

The Effect of Mobile Learning Media on Student Learning Motivation in Data Structure Courses

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Abstract—The study aims to determine the utilization of learning media data structure courses, the level of student motivation and the influence of learning media on student learning motivation. To achieve this purpose the author uses data collection techniques through observation, questionnaires, and documentation with a population of 175 students and a sample of 35 students. The data is processed using quantitative analysis to determine the effect of learning media on student learning motivation. The results showed that the level of use of learning media was in a good category, which was seen from the indicators of visual media, content media, and animated visual media. The level of student motivation is very high in terms of indicators that stimulate students, provide realistic expectations, provide incentives, and direct student behavior. The results of the analysis and testing of hypotheses show that there is a significant influence on the learning media on students' learning motivation with a low level of influence.

Keywords—mobile-learning, data-structure-courses, media, motivation, education

I. INTRODUCTION

According to the Law of the National Education System in Indonesia states learning is "the process of interacting students with educators and learning resources in the learning environment"[1]. While according to [2]: There are four pillars of learning according to the United Nations through UNESCO. The learning paradigm according to UNESCO will create an effective teaching and learning process, i.e.: learning to know, learning to do, learning to live together, and learning to be. In general, learning is a process of interaction between students and educators and learning resources in a learning environment that includes teachers and students who exchange information.

The learning process requires the teacher to know the basic abilities of students including their basic abilities, motivation, academic background, economic background, and so on. The readiness of teachers to recognize the characteristics of students in learning is the main capital that is very important in the delivery of learning material and is an indicator of the success of the implementation of learning.

Data Structure courses as one of the core topics of courses in the area of computer science, which considered it difficult causes many students to fail in their learning [3], [4]. Various approaches and methods of learning applied, such as making and developing learning media as a tool to assist students in teaching. Several studies on the application of learning media such as in [5], describes the development and

implementation of an interactive web-learning environment, called DSLEP (Data Structure Learning Platform), to support students in higher education IT courses. Studies [6] Data Structures Learning – A Visually Assisted Approach, the visualization tool to gauge its effect on the test scores and, the implication a significant and positive effect on the performance, it constitutes a good eLearning tool to support the traditional in-class and lab teaching methods. In studies [7-9], Interactive learning environment for data structures with gamification concept [7] in Web and Mobile Apps [10].

This paper is a study of evaluations from previous research related to the development of mobile learning media in the data structure courses. In a previous study, the author discussed [11] Mobile Learning: Visualizing the Course Content of Media Data Structures in Mobile Networks [11]. Has discussed the problem of cellular network availability in the Mobile Networks for Mobile Learning Tools [12], [13]. Measuring quality of service for mobile internet services [14-16], Broadband quality of service experience [17] and User perceptions [18].

The low learning outcomes indicated by the problem of student learning difficulties in studying the Data Structure course can be caused by several factors. Can be influenced by intrinsic factors (from within students) and extrinsic factors (from outside students). Factors that come from within students such as physical health, interest in learning, intelligence, learning motivation, student talent, cognitive abilities, and students' attitudes toward the Data Structure course. While the factors that come from outside the student self-such as family, physical and social environment, curriculum, teaching method, learning media, medium and facilities.

One of the external factors that influence learning achievement is the use of learning media. Learning media are intermediaries used to convey information to stimulate students to learn. The existence of media is expected to facilitate the learning process for students and lecturers because learning media can overcome the limitations of space and time in learning. The use of learning media can also provide motivation for students to learn. However, when the implementation of learning the use of learning media is still not optimal. This can be seen from the lack of variations in the media used by lecturers in Data Structure courses. The lecturer is still fixated on the book or module given to students so that the enthusiasm of students to practice becomes low.

The purpose of this study is to analyze the effect of mobile learning media in an effort to increase student motivation in studying Data Structure courses. Learning achievement is an important indicator to measure the success of the teaching and learning process. However, there is no denying that high and low student achievement is strongly affected by motivational factors. Therefore if student motivation is high then learning achievement will increase, on the contrary, if motivation is low then learning achievement will decrease.

