The effect of using mobile applications on literal and contextual vocabulary instruction

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Abstract

Smartphones have been an indispensable part of our lives and function in all fields of life effectively. Mobile applications, which are one of the core components of smartphones, are the main agent in integration of smartphones into education. After the mobile applications started to be used for educational purposes, a radical change took place in the nature of education. With the contribution of mobile applications, education has turned out to be more individualized, ubiquitous, learner-centred and, disquietly, uncontrolled. Language learning is highly affected by this prevalent impact of the mobile applications and vocabulary applications have taken the lead in number in application markets. This study aimed to find out the effectiveness of mobile applications on contextual and literal vocabulary instruction. 84 university freshman students were chosen as the participants of the study. The participants were divided into two groups as literal and contextual vocabulary instruction group, 42 in each. A four-week training session was administered to both groups using the particular vocabulary apps that comply with the necessity of the groups. The data obtained were analysed with Statistical Package for Social Sciences (SPSS) version 15. Consequently, it was found out that both groups showed improvements in their post-test scores, but literal instruction group outperformed the contextual instruction group. Along with this finding, some recommendations were made for further studies.

Keywords: Mobile Apps, Vocabulary, Contextual Instruction, Literal Instruction, MALL.

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1. Introduction

Education, as a phenomenon, has undergone four dramatic changes throughout the history with the invention of writing, computers, Web 2.0 technology and smartphones respectively. The invention of writing placed education on a concrete basis as well as changing its nature into a more disciplined structure. Computers contributed to the nature of education by creating a secure and productive atmosphere -what is called as 'virtual'. After the emergence of Web 2.0 technology, education adopted an autonomous and individual identity and smartphones removed the borders in time and place by mobilizing the education (McLoughlin and Lee, 2010).

Computers started to influence educational systems 10-15 years after the first functional private computer had been invented. Originated by Levy (1997), Computer Assisted Language Learning (CALL) created a fruitful atmosphere both theoretically and practically. Till the introduction of Web 2.0 technology (O'Reilly, 2005), computers had been effectively used in education but after Web 2.0 authoritarian nature of education yielded to a user-oriented system at the same time promoting the terms such as autonomous learning, learner-based teaching, situated cognition and so on. Web 2.0 has started to gain a position as the cornerstone for learner-centred methods and theories.

The invention of smartphones substantially changed the way that mobile phones had been used. The reflection of smartphones in education started to be seen in the early 2000s. This reflection occurred both negatively and positively. Along with its numerous positive contribution to education, it has considerable drawbacks in education, too (Mok et al,2014; Herrington, 2009). One of the biggest problems of smartphone use in schools is that they drain all the attention of learners. Smartphones started to be the sole attraction point for learners. In terms of language learning, smartphones have a considerable effect on learning process both positively and negatively. Negative effects of smartphones in language learning can be expressed in two ways. First, as aforementioned, smartphones create distraction problem for learners. The addiction of smartphones may interfere in the quality of learning process. Second, smartphone markets offer a great deal of language learning applications most of which do not stand on a scientific basis and do not have any methodological background. These applications mislead, mis-teach and demotivate learners because learners get no result at the end of their efforts. The number of mobile apps that teach vocabulary contextually and literally and their download counts are shown in table 1 below.

Table 1. The Number of Mobile Apps That Teach Vocabulary Contextually and Literally and Their Download Counts on Google Play (play.google.com, 2017)

16.08.2017	Number	Downloads
Number of Apps that teach vocabulary literally on Google Play	141	40.618.000
Number of Apps that teach vocabulary contextually on Google Play	51	8.515.000

This table reveals that the number of apps that aim to teach vocabulary literally is nearly three times more than the contextual apps. Also download counts show that literal vocabulary apps are highly demanded by users compared to contextual vocabulary apps. It is a fact that the majority of these apps are prepared by non-specialists and away from a scientific background. In can be inferred that the user tendency promotes the download of literal and non-scientific vocabulary apps which is the reflection of Web 2.0 technology's user integration to language instruction as an 'uncontrolled' learning material environment.

