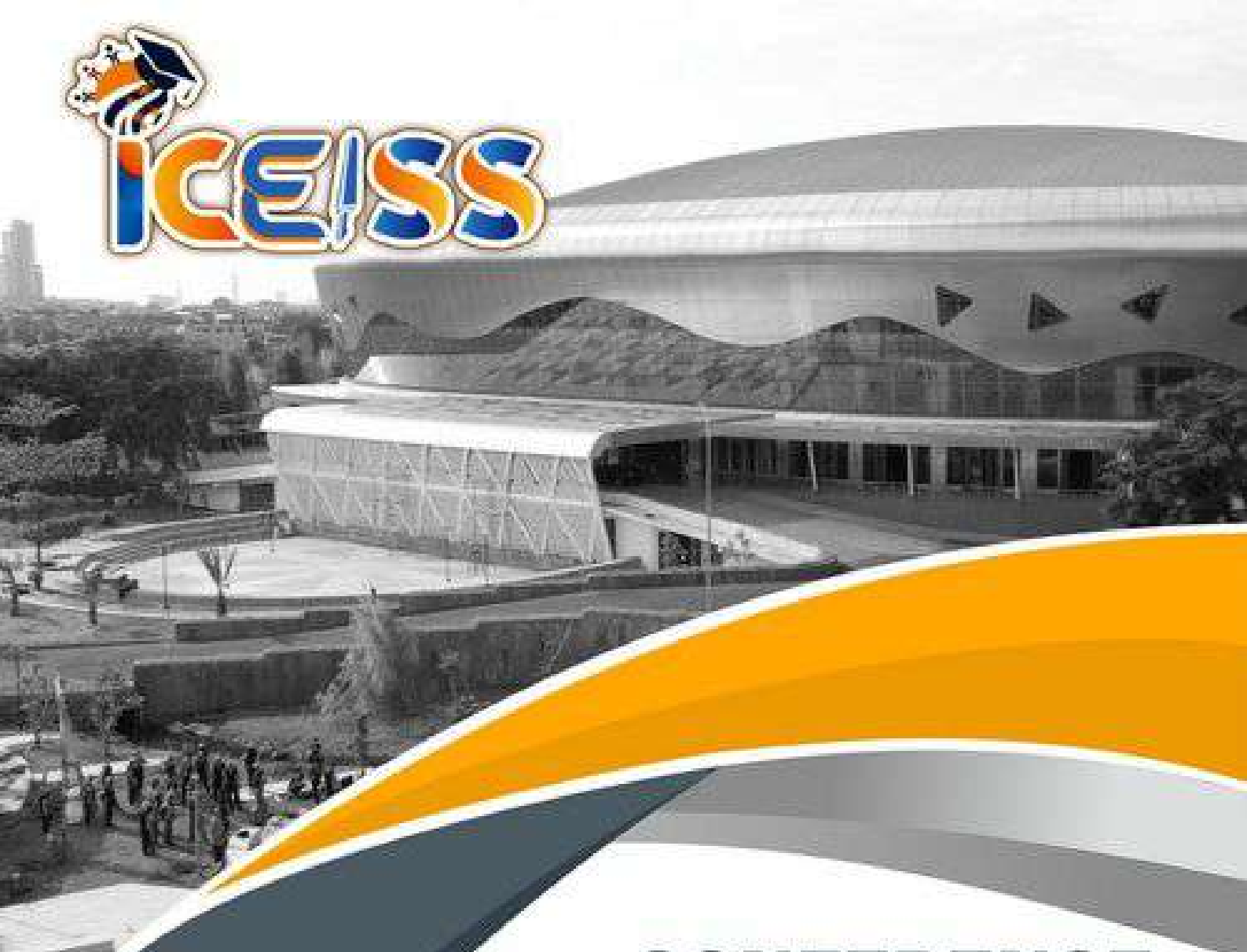

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THE EFFECTIVENESS OF WORDWALL MEDIA TO LEARNING OUTCOMES OF JOURNAL ENTRIES FOR MERCHANDISING COMPANY CLASS XII IPS SMA NEGERI 1 KARANGANOM

Yovi Annang Setiyawan[1] , Titik Ulfatun[2], Sengaloun Xaphakdy[3]
[1.2] Accounting Education Study Program, Universitas Muhammadiyah Surakarta,
[3]The National University Of Laos
[1] a210180211@student.ums.ac.id , [2] Titik.ulfatun@ums.ac.id, [3]s.xaphakdy@nuol.edu.la

Abstract

Technological developments make activities easy, effective, efficient and fast. This effectiveness is also felt in the world of education, namely the learning media used. One of the effective and easy-to-use learning media in the assessment of learning outcomes is wordwall. This study aims to determine the effectiveness of wordwall media to learning outcomes of merchandising company class XII IPS SMA Negeri 1 Karanganom. This research is a type of quantitative research with a quasi-experimental research method (quasi-experimental). The sampling technique used was non- probability sampling with purposive sampling. The results showed the average value of N-gain percent for the experimental class (wordwall media) was 68.3985 or 68% including quite effective category when compared to the average value of N-gain percent for the control class (conventional media) of 30.9269 or 31% included in the ineffective category. The result of the eta squared calculation is 0.91 which is interpreted as having a moderate effect. The significance value (2-tailed) in the paired t-test is 0.000. It can be interpreted that the value is less than 0.05, which means that there is an effectiveness of wordwall media to learning outcomes of journal entries for merchandising company class XII IPS SMA Negeri 1 Karanganom.

Keywords : effectiveness, wordwall media , accounting, learning outcomes

1. Introduction

The development of technology today cannot be separated from people's lives. All aspects of people's lives are affected by technological developments. The use of technology has no age limit and social status of the community. Many people believe that with advances in technology work can become easy, effective, efficient, and fast.

Technological developments also occur in the world of education, resulting in many new innovations, especially in terms of learning media. The role of technology in education, apart from helping students in learning, also has a fairly influential role for teachers, especially the use of learning media facilities in teaching and learning activities (Budiman, 2017). It is hoped that technological developments in education can improve effective learning.

Learning media are everything that can be used to deliver the sender's message to the recipient so that it can stimulate the thoughts, feelings, concerns, and interests of students to learn (Tafonao, 2018). Learning media is an important thing that must be considered by the teacher in carrying out teaching and learning activities in the classroom. Learning media is expected to support the effectiveness of teaching and learning so the educational goals can be achieved well. Learning media is an integral part of learning that cannot be separated (Jamilah, 2015).

Teaching and learning activities must create a comfortable, effective and efficient atmosphere between teachers and students through adequate facilities and infrastructure (Rohmah et al., 2019). The monotonous teaching and learning process makes students less enthusiastic so learning is less effective. The use of learning media can help the monotonous teaching and learning process (Pritandhari & Ratnawuri, 2015). Effective learning media include internet-based digital learning media that are widely available to measure student learning outcomes. This website-based application can usually be used to create learning media such as quizzes,

matchmaking, pairing, anagrams, word randomization, word search, grouping, and others (Nisaurrasyidah et al., 2021).

One of the effective learning media that can be used in teaching and learning process is Wordwall. Wordwall is an e-learning-based learning media and can also be used to create fun quiz-based games for assessment (Sari & Yarza, 2021). This Wordwall media can be accessed by students easily without being guided by teachers or other people.

The use of learning media can also improve students learning outcomes. Good learning media can make students able to achieve the desired learning goals. As it has been mentioned by Audie (2019), the role of learning media can improve student learning outcomes more optimally than without using learning media.

Learning outcomes are abilities obtained by individuals after the learning process takes place, which can provide behavioral changes in both knowledge, understanding, attitudes and skills of students so that they become better than before (Sjukur, 2012). Learning outcomes can be seen from three aspects of the assessment, namely cognitive aspects, psychomotor aspects, and affective aspects. Djamarah in Rijal & Bachtiar (2015) suggested that learning outcomes are influenced by several factors, including: (a) environment (b) instrumental (c) physiological conditions (d) psychological conditions.

Based on the results of initial interviews conducted with Economics/Accounting teachers at SMA Negeri 1 Karanganom, the teachers did not optimize the existing digital learning media in their classroom, especially for the assessment. The conventional method was used. Teacher had to print out the questions and distributed them to students, then submitted to the teachers again. Furthermore, the results of interviews with students were that they observed that the assessment of journal entries for merchandising company so far still use the conventional way using printed paper. Through this method, students must provide writing tool such as a ruler and a calculator independently to complete them.

Savitri (2021) mentioned that Wordwall learning media is proven to be used as a medium for evaluating student learning in Indonesian language courses. Based on the above background, the purpose of this study was to determine the effectiveness of wordwall media to learning outcomes of journal entries for merchandising company class XII IPS SMA Negeri 1 Karanganom.

2. Method

This research is a type of quantitative research with a quasi-experimental research method (quasi-experimental). This study uses a nonequivalent control group design with the aim of testing the effectiveness of wordwall media to learning outcomes of journal entries for merchandising company class XII IPS SMA Negeri 1 Karanganom. The population in this study were all students of class XII IPS at SMA Negeri 1 Karanganom. The sampling technique used was non-probability sampling in the form of purposive sampling. The samples in this study were students of class XII IPS 2 which consisted of 36 students who were assigned to the experimental class (wordwall media) and class XII IPS 3 students which consisted of 36 students who were assigned to the control class (conventional media).

This research was conducted in 4 meetings with a duration of 1 meeting of 60 minutes. This research was carried out in 1 month in every 1 week there was 1 meeting. Meeting 1 begins with giving an initial test (pretest) to both class groups with question instruments that have been declared valid and reliable. The pretest in both test groups used conventional media in the form of printed paper. This pretest aims to determine students' prior knowledge of accounting journal material in trading companies without using internet-based learning media. Meeting 2 was given material on accounting journals for trading companies in both class groups. Meeting 3 was given treatment in the experimental class in the form of wordwall media by being given practice questions and an explanation of the use of wordwall media.

The test instrument was made by consulting the economics/accounting teacher of SMA Negeri 1 Karanganom with reference to the 2013 curriculum. The test instrument was made based on the Learning Implementation Plan for the economics/accounting teacher of SMA Negeri 1 Karanganom which refers to KI KD 3.5 and 4.5 which reads analyze the preparation of the accounting cycle in trading companies (3.5) and make

financial reports on trading companies (4.5). This nonequivalent control group experimental research design can be illustrated as follows (Sugiyono, 2019) :

Table 1Experimental Design of Nonequivalent Control Group

Class	Pretest	Treatment	Posttest
Experiment	O1	X	O2
Control	O3	-	O4

Information :
O1 and O3 = Class before being treated with wordwall media
O2 and O4 = Class after being treated with wordwall media
X = Wordwall media treatment

The data collection technique used conventional media for both the pretest class and the test using wordwall media for the experimental class posttest. The instruments in this study were multiple choice questions consisting of 25 questions which were then tested in both class groups. The results of the study were then analyzed using the n-gain score test and paired t-test with the SPSS program (Statistical Program for Social Science) version 22. The effectiveness of wordwall media to learning outcomes of journal entries for merchandising company class XII IPS SMA Negeri 1 Karanganom can be calculated using the n-gain test which is calculated using the SPSS version 22 program. The results of the n-gain percent test calculation are then interpreted based on the results of the SPSS output. The interpretation of the N-gain percent calculation is based on table 2 (Lestari & Nasution, 2019) .

