary among third-grade junior high school students.

RESEARCHQUESTIONOFTHE STUDY

This study sought answer to the following question:

Does using problem- solving puzzles have any impact on Iranian intermediate EFL learners' lexical knowledge?

HYPOTHESIS OFTHE STUDY

In order to keep with the above research question, the following null hypothesis, accordingly, was formulated:

Using problem- solving puzzles does not have any impact on Iranian intermediate EFL learners' lexical knowledge.

REVIEWOFTHELITERATURE

The lexical significance in second language learning and teaching has been repeatedly acknowledged in theoretical and empirical second language acquisition (SLA) vocabulary research. Researchers have described the powerful, positive relationship between vocabulary and comprehension (Anderson &Freebody, 1981; Davis, 1944).

Meara (1996) argues that learners with big vocabularies are more proficient in a wide range of language skills than learners with smaller vocabularies, and there is some evidence to support the view that vocabulary skills make a significant contribution to almost all aspects of L2 proficiency. Sufficient vocabulary size is a prerequisite for becoming competent language learners. (Ruixue Ma Dalian, 2012)

Ardeo (2003) stated that during the last few decades there has been an increasing need to use the English language for the expression of knowledge within specific professional fields. In order to achieve a successful process of learning English, one must acquire its vocabulary, grammar, pronunciation and the four skills: listening, reading, speaking, and writing.

Unfortunately, there is often little emphasis on vocabulary development in the school curricula. Nation and Waring (1997), aptly mentioned, "Such as writing and reading, vocabulary knowledge is one of the components of language skills". According to Gairns and Redman (1986), there are three techniques used in the presentation of new vocabulary item. The first one is visual techniques including mime, gestures, and visual such as flash cards, photographs, black board drawings, wall charts and regalia. The second one is verbal techniques: (1) use of illustrative situation, (2) use of synonym and definition, (3) contrasts and opposites, (4) scales, and (5) examples of the type. The last one is translation. It is considered a quick, easy, and effective way of conveying the meaning of vocabulary. (LuuTrong Tuan, 2012).

The use of puzzles and games in the second-language classroom have now become intrinsic components of many approaches, and the choice of many teachers, as formats for students to review and reinforce grammar, vocabulary, and communication skills that it is difficult to

imagine a workshop or a seminar without them in a teacher-education program .(Marcel Danesi and Anthony Mollica,1994)

Alemi (2010) in her study investigated the role of using word games in expanding the learner's vocabulary. In so doing, an experiment using five word games, named Twenty Questions, Charades, Definition Game's, Passwords, and Crossword Puzzles respectively was conducted. The participants were selected randomly from a male/ female group of third grade junior high school students studying private school.

At a private school First, a standardized test was administered to 100 students out of which 60 almost homogeneous students were selected and randomly divided into two groups: experimental and control. Both groups were taught words using traditional methods, however, the experimental group received word games as a treatment at the end of each session. Finally, a vocabulary test was administered to both groups to determine the differences between them. The score obtained from the groups were compared through independent t-test. The calculated t exceeded the t-critical value, confirming the positive effect of word games on expanding learners' vocabulary.

Problem solving was introduced to education as early as ancient times. Socrates, in particular, was famous for applying it (History…). Later it was almost totally abandoned and revived only in the 1960s. Recently it has been widely studied and popularized (Martinez, 1998; Botti, J.A. & Myers, R., 1995, Simon, 1980), especially for teaching mathematics and science at school and at university.Nothing is more interesting for humans than human activity and the most characteristically human activity is solving problems; thinking for a purpose, devising means to some desired end.

According to Ormond (2006) problem solving is using existing knowledge and skills to address an unanswered question or troubling situation, while problem based learning is approach to instruction in which students acquire new knowledge and skills while working on a complex problem similar to those in the outside world (Ormond, 2006).