2. Experimental Procedure

This research intends to find out the effectiveness of certain mobile applications on contextual and literal vocabulary instruction. In order to gather data, randomly selected 84 freshmen students at Balikesir University, Susurluk Vocational High School from the departments of Laboratory and Veterinary Assistance Service, Food Quality Control and Analysis and Milk and Dairy Products were chosen as participants of the study and divided into two groups as contextual instruction group and literal instruction group. Both groups received six-weeks instruction including pre-test and post-test in the first and the last week of the period. Each week's lesson plan was divided into three parts as; pre-class, during class and post class. During class part was also divided into three parts as: engage, study and activate parts (Harmer, 2008).

In the first week, before administering the pre-test, both groups were informed about the purpose, participants and procedure of the study in details. Their attitude to use mobile applications was discussed and the integration of mobile application into the lesson was explained to the participants. Both groups were administered a pre-test in the first week. For the literal instruction group, a test including 40 words asking to fill in the blanks with the Turkish equivalents of the given words was administered to participants. For the contextual instruction group, a test including the same 40 words was administered, asking to fill in the blanks in the sentences using the contextually appropriate words in the box at the top of the page.

In the second week, 10 words were chosen to teach each group. For the literal instruction group, the list of target vocabulary and their meaning were sent to students before class via WhatsApp Messenger App. At the beginning of the class, in the engaging part, students were introduced a video named 'Horses can read emotions' which includes the ten-target vocabulary to be taught in the lesson. In the study part, learners checked the meaning of the words from bilingual word lists and watched the video again. After watching the video, learners tried to memorize the meanings of words with a flashcard app named Cram Flashcard App. In the activating part, students checked their knowledge with an interactive multiple-choice quiz game named Kahoot asking for the Turkish equivalents of the target words. At the end of the game, students could see their overall progress from their mobile phones and the game was repeated again in 'ghost mode' which allowed learners to compete with the ghost of themselves in the previous quiz. At the end of the activating part, students were announced to join a versatile quiz at a pre-defined hour with an online distance quiz after class.

For the contextual instruction group, the list of target vocabulary and their definitions were sent to the students before class. In the engaging part of the class, a video including the ten-target words was introduced to the students. Students tried to catch the words they had been introduced and notice their contextual use. Then in the study part, each word was introduced to the students with lexical definitions, pictures, videos and realia without giving the literal equivalents of the words. In the

second part of the study, target words were introduced to students in a reading passage about the video watched at the beginning. In the study part, students checked their knowledge with an online interactive quiz application called Socrative and competed with each other. At the end of the quiz, the teacher could see the overall progress of the class and personal progress of the students and detect the missing parts. Teacher studied on unclear parts with students and the quiz was repeated. At the end of the study part, students were announced to join a versatile quiz at a pre-defined hour with an online distant quiz.

For four weeks, this procedure was applied and in the sixth week, a post-test was administered to each group's participants. Data was gathered and analysed with SPSS software.

3. Materials and Methods

Statistical Package for Social Sciences (SPSS) version 15 was used to evaluate the data obtained from the study and to prepare the tables. The academic achievement, pre-test, post-test scores and post-test scores of the students in the groups are presented with mean, standard deviation, median, minimum and maximum values obtained by subtracting the pre-test score from the post-test scores. The relevance of the data to the normal distribution was assessed by the Shapiro-Wilk test. For this reason, non-parametric test methods were used for statistical analyses. The Mann-Whitney U test was used to examine whether there was a statistically significant difference between Contextual and Literal groups in terms of academic achievement, pre-test, post-test and change score averages. The Wilcoxon Sign Rank Test was used to see whether there was a difference between pre-test and post-test averages in each group. $p < 0.05$ significance level was considered in all statistical analyses.

The participants of the research were 84 freshmen students at Balikesir University, Susurluk Vocational High School who were randomly selected from the departments of Laboratory and Veterinary Assistance Service, Food Quality Control and Analysis and Milk and Dairy Products. The participants were divided into two groups as literal and contextual vocabulary instruction group. Each group had 42 students. In the Literal group, 9 out of 42 were male and 33 students were female. In contextual instruction group, 23 out of 42 were male and 19 students were female. Participants' age group was 18-20 and their English level was A-1. They took English classes in the first year for two terms and for two hours in a week in one term.