Table 2Category of N-gain Effectiveness Interpretation

No	Percentage	Interpretation
1	< 40	Ineffective
2	40 - 55	Less effective
3	56 - 75	Effective enough
4	> 76	Effective

Eta squared was used to find out the effect of Wordwall media on students' learning outcomes scores of journal entries for merchandising company topic. Pallant (2011) mentioned that the formula to obatin eta squared is:

$$\text{Eta squared} = \frac{t^2}{t^2 + (N - 1)}$$

Notes:
t = value t
N = number of samples
The results of the eta squared are then interpreted according to the interpretation proposed by Cohen (in Pallant, 2011):

Table 3 Interpretation of Eta Squared

No	Value	Interpretation
1	.01	Small effect
2	.06	Medium effect
3	.14	Large effect

3. Results and Diccussion

The results of the study obtained data on the effectiveness of students' learning outcomes of trade accounting journals in the control class and the experiment class, both pretest and posttest. The data is then given a value for the correct answer is worth 4 and 0 for the wrong answer. The maximum score that can be obtained from 25 questions is 100. Before entering the SPSS program the data were grouped by class, group 1 for the

experimental class and group 2 for the control class. The grouping aims to simplify the input process in the SPSS program version 22.

Table 4. N-gain Test Results Using SPSS

	Class		Statistics	Std. Error
N_gain_Percent	Experiment	mean	68.3985	2.60850
		Median	70.7143	
		Minimum	33.33	
		Maximum	93.33	
		Range	60.00	
	Control	Mean	30.9269	3.86734
		Median	27.5253	
		Minimum	20.00	
		Maximum	80.00	
		Range	80.00	

The number of respondents of the two research class groups were 36 students each. Based on the results of the N-gain percent test above, it shows that the average value of the N-gain percent for the experiment class (wordwall media) is 68.3985 or 68% is included in the quite effective category interpretation. The average value of n-gain percent for the control class (conventional media) is 30.9269 or 31% is included in the ineffective category interpretation. The interpretation is based on table 2 categories of n-gain effectiveness interpretation.

Then, it can be concluded that the use of wordwall media is quite effective in improving the learning outcomes of trading company accounting journals for the XII grade social studies students of SMA Negeri 1 Karanganom. The use of conventional media is not effective in improving the learning outcomes of trading company accounting journals in class XII social studies at SMA Negeri 1 Karanganom. This shows that wordwall media is more effective than conventional media on learning outcomes of accounting journals for trading companies for class XII IPS SMA Negeri 1 Karanganom.

Wordwall media has a significant difference with conventional media, so a paired t-test is needed with the SPSS program version 22. The paired t-test requires a prerequisite test, namely the normality test to find out the data is normally distributed. The normality test uses the Kolmogorov Smirnov test and the test results are in table 5 the results of the Kolmogorov Smirnov normality test.

Table 5 Kolmogorov Smirnov Normality Test Results

Class	Kolmogorov-Smirnov

		Statistics	df	Sig.
N_gain_Percent	Experiment	.105	36	.200*
	Control	.125	36	.166

The results of the Kolmogorov Smirnov normality test in table 5 show that the significance value (sig) for the experiment class is 0.200. This shows that the significance value (sig) is more than 0.05 or 5%, so it can be concluded that the data is normally distributed. The significance value (sig) for the control class shows 0.166, meaning that the value is more than 0.05, so it can be concluded that the control class data is normally distributed. Normal distributed data can be used for paired t-test.

Table 6 Test Results Paired T-Test

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	Pre_Eksperimen - Post_Eksperimen	-32.444	10.377	1.730	-35.956	-28.933	-18.759	35	.000
Pair 2	Pre_Kontrol - Post_Kontrol	-17.000	13.089	2.181	-21.429	-12.571	-7.793	35	.000

Based on the results of the paired t-test in table 6, it is known that the t value in pair 1 is -18,759. Then the t value is used to calculate the eta squared value which aims to determine the effect of the treatment. The eta squared formula is:

$$\text{Eta squared} = \frac{-18.759^2}{-18.759^2 + (36 - 1)}$$

$$\text{Eta squared} = .91$$

The result of eta squared calculation is 0.91. These results can be interpreted that the eta squared value of 0.91 is a medium effect. It can be concluded that there is a big influence on the scores obtained by students before and after wordwall media treatment. In addition, if viewed from the significance value (2-tailed) which is 0.000, it can be interpreted that the value is less than 0.05, which means that there is an effectiveness of wordwall media on learning outcomes of accounting journals for trading companies for class XII IPS SMA Negeri 1 Karanganom.

Discussion

The results of data analysis show the results of the n-gain test using SPSS version 22 that the use of wordwall media is quite effective in improving the learning outcomes of trade accounting journals in class XII social studies at SMA Negeri 1 Karanganom compared to conventional media. The results of calculations using the paired t-test show that there is an effectiveness of wordwall media on the learning outcomes of accounting journals for trading companies for class XII IPS SMA Negeri 1 Karanganom.

The results of this study are in line with A'isyah's research (2019) which proves that the use of wordwall learning media is effective and successful in improving learning outcomes. Furthermore, learning using technology-based media such as weblogs in accounting is more effective than using the lecture method (Khozanah et al., 2019) .

4. Conclusion

Based on the results of the data analysis that has been described, it can be concluded that the use of wordwall media is more effective than conventional media on the learning outcomes of accounting journals for trading companies for class XII IPS SMA Negeri 1 Karanganom. This is shown in the average value of n-gain percent for the experimental class (wordwall media) which is 68.3985 or 68% is included in the quite effective category interpretation when compared to the average value of n-gain percent for the control class (conventional media) of 30.9269 or 31% is included in the interpretation of the ineffective category

The result of eta squared calculation is 0.91. These results can be interpreted that the eta squared value of 0.91 is a medium effect. It can be concluded that there is a big influence on the scores obtained by students before and after wordwall media treatment. The paired t-test showed a significance value (2-tailed) of 0.000. It can be interpreted that the value is less than 0.05, which means that there is an effectiveness of wordwall media on learning outcomes of accounting journals for trading companies for class XII IPS SMA Negeri 1 Karanganom. The conclusion of the test calculation is that there is an effectiveness of wordwall media on learning outcomes of accounting journals for trading companies class XII IPS SMA Negeri 1 Karanganom. The study shows that if economics/accounting teachers use wordwall media as a daily assessment tool for trading company accounting journal materials, student learning outcomes will increase.

5. Acknowledgement

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THE EFFECT OF PRICE PERCEPTION, SHIPPING COSTS AND TIME PRESSURE ON PURCHASE DECISIONS OF SHOPEE FLASH SALE AT UNIVERSITAS MUHAMMADIYAH SURAKARTA

Zakiah[1], Dhany Efita Sari[2], Mutiara Karima[3], Noor Lela Ahmad[4]
[1, 2, 3] Accounting Education, Universitas Muhammadiyah Surakarta, [4] Accounting Education Department, Universiti Pendidikan Sultan Idris, Malaysia
a210180146@student.ums.ac.id

Abstrak

The goal of this study is to see if price perception, shipping expenses, and time pressure have a positive and substantial impact on purchasing decisions during the Shopee Flash Sale. This study used a survey research design to conduct a comparative causal study (cross sectional survey). 226 Accounting Education Universitas Muhammadiyah Surakarta students who used Shopee Flash Sale were polled. 7 questions for the price perception variable, 9 questions for the shipping cost variable, 6 questions for the time pressure variable, and 8 questions for the Shopee Flash Sale purchase decision variable were distributed via a google form. Multiple linear regression, partial t test, and f test were employed in the data analysis. The findings reveal that 1) there is a relationship between the two variables; and 2) there is a relationship between the two.

Keywords**: price perception, shipping cost, time pressure, purchase decisions, Shopee flash sale.**

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1. Introduction

Due to Indonesia's strong internet usage, there is a potential market for online company owners. Electronic commerce, or e-commerce, is the use of the internet in business. Tokopedia, Shopee, Bukalapak, Lazada, Blibli.com, Zalora, and Sociolla are some of the online stores that promote various enterprises as part of e-commerce.

In the first quarter of 2022, Shopee, a Singapore-based e-commerce company, remained a major player in the Southeast Asian e-commerce market. In five of Southeast Asia's six countries, namely Malaysia, Singapore, Thailand, the Philippines, and Vietnam, Shopee is routinely the most popular e-commerce site. In early 2022, the number of visitors hit 421 million (R. A. Putri & Fenalosa, 2022). According to the data provided by iprice, Shopee is the second largest e-commerce site behind Tokopedia (Iprice, n.d.).

Shopee offers initiatives such as lower rates on Flash Sales and free shipping to consumers in order to entice and grow product purchases at Shopee. Shopee Flash Sale is a program that provides consumers with discounted prices on certain products that have been approved by the vendor for a limited period. The key lure for attracting customers, particularly young individuals, such as students, is a flash sale. Consumer motives for making impulse purchases, hedonic motives or consumer utilitarian motives, are investigated when flash sale offers are presented at online retailers (Zakiyyah, 2018).

Several factors influence consumer purchase decisions during Shopee's flash sale campaigns. Choosing a product based on pricing is usually the first consideration for shoppers (Ananda & Dewi, 2018). One of the most crucial aspects that influences consumer interest in making online purchases is price. Consumers will sometimes compare the price of one product to the price of another product based on affordability and benefits obtained from the product. When consumers are given price information, it can cause them to have preconceived notions. This is in line with the findings of a study performed by the Data Insight Center (KIC), which found that 75 percent of respondents said the key factor influencing their decision to buy is price.

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crucial aspects that influences consumer interest in making online purchases is price. Consumers will sometimes compare the price of one product to the price of another product based on affordability and benefits obtained from the product. When consumers are given price information, it can cause them to have preconceived notions. This is in line with the findings of a study performed by the Data Insight Center (KIC), which found that 75 percent of respondents said the key factor influencing their decision to buy is price.

Furthermore, shoppers may be influenced by time constraint when making a Shopee Flash Sale purchase. Consumer behavior is influenced by a characteristic called time pressure. When consumers don't have enough time to think about the things they want to buy, time pressure is created, prompting them to make purchases right away. Time pressure, according to Rothstein in Kenny et al. (2019), is the amount of time that passes between assessments and decisions. As a result, time pressure can be characterized as a perceived cost resulting from a lack of or sufficient amount of time, and it can repress feelings. Consumers' emotional worth and purchasing intentions might be influenced by time constraints alone (Livang et al., 2019).

The goal of this study is to see if there is a positive and significant effect of price perception on Shopee flash sale purchasing decisions; if there is a positive and significant effect of shipping costs on Shopee Flash Sale purchase decisions; if there is a positive and significant effect of time pressure on Shopee Flash Sale purchase decisions; and if there is a positive and significant influence on the perceiving of price on the perceiving of price on the perceiving of price on the perce This study is significant in that it can offer tips for entrepreneurs who utilize Flash Sale promotion strategies with sales targets among students or teens, such as paying attention to teenagers' preferences.

2. Method

Design

This study is research that uses a quantitative approach which tests existing theoretical hypotheses. With a comparative type of causal research that uses a survey research design (cross sectional survey).

Population and Sample

The population in this study is Accounting Education students of the University of Muhammadiyah Surakarta class of 2018-2021 who have used Shopee in the flash sale feature with a total population of 552 students. The number of samples was determined using tables according to Krejcie and Morgan, so that the current population can be sampled as many as 226 Accounting Education students class of 2018-2021.

