The Implementation of Digital Multilingual Thematic Dictionary Towards the Fourth Grade Students' Literacy Skill: An Experimental Study

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Abstract

The study aims to investigate whether there is a significant impact on utilizing a digital multilingual dictionary for fourth grade students' literacy skills. The method of this study is a quasi-experimental and quantitative research approach. The samples were taken using statistical matching techniques by Fraenkel et al., (2012). The samples are the fourth grade students of SDN 2 Pacung as the control group and SDN 1 Banjar as the experimental group. The two groups received three treatments with three themes including: Greeting & Introduction, Family, and Things in the Classroom. The instrument of this study was a students' literacy test which consisted of a pre-test, treatment, and post-test. To analyze the data quantitatively, researchers used descriptive statistical analysis, inferential statistics, and the N-Gain score test. The results from the N-Gain score of the controlled group were 50.5% and 62,71% for the experimental group. It revealed that the use of a digital multilingual thematic dictionary was categorized as moderately effective compared to the printed version in improving fourth grade students' literacy skills compared to the controlled group who were treated by the printed version. Therefore, the digital multilingual thematic dictionary significantly affects fourth grade students' literacy skills.
Keywords: digital multilingual thematic dictionary; literacy skills; young learners

Introduction

There are many influences of English as an international language. English is used by many countries over the world as well as the growth of world globalization

(Atlantis, 2005:p.30).   Due to that, in Indonesia, English becomes an essential language subject and give an impact on people's social lifestyle (Lauder et al., 2006). Studying English is important, supported by Scott (2006) stated that English is used to support the development of science and technology, especially for Indonesia's national development. Therefore, Indonesia's Ministry of Education made English a compulsory subject in elementary schools, in case, to be able to access it for young learners, which is referred to regulation No. 0487/1992, Chapter VIII (Kulsum, 2016). Other than that, the rapid development of English also affects academic life, such as literacy activities (Dardjowidjojo, 2000).

Literacy is defined as the process of understanding the main points from sources. Literacy in Indonesia has been pursued as much as possible to get significant development, especially students' literacy at the elementary level. Regulation by Indonesia's Ministry of Education and Culture Number 23 of 2015 revealed the program called *Gerakan Literasi Sekolah (GLS)* (Kemendikbud, 2017). This movement is expected to improve students' learning abilities, including to think critically, analyze problems, and be able to solve those problems as part of 21st century learning (Daryanto dan Karim, 2017). To support this issue, supporting media are needed to facilitate the learning process.

A dictionary is believed to be used for supporting the development of students' literacy skills. A dictionary helps students to understand the meaning of each word from the text they have read (Omar & Dahan, 2011). Rohmatilah (2016) stated that the dictionary not only provides an understanding of the words, but more intensely to the word pronunciation, meaning intonation, and additional information about the words used. It helps students to gain a better understanding of the targeted languages. Through a dictionary, students can find the easiest way to learn the basic meaning of the word and to broaden their vocabularies. Furthermore, it will be beneficial for language students to understand other components of language, such as sentences, paragraphs, and develop a comprehensive understanding of a text in which to expand students' literacy skills (Huang & Eslami, 2013).

The dictionary becomes a suitable media for helping students' literacy. The dictionary includes with contents, arranged from one to several languages, organized thematically, and includes with pictures as visual content supporter for young learners (Islam & Purkayastha, 2015; Setyawan, 2016). The development of the multilingual thematic picture dictionary is believed to support young learners' literacy skills. It can be a perfect tool since it combines the form of multilingual, thematic, and picture dictionaries. The dictionary is formed and provides word translation in more than two languages, arranged thematically, and images which suit the characteristics of the target users who are young learners (Mawanti, 2014; Arista & Karim, 2015). Several related studies perform the effectiveness of using a dictionary in language class. Various studies found that the use of an electronic dictionary positively impacts the vocabulary learning and retention of EFL learners

(Amirian and Heshmatifar, 2013; Mandasari, 2020; Rezaei and Davoudi, 2016; Santosa and Andriyadi, 2019; Yanti, 2016). Other related study compared the use of printed dictionary and electronic dictionary (Akramah et al., 2020; Hakim, et al., 2018; Agustini et al., 2021) show that electronic dictionaries are considered superior in use to help students get better pronounce a word. Previous study from Suniyasih, et al. (2021) show that a multilingual thematic dictionary is categorized as an excellent media to increase vocabularies. Thus, a digital form of multilingual thematic dictionary brings an update to the quality of students' literacy. It is because the dictionary consists of more than two or more languages completed by images which can make students at eaze to use that in order to increase literacy skills.

