

Analysis of the Effectiveness of M-Learning Goes (Guide Objective Elementary School) in Elementary School

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Received December 29, 2019; Revised February 20, 2020; Accepted February 26, 2020

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Abstract Effectiveness is part of the quality of the software. The level of system planning will determine the successful implementation of the system in an educational institution. The higher the level of increase, the higher the functionality and usability of the system. This research was made to measure the efficiency of learning media through GOES (Guide Objective Elementary School) mobile learning (m-learning) in elementary schools in DKI Jakarta. With this GOES m-learning, it can make it easier for students to get teaching material because students cannot attend school. Also besides, it can be a liaison that provides information about the development of children to school and without having to come to school. The research sites are in the 15th, 19th, 20th, 21st and 22nd DKI Elementary Schools. This research is descriptive in nature using a questionnaire that is tested using the t-test. The total questionnaire processed was 150 questionnaires out of 540 questionnaires distributed to teachers, distributed and students. The results of the questionnaire show that GOES m-learning can improve students' learning and facilitate students' assignments even if they are not present at school.

Keywords M-learning, Elementary School, Absent, Goes, Mobile Application

1. Introduction

Today, the development and progress in the field of science and technology are growing rapidly. Because of the development of the progress of science and technology, humans can create sophisticated tools and equipment for various activities so that in their life activities various facilities enable their activities to be more effective and

efficient.

One tool that is used and is often used is a cellphone. Mobile can not only be used as a means of communication but also can be used as a media of learning in education. It is not a new thing if teachers and students currently use learning assistance by using mobile phones.

To complement the learning support facilities, a learning media designed using a computer and internet-based on mobile is called m-learning. M-learning is defined as a method of learning and teaching that uses electronic media (connected to the internet connection) to deliver material and guidance based on mobile. There is also a definition of M-learning as a form of distance learning that is done through internet media. M-learning makes it easy for users to get a lot of material from the internet as well as mobile-based.

Elementary School students in grades 4 through 6 already have a higher learning load compared to the classes below, so that they require more information. Obstacles that are meeting while the student cannot be present in the class. The effect of this absence affects Teaching and Learning activities to a lesser extent, which causes problems with learning material being left behind.

M-learning GOES is an interactive learning system that involves interactions between teachers, students, and parents. Applications that rely on the Android operating system are intended to facilitate teaching and learning activities. This application offers a learning system that utilizes information technology so that Teaching and Learning activities can be done anytime and anywhere.

Effectiveness is one part of software quality [1]. The level of effectiveness of a system will determine the successful implementation of the system or software in a basic education environment. The higher the level of effectiveness and efficiency, the more functionality and usability of the system increases. Based on ISO / ICE

9126 regarding software quality, the effectiveness of software can be measured from several factors such as work effectiveness, frequency of errors, completion of work [1]

This research was made to measure the efficiency of learning media through GOES mobile learning (m-learning) in elementary schools in DKI Jakarta. With this GOES m-learning, it can make it easier for students to get teaching material because students cannot attend school. Also besides, it can be a liaison that provides information about the development of children to school and without having to come to school.

2. Literature Review

GOES (Guide Objective Elementary School)

GOES M-learning is a more interactive system that involves teachers, students, and parents of students. Activities undertaken in this application include the teacher uploading materials, exercises, sample exams, and homework. Students can see the material; do the exercises, sample exams and homework. In this application, the teacher will also enter the collection time for homework, so students and parents will be reminded of the time indicated for doing homework have not been done.

The application will sound a warning alarm on the smartphone guardians of students and parents if the student has not finished the homework. The alarm will stop when the student input data that they have finished.

This system, too, will provide reports to student guardians on the results obtained by students at school, so that there are no more correction errors between teachers and students from the results of lesson evaluation.