Instruments

A questionnaire with proportional stratified random sample was utilized as the study instrument. A pilot study was conducted on 30 students utilizing Shopee Flash Sale before the questionnaire was utilized to assess the sample group, and all items in the research questionnaire were declared valid. According to the computation of the R table value using the number N = 30, the significant level utilized is 0.05 with a R table value of 0.361. All statements in this study's questionnaire are valid when the second instrument test is completed. Meanwhile, Table 5 shows the results of the questionnaire reliability test.

Table 5. Questionnaire Reliability Test Results

Variable Y		
Cronbach's Alpha	rii	Information
0,904	0,60	Reliable
Variable X1		
Cronbach's Alpha	rii	Information
0,916	0,60	Reliable
Variable X2		
Cronbach's Alpha	rii	Information

0,847	0,60	Reliable

Variable X3

Cronbach's Alpha	rii	Information
0,835	0,60	Reliable

If the Cronbach alpha value for each variable is more than 0.60, it can be concluded that all of the variables in this study are reliable and can be used.

Data analysis technique

Multiple linear regression analysis, partial t test, and f test are the data analytic techniques employed in this study. Before hypothesis testing, the analysis prerequisite test and the classical assumption test were performed, with the results displayed in Tables 6, 7, and 8.

Table 6. Normality Test Results

One-Sample Kolmogorov-Smirnov Test

N	Asymp. Sig (2tailed)	Information
226	0,975	Normal

The asymp value can be computed using the normalcy test findings. The value of Asymp can be determined. If the residual value in table 6 has a Sig. (2-tailed) of 0.975 > 0.05, the residual value can be deemed a normal distribution. It can be assumed that the residual value is normally distributed because it is normal.

Table 7. Linearity Test

Variable	F_{count}	F_{table}	Information
X1-Y	16,769	1,77	Linear
X2-Y	14,360	1,69	Linear
X3-Y	16,129	1,83	Linear

The value of Sig. in table 7. The results of the linearity test of price perception on Shopee Flash Sale purchasing decisions are 16,769 > 1.77, shipping costs on Shopee Flash Sale purchasing decisions are 14,360 1.69, and time pressure on Shopee Flash Sale purchasing decisions is 16,129 > 1.83, so it can be concluded that the perception of postage and time pressure on the purchase decision of Shopee Flash Sale

Table 8. Heteroskedasticities test

Variable	Sig	Information
X1	0,638	No heteroskedasticities
X2	0,154	No heteroskedasticities
X3	0,597	No heteroskedasticities

From the results of Table 8 above, it shows that the significant value of each variable is greater than 0.05 which states that it is free of heteroskedasticity.

Table 8. Multicollinearity Test Results

Variable	VIF	Tolerance	Information
X1	0,748	1,337	No multicollinearity occurs
X2	0,668	1,498	No multicollinearity occurs
X3	0,665	1,505	No multicollinearity occurs

The VIF value of price perception has a value of 0.748 10.0 and a tolerance of 1.337 > 0.1, according to the results in table 9. Shipping costs have a VIF value of 0.668 > 10.0 and a tolerance of 1.498 > 0.1, while time pressure has a VIF value of 0.665 > 10.0 and a tolerance of 1.505 > 0.1. As a result, the VIF value of each variable is less than 10.0, and the tolerance value is more than 0.1, indicating that there is no multicollinearity.

3. Results and Discussion

a. Multiple Regression Analysis

The data in this study were analyzed using multiple regression to assess the effect of the independent variable on the dependent variable, and the results of testing data that were processed using SPSS version 20.0 are shown in the following table:

Table 9. Multiple Regression Test Results

Model	Unstandardized Coefficients
	B
Constant	-0,374
Price Perception	0,339
Shipping Cost	0,307
Time Pressure	0,370

Based on the results of multiple regression analysis in the table above, the following equation can be made:

$$Y = a + b1X1 + b2X2 + b3X3$$

$$Y = -0{,}374 + 0{,}339X1 + 0{,}307X2 + 0{,}370X3$$

If the scores for the perceived price, shipping expenses, and time pressure factors are regarded non-existent or equal to zero, then the value of the Shopee Flash Sale purchase choice will decrease, according to the equation. The purchase choice made via the Shopee Flash Sale will increase by 33.9 percent if the price perception coefficient is increased by one unit. If the shipping cost coefficient is increased by one unit, the purchase decision

made through Shopee Flash Sale increases by 30.7 percent. The purchasing decision using the Shopee Flash Sale will increase by 37 percent if the time pressure coefficient is increased by one unit. As a result, the outcomes

b. T-Test (Parsial)

The purpose of this t-test is to examine if each independent variable has a positive and significant effect on the dependent variable. The results of the test are shown in the table below:

T-Test results

Variable	t_{count}	t_{table}	Value Sig.
Price Perception	3,865	1,651	0,00
Shipping Cost	3,996	1,651	0,00
Time Pressure	3,894	1,651	0,00

c. Simultan (f-test)

Table 11. f . test results

Variable	f_{count}	f_{table}	Value Sig.
Price Perception, Shipping Cost & Time Pressure	43,140	2,645	0,00

From the results of the t test in table 10 and the f test in table 11 it can be concluded that:

1) The effect of price perception on Shopee flash sale purchasing decisions.
   From the tcount value for the price perception variable of 3.865 > ttable 1.651 with a sig value. equal to 0.00 < alpha value 0.05 then H0 is rejected while Ha is accepted. It can be interpreted that the price perception variable has a positive and significant effect on the purchase decision of Shopee flash sale.
2) The effect of shipping costs on Shopee flash sale purchasing decisions.
   For the value of tcount for the variable postage of 3.996 > ttable 1.651 with a value of sig. equal to 0.00 < alpha value 0.05 then H0 is rejected while Ha is accepted. So that it shows that the postage variable has a positive and significant effect on the purchase decision of Shopee flash sale.
3) The effect of time pressure on Shopee flash sale purchasing decisions.
   And the tcount value of the time pressure variable is 3.894 > ttable 1.651 with a sig value of 0.00 < alpha value of 0.05 then H0 is rejected while Ha is accepted. So that it can be interpreted that the time pressure variable has a positive and significant effect on the purchase decision of Shopee flash sale.
4) The effect of price perception, shipping costs and time pressure on Shopee flash sale purchasing decisions.
   In the results of the f test, the fcount value is 43,140 > ftable is 2,645 with a sig value. 0.00 < alpha value 0.05. Therefore, H0 is rejected and Ha is accepted. So, it can be concluded that the variables of perception of price, shipping costs and time pressure simultaneously have a positive and significant effect on Shopee flash sale purchasing decisions.

d. Coefficient of Determination

Based on the results of the coefficient of determination, this research can be seen in the following table:

Table 12. Results of the Coefficient of Determination

Variable	R Square
Price Perception, Shipping Cost & Time Pressure	0,368

The results of the coefficient of determination in the table above show that the variables of price perception, shipping costs and time pressure affect Shopee Flash Sales purchasing decisions by 36.8% while the remaining 63.2% is influenced by other variables not examined in this study.

Because the tcount value is 3.865 > ttable 1.651, while the significance value is 0.00 and the alpha value is 0.05, this study discovered that price perception has a positive and substantial influence on Shopee Flash Sale purchase decisions. As a result, the first hypothesis, that price perception has a positive and considerable influence on Shopee Flash Sale purchasing decisions, was proven in this study. Price perception can have a favorable and significant effect on customer purchase decisions, according to prior research by Darmansah & Yosepha (2020), indicating that price perception is a component that influences purchasing decisions. As a result, customers' perceptions of price will lead them to believe that by receiving a discount, the costs paid would be little and that they will save money.

Then, this study found that shipping costs have a positive and significant impact on Shopee Flash Sale Then, because the calculated value is 3.996 > t table 1.651, while the significance value is 0.00 and the alpha value is 0.05, this study discovered that shipping costs had a positive and substantial impact on Shopee Flash Sale purchasing decisions. As a result, the second hypothesis, that shipping costs have a positive and large impact on Shopee Flash Sale purchasing decisions, was proven in this study. According to Maulana & Asra's (2019) research, if the free shipping promotion is bigger, it will have a beneficial effect on e-commerce purchase decisions, because the greater the shipping charges provided, the greater the decision. Shopee's free shipping promotion is part of a marketing strategy to educate, persuade, and impact consumer views.

Because the tcount value is 3.894 > ttable 1.651, while the significance value is 0.00 and the alpha value is 0.05, the results of this study demonstrate that time pressure has a positive and substantial impact on Shopee Flash Sale purchase decisions. As a result, the third hypothesis, that time pressure has a positive and significant influence on Shopee Flash Sale purchasing decisions, was proven in this study. The time pressure felt by consumers will not be disturbed by the time limit given because during the Shopee Flash Sale, because during the Shopee Flash Sale within 24 hours have different product variations, it is different from the research conducted by Taufik (2020), which states that time pressure has a negative effect on purchase intention, because the time pressure felt by consumers will not be disturbed by the time limit given because during the Shopee Flash Sale, because during the Shopee Flash Sale within 24 hours have different product variations. Within 24 hours

4. Conclusion

From the research results that have been analyzed, it can be concluded that price perception has a positive and significant effect on Shopee flash sale purchasing decisions. This shows that consumers already feel that product prices at Shopee Flash Sale are already cheap. Consumers also consider the discounts given during the Shopee Flash Sale to be large, even though consumers have compared prices at other stores and compared prices with other similar products. Recommendations for Shopee must be able to invite sellers to take part in the Flash Sale and provide discounts that look big. So in this case consumers will choose products that are felt as bigger discounts.

Sometimes the presence of postage also makes consumers think again about making a purchase. Because, the shipping costs that have been set are nominally greater than the products they buy. Based on this research, it also shows that consumers are mostly interested in the free shipping promo when making a Shopee Flash Sale purchase. This free shipping promo is also considered very effective to increase sales. Therefore, it is a recommendation for Shopee itself, to continue to provide free shipping vouchers for consumers when the flash sale is held. So that they will be enthusiastic in shopping for flash sales. Because this free shipping promo is one of the most important factors in influencing purchasing decisions at Shopee.

Time pressure that arises due to a predetermined time limit will make consumers rush, feel disturbed in evaluating a product and do not have time to compare prices or choose other products. So that this can affect consumer purchasing decisions in the Shopee flash sale session, where the time limit specified in the flash sale session causes special pressure for consumers. So, in this case, recommendations for future research can be carried out on the effect of time pressure on e-commerce platforms and other promotions.

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WORK CULTURE IMPLEMENTATION IN VOCATIONAL HIGH SCHOOL

Winda Pratiwi Santosa[1], Dhany Efita Sari[2], Noor Lela Ahmad[3]
[1,2] Accounting Education, Universitas Muhammadiyah Surakarta, [3] Accounting Education Department, Universiti Pendidikan Sultan Idris, Malaysia
[1]a210180069@student.ums.ac.id

Abstract

The purpose of this study is to detail the process of SMK Negeri 6 Surakarta's work culture implementation as well as the challenges that the school has encountered. The ethnographic research design is used in this study's qualitative investigation. The Head of the Institutional Accounting and Finance Expertise Program, the Institutional Accounting and Finance Laboratory Instructor, the Institutional Accounting and Finance Instructor, and the Accounting and Financial Institution students from SMK Negeri 6 Surakarta served as the study's resource participants. In this study, observation, interviews, and documentation were employed as data collection methods. The researchers employed source triangulation to ensure the accuracy of the data.

Keywords: Implementation of Work Culture, P5BK, SMK Center of Excellence.