II. METHODOLOGY

A. Mobile Learning Media for Data Structure Courses

Research and development of mobile-based learning aids software to support learning activities in the Data Structure course were developed using visualization and animation in each learning material content. The Application Interface is described in "Fig.1".

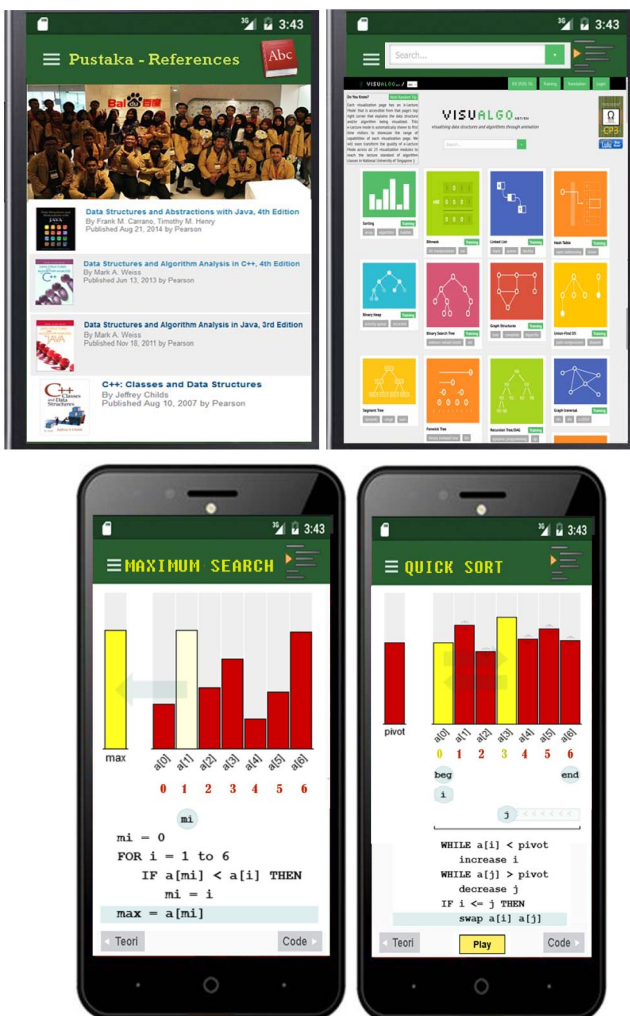


Fig. 1. Mobile learning media for data structure courses [11].

B. Research Design and Variables

The study uses a quantitative approach with the type of correlational research to determine whether there is influence between mobile learning media variables on student learning motivation. The Research Variables are "mobile learning media" as an independent variable or as an affecting variable,

which is depicted with the symbol X, and "learning motivation" as the dependent variable or as a variable that is affected, which is depicted with the symbol Y. Research Design is the relationship between X variables and Y variables. Therefore this research is correlational, that is research that describes the relationship between the two variables.

C. Variable Measurement

To measure this variable, then use the questionnaire instrument submitted to the respondent using a Likert scale. With a Likert scale, the variables to be measured are translated into indicator variables. Then the indicator is used as a starting point to compile instrument items that can be statements or questions. The measurement for each instrument uses the category "that is 81% - 100% categorized as Excellent, 61% - 80% categorized as Very Good, 41% - 60% categorized good, 21% - 40% categorized as Fair and below 20% categorized as Poor". Then the learning media variable is measured using categories; Excellent, Very Good, Good, Fair, Poor. While learning motivation can be measured using categories; very high, high, average, low, and very low.

D. Data Collection and Sampling

The population in the study amounted to 175 students divided into five classes, i.e. Class A = 36, B = 35, C = 35, D = 34, and E = 35 students. According to [19] it states that "if the subject is less than 100, it is better to take it all so that research is population research, but if the subject is large it can be taken between 10% - 15% or 20-25% or more". In this study, researchers took 20% of the total student population. So that the sample is taken is 7 students in each class, then the sample is 35 students.

In order to obtain accurate data and information, data collection techniques use observations, questionnaires and documentation.

E. Data Analysis Techniques

Data analysis techniques used in this research are descriptive statistical analysis techniques (Percentage Formulas) and inferential analysis techniques (Data homogeneity Test, Simple Linear Regression Analysis) which aims to examine the research variables.