Some examples of interface from GOES m-learning are as follows:

a. Login interface

This interface is useful for entering username and password input. For login, it will be given a NIP / NIS which is a unique code created by the system. Here is a display from login interface:

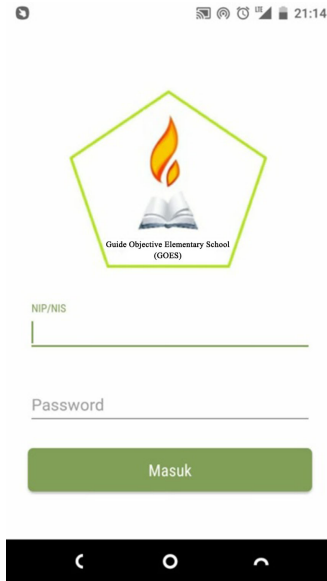


Figure 1. Login Interface

b. Main interface

This interface is useful for viewing subjects in the application and each subject will contain material, sample questions, exercises, and homework assignments. Below this is the main interface display:



Figure 2. Main interface

Effectiveness

Effectiveness is a measure that states how far targets (quantity, quality and time) have been achieved [2]. Where the greater the percentage of targets achieved, the higher the effectiveness. While [3] explains that effectiveness is the ability to choose the right goals or the right equipment for achieving the goals set. The effectiveness of the level of ability to achieve goals appropriately and well [4].

Effectiveness is the range of effort of a program as a system with certain resources and means to meet its goals and objectives without disabling the means and resources and without putting undue pressure on their implementation[5]. In learning, careful planning is needed, making learning tools, choosing strategies, media, and techniques, learning models, and learning evaluations, all of which are mutually sustainable. The need to use effective and innovative learning models so that learning can be varied and run smoothly. The use of the learning model is also adapted to the material to be taught so that the compatibility between the two and all the components is appropriate.

Measurement of learning effectiveness must always be linked to the achievement of learning objectives. Indicators that can be used to determine the effectiveness of learning, namely:

1. Accuracy in mastering behavior
2. Speed of performance
3. Compliance with procedures,
4. Performance quantity
5. The quality of the final results
6. The degree of transfer of learning
7. Retention rate.

Learning effectiveness is measured by the ratio between effectiveness and the amount of time spent by students and/or the amount of learning costs and/or learning resources used. Thus there are three indicators to determine the level of effectiveness, namely:

1. Time
2. What is the amount of time required by students to achieve goals that have been set
3. Personnel
4. How many personnel are involved in implementing learning?
5. Learning resources
6. How to use learning resources that are designed for learning

The answers to these questions will give an idea of the level of efficiency of the learning program.

Effectiveness Approach

The effectiveness approach is used to measure the extent to which the activity is effective. There are several approaches used for effectiveness, namely:

- a. Target Approach

This approach is used to measure the extent to which an institution has succeeded in realizing the goals to be achieved. In this approach, the target approach uses a measurement of effectiveness that starts with identifying organizational goals and measuring the level of organizational success in achieving these goals. In addition to achieving goals/targets, the time factor for implementation is also always used in measuring effectiveness. Therefore the effectiveness always contains an element of implementation time. The goal is reached with the right time so the program is effective [6].

- b. Source Approach

This approach measures effectiveness based on the success of an institution in obtaining the various sources it needs and also maintains the situation and system, this is done so that it can run effectively. This approach is based on the theory of the openness of an institution's system to its environment, because an institution has an even relationship with its environment where from the environment sources can be obtained from the institution's input and the resulting output is also cleared to its environment[6].

- c. Process Approach

This approach is used as the efficiency of an internal institution. In an effective institution, the internal process runs smoothly where the activities of the existing parts can run in a coordinated manner. This approach does not pay attention to the environment but focuses on activities carried out on sources owned by institutions that describe the level of efficiency of the institution [6]

3. Method

Research Type

This research uses quantitative, quantitative research as a study that contains an explanation (description) of a valid and objective phenomenon. In this study, the hypothesis test was done using the t-test [7].

Research Sites

In this study, the selected research locations were 15th, 19th, 20th, 21st and 22nd DKI Elementary Schools. The determination of the research location is based on several considerations as follows:

- a. The State Elementary School has facilities and infrastructure that support research.
- b. The State Elementary School is very strategically located for research implementation.

Population

The population in this study are teachers, students, and

parents who are in 15th, 19th, 20th, 21st and 22nd DKI Elementary Schools.

