

THE EFFECTS OF ICT-BASED LEARNING ON STUDENTS' VOCABULARY MASTERY IN JUNIOR HIGH SCHOOLS IN BANDUNG

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Abstract

ICT plays a vital role in English language learning, since it boosts motivation (Schoepp & Erogul, 2001), learners' autonomy (Tri & Nguyen 2014), and learning skills (Galavis, 1998). This study aimed to examine the effects of ICT-based learning using wiki on learning of students' vocabulary mastery at the junior high school level. The design of the present study was quasi-experimental. The population of the study was seventh graders of a junior high school in Bandung. Experimental group and control group comprised of 25 students each. The instruments of the study were a pre-test and a post-test of vocabulary mastery and an online learning platform called wiki. The data were analyzed by SPSS 16.0 for the windows. The findings revealed that there were significant differences at .05 level between experimental group and control group ($df= 49, t= 2.02$). Furthermore, recommendations are proposed for the teachers whose teaching philosophy is twisted with ICT-based learning. For instance, they should provide an interesting topic on the wiki, let them chat while working online, assign them working at home, and well prepare the facilities used in the class before starting of the lesson.

Keywords: ICT-based learning; effect; vocabulary mastery; EFL

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INTRODUCTION

The essential aspect of learning a language is learning vocabulary. Wilkins as an early representative advocate of the communicative approach believes that learning vocabulary is as important as learning grammar (as cited in Shen, 2003), and further he adds that "without grammar little can be conveyed, without vocabulary nothing can be conveyed." (UKessay,2015). Besides, Alqahtani (2015) indicates that many learners see second language acquisition (SLA) mostly a matter of learning vocabulary and therefore they spend lots of their time on memorizing lists of words and then rely on their bilingual dictionary as a fundamental communicative resource. Also, vocabulary is called a basic for the development of the other skills for instance listening, writing, reading, speaking, pronunciation and spelling. Hence, vocabulary has got its central role in learning a language.

Besides, in 21st-century information and communication technology (ICT) has brought numerous benefits to different aspects of living especially in teaching and learning. In fact, ICT is fertile of experienced science which differentiates modern lives. "ICT is defined any communication device or application that encompassing radio, television, telephones, computers, network, hardware and software, satellite systems and so on, as well as the various services and applications associated with them,

such as video conferencing and distance learning" (Khan et al., 2015). Further, ICTs are spoken in a particular context, for instance; ICTs in Healthcare, Libraries or Education.

At the meantime, English as Foreign Language (EFL) is not saved. Kopinska (2013) believes that Technologies are rapidly gaining the attention and interest of teachers and learners in EFL classrooms worldwide. Houcine also includes that ICT increases students' motivation, enhances personal commitment and engagement, Learners' collaboration and communication like web 2.0 tools (as cited in Isasag 2012). Today Web 2.0 technologies have become a ubiquitous component of our daily lives (Wang & Vasquez, 2012) which is used by millions of people to communicate, collaborate, network and entertain through blogs, wikis, social media, YouTube, and games. It is claimed that Web 2.0 tools in many L2 learning contexts have "transformed pedagogy curriculum design, the conception of language learning, and even the research in this field" (Wang & Vasquez, 2012).

Besides, Wiki is called a web page that can be viewed by everyone who has access to the internet. It can bust, open-ended and interacted collaboratively throughout the web. Here, the readers are the authors, co-authors, editors and everyone can upload, create a page and link the web pages. In fact, Wiki is an active learning community that helps to share information, creating knowledge and organizing materials which

combine a person personality, interactivity, and collaboration. Hence, wikis are used mostly in classrooms more than others and are significant and efficient.

On the other hand, Indonesia is one of the 20th counties with the highest number of ICT users (Lim and Nugroho, 2011). Thus, massive using of ICT is not shifted well in the school curriculum of Indonesia. Based on Ministry of education and culture (2013) ICT usage in Indonesian schools has repeatedly been reported low (Arzal in Monash arts, n.d.). Though, it is believed that ICT can help Indonesian government to achieve their goal which is called "three pillars of educations development" (fortunasari, 2016) that ICT must be implemented in teaching subjects to gain the learning goals (decree no. 65, 2013).