Phillips (1997) stated that "Games in the language classroom help children to see learning English as enjoyable and rewarding. Playing games in the classroom develops the ability to cooperate, to compete without being aggressive, and to be a good loser. Moreover, Antonaros and Couri (2003) state that "Games in the foreign language classroom … encourage and develop socialization, cooperating with others, learning self-discipline, respecting rules, peer teaching and cooperative learning." Although researchers believe that games are useful, Allen (1983) comments that "Not all games are helpful for language learning, of course… when we are considering possible games for use, we should ask, "Will this game help to make several English words seem interesting and important to my students?" According to Allen, "Games are helpful because they can make students feel that certain words are important and necessary, because without those words, the object of the game cannot be achieved".

Therefore, when playing a game they will concentrate and will try to recall words learnt in order to play the game. If games were used more often in U.A.E. classrooms, this may help

students learn vocabulary because vocabulary is introduced and used in an enjoyable and challenging way, instead of asking students to copy vocabulary in their copybooks.

METHODOLOGY

The design of the study

This study aimed to investigate the impact of problem solving puzzles onIranian Intermediate EFL learners' lexical knowledge. To answer the research question, the study followed a quasi-experimental design. This study included a pretest and posttest that were administered to experimental and control group before and after the former received the new and intended treatment and the latter received the traditional and regular method. One way ANCOVA between pretest and posttest of each group was analyzed to find out the differences in the performance of the group from the pretest to the posttest.

Participants or (Subjects)

The participants of the study included 30 Intermediate EFL learners from Shahed high school aged between16 to 17 attending at the third grade were selected according to their level of proficiency. They were randomly selected and sampled and were randomly divided into two equal groups, one experimental group and one control group that each consisting fifteen participants with the same age range and the same English language background.

Materials

Material for the proficiency test

The first material adopted in this study was a vocabulary test that was designed by the teacher to measure the learners' previous knowledge of vocabulary. A proficiency test was administered to screen the subjects and homogenize them based on their level of proficiency. The study benefited from Test of General English for junior high school, grade three that had been designed and validated by Farhady (2000).The test consisted of 20 multiple choice items which were designed on structure, vocabulary , expressions and pronunciations. The students were asked to take the test in fifty minutes under testing condition.   The teacher checked the marks that the learners gained the marks before running the training program.

Material for the pretest and the posttestof the study

Another vocabulary test made by the teacher was used for the pretest and posttest of the study to measure the participants' vocabulary gained from the training program. The pretest and posttest of the study were similar in form to neutralize the effect of inconsistency. This test consisted of 40 items with four alternatives including blank in the stem.

Material for the treatment of the study

The learners were given definitions or incomplete sentences for each word and then asked to find the words in the puzzle (vocabulary review/cloze task …). The number of the instructions was limited only by the imagination and specific requirements of the teacher. All form-based language teaching puzzles have this feature. The last materials that researcher used were free word search puzzles, crossword puzzles, sampling, computer network, Internet and a lot of games.

Procedure

The first step, a vocabulary test was administered to sample population to set a balance in the level of participants. Those who scored highest and lowest would be removed from the sample. The group of participants was divided into two groups randomly.Then one group was assigned as control group and the other as experimental group. A vocabulary test was administered to the both groups to measure the current lexical knowledge of them. The scores were kept to be compared with the second scores in posttests.

The procedure of treatment lasted 10 sessions that each lasted 15 minutes. After a warm up activity, the teacher read each new word and wanted the students to tell the synonyms and antonyms that they knew. She read a comprehension and then, made the meaning of the words clear.

The control group received no treatment and the usual routine of the class was kept on. The experimental group received instructions on different kinds of puzzles to learn the target vocabulary corpus. This instruction lasted 15 minutes for 10 sessions.They received the treatment besides of the usual routine. In each session, a kind of puzzles was administered and the students had to find the answers or the key of the puzzles. Sometimes they had to decode the puzzles.

At the end of this study, the last step was to conduct a posttest of vocabulary with a similar structure to the pretest to see if any improvements and progresses occurred in lexical knowledge of experimental group participants. The results were compared with the pretest. The mean of the scores of the two groups in both pretest and posttest were finally compared in order to see which group has performed better.