As mentioned above, dictionaries are the essential tool for foreign language learners (EFL). Since, dictionaries are designed to improve students' abilities based on understanding information in a text, helps in vocabulary mastery in particular languages, regardless of how effective the use of dictionary is in significantly improving young learners' ability are still being studied further by the researchers. Therefore, in this current study, the researchers decided to compare printed multilingual thematic dictionaries and digital multilingual dictionaries as part of previous study under the umbrella research. Furthermore, current study is expected to show a significant impact after the implementation of those types of dictionaries on literacy skill for four-grade students. This experimental study wants to clarify the impact of a digital multilingual thematic dictionary on developing young learners' literacy skills in today's globalization. The hypothesis of this research is that using multilingual thematic dictionaries can significantly affect the literacy of fourth-grade students.

Method

This research applied quantitative study of quasi-experimental method with the Pre-Test and Post-Test Only Control Group design. The pre-test is a test before giving treatment, then receives a post-test after giving treatment. The focus of the study is to investigate the effect of giving treatment on students' literacy skills, especially on vocabulary understanding. To conduct the study, the researchers divide the participants into two groups, called the control group and the experimental group. The experimental group was treated by the use of a digital version of the multilingual thematic dictionary and involved with inquiry-based learning methods. Meanwhile, the control group used the printed version of the thematic picture dictionary and treated it using conventional teaching with an inquiry-based learning method. In the execution, the researchers gave the same treatment. Both groups received three treatments and took 45 minutes for each material taught, namely; 1) Introductions and greetings, 2) Family, and 3) Things in the Classroom.

The participant in this research used a statistical matching score in a quasi-experimental study by Fraenkel & Hyun (2012) with the intact group. From the eight schools in the previous study which were located in Buleleng regency, the schools were tested based on the students' English final exam using ANOVA to compare their abilities. In the end, the participants were chosen from the two schools. The two elementary schools in fourth grade were drawn using a lottery to determine the group of control and experimental. The results showed that SDN 2 Pacung was determined as the control group and SDN 1 Banjar as the experimental group.

The instrument used in this study was a test called literacy skill test. The test consists of 30 questions for assessing students' literacy skills in pre-test and post-test. The description of the literacy test was arranged with 20 multiple-choice questions and essays for the rest. The pre-test questions are designed to be accessed by the students before treatment in order to know students' initial abilities. Contrarily, the purpose of the post-test is to measure students' ability after giving treatment. Those tests are used to investigate whether there is a significant difference between before and after treatments. The instrument used in this study has already been checked for validity and reliability by the experts involved.

The data analysis process is carried out by analyzing the results of pre-test and post-test. The data then compared between control group and experimental group (Trochim W, 2020). The researcher analyzed the data using SPSS version 26 through three types of analysis processes, including: 1) descriptive statistical analysis to determine the effect before and after treatment, 2) inferential statistical analysis is the process of analyzing the sample is homogeneous, and 3) normalized gain score test to make sure the effectiveness of product application. There are two statistical analysis formulas of this study, namely Independent Sample T-test and the N-Gain Score (Normalized Gain). The tests used to confirm the effectiveness of the digital multilingual thematic dictionary in affecting the improvement of fourth-grade students' literacy skills. The formula of N-Gain score is as follows.

$$N\ Gain = \frac{Posttest\ score - Pretest\ score}{Ideal\ score - Pretest\ score}$$

Description:
Ideal score   : The maximum (highest) score of a value that students earn
The N gain   : score in percent and decimal

The N-Gain score in percent and decimal was categorized by Hake (1999) into the following categories

Table 1. N-Gain score categories in percent by Hake (1999)

Percentage	Interpretation
< 40	Ineffective
40 – 55	Less Effective
56 – 75	Moderately Effective
>76	Effective

Results

Finding

There are some results from this study. Those results were divided into descriptive statistical, inferential statistical analysis of data, and the N-Gain score. The researcher initially used descriptive and inferential statistical analysis on the pre-test and post-test results to determine the impact of a digital multilingual thematic dictionary on fourth-grade students' literacy skills. It is because descriptive statistical analysis frequently concentrates on illustrating the dispersion and estimating the primary trend of the collected data (Trochim W, 2020). The numerical data for the pre-test and post-test scores were all summarized and explained in a descriptive way. The measurements employed in the data analysis for this study's inferential statistical analysis were the normality test, homogeneity test, and hypothesis testing. First, Figure 1 will show the results of the descriptive statistical analysis of the pre-test score and the post-test.