Regarding the stated above, applying ICT in Indonesian schools is a must. Therefore, this research will be conducted in junior high school to reveal ICT-based learning implementation and instruction effects on students' vocabulary mastery in EFL class. Moreover, this research will disclose using more meaningful ICT integration especially "Wiki" for improving students' skill and performance in EFL class that will help English teachers to figure out their future teaching philosophy based on ICT implementation in EFL classes in Indonesia.

The focus question of this research is "How is the effect of ICT-based learning on students' vocabulary mastery in junior high school?" To clarify the focus issue, these following questions are to be answered:

1. Does Wiki effect on students improving vocabulary mastery in EFL class?
2. Is there any significant difference in students' achievements' with ICT` based learning in EFL class in junior high school?

LITERATURE REVIEW

ICT in Education and EFL Classes

ICT is defined as a "scientific, technological and engineering-based management techniques which are used in information storage and communication mechanism with optimal time and space utilization in comparison to other traditional methods adopted for the same" (Raval, 2014), in other words, Azad (2010) stated that the word "ICT" is any communication device or application such as the computer, mobile phones, radio, television, satellite system, etc." which are used for accessing, gathering, manipulating and presenting or communicating information (Toomey (2001).

Mikre (2011) stated that ICTs had revolutionized the way people work today and are now transforming education systems. Volman (2005) includes that the gradual progress in using computers changes from learning about computers to learning computers, and finally to learning with computers. Further, Liu (2009) adds that Technology is playing a greater role during class and home study, as computer-assisted instruction and interactive media technologies, supplement the traditional use of the chalk and the blackboard. Also,

Policy makers widely accept that access to information and communication technology (ICT) in education can help individuals to compete in a global economy by creating a skilled workforce and facilitating social mobility (open access 02, 2014).

Moreover, Schools throughout the western world have invested a lot in their infrastructure over the past 20 years (Pelgrum & Anderson as cited in Volman, M. 2005). By introducing Computers in schools, now computers are as a part of ICT accepted as an efficient means of acquiring knowledge (Volman, 2005). This was proved by several studies that students who are using ICT gain higher score than students who do not. For instance, Kulik's (1994) findings showed that Students who used computer tutorials in mathematics, natural science, and social science score significantly higher on tests in these subjects and Students who used simulation software in science also scored higher. Similarly, the results also indicated that primary school students who used the tutorial software in reading scored significantly higher on reading scores, including these young students who used computers to write their own stories scored considerably higher on measures of reading skill. Meanwhile, students who used word processors or otherwise used the computer for writing scored higher on the steps of writing ability.

Besides, there is a common belief that the use of ICTs in education contributes to a more constructivist learning and an increase in activity and greater responsibility of students (Mikre, 2011) so it means that the role of the teacher in supporting, advising, and coaching of students becoming less rather than transmitting knowledge, so this why Technological advancement and innovations in educational transactions make a visible impact on academic development as well as administration and Traditional methods of imparting higher education have become less motivating to the large number of students (Raval, 2014). Hence, ICT no longer serves to be a simple additional means, but ICT is an indispensable part of the modern and contemporary learning environment (Kalnina & Kangro, as cited in Isisag, 2012).

English Language as the lingua franca is required for communication, science, information technology, business, aviation, entertainment, radio, television and even diplomacy (Abilashai, Ilankumaran, 2014). Meanwhile, Technologies are rapidly gaining the attention and interest of teachers and learners in English as Foreign Language (EFL) classrooms in the world (kopinska, 2013) which the modern technologies are needed for a well-mixed method of delivery to innovate appropriate teaching techniques to elevate the process of learning English language (Ibrahim, 2010). Therefore, shortly in EFL classes the teaching and learning cannot be done with the textbook alone (Mishra and Koehler as cited in Raman & Mohamed 2012). Likely, EFL teachers used ICT tools for preparing teaching materials such as pronunciation (Lee, 2002), vocabulary (Tsou, Wang, & Li, 2002), listening and speaking (Hochart, 1998), grammar (Al-

Jarf, 2005) and communication skills (Lee, 2002). Therefore, language teacher always has been the pioneer in using technology teaching tools in their classes (Amiri, as cited in Rahimi & Yadollahi, 2011).