Method of Analyzing Data

After the researcher scored the posttests and generated quantitative data, she   analyzed them using the Statistical Package for Social Sciences (SPSS) to establish whether there was any correlation between the use of crossword puzzles and Traditional Lexical Pedagogy approaches as methods of teaching vocabulary in English.

The data of this study were analyzed via running an independent sample, T-test between the post test scores of the experimental and the control groups of the study andalso one way ANCOVA betweenthe pretest and posttest of each group of the study.

Data Analysis and Findings

Descriptive Analysis of the Data

Table 1 shows the descriptive analysis for the experimental (+Problem-Solving Puzzles) and the control (-Problem-Solving Puzzles) group posttest scores of study.

Table 1. Descriptive analysis results of the study

PS Puzzles	N	Mean	Std. Deviation	Std. Error Mean
Lexicon +Problem-Solving Puzzles	15	19.3000	0.67612	0.17457
-Problem-Solving Puzzles	15	18.7333	1.06682	0.27545

As is indicated in table (1), the number of participants has been 15 in each group ($N_{EX} = 15; N_{CON} = 15$). The mean for the experimental group posttest scores was shown to be 19.3000($\bar{x}_{ex}$=19.3000) and the mean for control group posttest scores was 18.7333($\bar{x}_{con}$=18.7333). As for standard deviation obtained, it seems to be more variability among the control group scores than the scores in the experimental group. This may give an image of the participants' scores being more homogenous after conducting the treatment of the study (treating with problem-solving puzzles)

Inferential Analysis of the Data

This section focuses of the inferential analysis of the obtained data of this study through tables (2),(3) and(4)below:

Table 2. Independent Samples T-test results of the study

	t-test for Equality of Means		
	t	df	Sig. (2-tailed)
Lexicon Equal variances assumed	1.738	28	0.009
Equal variances not assumed	1.738	23.684	0.009

As is indicated in table (2.), the t-value of the study was calculated between the posttests of lexical knowledge of the experimental and the control groups as to be 1.738(t_{obs} =1.738), and the degree of freedom was 23.684(df =23.684) The reason why the degree of freedom here was not calculated based on the common formula of df=N-1was that the SPSS calculated the degree of freedom while considering the variances of the participant posttest groups as unequal instead of equal. Finally, the level of significance was calculated as to be 0.009(p=0.009) which has been used in interpreting the data for rejection or support of the first hypothesis of the study in the next section.

The next inferential analysis of the data of this study was related to the degree of relationship between the pretest and the posttest of lexical knowledge in each participant group. This was indicated by analyzing the Covariance between the pretest and the posttest scores in each group of the study.

Table 3. One-Way ANCOVA results for the experimental group of the study

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.166[a]	1	5.166	0.937	0.351
Intercept	18.886	1	18.886	3.426	0.087
PretestEX/PosttestEX	**5.166**	**1**	**5.166**	**0.937**	**0.035**
Error	71.667	13	5.513		
Total	3837.250	15			
Corrected Total	76.833	14			

According to table (3.), the covariance between the two sets of pretest and posttest scores in the experimental group is 0.937(F=0.937)

Table 4. One-Way ANCOVA results for the control group of the study

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.933[a]	1	3.933	0.995	0.337
Intercept	29.761	1	29.761	7.527	0.017
Pretest CON/PosttestCON	**3.933**	**1**	**3.933**	**0.995**	**0.033**
Error	51.400	13	3.954		
Total	4057.000	15			
Corrected Total	55.333	14			

According to the table (4.), the covariance between the two sets of pretest and posttest scores in the control group is 0.995(F=0.995). A comparison between the F value in the experimental group and the F value in the control group is the degree of statistical distance between the pretest and the posttest scores in the experimental group is not different from the control group which is representative of the closeness of the scores in the control group; thus, it can be concluded that the control group of the study has not undergone a significant change as a result of being treated without problem-solving puzzles.