1. Introduction

The Center for Excellence Vocational School has the aim of preparing graduates needed in the world of work accompanied by universities that are partner schools (Faisal, 2021). This is also based on the Decree of the Head of the Research and Development Agency and Books Number 029/H/Ku/2021 concerning the Learning Outcomes of Subjects in the Center for Excellence Vocational School Program. The decision states that the desired learning outcomes can be achieved with assistance from universities as school partners. In addition, students from partner universities can also do internships or teach at related schools (M. Fahrian Noor, 2021). This is done so that later it can improve the quality of human resources as desired.

To meet the objectives of the Center of Excellence Vocational School program, it is necessary to strengthen the character or profile of national students to instill the spirit of Pancasila in it. Therefore, a program was created which is expected to be used as an alternative to produce Pancasila students as desired. P5BK is a program with a form of science learning that can be used to find a way out of an existing problem, and is used to observe problems that occur in the surrounding environment through programs that can train students to be able to learn more creatively, interactively, flexible and able to solve an existing problem by producing a product or it can also be in the form of an action (Rusnaini et al., 2021).

One way that can be used to shape the character of Pancasila students is to train them through the application of work culture. According to (Suwondo, 2012) work culture is a behavior that exists within an individual in an organization. The existence of a work culture aims to improve the behavior and attitudes of human resources in developing productivity in the world of work. To be able to produce a work culture that is in accordance with organizational goals, it takes quite a long time because work culture cannot be formed without daily habituation. The work culture itself can be implemented if it has the support of existing organizational members. So that later the work culture can be applied effectively and efficiently to be able to achieve the sustainability of the vision and mission of an organization (Makmur, 2015).

One of the official institutions that implements a work culture is SMK Negeri 6 Surakarta. SMK Negeri 6 Surakarta itself is one of the Vocational Centers of Excellence in Central Java provinces. After being selected as one of the Vocational Centers of Excellence, teachers of SMK Negeri 6 Surakarta also received online training as a driving committee organized by the Ministry of Education and Culture in July 2021 (SMKN6SOLO, 2021). Therefore, it is necessary to conduct research related to the implementation of work culture at SMK Negeri 6 Surakarta. The Center for Excellence Vocational School is one of the programs of the

Ministry of Education and Culture to improve the quality of Indonesia's human resources through the younger generation.

With the Center of Excellence Vocational School program, it will be possible to develop Vocational High Schools with existing expertise competencies by improving their performance and quality through collaboration with partners in the world of work or the business world. This is done so that Vocational Schools can later become driving schools and improve the performance and quality of their students. The Center of Excellence SMK program itself is based on PERMENDIKBUD No. 22 of 2020 concerning the Strategic Plan of the Ministry of Education Center for Excellence Vocational School has the aim of preparing graduates needed in the world of work accompanied by universities that are partner schools (Faisal, 2021). This is also based on the Decree of the Head of the Research and Development Agency and Books Number 029/H/Ku/2021 concerning the Learning Outcomes of Subjects in the Center for Excellence Vocational School Program. The decision states that the desired learning outcomes can be achieved with assistance from universities as school partners. In addition, students from partner universities can also do internships or teach at related schools (M. Fahrian Noor, 2021). This is done so that later it can improve the quality of human resources as desired.

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Work culture is a philosophical statement that can be used as a binding rule for employees because it can be applied formally (Irene et al., 2021). Usually, the work culture is created from the beginning of the establishment of an organization or company. The work culture itself is one of the basic things in existing human resource management. When someone has joined an organization or company, it can be ascertained that they already have the goals of the organization for the common good (Liliana & Suyadi, 2018). According to Putera (2019), work culture is defined as the overall attitude and behavior or social values that are related to the human

mind in carrying out a job. Meanwhile, Frinaldi & Embi (2011) describe work culture as a philosophy based on a person's view of life as a value that becomes a character or character, habits, and motivators that become a culture or habit in certain groups and organizations that can be seen through opinions, ideals and aspirations. - aspirations and actions.

Darodjat (2015) states that the reflection of an organization that is advanced and has high integrity can be seen from its high and strong work culture. With the work culture, every member of the organization will work in an organized manner and have high performance. In addition, Darodjat also explained that there are three important points of having a work culture in an organization, namely the intention to work well, to be able to work well, to be able to retain members of the organization, and to build the good name of the organization. Based on the description that has been submitted, researchers are interested in conducting research related to the implementation of work culture with the aim of being able to describe the implementation of work culture and to describe the obstacles faced in implementing work culture at SMK Negeri 6 Surakarta.

2. Method

The type of research used in this research is qualitative research, using an ethnographic research design. The research will be conducted in March 2022 at SMK Negeri 6 Surakarta. The object of this research is the implementation of work culture at SMK Negeri 6 Surakarta. While the subjects in this study were the head of the Institute's Accounting and Finance expertise program, teachers and students of SMK Negeri 6 Surakarta. The techniques used to collect data by researchers are observation, interviews and documentation. To test the validity of the data used by researchers, namely source triangulation and technique triangulation. Testing the validity of data data is very necessary so that later the existing data can be accounted for as a finding from scientific research carried out (Sidiq et al., 2019). After testing the validity of the data, then the data obtained by the researcher was analyzed using interactive analysis.

3. Results and Discussion

In obtaining research data, researchers conducted observations, interviews and documentation at SMK Negeri 6 Surakarta. Interviews were conducted with the Head of Institutional Accounting and Finance Expertise Program, Institutional Accounting and Finance Expertise Program Teacher, Laboratory Teacher of Institutional Accounting and Finance Expertise Program and by conducting interviews with students of Institutional Accounting and Finance Expertise Program. As for the observation and documentation of the research itself, the researcher focuses on every activity in the school related to the implementation of work culture. Based on interviews conducted with research sources, an overview of the implementation of work culture at SMK Negeri 6 Surakarta during distance learning is to apply an honest attitude and 5S (Smile, Greet, Greeting, Polite, Courteous).

However, when face-to-face learning, students and teachers carry out a disciplined work culture, are thorough, honest, consistent, can manage time, and apply 5R culture in the classroom or in the Lab. AKL. As for the scope of the implementation of work culture at SMK Negeri 6 Surakarta, which includes 5R (Concise, Neat, Clean, Treat, Diligent), orderly in administration, discipline in teaching, applying 5S (Smile, Greet, Greeting, Polite, Courteous), maintain communication with the teacher or with colleagues, and be honest in any case whether it is during the learning process or outside class hours. Teachers in addition to assisting and directing students in implementing a work culture but also participate in implementing a work culture in the school environment. Where at first the teacher gets a guide or workshop related to work culture and after that the teacher will carry out as well as give examples to students regarding the implementation of work culture in schools.

In implementing the work culture at SMK Negeri 6 Surakarta, there are several things that can be said to support the implementation of the work culture itself. Some of these things include good communication between teachers or between teachers and students, the presence of competent teachers, active and responsive students and the availability of complete facilities and infrastructure. Where the researchers obtained data that when there were students who did not implement the work culture properly and correctly at school, the teacher would give a warning or even give sanctions for disobeying the implementation of the work culture in schools as

determined by the school. In addition to providing sanctions, teachers will also conduct an evaluation of the implementation of work culture in schools.

In implementing work culture in schools, teachers and students assume that in its implementation at SMK Negeri 6 Surakarta the work culture has been going well. However, there are still some students who have not implemented the work culture well at school. This is due to several obstacles, such as the Covid-19 virus and the presence of students who are difficult to notify.

The general description of the implementation of work culture at SMK Negeri 6 Surakarta itself during distance learning is by applying an honest attitude, discipline both when joining online learning or being disciplined in collecting assignments and by applying 5S (Smile, Greet, Greeting, Polite, Courteous). However, when face-to-face learning, students and teachers carry out a disciplined work culture, are thorough, honest, consistent, can manage time, and apply 5R culture in the classroom or in the Lab. AKL. This is in accordance with research conducted by (Irene et al., 2021) which reveals that work culture can grow and develop well if there is guidance and development of a good work culture as well.

Where the work culture includes discipline, motivation, and the application of 5R in order to increase public sensitivity to work culture in everyday life. In developing a work culture at SMK Negeri 6 Surakarta, there is a scope for its implementation. The scope of implementing work culture at SMK Negeri 6 Surakarta itself is to apply 5R (Concise, Neat, Clean, Treat, Diligent), orderly in administration, discipline in teaching, apply 5S (Smile, Greet, Greeting, Polite, Polite), maintain communication with teachers and colleagues, as well as being honest in any case, whether during the learning process or outside class hours.

This is in accordance with research conducted by (Rohmah et al., 2019) which states that in improving the soft skills and hard skills of students, teachers can assess students with several aspects. Where these aspects include being disciplined, honest, responsible, having a good level of confidence, willing to work together, being able to tolerate anyone at school, and of course having a good level of knowledge and skills. Here the teacher has an important role in educating students at school. Based on the research that has been done, it is obtained data that in SMK Negeri 6 Surakarta the teacher plays a role in assisting and directing students to implement a work culture but also participates in implementing a work culture in the school environment. As stated by (Maheasy et al., 2019) in his research which revealed that teachers as educators are required to be able to accompany, guide and be role models for students at school.

Teachers in implementing work culture at SMK Negeri 6 Surakarta are also supported by various things, including good communication between teachers and between teachers and students, the presence of competent teachers, active and responsive students and the availability of school facilities and infrastructure that complete. Where (Mahardani & Basalamah, 2018) in his research states that teachers need adequate advice and infrastructure to support teaching and learning activities so that teaching and learning activities or other activities that are in the school environment can run conducive.

However, in implementing the work culture at SMK Negeri 6 Surakarta, there are also obstacles with students who do not implement the work culture at school and are difficult to notify. Therefore, when the teacher finds out that there are students who act in this way, they will be reprimanded verbally first. However, if the warning is not heeded, the student will be dealt with firmly. This is like the research that has been done (Ismawati et al., 2020) which states that work culture must be upheld in schools and applied in learning and collaboration between teachers. If there are school residents who violate it, they will get a warning.

4. Conclusion

Based on the results of research and discussions that have been carried out by researchers, conclusions can be drawn:

a The implementation of work culture at SMK Negeri 6 Surakarta has been implemented long before getting the SMK-PK grant. Where in its own implementation all school residents apply a work culture while at school. The scope of implementing work culture at SMK Negeri 6 Surakarta itself includes the application of 5R (Concise, Neat, Clean, Treat, Diligent), 5S (Smile, Greet, Greeting, Polite, Courteous), discipline,

orderly, and honest. In implementing work culture in schools, teachers act as implementers and also accompany students in implementing work culture. In addition, teachers also act as role models or role models for students in implementing work culture at SMK Negeri 6 Surakarta. In its implementation, there are factors that support the work culture, including the presence of capable and competent teachers, good communication between teachers and between teachers and students, active students and the availability of complete school facilities.

b In practice, the work culture encountered several obstacles. These obstacles are the increasing Covid-19 virus and also the presence of students who do not carry out a work culture. Therefore, to overcome these obstacles, the school implemented solutions such as the increase in the Covid-19 virus, schools implemented distance learning while still providing understanding to 84 students related to work culture. In addition, by giving sanctions to students who do not apply the work culture.