To find out the level of effect the variables of learning media with learning motivation, then the interpretation table of r values is used, explained in TABLE 1.

TABLE I. INTERPRETATION GUIDELINES FOR CORRELATION COEFFICIENTS

Coefficient Interval	Relationship Level
0.00 - 0.199	Very low
0.20 - 0.399	Low
0.40 - 0.599	Medium
0.60 - 0.799	Strong
0.80 - 1,000	Very strong

Furthermore, to ease data tabulation and processing using IBM SPSS Version 24 Apps.

III. RESULTS AND DISCUSSION

To determine the effect of learning media on student learning motivation, the questionnaire instrument was used as a data collection technique for both variable X and for variable Y. Furthermore, in terms of testing hypotheses, quantitative tests were performed using statistical formulas and computer software with the SPSS Program considered relevant for data analysis that aims to determine the level of effect of learning media on student learning motivation.

The following is described the results of the data processing of variables X and Y per question item.

A. Descriptive Analysis

1) Mobile Learning Media (X)

To find out the level of utilization of mobile learning media base on indicators, can be seen in the "Fig. 2.

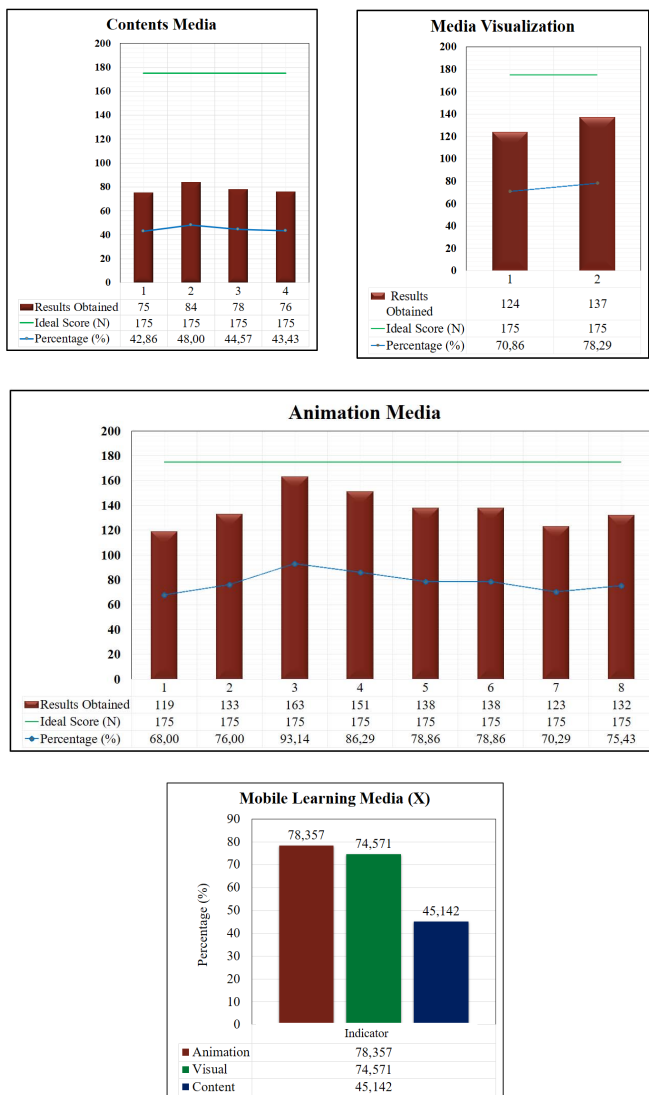


Fig. 2. The level of utilization per indicators on mobile learning media

In "Fig. 2" is the result of tabulation of data from each indicator item on cellular learning media. These results show that for indicators of media and animation content, both are in the Very Good category with 74,571% for media visualization and 78,357% for animation. Whereas for the media content indicator is in a Good category with 45,142%.

This shows that the mobile learning media variable has the highest percentage of animation indicators, which means that students are easier to learn using cellular learning media in the animation menu.

2) Learning Motivation (Y)

To find out the level of utilization of learning motivation can be seen in "Fig. 3".