The significance level was calculated between the pretest and the posttest of the experimental and control groups of the study were calculated as to be 0.035($Sig_{2-tailed}$=0.035)

which means that the results of the effect of the independent variable of the study (+Problem-Solving Puzzles)were dependable and were not because of the effect of the treatment.

Results of Hypothesis Testing

In this section, the results of testing the hypothesis of the study have been presented and elaborated. Before analyzing the hypothesis, it will be presented below:

Hypothesis (H0): using problem- solving puzzles does not have any impact on Iranian intermediate EFL learners' lexical knowledge.

The null hypothesis of the study which targeted the effect of using problem- solving puzzles on Iranian intermediate EFL learners' lexical knowledge was supported. Evidence from various sources of the data could help the rejection but the results of the T-Test of the study (see table 4.2.) could be employed to confirm this analysis, accordingly, the observed t value calculated by the SPSS was 1.738(t_{Obs}=1.738) while the critical value of t determined on the basis of considering the 2-tailed significance level of (p=0.05) was 2.069(t_{cric}= 2.069).Thus, the observed t was lower than the critical t and was not high enough to reject the null hypothesis of this study.

The second evidence to verify the rejection or support of the hypothesis was the value of the level of significance calculated by the SPSS to be 0.009($Significance_{2-tailed}$ =0.009).Since this value was lower than 0.05 (based on the SPSS regulations), the difference between the means of the pretest and posttest of each group of study could not be by chance and thus, by supporting the hypothesis of the study indicated that using problem- solving puzzles would not enhance the lexical knowledge of the participants of the experimental group of the study.

Supporting the hypothesis of the study could also be accepted by showing that the experimental group participants' progress was not significant from the pretest to posttest. Tables (4.3.) and (4.4.) provided the evidence for this support. According to the One –Way ANCOVA tables, the covariance value between the pretest and the posttest scores in the experimental group was not significantly different from that of the control group. This meant that the posttest scores of lexical knowledge were not significantly distant from the pretest scores in the experimental group and indicated that using problem- solving puzzles did not have effect on the participants' lexical knowledge and caused the posttest scores to stand nearly fixed. A further evidence for the support of the hypothesis of the study was the control group participants' progress from the pretest to the posttest. Table (4.4.) provided the evidence for this support. According to the table, the covariance value between the pretest and the posttest scores in the control group was as well as that of the experimental group. This meant that the posttest scores of lexical knowledge was more than the pretest scores in the control group; and indicated that using and not using problem-solving puzzles did not result in the participants' lexical knowledge.

General Discussion

Alex Case (2009) suggested some Good reasons for using games in an adult class: 1.More drilling/controlled practice. 2. Fun and memory 3.Class spirit.　　　　4. Knowingwhen you are doing well 5. Warmers 6. Using different parts of your brain 7. A natural way of learning 8.

Competition and motivation   9. Most students like games 10. The students complain about games for the wrong reasons 11. Variety 12. Remembering the language by the game and he suggested (review chapter 2)

Some Bad reasons for using games in an adult class: 1. Killing time   2. Learning just like kids 3. The teacher just want to try something new 4. It's fun for the teacher 5. The teacher thinks smiling faces means happy students 6. The teacher doesn't know what else to do. With the use of games, the teacher can create various contexts in which students have to use the language to communicate, exchange information and express their own opinions (adopted from Wright, Betteridge and Buck, 1984). In this study, some of the good and bad reasons of using games were supported.

Thornbury (2002) stated that lack of vocabulary knowledge impedes language comprehension and production. Michael (2006) similarly holds that knowledge of vocabulary is the most important factor in showing a learner's abilities in listening and speaking. Allen (1983) also states that in order to get native-like mastery over a language, learners must learn thousands of words. It can be concluded that that without words to express a wider range of meanings, communication in an L2 just cannot happen in any meaningful way (McCarthy, 1990). Phillips (1997) stated that "Games in the language classroom help children to see learning English as enjoyable and rewarding. Playing games in the classroom develops the ability to cooperate, to compete without being aggressive, and to be a good loser. Moreover, Antonaros and Couri (2003) states that "Games in the foreign language classroom … encourage and develop socialization, cooperating with others, learning self-discipline, respecting rules, peer teaching and cooperative learning." Although researchers believe that games are useful, Allen (1983) comments that "Not all games are helpful for language learning, of course… when we are considering possible games for use, we should ask, "Will this game help to make several English words seem interesting and important to my students?" According to Allen, "Games are helpful because they can make students feel that certain words are important and necessary, because without those words, the object of the game cannot be achieved". Therefore, when playing a game they will concentrate and will try to recall words learnt in order to play the game.