In this research, two types of tools were used; data gathering tools and practice tools. As data gathering tools, a pre-test and post-test were administered to both literal and contextual instruction groups. Pre-and Post-test of the literal instruction group includes 25 vocabulary questions asking for the Turkish equivalents of the English words. Pre-and-Post Test of the contextual instruction group included 25 vocabulary questions as a fill-in-the-gaps exercise choosing from the given word box. Practice tools were the apps that were used in practice session. In the lexical instruction group's practice session, the apps used are Kahoot App and Cram Flashcard App. In the contextual instruction group, Socrative App was used. The common apps used in both groups were WhatsApp Messenger App and YouTube App.

4. Results

The study was conducted with a total of 84 participants; 42 in Contextual Instruction Groups and 42 in Literal Instruction Groups. In order to see the distribution of the groups, the average of the

grades that participants had received from the previous English course were analysed. Descriptive statistics related to the academic achievement of the students are shown in Table 2.

Table 2. Descriptive Statistics of Groups

Descriptive statistics	Groups		Test statistics [a]	P
	Contextual	Literal		
Mean	65.3	67.4		
Standard Deviation	14.6	16.8		
Median	67.5	68.5	z = -0.747	0.455
Minimum	26.0	12.0		
Maximum	91.0	99.0		

[a] z value of Mann-Whitney U test

There was no statistically significant difference between the Contextual Instruction Group's academic average (65.3 ± 14.6) and the Literal Instruction Group's academic average (67.4 ± 16.8) (p> 0.05). Hence, it can be concluded that English course academic achievement average of the both groups are similar.

The descriptive statistics and the statistical analysis results of the pre-test scores of the participants in the Contextual and Literal groups are shown in Table 3.
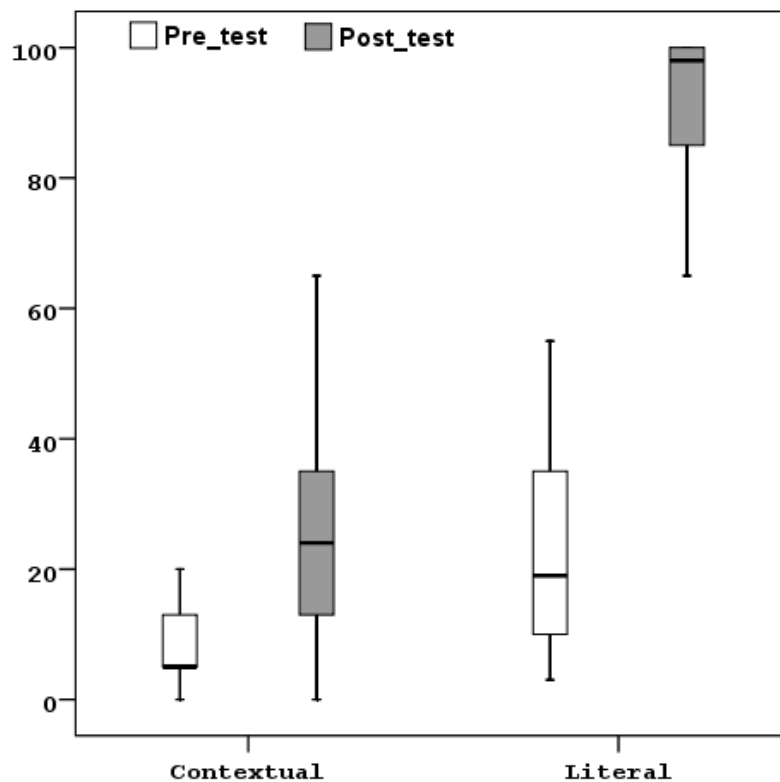

Figure 1. Graphical representation of pre-test and post-test score averages of Contextual and Literal groups

Table 3. Descriptive Statistics of Groups (Pre-Test)

Descriptive statistics	Groups		Test statistics [a]	P
	Contextual	Literal		
Mean	9.8	23.7		
Standard Deviation	11.4	16.2		<0.00
Median	5.0	19.0	z = -4.891	1
Minimum	0.0	3.0		
Maximum	65.0	73.0		

[a] z value of Mann-Whitney U test

Pre-test scores of the participants were analysed statistically and it was found that there was a statistically significant difference between the Pre-test score average (9.8 ± 11.4) of the Contextual group and the Pre-test score average (23.7 ± 16.2) of the Literal group and it was found that the Literal group was significantly higher than the average of the Contextual group (p <0.05). As expected, the Literal Group's pre-test averages were high because the questions in the exam administered to the Literal Instruction Group addressed only low-level cognitive abilities such as memorization, while the Contextual Instruction Group required high-level cognitive abilities such as inference, coherence and comprehension. That's why the Literal Group's pre-test results are high.