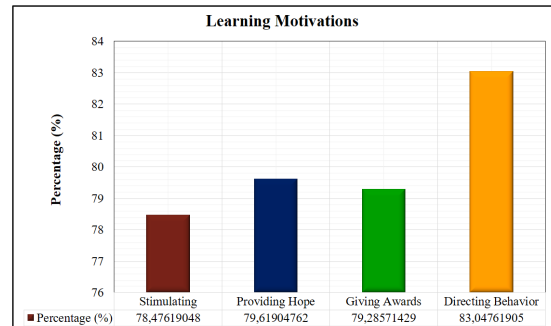


Fig. 3. The level of utilization per indicators on learning motivations

In "Fig. 3" is the result of data tabulation of each indicator item on learning motivation. This result shows that for Stimulating indicators, Providing Hope, and Giving Awards are in the High category with a percentage of 78.47% for stimulants, 79.61% for giving Hope and 79.28% for Awards. While for indicator Directing Student Behavior is in the Very High category with 83,04%. This shows that the variable student learning motivation on indicators directs student behavior to have the Highest percentage, meaning that students are more motivated to learn if there is the direction from the lecturer.

B. Inferential analysis

• Data Homogeneity Test

Homogeneity test [20] is used to find out the variants of several populations or not. This test is carried out as a precondition in the analysis of Independent Samples. The underlying assumption in Analysis of variance (ANOVA) [21] is that variants of several populations are the same. Furthermore, the results of the homogeneity test analysis shown in "Fig. 3".

Test of Homogeneity of Variances			
Learning Motivation			
Levene Statistic	df1	df2	Sig.
.971	8	16	.491

ANOVA					
Learning Motivation					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	524.136	18	29.119	.698	.770
Within Groups	667.750	16	41.734		
Total	1191.886	34			

Fig. 4. Results test of homogeneity variable one-way Y by X

Based on the SPSS output in "Fig. 3" it is known that the significance value of the Student Learning Motivation based on the Mobile Learning variable is 0.171 > 0.05, meaning that the Learning Motivation variable data based on the Mobile Learning variable has the same or homogeneous variant.

• Simple Linear Regression Analysis

The purpose of using simple linear regression analysis [22], [23] is to test hypotheses about the significant influence between learning media and student learning motivation. The testing criteria are if F count is greater than F Table at the 5% significance level test then H0 is rejected which states that there is an influence of learning media on student learning motivation and H1 is accepted which states there is no influence of learning media on student learning motivation.

The hypothesis or conclusions from the authors propose, analyzed using simple linear regression is "There is an Influence of Mobile Learning on Learning Motivation". For more details, see "Fig. 5".

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.228	1	5.228	.145	.705 ^b
	Residual	1186.658	33	35.959		
	Total	1191.886	34			

a. Dependent Variable: Learning Motivation
b. Predictors: (Constant), Mobile Learning

Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
		B	Std. Error			
1	(Constant)	59.667	7.091		8.414	.000
	Mobile Learning	.056	.148	.066	.381	.705

a. Dependent Variable: Learning Motivation

Fig. 5. Results test of simple linear regression analysis

In general, the simple linear regression equation formula is $Y = a + bX$. To find out the regression coefficient value at the output ("Fig. 5") in the table of the coefficients. a = constant number of unstandardized coefficients. In this case the value is 59.667. This number is a constant number which means that if there is no Mobile Learning Media (X), the consistent value of Learning Motivation (Y) is 59.667 b = regression coefficient number. The value is +0.56. This number implies that every additional 1% level of Mobile Learning (X), then Learning Motivation (Y) will increase by +0.56, because the value of the regression coefficient is positive (+), so it can be said that Mobile Learning Media (X) have a positive effect on Learning Motivation (Y). So that the regression equation is $Y = 59.667 + 0.56 X$.

• Hypothesis Testing

The effect testing use to determine whether the regression coefficient is significant or not. The hypothesis proposed in this simple linear regression analysis is:

H0 = There is an effect of Mobile Learning Media (X) towards Learning Motivation (Y).

Ha = There is no effect of Mobile Learning Media (X) towards Learning Motivation (Y).