Pre-test descriptive statistics analysis   Post-test descriptive statistics analysis
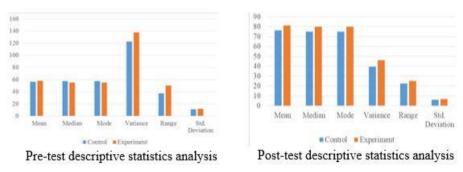
Figure 1. The results of descriptive statistical analysis

From the Figure 1 above, it can be inferred from the data of the controlled and experimental group. The mean data for both groups was not much different in pre-test. However, in post-test the mean score of the experimental group was higher than the control group. The median data of pre and post-test is much different. In the pre-test, the control group gained 57.50 points but in the post test gained 75.00 points. The situation also appeared in the experimental group which showed 55.00 and after treatment was changed to 80.00 points. For the mode data, the majority score of the controlled group was 57.50 for pre-test and 75.00 at post-test. Then, the

mode in the experimental group showed 55.00 at pre-test and 80.00 for post-test. For the variance data, the controlled group both in the pre-test and post-test much lower than the experimental group. The range data is decreased from pre-test and post-test from both groups. Last, for the standard deviation, the pre and post-test at both groups are not spread too far from the average value.

Second the results from inferential statistical analysis of pre-test and post-test by using an independent sample T-test. In this stage, the researchers want to investigate the normality and homogeneity of the study. For the normality test used the Shapiro-Wilk statistical Table 2 will present method (Sig. 0.05) for pre-test.

Table 2. The normality test of pre-test

Test of Normality

	Class	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Pre-Test Score	Experiment	,124	27	,200	,957	27	,311
	Control	,129	27	,200	,942	27	,134

From the results performed by Table 2, it can be seen that the significant value of the controlled and experimental group is higher than 0.05. (Sig. > 0.05). It means that the pre-test score for both groups are normally distributed. Table 3 will show the normality test of post-test from both groups which show that the post-test score for the control and experimental groups were also normally distributed

Table 3. The normality test of post-test

Test of Normality

	Class	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	df	Sig.
Post-Test Score	Experiment	,120	27	,200	,962	27	,414
	Control	,143	27	,166	,928	27	,061

The homogeneity test is used to ensure that the number of participants is homogeneous. Table 4 drew the pre-test homogeneity results. Meanwhile, the post test will be presented by Table 5.

Table 4. The pre-test homogeneity results

Homogeneity Test of Variances

		Levene Statistic	df1	df2	Sig.
Pre-Test Score	Based on Mean	.005	1	52	.946
	Based on Median	.008	1	52	.928
	Based on Median and with adjusted df	.008	1	50.530	.928
	Based on trimmed mean	.008	1	52	.942

Table 5. The post-test homogeneity results
Homogeneity Test of Variances

		Levene Statistic	df1	df2	Sig.
Post-Test Score	Based on Mean	.212	1	52	.647
	Based on Median	.192	1	52	.663
	Based on Median and with adjusted df	.192	1	51,955	.663
	Based on trimmed mean	.220	1	52	.641

From those tables, it can be seen that the significant value of the control group and experimental group, both pre-test and post-test, was higher than 0.05. It means that the group was homogeneous.

As mentioned before, the independent sample T-test is used to compare two unpaired samples. The results of the T-test for pre-test and post-test will be presented below.

Table 6. The independent sample T-test of pre-test results
Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2 tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pre-Test	Equal variances assumed	.005	.946	.447	52	.657	1.38889	3.1065	-4.8447	7.6225
	Equal variances not assumed			.447	51.8	.657	1.38889	3.1065	-4.8452	7.62304

Based on the data on the table, it can be seen that the Sig. Levene's Test for Equality of Variances is 0.946 > 0.05, which means that the data were homogeneous between experimental and control group in pre-test, called "equal variances assumed". It is supported by the results of mean differences which are categorized as "Confidence Interval of the Difference Lower Upper". Moreover, it means that the

H0 is accepted and Ha is rejected. Then, it can be concluded that the students used in this study were at the same level/ability. For the T-test of post-test results of T-test will be described further below.