The descriptive statistics and the statistical analysis results of the post-test scores of the participants in the Contextual and Literal groups are shown in Table 4.

Table 4. Descriptive Statistics of Groups (Post-Test)

Descriptive statistics	Groups		Test statistics [a]	P
	Contextual	Literal		
Mean	31.4	84.5		
Standard Deviation	28.3	24.9		<0.00
Median	24.0	98.0	z = -6.256	1
Minimum	0.0	15.0		
Maximum	100.0	100.0		

[a] z value of Mann-Whitney U test

Post-test scores of the participants were analysed statistically and it was found that there was a statistically significant difference between the Post-test score average (31.4 ± 28.3) of the Contextual group and the Post-test score average (84.5 ± 24.9) of the Literal group and it was found that the Literal group was significantly higher than the average of the Contextual group (p <0.05)

Descriptive statistics and statistical analysis results regarding the score change between Pre-test and Post-test of the participants in Contextual and Literal Instruction Groups are shown in Table 5.

Table 5. Descriptive Statistics of Groups (The Score Change Between Pre-Test And Post-Test)

Descriptive statistics	Groups		Test statistics [a]	P
	Contextual	Literal		
Mean	21.5	60.8		
Standard Deviation	22.4	26.4		<0.00
Median	16.5	63.5	z = -5.728	
Minimum	-5.0	5.0		1
Maximum	87.0	97.0		

[a] z value of Mann-Whitney U test

The change score between pre-test and post-test of the groups was statistically analysed and Pre-test and post-test scores of the participants in the Contextual group (21.5 ± 22.4) and Pre-test and Post Test scores of the Literal group (60.8 ± 26.4) were found to be statistically significant (p <0.05).

Pre-test and post-test descriptive statistics of Contextual group are shown in Table 6 and pre-test and post-test descriptive statistics for the Literal group are shown in Table 7.

Table 6. Descriptive Statistics of Contextual Group

Descriptive statistics	Groups		Test statistics [a]	P
	Pre-test	Post-test		
Mean	9.8	31.4		
Standard Deviation	11.4	28.3		<0.00
Median	5.0	24.0	z = -5.238	
Minimum	0.0	0.0		1
Maximum	65.0	100.0		

[a] z value of Wilcoxon Sign Rank test

Table 7. Descriptive Statistics of Literal Group

Descriptive statistics	Groups		Test statistics [a]	P
	Pre-test	Post-test		
Mean	23.7	84.5		
Standard Deviation	16.2	24.9		<0.00
Median	19.0	98.0	z = -5.647	
Minimum	3.0	15.0		1
Maximum	73.0	100.0		

[a] z value of Wilcoxon Sign Rank test

5. Discussion

In this study, the effects of some mobile applications on Contextual and Literal vocabulary teaching were investigated. In this respect, a 4-week education program was applied to two groups of 42 participants and the results were evaluated. Participants were randomly selected from students from Milk and Dairy Technology, Food Quality Control and Analysis, and Laboratories and Veterinary Health departments from the associate degree programs of the Susurluk Vocational School in Balıkesir University in Turkey. The students who were entitled to study in these departments entered a placement test administered by ÖSYM (Measuring, Selection and Placement Institution in Turkey) and scored as; Milk and Dairy Technology Department 176 points, Food Quality Control and Analysis Department 234 points and Laboratory and Veterinary Health Department 248 points respectively (http://www.osym.gov.tr., 2015). These scores indicate that the participants are intellectually close to each other. In addition to the intellectual status of the participants, the final grades of the Foreign Language I (English) course they have taken in the previous semester are compared in terms of determining the success of the English course and the results are given in Table 1 in the data analysis section. According to these results, the academic achievement average of the Contextual Instruction Group was 65.3 while the Literal Instruction Group's English course academic achievement average was 67.4. Although there is no significant difference between the groups' average, the academic achievement of the English course of the Literal Instruction Group appears to be higher. However, in the collection and analysis of these data, independent variables such as the structure of the English course in the previous semester, the attitude of the teacher, course contents and student motivation should be considered.