To determine whether the regression coefficient is significant or not (in the sense that the variable X affects the variable Y) the author tests this hypothesis by comparing the significance value (Sig.) with a probability of 0.05 or in other ways that is comparing the value of T count with T table.

1) Hypothesis testing compares the sig value with 0.05.: As for the basis of decision making in regression analysis by

looking at the significance value (Sig.) Output results based on "Fig. 5" are: "If the significance value (Sig.) Is greater than the 0.05 probability, it means that there is an influence of Mobile (X) Learning Media on Learning Motivation (Y). Conversely, if the significance value (Sig.) Is smaller than the 0.05 probability, it means that there is no effect of Mobile (X) Learning Media on Learning Motivation (Y)".

Based on the output "Fig. 5", the significance value (Sig.) Is 0.705 greater than the 0.05 probability, so it can be concluded that H0 is rejected and Ha is accepted, which means that "There is an Influence of Mobile (X) Learning Media on Learning Motivation (Y).

2) Hypothesis test compares the calculation value with T-tables.: The Testing this hypothesis is often referred to as T-test. Where the basis for decision making in T-test is "If the t-count value is smaller than t table then there is the Influence of Mobile Learning Media (X) on Learning Motivation (Y). Conversely. If the t count value is greater from t table there is no Effect of Mobile (X) Learning Media on Learning Motivation (Y).

Based on the output "Fig. 5" it known that the value of t counts is 0.381. Because the t-count value of 0.381 is smaller than 2.750 (t-table), so it can be concluded that H0 is rejected and Ha is accepted, which means that there is an influence of Mobile (X) Learning Media on Learning Motivation (Y). Next, the illustrated by the t test curve in a simple linear regression analysis on "Fig. 6".

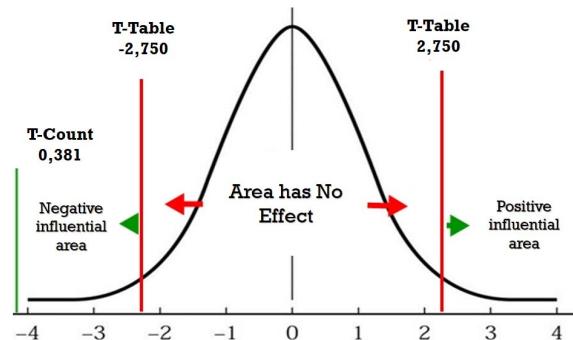


Fig. 6. Illustrated t-test curve in a simple linear regression analysis

Based on the curve in "Fig. 6", it known that the calculated t value of 0.381 reside in the positive influential area, so that it can be concluded that:

"There is an effect of Mobile Learning Media (X) toward Learning Motivation (Y)."

To find out the value of the Effect of Mobile Learning Media (X) on Learning Motivation (Y). Based on the R Square or R2 values contained in the output "Fig. 7".

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.066 ^a	.004	-.026	5.99661

a. Predictors: (Constant), Mobile Learning
b. Dependent Variable: Learning Motivation

Fig. 7. Summary Model of the value of R Square

From the output "Fig. 7", it is known that the value of R Square is 0.66. This value implies that the effect of Mobile Learning Media (X) toward Learning Motivation (Y) is 66% while 34% is affected by other variables. Referring to the above explanation, we can conclude that Mobile Learning Media (X) has a positive effect on Learning Motivation (Y) with a total effect of 66%. This positive effect means that the increasing mobile learning media will affect the student's motivation learning.

IV. CONCLUSION

The results of the study indicate that learning media affect student learning motivation, correlation or relationship between learning media and learning motivation of students in obtaining an influence in the high category. This means there is a positive correlational relationship between mobile learning media and learning motivation. From these results, it was concluded that the media of mobile learning was very good, this can be seen from the utilization of media in the learning process. This means that it has effort, developed, and applied mobile learning media to improve the quality of education that is better for students.

Student learning motivation has been high, this can be seen by students' desire to always try to succeed in the learning process so that students can achieve good performance. The use of media also contributes to increase student motivation, which is classified as very high in terms of aspects including exciting students, giving awards, giving realistic expectations and directing student behaviour. Where this can be seen from the provision of learning materials to achieve the learning objectives that have been established, supported by adequate learning media that can motivate students to succeed in the learning process.

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