Besides, ICT new instrument has altered the way we learn and teach and additionally provides a diversity of teaching and learning opportunities for applicants to learn language (Yunus, M.M as cited in Yunus, M.M. *et al.* 2009) because technology can afford chances for meaningful teaching and learning environments which can affect students' motivation, critical thinking, and independence (Rahimi & Yadollahi, 2011) and gives more opportunities for interaction with their peer learners (Padurean & Margan, 2009) For instance, they can exchange information in real time, they can participate in blog discussions, work in teams on different projects, exchange emails and search for information, etc.

Unlike the facts mentioned above, ICT as a teaching aid is more complicated which demands more accurate skills from the teachers (Salehi & Salehi, 2012) and undoubtedly the development of ICT such as electronic mail, internet and multimedia in using collaborative platforms influences the process of using them in everyday classroom that unfortunately most teachers only use a limited range of types of technology which still stays at their personal level (Park, *et al.* as cited in Xuan, T.T, 2013).

Vocabulary and ICT

Vocabulary is the important part of learning a language and as a meaning of a new word is emphasized in books and classrooms. Alqahtani (2015) claimed that Vocabulary means words that we use to communicate effectively in speaking (expressive vocabulary) and in listening (receptive vocabulary). Others such as Hornby (1995) defined vocabulary as the total number of words in a language and Sedita (2005) included that vocabulary is one of the five core components of reading instruction which includes phonemic awareness, phonics and word study, fluency vocabulary, and comprehension.

Koptyug (n.d.) stated that uses of ICT in language teaching vocabulary are in several ways e.g.:

- a. The regular class: the teacher should hold a regular class with the availability of computer and internet. The teacher can download English material and deliver to the students.
- b. Using the net as a research resource: students should be given the opportunity to the search engine. While working, they can have the note, and next day it provides good feedback. In this case, it is too much motivational to students using the web and will enjoy the reporting of what they have learned.
- c. Web site projects: there is a website project, and students are writing their essays and the teacher checks in the class, and then students will use the computer and the internet to email their works to the project site.
- d. Real communication: students always like to email their job which is called "keypal." They can do this with

their friends in abroad and communicate about their culture to use modern word combination and exchange cultural information

Also, Dalton and Grisham (2011) proposed ten strategies how to teach and learn vocabulary through using technology:

- a. Learn from visual displays of word and relationships with text.
- b. Take a digital vocabulary field trip
- c. Connect fun and learning with online vocabulary games
- d. Have students use media to express vocabulary knowledge
- e. Take advantage of online word reference tools that are also teaching tools
- f. Support reading and word learning with just-in-time vocabulary reference support
- g. Use language translators to provide just-in-time help for ELLs.
- h. Increase reading volume by reading digital text
- i. Increase reading volume by listening to digital text with a text-to-speech tool and audio books. Combine vocabulary learning and social service.

Meanwhile, Padurean and Margan (2009) explained the role of the computer in class explicitly. The role of the computer is assumed as the role of stimuli in language learning, and they called computer as a tool stage that helps in understanding and using language through spelling and grammar checker and editing of the program and finally it is introduced CALL which includes all steps. Relatively, Wiki is a web-based collaboration that can be modified by any of the web browsers which can be viewed, edited and created quickly. It is believed that Wiki or Wikipedia is considered a tool to expedite social constructivist learning process (Khany & Khosravian, 2014). Further, Forte and Bruckman (2006) claimed that it challenges the traditional pedagogical hypothesis regarding the teaching of some or sub-skills in a language (as cited in Khany & Khosravian, 2014).