The pre-test scores of the students were analysed statistically by using the Mann-Whitney U test and a significant correlation was found between the Pre-test score average of the Contextual group (9.8 ± 11.4) and the Pre-test score average of the Literal group 23.7 ± 16.2), and the Literal group was found to be significantly higher than the average of the Contextual group. Normally, it is not desirable that Pre-Test scores differ because of the similarity principle between groups, but this study will not be affected by the abnormal distribution of Pre-Test scores, since the focus of this study is on to what extend the groups are improving. It is also expected that the Literal Instruction Group's high pre-test results will be high because the questions of the Literal Group include only low level cognitive activity such as memorization, while the questions of the Contextual Group include high level cognitive activities such as inference, comprehension, background knowledge. Therefore, while the academic achievement averages of the previous semester, shown in Table 1, are close to each other for the two groups, and no such similarity is observed in the Pre-Test results. This information can be shown in the light of evidence that contextual vocabulary learning is a system involving all components of the language beyond a simple vocabulary learning process.

In table 3, Post-test scores applied to both groups were analysed by Mann-Whitney U test and Post-test scores of the students were evaluated statistically. It was found out that post-test score average (31.4 ± 28.3) of the Contextual Group and post-test score average 84.5 ± 24.9) of the Literal group is statistically significant, Literal Groups average was significantly higher than the average of the Contextual group. Post-test results show that progress has been achieved in both groups. These results suggest that mobile applications have a positive effect on both contextual and literal vocabulary instruction. In terms of Contextual Group, Table 5 shows an improvement from 9.8 points to 31.4 points in average. Although high scores cannot be achieved in terms of product-based results, a considerable progress has been made in the process-based results. This suggests that the mobile applications used have a positive effect on contextual vocabulary teaching. This process, which is

difficult to plan and control for the teacher and has various difficulties in the learning process for the student, has turned into a process that is easy to plan, more controllable and can be effectively applied due to the practical use of mobile applications. Mobile applications, with the technical possibilities they offer, allow the participants to use high-level cognitive activities and let them exploit their capacities to the full. As a result, there are several reasons why high scores cannot be achieved. First, contextual vocabulary learning involving high-level cognitive activities may be a process that transcends academic levels for participants who have an intellectually average level when the YGS entrance scores are considered. Because contextual vocabulary learning requires a high level of intellectual level, such as having a background knowledge of the subject, knowing what you read, analysing and deducing, other than knowing the meaning of words. Participants may be inadequate to meet intellectual requirements. Second, the other reason why the average is kept low may be the loss of motivation. Based on researcher's observations, it can be said that in such a challenging process, the participants have lost their motivation increasingly. Although mobile applications technically make the implication phase as concrete as possible, the difficult process has inevitably brought about the loss of motivation. From the perspective of the Literal Group, Table 5 shows an increase in average from 23.7 points to 84.5 points. In the light of this data, it can be argued that mobile applications have a very significant positive contribution to the teaching of literal vocabulary instruction. Considering both result-based and process-based results, significant increases are noticed in both areas. It can be argued that with mobile applications, literal vocabulary learning which addresses lower-level cognitive activities has become a process that can be more effectively guided and used. In addition to classical flashcard teaching, post-test results show that how mobile applications are fairly effective in vocabulary instruction with keeping records of results according to application characteristics, making interpretation of the progress through the records, making the word memorization process more systematic, and diversifying the process with games, tests and quiz functions.

In conclusion, this study investigated the effect of certain mobile applications on contextual and literal vocabulary instruction, and when the results in Table 4 are examined, it can be concluded that mobile applications are effective in both literal and contextual vocabulary instruction, but the effect on literal vocabulary learning is considerably greater. However, as noted in the section on limitations, this research was conducted on a group of participants with a medium level English academic achievement and intellectual level, with specific mobile applications selected and consequently these results were obtained.