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STRATEGIES TO CREATE DIGITAL LEARNING MATERIALS OF EARLY READING FOR ELEMENTARY SCHOOL STUDENTS USING KODULAR

Cahyo Hasanudin[1], Ayu Fitrianingsih[2], Dicky Nuri Prasetyo Utomo [3], M. Abu Rizal Baihaqi[4]
[1,3] Indonesian Language and Literature Education Department, IKIP PGRI Bojonegoro, East Java, Indonesia,
[2,4]English Education Department, IKIP PGRI Bojonegoro, East Java, Indonesia
cahyo.hasanudin@ikippgribojonegoro.ac.id

Abstract

The development of modern science and technology has to be accompanied by learning media innovation. The transformation of it can be in form of digital learning materials. The aim of this study is to investigate whether the Kodular can be utilized in compiling digital learning materials. This study is descriptive qualitative exploratory research based on depth interview in which the primary data is in form of field notes taken from interviews to the user of Kodular, the elementary school teachers, and the questionnaire results on the teachers' needs in the elementary school. This study involves the user of Kodular and elementary school teachers which are selected using purposive sampling. The procedures of preparing digital learning materials are 1) analyzing the needs of teaching materials, 2) designing the concepts of teaching materials, and 3) developing teaching materials based on the structure of each learning material. The results of study shows that Kodular is able to be utilized in compiling digital learning materials of early reading for elementary school students by implementing Kosasih's strategy. It can be concluded that Kodular is used as a media in compiling the materials of early reading in forms of texts, pictures, voices, and animations. The output is the digital learning materials in form of application which can be installed on Android devices.

Keywords: Digital learning material, early reading, elementary school students.

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4. Introduction

Manuscript The elementary school is one of the most important parts for students because it is the first step in introducing a more complex world of learning. It is an educational institution for children (7-12 years old) in having elementary learning for 6 years (Kurniawan, 2015). It is as a new learning source to support the learning process (Puspitasari & Hanif, 2019). This condition drives the elementary school as a determinant that greatly influences how students will carry out their future education (Chen et al., 2020). It can be done by providing understanding, skill, and attitudes for students (Marmoah, 2022). Therefore, in the early stage, students will be introduced to arts such as drawing (Caiman & Jakobson, 2019). They are trained to think using mathematical symbols (Schliemann et al., 2003) and taught learning skills such as listening, speaking, reading, and writing (Widyaningrum & Hasanudin, 2019).

The several learning have been designed, structured, and considered in form of curriculum which is suitable for students. The curriculum has to focus on students, review their personalities, facilitate them to express themselves (Altun & Büyüköztürk, 2014), develop their thinking ability about the future (Vidergor et al., 2019), and able to be accepted by students, parents, and teachers (Wylie et al., 2018). The curriculum implementation at elementary school helps the learning understanding to be more systematic and effective (Li, 2022) because it uses educational theory which has been tested and suited to the students' age and development (Schick & Cierpka, 2005).

The age and development of elementary school students greatly affect their characters. It is proven by the emergence of strong relationship between character development and school age (Zen et al., 2019). There are also the differences in students' basic characters at different class levels (Koussihouèdé, 2020). This

characteristic creates the differences in students' acquisition ability (Bourdeaud'hui et al., 2018). It will influence on their learning results in the class (Fitchett & Heafner, 2017). Therefore, the suitable learning is needed to improve their achievement and intention to learn in the elementary school (Chu et al., 2010).

The academic level at elementary school which is getting higher causes the learning process to be difficult and students' achievement to be decreased (Quilez-Robres et al., 2021). Moreover, it causes students to be difficult to concentrate in learning (Cai, 2021). As a result, it is important to provide learning which contributes to the students' success at elementary school such as social skill, self-regulation skill (McClelland et al., 2006), and the use of language skills (Ufer & Bochnik, 2020). One of the language skills that becomes the core to gain success at elementary school level is the ability to understand from early reading (Lervåg et al., 2018). Based on those explanations, it can be viewed that developed learning at elementary school is initiated by various basic skills including language skills which make early reading as a core to make students to be success.

Early reading is a process of forming reading skill which is delivered in the early years of elementary school. It is a phase in which students start to study reading and understanding an instruction (January & Klingbeil, 2020) by recognizing syllables and language sounds (da Silva et al., 2022). In the early reading, students will start to recognize clues (Nation et al., 2001) and learn to understand texts as an initial support for the desire to read in a higher stage (Stutz et al., 2016). It is also utilized to improve students' reading skill with various purposes (Slavin et al., 2009).

There are many goals that can be achieved through early reading for elementary school students starting from understanding to voicing words. Early reading can also help students to memorize words easier in the learning process (Gallet et al., 2020). Abadzi states that early reading aims to develop children's brains in the golden age by mastering and voicing words to achieve fluent reading ability (Graham & Kelly, 2019). This phase aims to train students' visual and memories related to the text given (January & Klingbeil, 2020), so it has positive effect, creates critical thinking (Coyne et al., 2004), and improves students' achievement scores in the following year (Eppler et al., 2011).

To achieve the learning goal of early reading needs to implement the suitable method (Sung, 2020). Teachers have to understand the early reading skill and learn the methods that can be used to instil and improve students' early reading skill (Andzayi & Ikwen, 2014). Eri describes several methods which can be provided to students such as pre-alphabets, partial alphabets, full alphabet, and combined alphabet (January & Klingbeil, 2020). Other methods that can be used such as 'see and say' as the beginning of letter introduction (McBride-Chang & Suk-Han Ho, 2005). The 'rhyme and analogy' method as an initial introduction to advanced learning skill (Goswami & East, 2000). The method of providing independent reading materials is as a teaching material (Wang et al., 2020). Based on those explanations, it can be stated that there are various methods which can be utilized to gain learning goals of early reading starting from introducing alphabets to providing teaching materials.

A teacher has to be able to create and provide learning materials as the student's way to understand higher reading skill (Kurniaman & Zufriady, 2019). Several learning materials that are often used by teachers can be in forms of determining reading materials, reading in groups, and reading as weekly assignments (Hamra & Syatriana, 2012). It needs to be noted that other teaching materials that can be utilized to improve reading process can be manifested in individual reading activities, group reading, and discussion (Jin et al., 2020). The early reading can also be delivered using teaching materials in forms of language word structures. However, there are many mistakes in the basic concept of the teaching materials (Joshi et al., 2009) and teacher gives no knowledge related to reading which causes it is less efficient (Phelps & Schilling, 2004). In other words, the use of various teaching materials becomes one of important aspects for the continuity of early reading. Furthermore, there are still many errors in the implementation of teaching materials, so the learning process will be less efficient.

The improper implementation of learning materials causes problems in reading such as early reading which needs more innovation. It is proven by the role of reading in most countries has decreased in the last twenty years (Kamalova & Koletvinova, 2016). It causes problems in school policy about learning to read (Coburn, 2006). The same thing happens in Indonesia in which students' early reading skill at elementary schools is still relatively low (Rahman & Haryanto, 2014). It is indicated by several elementary school students in the East Java

are not able to read and do not have good reading skill (Damaiyanti, 2021). It happens because there is no students' interest in reading all book materials (Hasanudin & Puspita, 2017), so it needs teaching materials which are more varied such as interactive teaching material or digital teaching material (Smaragdina, 2020).

Digital teaching material is one of teaching materials which is available with the support of technology, so it helps teachers in delivering materials easier and it can attract students' intention to use it. Digital learning material supports the technology which is closely related to teaching and learning process (Damirkan, 2019). It is able to help teachers in preparing learning process with automatic control and the materials can be delivered directly through technology media (Tsai et al., 2017). Materials that have been prepared by teachers can be stored in digital teaching material in form of electronic text documents and various other forms (Acker et al., 2013), so the students can easily access the learning (Walan, 2020). Moreover, it makes the digital learning material as fun guidance and provides many additional functions (Basarmak, 2019).

The function and use of digital teaching material for its users also tend to be varied (Zhang & Li, 2006). Mishra and Koehler state that digital learning material has a function to help students in carrying out the teaching and learning process and creating communication that supports it to be more effective (Walan, 2020)). Furthermore, the learning material can support the learning by examining the advantages and disadvantages of the teaching and learning process (Bergvall & Dyrvold, 2021), so it has a role as a component to improve the learning media which has not been optimal (Setiyani et al., 2020). Moreover, the learning material can increase the teachers' roles in educating and delivering the materials to students (Qi, 2018). In other words, the use of digital learning material is as the learning support and one of components in delivering materials which is very useful for students and teachers.

These various functions are one of the advantages provided in implementing digital learning material. The other advantages of digital learning material are that it can be implemented in various ways and technological devices (Buzzard et al., 2011), be able to copy the learning information, be able to construct the learning model, and be able to develop the learning system (Zhang, 2021). Moreover, it can optimize and expand the students' learning (Henderson et al., 2017). It is also able to attract students' attention, improve their focus, create fun learning, and provide learning motivation (Damirkan, 2019) because the technological media is not only the source of information, it also provides opportunity to express themselves in forms of broader imaginations (Buckingham, 2007).

Result of study on the implementation of digital learning material reveals that it is potential and practical in the learning process (Gong, 2021), the students' motivation is improved when the digital learning material is implemented and it becomes the learning technology (Flórez-Aristizábal et al., 2019). The digital learning material is proven to be more effective than traditional learning material in encouraging students to join the fun learning (Hughes-Roberts et al., 2020). Its implementation is able to maximize the use of educational tools (Hassell et al., 2021) and strengthen the relationship of classroom learning and social environment (Chen, 2022). Based on those results, the digital learning material is stated to be useful in learning, it provides students' motivation and attention, and it also optimizes the educational tools in learning.

The success of using digital learning material cannot be separated from how it is arranged and designed to meet student's and teachers' needs. It is designed comprehensively from the knowledge and the use of appropriate technology to create broader teaching and learning (Quintero et al., 2007). The examples of digital learning materials which can be used by teachers are digital whiteboards, digital portfolios (Kreijns et al., 2013), and visual technology that facilitate students in the learning process (Calandra & Lee, 2005). In addition, the use of digital learning material can be arranged by reacting to abundant learning management system (Robinson et al., 2019), for instance making digital learning material using Kodular (Syarlisjiswan & Wahyuningsih, 2021).

Kodular is a website that makes the users to be easier to create the application without coding or programming language (Firdaus & Hamdu, 2020). It becomes a platform that is enhanced to create the application (Saputra et al., 2020) for the Android devices using browser and connected smartphones (Wahyuni et al., 2021). Kodular can be considered as website for making android-based application without coding and block programming (Ronaldo & Ardoni, 2020). It also provides places to make application quickly (Alda, 2020). It can be concluded that Kodular is a website that can create an android application without going through a complicated programming process, so it is easier to be used by its users.

Kodular is a part of computer program that provides facilities to create new software (Sutrisno & Hamdu, 2020) which also has several tools in creating application easier (Kholifah & Imansari, 2022). This website has a function to develop learning through android smartphones to improve students' skills (Rismayanti et al., 2022). It is also as a medium for monitoring and storing information (Alfian et al., 2020). Kodular has the function of improving the application builder to make it more efficient and can be used as database storage (Kumala & Winardi, 2020). In conclusion, Kodular is the creator of new software in form of android-based application which can store the data without coding process.

The function of Kodular in creating application easier becomes one of its advantages. Other advantage of it is its simple appearance, so it is easier to be understood (Supanji et al., 2021) with the principle of making application from components and features based on the user's desire (Sutrisno & Hamdu, 2020). In addition, Kodular can develop learning materials so the students can understand it easier (Rizqiyani et al., 2022). It is also used as teaching-learning media that is easy to be understood (Kasma & Siaulhak, 2022). Moreover, Kodular has an advantage of online and free access method (Rismayanti et al., 2022).