Sampling Technique

Researchers used a non-random sampling method. In taking this sample the researchers processed 150 questionnaires out of 540 questionnaires which were distributed to teachers, parents, and students, consisting of:

- a. 60 questionnaires out of 180 total questionnaires distributed to teachers.
- b. 40 questionnaires out of 180 total questionnaires distributed to parents.
- c. 50 questionnaires out of 180 total questionnaires distributed to students.

Research Instruments

This study uses a questionnaire as a research instrument to obtain the results of the reliability and validity as well as effective and efficient time. The questionnaire is used as the main data collection tool to measure effectiveness.

The questions in this questionnaire were compiled by researchers in a systematic and structured approach to closed and semi-open questions. Where for closed questions the answers provided have been determined beforehand by researchers and respondents were not allowed to provide other answers. This study uses a Likert scale which has the following values:

Table1. Scoring Table

Scoring Classification	Score
Strongly Agree	5
Agree	4
Enough	3
Disagree	2
Strongly Disagree	1

However, researchers only use up to 4 only and eliminate scores of 3 because of the tendency of Indonesians to choose a value of 3 which will cause the assessment to be unfavorable.

Data Collection Technique

The data that the researcher wants to obtain is

quantitative and qualitative. Because of that researcher, the data collection technique used in this study is by collecting primary and secondary data.

Data Processing Techniques

Analysis of the data of this study used a validation test with a t-test. Descriptive data analysis is processed by providing manual coding of primary data derived from questionnaires. A tabulation table is made, and then the frequency table is arranged for each category of respondents and each of the questions.

Dependent sample t-test, often termed Paired Sample t-Test, is a type of statistical test that aims to compare the average of two groups that are in pairs [8]. Paired samples can be interpreted as a sample with the same subject but experience 2 different treatments or measurements, namely measurements before and after treatment [9].

The requirements for the type of Paired Sample t-Test are:

- a. Data is normally distributed
- b. The two data groups are dependent (interconnected or paired)
- c. The type of data used is numeric and categorical (two groups).

The t-test formula used for paired samples is [10]:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2} - 2r\left(\frac{s_1}{\sqrt{n_1}}\right)\left(\frac{s_2}{\sqrt{n_1}}\right)} \tag{1}$$

where:

- x_1 = Sample average 1
- x_2 = Sample mean 2
- s_1 = Standard sample deviation 1
- s_2 = Standard sample deviation 2
- s_1^2 = Sample variance 1
- s_2^2 = Sample variance 2
- r = Correlation between two samples

According to formula (1), there is a variable x as the data used by the sample. In this research, x is the student's grade, so x_1 is the student's average grade before implementing GOES, and x_2 is the student's average grade after applying GOES.

Here is a picture of the t-region test curve:

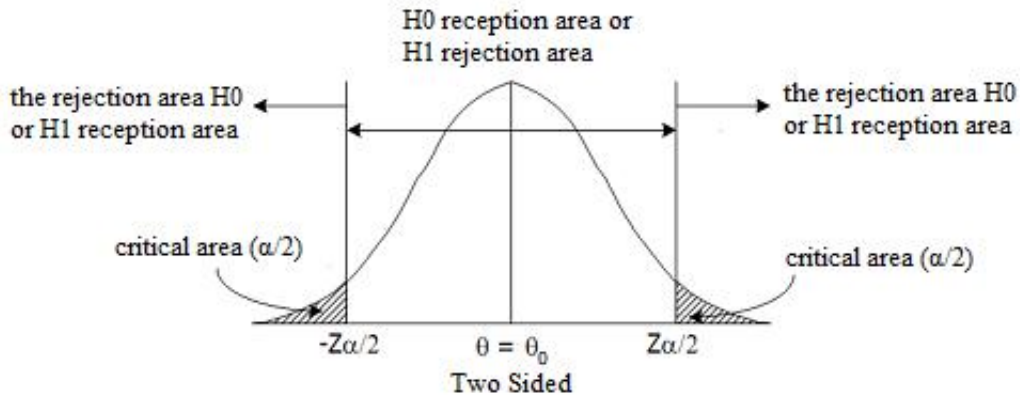


Figure 3. Curve the area of the t-test results [11]