Table 7. The independent sample T-test of post-test results
Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	Df	Sig. (2 tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Post Test	Equal variances assumed	.212	.647	2.6	52	.011	4.72222	1.78364	1,14308	8,30137
	Equal variances not assumed			2.6	51.68	.011	4.72222	1.78364	1,14256	8,30189

The value of Sig. Levene's Test for Equality of Variances is 0.647 > 0.05. It is also supported by categories of equal variances assumed and Confidence Interval of the Difference Lower Upper. The H0 is rejected and Ha is accepted. It can be supposed that there is a significant difference in the average of post-test results in the experimental group and the control group.

Last, the N-Gain score results. The N-Gain score test after obtaining data from descriptive statistical analysis and inferential scores of pre-test and post-test. The following table describes the descriptive analysis of the N-gain Score test.

Table 8. N-Gain score test results

N-Gain Score Test Calculation Results

No	Experimental Class N-Gain Score (%)	No	Control Class N-Gain Score (%)
1	70,00	1	69,23
2	55,56	2	60,00
3	83,33	3	58,33
4	70,00	4	63,64
5	66,67	5	63,64
6	52,94	6	50,00
7	72,73	7	52,94
8	71,43	8	45,45
9	55,56	9	47,37
10	64,29	10	40,00
11	68,75	11	57,14
12	61,90	12	55,56
13	64,29	13	50,00
14	71,43	14	42,86
15	60,00	15	50,00
16	61,90	16	54,17
17	55,56	17	60,00
18	63,64	18	41,18
19	55,56	19	52,94
20	69,23	20	50,00
21	46,67	21	38,46
22	62,50	22	45,45
23	55,56	23	29,41
24	33,33	24	38,46
25	66,67	25	54,17
26	62,50	26	66,67
27	59,24	27	50,00

The result of the N-Gain analysis was calculated as a percentage, as seen in the table above. To obtain these results, the pre-test score was divided by the ideal score, and the resulting number was then taken from the post-test scores. To get the results in % notation, the obtained score was multiplied by 100. The results of the N-Gain calculations are shown in the table above, and they also highlighted the significant difference between the test scores of the students in the control and experimental groups. In terms of percentage scores, the experimental group outperformed the control group. Additionally, in order to obtain more specific information, the descriptive analysis table of the N-Gain test, which was obtained using SPSS Version 26, was evaluated. It presents as follows:

Table 9. Descriptive analysis table of the N-Gain Score test

		Group	Statistic	Std. Error
NGain	Experim	Mean	62.7127	1,38474

percent	ent	95% Confidence Interval for Mean	Lower Bound	59.8663	
			Upper Bound	65.5591	
		5% Trimmed Mean		62.8639	
		Median		62.5000	
		Variance		51.773	
		Std. Deviation		7.19533	
		Minimum		46.67	
		Maximum		75.00	
		Range		28.33	
		Interquartile Range		13.68	
		Skewness		-.255	.448
		Kurtosis		-.642	.872
	Control	Mean		50.5112	1.79591
		95% Confidence Interval for Mean	Lower Bound	46.8197	
			Upper Bound	54.2028	
		5% Trimmed Mean		50.5937	
		Median		52.9412	
		Variance		87.082	
		Std. Deviation		9.33180	
		Minimum		29.41	
		Maximum		69.23	
		Range		39.82	
		Interquartile Range		14.64	
		Skewness		-.154	.448
		Kurtosis		-.296	.827

From N-Gain Score data, the experimental group who use a digital dictionary reached a mean score 62.71% and it indicated that using a digital multilingual thematic dictionary shows moderately effective based on N-Gain score category in percent [Table 1]. Contrarily, the control group reached 50.51% and was categorized as less effective. However, judging from the comparison of the results of the pre-test and post-test score of the control group, it still affected students' literacy skills, although less significant than the effect of the multilingual thematic digital dictionary.

Discussion

The focus of this research aims to investigate the effect of using digital multilingual thematic dictionaries in influencing fourth-grade students' literacy skills. In deciding the treatment's impact on the fourth-grade students' literacy skills, statistical analyses were carried out on students' ability tests in the pre-test and post-test. The test was carried out at the beginning to know the students' initial abilities in the control and experimental groups based on the acquisition of pre-test scores. Then proceed with looking at the results of the post-test scores to see the

students' final abilities after being given treatment. The results of the student scores by the two groups will be analyzed through the N-Gain test after obtaining descriptive statistical analysis results of pre-test and post-test inferential scores. It aims to determine whether there is an effect of digital multilingual thematic dictionaries on the literacy skills of fourth-grade students.