The success of making digital learning material using Kodular has been proven by many researchers. A study in which a learning assisted by Kodular using smartphones reveals that it encourages students to have independent learning anywhere and anytime (Fauziyah et al., 2022). Another research shows that Kodular provides satisfactory result in creating valid, effective, and practical learning (Rizqiyani et al., 2022). Moreover, learning using Kodular is acceptable and has no access constraint (Setiawan, 2020). The learning which is supported by Kodular is fairly good because its features are very useful (Kasma & Siaulhak, 2022, so it is able to create adequate and interesting results (Rismayanti et al., 2022).

Based on those explanations, it needs a strategy in compiling digital learning material using Kodular. So, the compiled digital learning materials really help elementary school students to read.

5. Method

This study is descriptive qualitative exploratory research based on depth interview. The aims of this study are to collect as much data as possible and investigate the new relationships which show that Kodular can create digital learning materials. The analysis result creates hypothesis on whether the Kodular can be utilized in compiling digital learning materials.

The primary data is in form of field notes taken from interviews to the user of Kodular, the elementary school teachers, and the questionnaire results on the teachers' needs in the elementary school.

The research subjects are selected using purposive sampling. The subject criteria are: 1) Subject A as the users of Kodular who have ever created various applications, 2) Subject B as elementary school teachers in East Java, Indonesia.

The procedures of preparing digital learning materials are 1) analyzing the needs of teaching materials, 2) designing the concepts of teaching materials, and 3) developing teaching materials based on the structure of each learning material (Kosasih, 2020).

6. Results and Discussion

Results The strategy to compile digital learning materials of early reading for elementary school students using Kodular utilizes the strategy developed by Kosasih. It is started from 1) analysing the needs of teaching materials, 2) designing the concepts of teaching materials, and 3) developing teaching materials based on the structure of each learning material (Kosasih, 2020). It is described as follows:

3.1. Analysing the needs of teaching materials

To investigate the needs of teaching materials of early reading for elementary school students, the researchers distributed questionnaires to the elementary school teachers especially in the first grade of it. The teachers are in five districts at East Java, namely Bojonegoro, Tuban, Lamongan, Mojokerto, and Jombang.

The questionnaire is stated “Based on the development of science and technology, do you think that the availability of early reading teaching media for elementary school students needs to be developed? [In accordance with the development of science and technology, do you think the availability of peer reading learning media for elementary school students still needs to be developed?]”. Based on that question, the teachers’ responses can be viewed in figure 1.

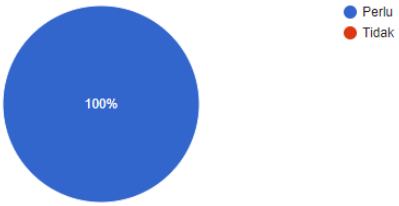

Figure 1. Teachers’ responses on the availability of teaching media

Source: Researchers’ Data taken from Google forms

In figure 1, it can be viewed that the percentage of teachers who say ‘Yes’ are 100% and ‘No’ are 0%. In other words, the elementary school teachers agree that teaching media of early reading for elementary school students needs to be developed.

Their reasons are almost the same. It needs to be developed because in line with the development of science and technology, the teaching media has to be developed. To get more reasons, the researchers conduct interview. The interview transcript with one of the teachers in elementary school at East Java can be viewed as follows.

P : “Assalamualaikum, Mam.”

SB : “Waalaikumusalam, Sir.”

P : “We would like to confirm your response in the questionnaire that you have submitted.”

SB : “Sure. Go ahead!”

P : “You say that ‘every year the technology is developed. The application is also updated once in a month. So, the teaching media for elementary school students has to be developed’. We would like to ask you, in what fields the relationship of technology and teaching media for elementary school students?”

SB : “The thematic materials can be combined with the current technology. For example, the material of singing together for the first-grade students can utilize audio visual media such as YouTube or the video edited by teacher which is shown using an LCD Projector and sound to make the students follow the song played”

P : “Then how about the materials of early reading, Mam?”

SB : “Absolutely the children are created audio visual media. The teachers are able to read various recorded alphabets. It is edited attractively by adding animations, music. The students will be motivated to learn.”

P : “So, what form can these teaching materials be packaged in to keep up with technological development?”

SB : “The learning materials can be created in form of short videos that can be added into the application.”

P : “Thank you for your information, Mam.”

SB : “My pleasure, Sir.”

The results of interview with the elementary school teacher are strengthen by the research which reveals that the Android application in form of education games based on Nusa Tenggara Timur local wisdom can be

utilized as teaching media of early reading for the first-grade students of elementary school (Kharisma & Arvianto, 2019). Another study states that digital learning media which is popular to be used is based on website and Android (Astuti et al., 2020).

3.2. Designing the concepts of teaching materials

Designing the concepts of digital teaching materials of early reading for elementary school students is started from 1) preparing the material compositions to be written such as picture design, voices, animations about reading which are suitable for elementary school students, 2) making the sequence of materials from the easiest to the most difficult, for instance, recognizing the alphabets so the students are able to read story. It can be viewed in figure 2.

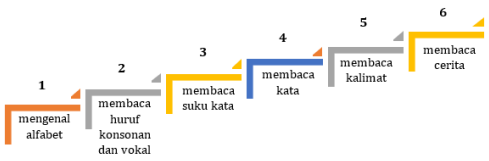

Figure 2. The sequence materials in digital teaching materials of early reading

Source: Researchers' Data

Moreover, 3) designing a digital teaching material container for early reading by utilizing free or paid websites which can produce digital teaching material. The three stages are the main parts in designing the concepts of teaching materials. A study reveals that the concepts have a function to relate one material with other materials which can be used in Maple (Yenti, 2016). Other study shows that the concepts make the students to be able to find and understand the sequences and development of structured language teaching and learning theories (Irfadila, 2020).

3.3. Developing teaching materials based on the structure of each learning material

The digital teaching materials of early reading for elementary school students can be developed using Kodular website. It can be accessed through the link https://www.kodular.io/ . The homepage of Kodular can be viewed in figure 3.

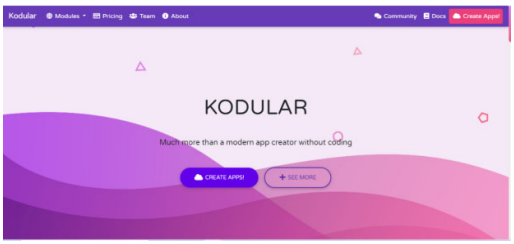

Figure 3. The sequence materials in digital teaching materials of early reading

Source: Researchers' Data

To access Kodular, the user has to register as follows:

1. Create an account in Kodular website by clicking 'Create Apps!' in the right corner or in the centre of the screen.
2. Enter the email and password.
3. Click the button 'Create Account' to make a new account, or 'Sign in' when the user has had the Kodular account.

4. The first page of Kodular website can be viewed in figure 2.

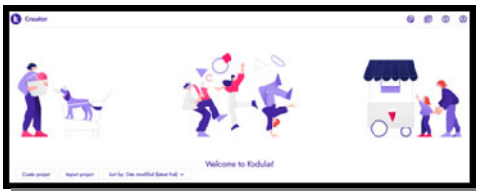

Figure 4. The first page of Kodular website

Source: Researchers' Data

After successfully registering, the second step is to start in compiling teaching materials. The ways to create digital teaching materials of early reading using Kodular are as follows:

1. Selecting the button 'Create Project' in the lower left corner. The button 'Import Project' is used to send project to another devices. In the 'List project', there is a project logo that has been created before. So, the user is able to find project easily because it is equipped with a description of time manufacture. To edit the project which has been created, the user needs to click the menu button based on the project image.
2. The Kodular will direct the user to give a name to the project that will be created. Pay attention to make the project name, so it is accepted by the system. The example of giving name that is rejected by system can be viewed in figure 5.

Figure 5. The way to provide name to the project

Source: Researchers' Data

It should use 'underscore', so the name is not rejected by system. The example of project name which is not suitable is "Literacy Education" (✗), the appropriate project name should be "Literacy Education" (✓).

3. Configuring the project that will be created. In the configuration window, the user is asked to fill the theme, min SDK, package name, primary colour, primary colour dark, and accent colour. The functions of the menu are explained in table 1.

Table 1. Functions in the configuration window

Source: Researchers' Data

Menu	Function
Theme	There are three choices in this menu, namely default, light theme, and dark theme. Choose one of them!
Min SDK	This menu is suitable for Android level 4.4 -4.4.4 (API 19) to Android 10.0 (API 29)
Package name	This menu is used to fill the name of company or its user
Primary color	This menu is used to choose the basic color of the application
Primary color dark	This menu is used to choose the color of the application
Accent color	This menu is used to choose the color of the application

When the setting has done, the user should click ‘Finish’.

4. The main project screen of Kodular will show ‘screen 1’ that is ready to be filled in.
5. To add the next screen, the user has to click the button ‘add screen’. The user can rename ‘screen 2’ as he wants. After that, he has to click the button ‘create’. The screen that has been added can be viewed in the menu of ‘screen 1’ by clicking it. In this case, there are two screens that have been created. One screen means that one screen on Android smartphone. The more screens are created means more materials that have to be prepared and designed.
6. In processing the screen into an attractive display, it can utilize the feature ‘designer’. It has a function to design the screen. While the ‘assets’ menu is used to input the materials in form of pictures, etc. into the Kodular. In ‘designer’ menu, there are many tools on the left screen, namely user interface, layout, media, drawing and animation, maps, sensors, social, storage, utilities, dynamic, components, connectivity, Google, monetization, Lego mind storms, and extension.
7. After the screen has been laid out, the user should make ‘blocks. It is used to provide link to the following screen. This menu is next to the ‘designer’ menu. There are three main tools on the left side of the layer. In the ‘built-in’ menu, there are many tools which can appear by clicking the button ‘+’ in it. The tools contain control, logic, math, text, lists, dictionaries, colours, variables, and procedures tools. It can be viewed in figure 6.

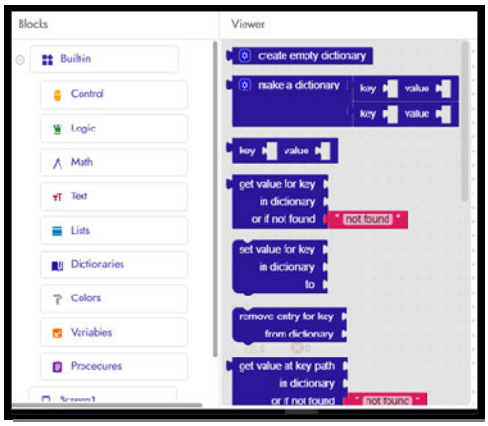

Figure 6. Tools in ‘built-in’ menu

Source: Researchers’ Data

Those tools provide command to the next screen. This function is exactly the same with coding in programming language or hyperlink function in a PPT file at Microsoft power point.

8. After all of the materials have been inputted into Kodular and all screens have been blocked to the next screen, the user has to preview the result by clicking the button ‘test’. This button aims to provide the display result on the Android-based devices. In this part, the work of application can be monitored. It needs accuracy in editing, deleting, or adding necessary materials. Both terms of aesthetics and content have to synergize to provide suitable teaching materials.
9. In the last part, the user is able to convert the materials in form of application using ‘export’ menu. He has to wait for Kodular to complete the export project. At the end, the menu will be appeared as in figure 7.