Many other researchers support the use of language games in the classroom like Alemi(2010) in his study investigates the role of using word games in expanding the learner's vocabulary. Bouteliaten (2010) investigates the effectiveness of using crossword puzzles as a teaching technique to enhance English students' knowledge of new foreign vocabulary items. In almost all above mentioned studies, the results showed that the learners proved to have learnt better nearly all the unfamiliar vocabulary items that they have dealt with in the pre-test by using puzzles. In spite of the above findings, the result of this study didn't support the impact of using puzzles and support the null hypothesis that using problem- solving puzzles doesn't   have any impact on Iranian intermediate EFL learners' lexical knowledge.

Rohani and Pourgharib(2013) claimed Vocabulary learning has always been a major concern for those who want to learn a second language. This study aimed at determination of effect of games on vocabulary gain of student. For this, two groups of students were chosen as control and

experimental groups. The control group was exposed to textbook teaching between pretest and posttest; however, the experimental group was taught by games. Although both groups made noticeable progress after training program, there was no significant difference between the groups. The result of this study didn't support the effect of games on vocabulary gain of student.

Implications of the Study

The implication of the study can be divided into two areas as pedagogical and theoretical implications. For as far as the teachers and teaching system are concerned and also the teaching materials, there are a number of implications as follows:

First, the teachers need to be provided with suitable materials which specifically help them teach lexicons.

Second, the learners need to be encouraged to practice vocabulary by using puzzles as well as they practice skills. Third, the teachers need to motivate their learners to improve their lexical knowledge.

Many students and teachers are now aware that the traditional approaches to teaching and preparing students for enhancing lexical knowledge no longer work. As a result of this, new approaches and theories are being considered as replacements. A major difference between the present study and what many institutions and free-lance teachers are applying to their classes is that unlike what is being done in those situations, which is mainly a trial –and-error procedure where learners' time and the institution's resources are wasted, this study has in fact conducted and applied a scientific approach to research and the results are professionally reliable.

What this study isn't along with many others, is that using problem-solving puzzles cannot improve lexical knowledge alone, it is time-consuming and cannot save energy more than traditional way. It may be useful for other schools or other participants. Finally, it is needed to mention that improvement is a gradual process with much variability, neither an overnight phenomenon, nor an overall development, and it may be difficult for learners to perceive changes in lexical knowledge. There are some implications to be made theoretically as well. That is to say, instructional planning can be made which is basically a cognitive based plan.

Suggestion for further Research

However, due to the limitations of this study, the results should be interpreted cautiously. Having mentioned the limitations and obstacles that the researcher had encountered, it couldn't be helped but think that similar researches viewing the issue from a different angle could possibly develop different results which might lead to more insight into the notion at hand. The participants of the study were female and high school students .The gender has always been an important learner factor in the field of EFL. Although no researcher has claimed conclusive proof that one gender can or has outperformed the other, there certainly exist specific differences in the way each approaches issues in learning. Therefore, a study of a similar nature on the opposite sex or a mixture of both might lead to better or at least different results.

Time, the greatest limitation of this research, is another factor that could change the outcome. Perhaps a longer period of time for the treatment to take effect can lead to different

results. This research has a number of implications to make as follows, 1.There is a need to focus on new ways to teach vocabulary 2. There are different views in teaching vocabulary and so on.

The researcher would also like to point out that the level of proficiency of the learners could present an alternative point of view. Whereas the intermediate level has its own merits and demerits, advanced and elementary levels could be worked in different ways.

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