The systematics of conducting this research involved design with a Pre-test and Post-test Control Group Design, which involves a design that provides tests before and after giving treatment for both research groups. The two groups in giving treatment facilitated with different media. One group was classified as an experiment by giving treatment using the Digital version of the Multilingual Thematic Dictionary. Then, the other group was classified as the control group by providing conventional teaching methods using the printed version of the Thematic Picture Dictionary. Both groups received three treatments that took 45 minutes for each group with three materials taught, namely (1) Introductions and Greetings, (2) Family, and (3) Things in The Classroom. Learning activities designed for the experimental group use inquiry-based scientific learning methods facilitated by the Digital Multilingual Thematic Dictionary. While the learning activities in the control group used a conventional system in the form of inquiry-based learning using a Printed Thematic Picture Dictionary.

The continued investigation of effectiveness in using a multilingual thematic digital dictionary with an N-gain score test was to determine differences in the analysis of pre-test and post-test scores after receiving treatment. The researcher conducted the N-Gain Score test after obtaining descriptive statistical analysis results of pretest and post-test inferential scores. From the results of the calculation of the N-Gain Score test in the descriptive analysis that has been carried out, it is known that the average N-Gain value of the experimental class (digital dictionary implementation) is 62.7127 or 62.71%, with a minimum N-Gain Score of 46.67% and the maximum of 75.00%. Then the average N-Gain score for the control class (implementation of the printed dictionary) was 50.5112 or 50.5%, with a minimum N-Gain score of 29.41% and a maximum of 69.23%. From the results obtained from the N-Gain test, the score shows that the experimental group's use of multilingual thematic dictionaries and digital dictionaries was categorized as "moderately effective" (Hake, 1999). In contrast, the use of printed picture thematic dictionary in the control group was less effective. It can be conclude that the experimental group prove that the alternative hypothesis (Ha) of this study is accepted because the N-Gain score of the experimental group is more than 55% with moderately effective category in using digital multilingual thematic dictionaries.

The results of this study are in line with ten previous studies. A study stated that digital dictionaries have more extended usage compared with printed dictionaries. A digital dictionary is effective for increasing vocabulary mastery (Amirian & Heshmatifar, 2013; Yanti, 2016). The use of digital dictionaries are recommended for lecture method in learning vocabulary (Hakim et al., 2018; Santoso & Andriyadi, 2019) and can facilitate students in the learning process (Ambarwati & Mandasari, 2020). The results of this study are also in line with Davoudi's study (2016) who found that using a digital dictionary can be the media which supports learning vocabulary and decreases time cconsumption Then, it also

supported by the statement that digital dictionaries help students to get a better pronounce of a word (Akramah et al., 2020; Alamri & Hakami, 2022; Ratminingsih et al., 2021). It can be concluded that a digital dictionary in the experimental group was achieved since they were supported by many conveniences and classified as effective in facilitating students' language learning.

Since the results of the alternative hypothesis accepted in this study confirmed that the influence of a multilingual thematic digital dictionary significantly impacts fourth-grade students' literacy skills. The influences of multilingual thematic dictionaries on students' literacy skills were categorized as "moderately effective" in facilitating students' language learning. The effectiveness of using a digital dictionary includes students' ability to read vocabulary with good pronunciation, write in sentences with correct spelling, and understand the meaning of vocabulary related to the themes taught in the learning process. This was proven in the treatment, with the results obtained by the experimental group increasing when used multilingual digital thematic dictionaries that students tended to be more active than the control group in the learning process pronunciation correctly. Thus, observing the convenience analysis provided by the experimental group proves that digital multilingual thematic dictionaries are superior in influencing students' literacy skills by considering the maximal way to use dictionaries in the classroom.

Conclusion

In conclusion, by applying the digital multilingual thematic dictionary as a learning media effectively increases the fourth-grade students' literacy skills. The significant influence of the dictionary used by the experimental group can significantly increase pronunciation, write sentences with correct spelling, and understand the meaning of vocabulary on the themes taught in the learning process. As the point of this study, the digital multilingual thematic dictionary is highly recommended to use in language learning since the N-Gain value was more than 55% and categorized as moderately effective. There are also benefits of a digital dictionary, such as not being easily damaged, accessible, and compact to carry anywhere.

The implementation of digital multilingual thematic dictionaries significantly impacted the fourth-grade students' literacy skills compared to the application of printed thematic picture dictionaries. However, further research is needed to explore more about this study with the broader population and a higher level. It also recommended planning a longer period of time than three meetings in order to get more accurate and consistent evidence.

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