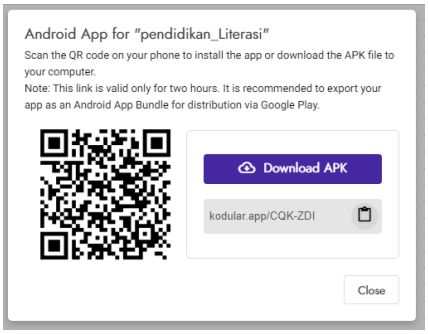

Figure 7. The menu of application downloader

Source: Researchers' Data

The user can download the application directly or scan it using QR Barcode.

10. The export result of application can be moved to Android devices.
11. Digital teaching materials of early reading at elementary school can already be used on students' Android devices.

In gaining information about Kodular website, the researchers carry out interview with one of Kodular user who has created various applications. The interview transcript can be stated as follows:

P : "Assalamualaikum, Sir."

SA : "Waalaikumusalam, Sir."

P : "Do you often use a Kodular website?"

SA : "Yes, I do"

P : "Excuse me, Sir. What do you use it for?"

SB : "I often use Kodular to compile teaching material, to make educational game and other simple game in which the output is based on Android."

P : "Then, how is the Kodular's role in early reading of elementary school?"

SA : "Kodular has a role as a media for compiling materials in early reading in which the output of digital teaching material is in form of application that can be installed in Android smartphones."

P : "So, what are needed to compile digital teaching material of early reading in Kodular website?"

SA : "the materials in forms of texts, pictures, voices, or animations."

P : "You can conclude that Kodular can be utilized in compiling digital teaching material, can't it?"

SA : "Yes, it can."

P : "Thank you so much for your information, Sir."

SB : "My big pleasure"

The results of interview with the Kodular users are reinforced by a study which reveals that mobile application is developed using Kodular software (Rosman & Latip, 2022). Other research explains that Kodular can be used to create application display on smartphones. To display the application on smartphone is carried out by scanning the QR barcode in the Kodular (Fitriyah et al., 2022).

4. Conclusion

The conclusion of this study is Kodular can be utilized in compiling digital teaching materials of early reading for elementary school students by implementing Kosasih's strategies, namely 1) analyzing the needs of teaching materials, 2) designing the concepts of teaching materials, and 3) developing teaching materials based on the structure of each learning material. Kodular has a role as a media for compiling early reading materials in forms of texts, pictures, voices, or animations. The output of it is the application which can be installed in Android smartphones.

5. Acknowledgement

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STUDENT OPINIONS REGARDING EDUCATIONAL GAME-BASED LEARNING MEDIA INNOVATION FOR CHARACTER EDUCATION

Irhas[1], Asrowi[2], Djono[3]
[1,2,3] Educational Technology, Universitas Sebelas Maret
[1]irhas.ranggakal@gmail.com, [2]asrowi@yahoo.com, [3]djono_sk@yahoo.com

Abstract

This research has the aim of identifying the need for innovation in the development of fun learning media in game format. Due to the swift currents of globalization, education needs to innovate in various aspects in order to create graduates who have the competence as well as the character of love for the homeland. The method used in this research is descriptive quantitative, it takes 47 students of elementary school as a research subject, the data is collected by survey method which uses a questionnaire item as a data collection tool. The data from the distribution of the questionnaires were then processed using the percentage technique. The results showed that in terms of the implementation of learning, so far students feel bored when participating in learning activities in class (83%), meanwhile the use of media used by teachers also tends not to keep up with the times, such as student handbooks (68.1 %) still dominates in learning. Students think that innovation is needed in the form of learning media with an educational game format (76.6%). It is hoped that the results of this study can be the basis for the development of learning media that are in accordance with the needs and characteristics of students.

Keywords: needs analysis, innovation, instructional Media, character building, globalization

1. Introduction

The view of National Education can be said as a sector that has a noble goal, namely to educate the lives of its people (Syamsuar & Reflianto, 2018), accompanied by a vision that is the realization of an education system that is able to compete in global competition (LUBIS, 2020; Yildiz, 2019). and can respond to the challenges of an era that dynamically continues to progress (Putra, 2019; Syamsuar & Reflianto, 2018). In addition, education is also considered an indicator of the nation's progress (Syarif & Mawardi, 2021), this is because through education it will produce human resources with character and competence.

Unfortunately, until now the national education system still focuses on competence in the cognitive aspect regardless of the affective, psychomotor and nationalist character of graduates (Amirin, 2013). In fact, in this era of information disclosure and the swift flow of globalization, apart from the need for intelligent human resources, it also needs to be accompanied by morals and character to maintain a love for the homeland and its cultural heritage (Sajadi, 2019; Atika et al., 2019). If intellectual intelligence is not accompanied by character building, it is possible that these students will be able to harm others (Ramdani, 2018). Therefore, it is very important to instill character and moral education in students from an early age (Amirin, 2013; Hamriana, 2021).

Basically, character education should bring students to cognitive value recognition, affective value appreciation, and finally to real value practice (Arfandi & Shaleh, 2016). Character education is character education that touches the cognitive, affective, and psychomotor domains (Ronald Tambunan, 2021). So far, character education instilled by parents in the family environment, as well as teachers in schools, places more emphasis on aspects of knowledge than aspects of attitudes and applications. In addition to teaching, teachers have an obligation to assist students in shaping their own character and morals, through giving good moral examples to students both when teaching in the classroom and when meeting outside the classroom (Hasnadi, 2019).

Basically, character education is supposed to lead learners to cognitive recognition of values, affective passion for values, and finally to the real practice of values. Character education is an ethics education that touches the cognitive, affective, and psychomotor realms. So far, character education instilled by parents in the family environment, as well as teachers in schools, has emphasized more on the aspect of knowledge than the aspect of attitudes and applications. In addition to teaching, teachers have an obligation to assist students in

shaping their character and morals, through giving ethical examples both to students both when teaching in the classroom and when meeting outside the classroom (Hasnadi, 2019; Zubaedi, 2012).

Indonesia is rich in local culture, one of which is Wayang. Wayang can be one of the many alternatives to make it an instrument in character building for students, by examining the stories and characters in the story of a wayang. As a noble cultural heritage, it seems that wayang continues to exist from generation to generation and is a part of the life of the Indonesian people, especially Java (Nurgiyantoro, 2011; Handayani, 2014). The various values contained in it are the values of art, beauty, philosophy, behavior, religious perception, outlook on life and ideals, contained in the world of wayang (Saraswati et al., 2019). It is undeniable that based on the results of this analysis, wayang can be an integral part of learning activities to convey education of noble character for children (Nikmah, 2020). Therefore, character education based on the local wisdom of the Indonesian people is very important.

It is known together that the learning process requires a pleasant interaction by integrating the principle of edutainment so that students are interested in the learning process. Furthermore, learning as an interaction process between teachers, students, and teaching materials requires media that will mediate the flow of information on the content of the material to be studied (Sugiyati, 2016; Budiarto et al., 2020). One form of fun, games in learning is to use media that are currently familiar among students (Budiarto et al., 2021).

Various research results have shown that the learning process needs a stimulus that is able to attract students' attention, such as a picture stimulus and a word stimulus or visual and verbal concluding that verbal stimuli produce better learning outcomes for the task of remembering, recognizing, remembering, and connecting facts and concepts (Perdana et al., 2021; Ige, 2019; Capuno et al., 2019). Through learning media, later it can increase student motivation in participating in a series of learning activities with full appreciation (Roemintoyo et al., 2022; Lin et al., 2016).

Packaging information into game-based learning media that is a favorite of children at the elementary education level (Cheng et al., 2013). This is because game media has the advantage that it can help students learn well because students will tend to feel happy and it has been proven to reduce students' anxiety levels (Wahyuningtyas et al., 2017). In addition, game media can also be used as a supporting tool to complement conventional and modern teaching methods so that students get an optimal learning experience, so that they can acquire skills, adapt, problem solving, interactive, creativity, good teamwork, and communication (Hwang et al., 2014; Greipl et al., 2020; Widyatmojo & Muhtadi, 2017).

Puzzle is a game of arranging pictures in which before starting, the pictures are scrambled (Yunanto & Chandrawati, 2017). Puzzle is a child-friendly game and has high educational value, considering the difficulty level of this game tends to be adjusted to the development of students (Andrea & Nurhuda, 2020). Thus, puzzles can be an option to be used as learning media in the classroom.

Based on the various empirical and theoretical facts above, a bold innovation is needed to then be able to apply puzzle games as learning media to shape student characters that contain material or values for wayang characters (Yunanto & Chandrawati, 2017; Triyanto & Rejekiningsih, 2021; Kadek Suartama et al., 2020). In addition, children's motor skills will also develop and can be trained through puzzle games. Puzzle game-based learning is almost certainly seen to facilitate the process of achieving student competence, especially those who are undergoing basic education (Gil-Flores et al., 2017; Abdul Jabbar & Felicia, 2015). Through this strategy students easily understand besides being fun because it is in the form of a game. Thus, this study will identify opportunities for using ICT-based learning media in the format of puzzle games as an effort to instill character in elementary school students.

2. Method

The type of research used is descriptive quantitative research (Sugiyono, 2018). This research was adopted based on the research objective, namely to be able to obtain descriptive data derived from a needs analysis questionnaire. The population of this study was elementary school students at Singosaren Elementary School Bantul, with a total sample of 47 students.

The method used is a survey with a non-test data collection technique accompanied by a data collection instrument, namely a questionnaire (Widoyoko, 2012). Meanwhile, the data analysis technique used is descriptive by converting the results of the questionnaire into percentages to make it easier to present data and identify innovation opportunities for developing learning media for character education (Ivanovich, 2014). The data needed in this study are (1) the conditions of the implementation of learning; (2) the use of learning media, and (3) students' views on media development in the form of puzzle games for classroom learning.

3. Results and Discussion

In this needs analysis research, it is carried out using the data collection method through the distribution of questionnaires to students. The scope of its implementation includes analysis of the learning process, analysis of the use of learning media, and students' views on learning media innovations based on puzzle games.

Questionnaires have been distributed to research subjects, a total of 47 students. The results of the questionnaire that has gone through the analysis process on aspects of the process or learning conditions can be seen in the following table.

Table 1. The results of the questionnaire on learning conditions

No.	Conditions felt by students	Total students	%
1.	Boring	39	83%
2.	Pleasant	2	4,3%
3.	Ordinary	6	12,8%

Based on the table, it was identified that a number of students felt that learning activities in class tended to be boring, almost 83% of students gave this response, ironically only 4.3% of students stated that learning activities in class were fun, this of course does not apply to all subjects considering that This research is also limited to a certain learning time. This is because learning activities in the classroom, especially during a pandemic like this, tend to be more boring, considering that there are no outdoor activities (very limited), interactions between friends also tend to be limited, thus making students feel more that learning activities in class today tend to be towards boring. Students only focus on studying or reading the material and then completing the assignment.

Next are the results of the analysis of the questionnaire which contains questions about the use of learning media during classroom activities, the following are the results of the analysis.

Table 2. The results of the questionnaire on the use of instructional media

No.	Type of Instructional Media Used	Total students	%
1.	Student Handbook	32	68,1%
2.	Worksheet	2	4,3%
3.	Electronic Module	0	0
4.	Audio Visual	13	27,7%

Looking at the results of the analysis of the distributed questionnaires, it appears that congratulations, the use of learning media is still dominated by student handbooks (68.1%), followed by audio-visual-based media (YouTube). media of this type. Seeing these results, it certainly cannot be denied that it will have an impact on the achievement of learning outcomes, both in terms of cognitive, affective and psychomotor. In addition, learning in schools that puts aside character will certainly also receive a negative impact if the implementation of learning still tends to be conventional and does not pay attention to sharing the components that make up the learning process.