6. Conclusion & Recommendations

This study aimed to find out the effectiveness of mobile applications on the contextual and literal vocabulary instruction. 84 freshmen university students were chosen as the participants of the study and they were divided into two groups as contextual instruction group and literal instruction group. Both groups were trained in a six-week instruction programme. For the contextual group, the mobile apps which are effective in teaching the vocabulary were chosen and participants used these apps during the training sessions. For the literal group, an app that is designed to teach the vocabulary literally (mostly flashcard apps) was chosen and participants studied vocabulary using these apps. A pre-test and a post-test were administered to participants and the results were analysed with SPSS software. According to the analysis results, both groups showed improvements in their post-test scores, but literal instruction group outperformed the contextual instruction group.

As stated in the 'problems' section of the study, literal learning, in other words, memorization, is regarded as an innate skill which creates an unequal atmosphere in classrooms between learners because some learners will be more 'gifted' than others in terms of memorizing the words. This statement can be counted as an advantage for the literal instruction group and can be regarded as one of the factors positively affecting the post-test results of the literal instruction group. Memorization has been a widely used technique in all educational fields in Turkey, especially in language learning. Though the latest developments and updates in language teaching policies in Turkey, practically memorization technique prevailed its dominance over other techniques in language classrooms. Thus, language learners in Turkey rely much on memorization technique and the participants of this study are familiar with it from their previous experiences. This situation can be regarded as another factor in the success of the literal instruction group.

With the radical shift from behaviourism to constructivism in language instruction policies, contextual vocabulary instruction has gained significant importance covering all aspects of the constructivist theory. Contextual vocabulary instruction requires active learners taking part in language learning process performing their cognitive skills and at the same time make use of their prior knowledge. In this learner-based process, they are expected to construct the knowledge by making inferences from their present and prior knowledge. So, this means that contextual learning requires high-level cognitive skills. The apps chosen for the participants include functions to trigger their cognitive skills, but it is a fact that learners should intellectually be equipped enough to use these apps. The main problem that the participants of the contextual instruction group faced is not the use of mobile apps but making inferences from the given knowledge. Since the participants' intellectual levels were mediocre when their university entrance exam results could be regarded as an indicator, this process could be challenging or them. However, the functionality of apps made this process easier, but it can be suggested that learners who are not intellectually high-level can find contextual instruction process challenging and demotivating. Motivation is a crucial factor in this process because learners get motivated as they see outcomes of their effort and in contextual vocabulary instruction, unlike literal one, it takes time to see the outcomes of their effort which can be a demotivating issue for the learners. Also, contextual group's participants were required to make a great effort when compared to literal group's participants. These factors can be seen as the main reasons for the contextual instruction group's low post-test scores when compared to literal group's post-test scores.

In this point, several recommendations can be made according to the results of the study. First, it was seen that mobile apps are effective in both contextual and literal vocabulary instruction. For this reason, mobile apps can be implemented into the language learning process in schools. But at this point, there is a crucial factor to be taken into consideration. Mobile apps chosen must be suitable for the level of the students and should be designed by experts. In app market, there are lots of applications designed by users and do not have a scientific background. This type of apps can yield harmful results for the learners. Second, user-designed mobile apps mainly focus on literal vocabulary learning, in other words, flashcard apps. Word memorization apps just intend to teach words' literal meanings along with a catchy interface. In this way of learning, learning occurs at the short-term memory. The words memorized can be forgotten after a certain period of time and the learner keeps memorizing the words again and again. This process yields from knowing how to use the words to just memorize the literal meanings of the words resulting in interfering production because of learners' motivation shifts from production to memorization. An unguided app chose by the learners may lead misconceptions in vocabulary learning. Third, as stated, contextual vocabulary learning covers high-level cognitive skills. The level of the students should be taken into consideration while choosing the

appropriate contextual vocabulary apps. It is clear that with the help of their practical functions, mobile apps make this sophisticated process easier but the type of the activities and learning method that mobile app uses should be suitable to the learners' level. Fourth, it is a well-known fact that smartphones are an indispensable part of our lives and for a long time, they have been used effectively for educational purposes. It would be wise to implement smartphones into learning process effectively rather than forbidding the use of them in schools or leaving learners alone in choosing the learning apps for themselves. A guided and controlled implementation of smartphones can enhance the effectiveness and quality of language learning process.

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