According to Graves (2006), Wikis have much potential in the teaching of vocabulary. Therefore, students can follow the different methods in learning vocabulary in the wiki:

- a. Students should supply the information included the context and the meaning.
- b. Students should be engaged and should have given enough time to learn the word.
- c. Students should have many disclosures by practicing and reviewing the word
- d. Students should have a conversation about the meaning of the word.

Further, within e-learning system design such as a wiki regarding the pedagogical selected model, teachers will be able to use the learning resources in a form that is suitable to the learning objectives and especially to the learning style of the student (Granic *et al.* 2009).

METHODOLOGY Method and design

The design of this research is a quasi-experiment to investigate whether ICT-based learning affects the students' vocabulary mastery or not. Freankel et al. (2012) stated that two groups are involved in quasi-experiment: an experimental group where the treatment was conducted and a control group which is observed. Also, Hatch & Farhady (1982) said that a pre-test and a post-test are carried out in both groups. The experiment took overall seven meetings (each session 80 minutes). The population of the research is the 7th graders of the public school in Bandung. It is believed that this level of students learns new and basic vocabularies. Hence, we can find out the effect of ICT better rather than higher classes. Furthermore, two classes are chosen as a sample that represents the population. These two classes are purposive sampling and have the same proficiency level of the English; they had been selected based on the teacher recommendations due to their timing schedule that includes 25 students each class. Besides, one class at the same level is chosen to see Table 1 test of normality

the validity and reliability of the questions. Pre-test and post-test were the instruments used in this study. While treatment was employed in the experiment class, Control class was observed by the researcher to see whether the class runs on an ordinary and regular course curriculum or not.

RESULTS

Data analysis on Pre-test and post-test

After collecting the output data such as pre-test and post-test, the next step is to analyze the data using SPSS 16.0 for windows. Independent t-test was used to analyze the output data to see whether there is a significant difference between the mean of the participants before and after the treatment or not. However, to see the differences between the two mean score of both classes, the t-test is used as it is normally distributed (Hatch & Farhady, 1982). By this test, we are able to say that both classes have similar ability in vocabulary mastery.

Tests of Normality

GROUP	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PRETEST						
CONTROL CLASS	.157	25	.114	.943	25	.175
EXPERIMENTAL CLASS	.113	25	.200	.954	25	.308

a. Lilliefors Significance Correction

*This is a lower bound of the true significance.

The table above shows that the pre-test of the control class and experimental class are normally distributed because the Asymp Sig. of the data in Kolmogorov-Smirnov column is greater than 0.05. In details, the probability of the control class (Asymp. Sig) is 0.114, and the experimental class (Asymp.Sig) is 0.200. It means the pre-test of both classes is distributed normally. Besides, Levenes' test is used to analyze the homogeneity of the variance by using the SPSS 16.0 for windows.

In checking the homogeneity of the variance, there is need of comparing the Asymp.sig with the significance level at 0.05. In this case, the probability should be >0.05; therefore, the variance of the control and experiment are expected to be homogeneous.

Table 2 Test of Homogeneity

Test of Homogeneity of Variances				
PRETEST	Levene Statistic	df1	df2	Sig.
	.508	1	48	.479

Based on the findings above, the probability of score in pretest is higher than 0.05 (0.479>0.05). It clarifies that the variances of both classes are homogeneous.

Independent t-test

In order to disclose the significant differences between the mean of control and experimental class in the pre-test, it is analyzed by independent t-test formula in SPSS 16.0. Furthermore, to reject the null hypothesis that there is no significant difference between the two classes, there is need of comparing between t_{obt} and t_{crit} at the level of 0.05 and $df=48$ (2.021). Moreover, if the null hypothesis is rejected, it means that there is the difference between the mean of the two classes ($t_{obt}>t_{crit}$). In opposite, if the hypothesis is accepted then there is not any difference of means between the two classes ($t_{obt}<t_{crit}$).

Table 3 shows the t-test result.