Calculation of the t- test will result in a decision. The decision rules of the t-test are:

- a. For correlations X_1 and X_2 are:
 1. If $\alpha = 0.05$ is smaller or equal to sig. or [$\alpha = 0.05 \leq \text{Sig.}$] then H_0 is accepted and H_1 is rejected.
 2. If $\alpha = 0.05$ is greater or equal to sig. or [$\alpha = 0.05 \geq \text{Sig.}$] then H_1 is accepted and H_0 is rejected.
- b. For the t-test is:
 1. If tarithmetic \leq table then H_0 is accepted and H_1 is rejected
 2. If tarithmetic \geq table then H_1 is accepted and H_0 is rejected

Below is the t_{table} for t-test:

Table2. Presentation table of t-test distribution

Pr	0.25	0.10	0.05	0.025	0.01	0.005	0.001
df	0.50	0.20	0.10	0.050	0.02	0.010	0.002
1	1.00000	3.07768	6.31375	12.70620	31.82052	63.65674	318.30884
2	0.81650	1.88562	2.91999	4.30265	6.96456	9.92484	22.32712
3	0.76489	1.63774	2.35336	3.18245	4.54070	5.84091	10.21453
4	0.74070	1.53321	2.13185	2.77645	3.74695	4.60409	7.17318
5	0.72669	1.47588	2.01505	2.57058	3.36493	4.03214	5.89343
115	0.67663	1.28896	1.65821	1.98081	2.35921	2.61926	3.16262
116	0.67661	1.28889	1.65810	1.98063	2.35892	2.61888	3.16198
117	0.67659	1.28883	1.65798	1.98045	2.35864	2.61850	3.16135
118	0.67657	1.28877	1.65787	1.98027	2.35837	2.61814	3.16074
119	0.67656	1.28871	1.65776	1.98010	2.35809	2.61778	3.16013
120	0.67654	1.28865	1.65765	1.97993	2.35782	2.61742	3.15954

Source : [11]

3. Results

Researchers used a non-random sampling method. In taking this sample the researchers processed 120 questionnaires out of 500 questionnaires which were distributed to teachers, parents, and students, consisting of:

- a. 50 questionnaires out of 180 total questionnaires distributed to teachers.
- b. 30 questionnaires out of 180 total questionnaires distributed to parents.
- c. 40 questionnaires out of 180 total questionnaires distributed to students.

With hypotheses H_0 and H_1 are as follows:

H_1 = There is a significant effect using the GOES application

H_0 = There is no significant effect using the GOES application

Below is data generated from 120 questionnaires out of 500 total questionnaires distributed:

Table 3. Questionnaire results table

Data	Before	After	Data	Before	After
1	75	85	61	75	75
2	80	90	62	80	85
3	65	75	63	70	80
4	70	75	64	90	95
5	75	75	65	70	75
6	80	90	66	75	85
7	65	75	67	80	90
8	80	75	68	65	75
9	90	90	69	70	75
10	75	70	70	75	75
11	60	65	71	80	90
12	70	75	72	65	70

Table 3. continue

13	75	85	73	80	85
14	70	65	74	90	95
15	80	95	75	75	70
16	65	65	76	60	65
17	75	80	77	70	75
18	70	80	78	75	85
19	80	90	79	70	65
20	65	60	80	80	95
21	75	75	81	75	85
22	80	85	82	80	90
23	70	80	83	65	75
24	90	95	84	70	75
25	70	75	85	75	75
26	75	85	86	80	90
27	80	90	87	65	75
28	65	75	88	80	75
29	70	75	89	90	90
30	75	75	90	75	70
31	80	90	91	60	65
32	65	70	92	70	75
33	80	85	93	75	85
34	90	95	94	70	65
35	75	70	95	80	95
36	60	65	96	65	65
37	70	75	97	75	80
38	75	85	98	70	80
39	70	65	99	80	90
40	80	95	100	65	60
41	75	85	101	75	75
42	80	90	102	80	85
43	65	75	103	70	80
44	70	75	104	90	95
45	75	75	105	70	75
46	80	90	106	75	85