		Group Statistics			
	GROUP	N	Mean	Std. Deviation	Std. Error Mean
PRETEST	CONTROL CLASS	25	49.94	12.069	2.414
	EXPERIMENTAL CLASS	25	52.80	11.100	2.220

Independent t-test results

	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
PRETEST Equal variances assumed	.508	.479	.871	48	.388	-2.857	3.279	-9.451	3.737
Equal variances not assumed			.871	47.668	.388	-2.857	3.279	-9.452	3.738

According to t-test table 3, there are differences in mean of the control class (49.94) and experimental class (52.8). While t_{obt} is 0.871 which means t_{obt} is smaller than t_{crit} (0.871 < 2.021). Hence, the null hypothesis is accepted (H0). It clarifies that there is no significant difference of means between control and experimental group in the pre-test.

The result of Post-test

The analyzing procedure of the post-test was similar to the pre-test. Besides; the post-test measures the students' improvement in vocabulary mastery after conducting the treatment and expose the differences

whether there is any difference in scores between two classes or not.

The normality distribution of test

The measurement of the normal distribution of post-test is performed by the Kolmogorov-Smirnov in SPSS 16.0 to see whether the scores are distributed normally or not. Moreover, when the data is normally distributed, it can be compared using the statistics parametric for instance simple t-test, and if it is not distributed normally, then it can be analyzed further with non-parametric statistics such as Wilcoxon test. The result of the normality of the post-test is presented in the table 4.

Table 4 Test of the normality

GROUP	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
POSTTEST CONTROL CLASS	.129	25	.200 [*]	.966	25	.544
EXPERIMENTAL CLASS	.137	25	.200 [*]	.960	25	.409

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Table 4 reveals that post-test of the control class and experimental class are distributed normally because the Asymp Sig. of the data in Kolmogorov-Smirnov column is greater than 0.05 (0.544 > 0.05 and 0.409 > 0.05) It means that the post-test is distributed normally. Including this, In order to measure the homogeneity of the variance, there is need of comparing the Asymp.sig with the significance level at 0.05.

Table 5. Test of homogeneity

Test of Homogeneity of Variances				
POSTTEST	Levene Statistic	df1	df2	Sig.
	.013	1	48	.910

According to the findings in table 5, the probability of score in post-test is higher than 0.05 (0.910 > 0.05). It means that the variances of both classes are homogeneous.

Independent t-test of post-test

To find out the significant differences between the mean of control and experimental class in post-test, the data is analyzed by independent t-test formula. Besides, to reject the null hypothesis (H0) that there is no significant difference between the two classes, the next step is to compare between t_{obt} and t_{crit} at the level of 0.05 and df=48 (2.021). Also, if the null hypothesis is rejected it means there is the difference between the mean of the two classes ($t_{obt} > t_{crit}$) but if the hypothesis

is accepted, then there is no difference of means between the control and experimental group ($t_{obt} < t_{crit}$).

Table 6 shows the t-test result.

Group Statistics									
	GROUP	N	Mean	Std. Deviation	Std. Error Mean				
POSTTEST	CONTROL CLASS	25	58.06	11.118	2.224				
	EXPERIMENTAL CLASS	25	65.03	11.317	2.263				

Independent Samples Test										
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
POSTTEST	Equal variances assumed	.013	.910	2.197	48	.033	-6.971	3.173	-13.351	-.592
	Equal variances not assumed			2.197	47.985	.033	-6.971	3.173	-13.351	-.592

As shown in Table 6, the mean score of the control group is (58.06) and the mean score of the experimental group is (65.03). Moreover, t_{obt} is (2.197), which means t_{obt} is greater than t_{crit} (2.197 > 2.02). Therefore, the null hypothesis is rejected (H_0). It means that there are significant differences between mean scores of control and experimental group in post-test scores.

The paired t-test

The paired t-test was used to measure the scores of the experimental group through SPSS 16.0 for windows. It was aimed to see the differences of mean between Pre-test and Post-test. The result provided below:

Table 7 paired t-test

Paired Samples Statistics				
	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 PRETEST	51.37	50	11.566	1.636
POSTTEST	61.54	50	11.648	1.647

As table shown, the mean score of the pre-test in experimental class is (51.37), while the mean score of post-test is (61.54). Including this, the significance of the 2 tailed is 0.00, which is smaller than 0.05 (0.00 < 0.05). See table 8.

Table 8. Paired Sample Correlations

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	PRETEST & POSTTEST	50	.807	.000

Based on the findings above, it revealed that the null hypothesis is rejected; means there was difference in pre-test and post-test scores after the treatment.

The finding revealed that the mean of post-test in experimental group is higher than pre-test. It is because the experimental group was received the treatment of learning vocabulary via Wiki during the lesson. They have learned words using in sentences, finding means and synonyms describing pictures and using the words in their story. It is in line with Marazano's vocabulary learning strategy (Scurletis, G, 2009) that students should describe, provide an explanation, nonlinguistic definition, discuss and playing game learning words. In other side, the control group did not receive any treatment of learning vocabulary during their class. The class normally performed as a static class that focused on vocabulary improvement of the students. The researcher has observed the class to see whether the class runs on a normal and regular class curriculum or not.

Respectively, the result of this study is in line with the results Khany, R. & Khosravian, F (2014), Sadikin (2016), Eren (2015) reported that there was statistically significant difference in language learners' vocabulary development. Their findings showed that students in experimental group have surpassed than the control group. Therefore, they believed that ICT is an

encouraging authentic resource to help EFL students in elevating their vocabulary knowledge.

CONCLUSIONS

The aim of this research was to find out the effectiveness of the ICT-based learning such as Wiki in enhancing students' vocabulary mastery in a junior high school in Bandung, Indonesia. The instruments used in this study were pre-test, post-test and online platform is called Wiki.

According to the findings and discussions of this study, applying the Media to the junior high school in Bandung on students' improving vocabulary mastery between those who used Wiki and who did not are different statistically.

The findings of Post-test between control and experimental class are different significantly. The results were proved by t-test of both pre-test and post-test scores. In the beginning, control group and experimental group statistically were at the same level of scores. It can be seen in homogeneity test.

Relatively, after several implementations of the treatments to experimental class, both groups were tested again using same test, the scores were highly improved. Including this, the difference of experimental class is resulted better than control class. The result was proved by t_{ob} (2.197) which is higher than t_{crit} (2.02) for the degree of freedom 49.

Null-hypothesis was used in this study, the findings showed that the hypothesis was rejected. It means there was significant difference between experimental class and control class ability in mastering vocabulary statistically. Including this, it was exposed that experimental class has better score result than control class in terms of ability in vocabulary mastery as it was positive in the result of *t-observed*.

To sum up, learning vocabulary through Wiki is proven effective to provide students another vocabulary learning media which is online and meanwhile, joyful learning activities in the class.

Respectively, the implementation of ICT-based learning using Wiki was significant in teaching vocabulary for student's vocabulary mastery in EFL junior high school, Bandung; nevertheless, some suggestions are regarding using Wiki in teaching EFL class. There is some guidance for the EFL teachers who are using Wiki as an ICT-based learning media in teaching vocabulary mastery in schools: Though Wiki is collaborative web-based learning, It is impossible to be implemented in the class where students cannot edit and share their works at the same time. In this case, the teacher should figure it out and assign them at home. However, learning vocabulary is through Wiki is fun; the teachers should provide interesting topics to students. Otherwise, they are fed up with the related lesson. Teachers should provide different methods that students could chat with each other while working on Wiki. This is what they like too much, as it is experienced and it seemed interesting. Teachers should have well prepared the facilities; unless, they are involved in a problem even in a single small case

related to ICT-based learning. Since this study is dealt with improving one aspect of learning a language; further research should focus on teaching writing through Wiki. Even though, Wiki is part of students work. Hence, students are interested in writing for the website and at the same time, it would be fun for them.

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