47	65	75	107	80	90
48	80	75	108	65	75
49	90	90	109	70	75
50	75	70	110	75	75
51	60	65	111	80	90
52	70	75	112	65	70
53	75	85	113	80	85
54	70	65	114	90	95
55	80	95	115	75	70
56	65	65	116	60	65
57	75	80	117	70	75
58	70	80	118	75	85
59	80	90	119	70	65
60	65	60	120	80	95

From the above results, a t-test was carried out and the following output was produced:

a. Paired samples statistics table results

Table 4. Paired samples statistics table on the results of the questionnaire

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Effectiveness Before using the GOES App	74.00	120	7.379	.674
	Effectiveness After using the GOES App	79.13	120	9.716	.887

The table above shows the average difference between teaching and learning activities before using the GOES application (X_1) is 74 with the case being analyzed at 120, the standard deviation is 7,379. Whereas after using the GOES application (X_2) of 79.13 with a standard deviation of 9,716

b. Paired samples correlations table results

Table 5. Paired samples correlations table questionnaire results

Paired Samples Correlations				
		N	Correlation	Sig.
air 1	Effectiveness Before using the GOES App & Effectiveness After using the GOES App	120	.814	.000

Paired samples correlations table shows the magnitude of the correlation between X_1 and X_2 that is equal to 0.814 with a significance level of 0. Apparently, $\alpha = 0.05$ is greater than the value of Sig or $[0.05 > 0]$, then H_1 is accepted and H_0 is rejected, meaning there is a change in activity teaching and learning after using the GOES application.

c. Paired Samples Test table results

Table 6. Paired Samples Test Table questionnaire results

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Effectiveness Before using the GOES App - Effectiveness After using the GOES App	-5.125	5.668	.517	-6.150	-4.100	-9.905	119	.000

The Paired Samples Test table shows at $t_{\text{arithmetic}}$ of -9,905 with a Sig level (2-tailed) = 0,000 and $df = N-1 = 120-1 = 119$ so the value of $t_{\text{table}} = -1.98010$ at the significance level $[\alpha = 0.05]$. It turns out that $t_{\text{arithmetic}} > t_{\text{table}}$ then H_1 is accepted and H_0 is rejected, meaning there is a change in teaching and learning activities after using the GOES application.

4. Conclusions

Based on data generated from 120 questionnaires out of 500 total questionnaires distributed with hypotheses H_0 and H_1 are as follows:

H_1 = There is a significant influence using the GOES application

H_0 = There is no significant effect using the GOES application

A t-test was carried out which produced:

- a. For correlations X_1 and X_2 , the value $\alpha = 0.05$ is greater or equal to sig. or [$\alpha = 0.05 \geq 0$] then H_1 is accepted and H_0 is rejected.
- b. For t-test is the value of tarithmetic $\geq t_{table}$ then H_1 is accepted and H_0 is rejected

Thus it can be concluded that there is a significant effect using the GOES application. The GOES application provides a positive influence on teaching and learning activities in the classroom. Students can still get learning material even though they cannot attend class. Parents can easily help students with their work. The GOES application can help the teacher deliver the material, and it can also be a liaison between parents and teachers at school.

For future research, this application can be added to the list of attendance of students and teachers, so that it can be a monitoring of the Principal about the condition of teaching and learning activities. Additional assessments can also be given so that parents can find out student learning outcomes.

Acknowledgments

Appreciation and thanks to the Ministry of Research and Technology which has funded the activities of University Basic Research in 2018-2019 with the title: "Designing Guide Application Objective Elementary School (Goes) System for Optimizing Elementary School Learning". Thanks also to the Indraprasta University Research Institute and Community Service PGRI for helping with this research activity through the Research Contract Number: 30/AKM/MONOPNT/2019, tanggal 27 Maret 2019 and LPPM Indraprasta University PGRI Research Agreement / Contract Number: 0504 / SKP.LT / LPPM / UNINDRA / III / 2019, March 29, 2019.

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