Therefore, it is necessary to innovate learning media that can eliminate students' boredom when learning and be able to integrate ICT for optimizing the use of learning resources. The results of the next questionnaire will provide results regarding students' views on learning media innovations made in the format of a puzzle game. The following is a student's view of the learning media innovation.

Table 3. Students' views on instructional media innovation

No.	Student Opinion	Total students	%

1.	Interested	31	66%
2.	Ordinary	16	34%
3.	Not Interested	0	0

Table 4. Types of instructional media innovations

No.	Media Type	Total students	%
1.	Game	36	76,6%
2.	Electronic Module	3	6,4%
3.	Video	5	10,6%
4	Interactive Quiz	0	0
5.	Audio	3	6,4%

Referring to the two tables, it is known that most students are interested in innovation in the use of learning media (66%), this certainly provides an opportunity to be able to make them not bored anymore when participating in the learning process in class. In addition, students also expressed their wishes regarding the type of learning media innovation they want. The type of media in the game format dominates the students' desires, as can be seen from the percentage in the table which shows the figure of 76.6%. Followed by the type of video media (10.6%), then there are electronic and audio modules which are 6.4% each.

It is well known that learning media is indeed an intermediary that has an important role in conveying information and subject matter. Learning media has the benefit of providing a stimulus to students' thoughts, feelings, attention and interest in learning (Daryanto, 2013; Aripin & Suryaningsih, 2019). Therefore, in its development and utilization, it is necessary to pay attention to the needs of learning subjects (Budiarto et al., 2020).

In addition, actually the learning process contains two elements that are considered to have a very important role in the success of learning activities, namely teaching methods and teaching media (Mutluer & Altun, 2021). These two aspects are interrelated. The choice of one of the two elements will affect each other. So that in the development of learning media innovation, of course it must be based on teaching objectives, types of tasks and responses that students are expected to master after teaching takes place, place, and learning context.

The results of this study indicate high student interest in the presence of learning media innovations. One of them is the type of learning media with a game format. Recently, game-based learning has been specifically designed to help students understand the material and achieve predetermined learning competencies (Tsai et al., 2016; Partovi & Razavi, 2019; Irmansyah et al., 2020). Where a game is designed for education, students will acquire knowledge through playing the game, helping them absorb and understand concepts. Given that so far, teachers only deliver material with the help of material books. Of course the choice of using the media is not optimal enough for the achievement of learning objectives and the formation of student character. Through innovative learning media, puzzle games that are integrated with subjects and noble cultural values will later be able to assist students in learning and assist in the formation of strong characters (Irmansyah et al., 2020; Arfiariska & Hariyati, 2021; Fransiska, 2021; Ronald Tambunan, 2021).

Through this needs analysis research, it is hoped that it can accommodate the characteristics of students, students' needs for subject matter, and the suitability of the media with students. Do not forget that, the results of this research are also very important for the development of further products, namely the innovation of learning media based on puzzle games. Thus, students will be able to feel the benefits according to what they need when using puzzle game products.

4. Conclusion

Character education plays an important role in the era of globalization, this of course must receive important attention for all academics and policy makers that there should not be a decline in morals and character as a result of us ignoring it. Knowledge and skills are indeed important to be achieved by students

when participating in a series of learning activities. However, solid character education will determine the nation's morale in the future.

Learning media innovation is considered to have an important role in achieving learning objectives, but still must accommodate the wishes and characteristics of its users. The results of this study indicate the need for innovation in the development of learning media, so that students are more active and not bored when following a series of learning processes. Puzzle game media that contains noble cultural values such as characters in wayang certainly have a great opportunity to be utilized. In addition to the learning objectives achieved, students will also have and know the moral values, cultural values contained therein. So they are expected to have a strong character and not be eroded by the swift currents of globalization.

Other researchers can use the results of this needs analysis for the development of a learning media innovation product based on local cultural values, as an effort to enrich the stimulus for the formation of student character, besides they also have the knowledge and skills as determined in the study plan.

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MATHEMATICS LEARNING STRATEGIES TO IMPROVE CRITICAL THINKING AND PROBLEM-SOLVING SKILLS FOR MADRASAH IBTIDAIYAH STUDENTS

Khurin'In Ratnasari[1], Mar'atus Sholihah[2], Asnawan[3], Erfan Efendi[4], Nina Sutrisno[5]
[1,2,3] IAI Al-Falah Assunniyyah Kencong, [4,5] UIN KHAS Jember
[1]khurininratnasari@gmail.com, [2]marmarapgmi@inaifas.ac.id, [3]asnawanwan@gmail.com,
[4]efendi.e89@gmail.com, [5]ninasutrisno80@gmail.com

Abstract

Critical thinking and problem-solving skills are very important for students to have both in the short and long term. However, in reality, students in madrasah ibtidaiyah have the low-level category of critical thinking and problem-solving skills. For this reason, it is necessary to have the right strategy to be able to improve these two abilities. This scientific article will answer the question of how mathematics learning strategies can improve critical thinking and problem-solving skills in madrasah ibtidaiyah students. By using descriptive qualitative methods and using library research in collecting data and information. Problem Based Learning can be the right strategy or model to achieve these goals. In addition, by integrating Problem Based Learning and IDEAL (identify, define, enumerate, analyze, list, and self-correct). This is because the strategy emphasizes the involvement of students in the process of solving a problem. Thus, students no longer depend only on the teacher but can also independently find solutions to the problems they are facing.

Keywords: mathematics learning, critical thinking, problem-solving, problem-based learning.

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1. Introduction

The development of the world gradually occurs in all aspects of human life. This happens very quickly and dynamically and is supported by advances in information and communication technology. Various opinions were conveyed by experts to the general public, that human resources can one day be replaced by the latest technology. In addition, during the current disruption period, human resources are required to be dynamic so that they can continue to survive and face all the challenges that exist. There needs to be careful preparation to create quality and competitive human resources. Education has a very important role in efforts to make this happen. Therefore, optimizing education for all levels is important and must be done.

Problems in the world of education, especially in Indonesia, are things that must be addressed immediately. Efforts that can be made include many things, such as changes to the curriculum, changes in learning paradigms, improvements to facilities and infrastructure, and other steps that lead to improvements. The education sector must be optimized as a long-term investment in human resources. Education needs to be handled systematically and adhere to a paradigm that is relevant to current conditions. This is certainly a cycle that is interrelated and affects people's lives in the future. Mathematics education is one of the areas of concern because it is a basic knowledge that must be possessed by the community, especially students.

Mathematics is one of the sciences that has an important role in everyday life, the development of information and communication technology, and even contributes to the development of other sciences. This is also related to mathematical abilities that can be developed by a student at the learning stage. Mathematical ability includes several things, namely the ability to think logically, think critically, and the ability to solve problems. This shows that mathematical ability is not only related to the ability to count and work on math problems but is at a broader level. Therefore, mathematics needs to be taught starting from the most basic level, namely starting at Elementary School or Madrasah Ibtidaiyah.

Mathematics education is important to be given to students because through these students can be equipped with the ability to think logically, analytically, systematically, critically, and creatively. This is also following the objectives of learning mathematics, namely to create students who have critical thinking and problem-solving. The development of the world that exists today also requires students to have these two abilities. Thus, learning mathematics needs to be given appropriately also with a mature strategy (Arifuddin, 2019). Although in practice there will certainly be various kinds of challenges that must be faced by the government as well as by teachers, students, and parents.

Critical thinking is the ability to make decisions based on logical reasons and scientifically measurable facts (Arifuddin, 2019). Cahyana, Kadir, and Gherardini (Cahyana, Kadir, & Gherardini, 2017) also explain that critical thinking includes cognitive processes that are directed and clear to solve problems, make decisions, argue, and analyze assumptions. Someone who can think critically has the characteristics as conveyed by Setyawati (Setyawati, 2013), namely the ability to solve focused problems; the ability to analyze, generalize, and organize ideas; and decision-making abilities to solve existing problems.

Problem-solving is a very important activity in learning mathematics. As stated by Davis and McKillip (Haryani, 2011) problem solving is one of the most important objectives in learning mathematics. Through learning mathematics, the ability to solve a problem can be learned and absorbed and then applied in various fields of life such as science or everyday life. The ability to solve problems has a very high relationship with the ability to think critically. Both are interconnected and influence each other. With the problem-solving ability, students can further develop their thinking skills, develop alternative solutions to problems, and choose the best alternative that can be used to solve existing problems, up to the level of evaluation of what the students themselves have done.

Critical thinking and problem-solving skills are very important to be instilled in students through learning mathematics. This can be started from the most basic level, namely Elementary School or madrasah ibtidaiyah. These two abilities need to be taught to students with the aim that students can become more qualified and competitive human resources. In addition, students can solve problems at a light level such as solving math problems, or at a more complex level. Learning mathematics to optimize these two abilities can of course be adjusted to the level of a student's abilities so that it can be easier to understand and practice.

Efforts to realize students who can think critically and problems solving do not run smoothly. This is supported by the existence of several data showing that the achievement of these two capabilities is still low. As explained in the results of the Trends in International Mathematics and Science Study (TIMSS) analysis that 80% of students in Indonesia belong to a low level of critical thinking skills. In addition, the research of Widiantari, Suarjana, and Kusmariyatni (2016) shows that the thinking ability of students, especially fourth-grade students is still low at 70% (Arifuddin, 2019). Other data that was also presented by TIMSS in 2015 related to the achievement results of Indonesian students showed that Indonesia was in the 44th position out of 49 countries (Kholid, 2018). This shows that the mathematical ability of students in Indonesia is low.

The low mathematical ability of students in Indonesia is caused by various things. One of them is learning that focuses too much on practice questions rather than a deep understanding of the concepts of the material being taught. Not infrequently the learning process is carried out in one direction from teacher to student without providing opportunities for students to compile and connect their knowledge. The lecture and memorization methods are considered to be one of the causes of the low critical thinking and problem-solving abilities of students. This is because students are too fixated on what is conveyed by the teacher and that becomes a determination in their memorization without any other effort to understand it further. This then ignores the process of deductive and inductive reasoning as nature in mathematics (Kholid, 2018).

This article tries to answer the question of how mathematics learning strategies improve critical thinking and problem-solving skills in madrasah ibtidaiyah students? This is based on the problems described above, which are related to students' mastery of mathematics in Indonesia, especially those related to critical thinking and problem-solving skills which are still relatively low. This article is expected to be able to answer the questions above and provide an overview of the right strategies to improve students' critical thinking and problem-solving skills.

2. Method

The method used in writing this article is descriptive qualitative. The author uses a descriptive qualitative method that aims to describe the problem in detail. To be able to describe the problem in detail, an in-depth understanding is carried out so that the information conveyed becomes more accurate (Neuman, 2014). The data collection technique used is observation, interview, and documentation. The data collection technique in this research uses the interview technique by asking and answering questions that have been prepared before to the informants. Another data collection technique is documentation to get more data, documents or other things related to the research. The data analysis technique used in this research is qualitative technique, namely interactive analysis techniques such as data reduction, data display, and conclusions.

3. Results and Discussion

Critical thinking is a cognitive process that has clear directions and goals to solve problems, make decisions, analyze, and conduct scientific research (Cahyana et al., 2017). Critical thinking can also be interpreted as an ability to convey personal opinions in an organized manner and the ability to evaluate the phenomena around it. When a student can think critically, then basically the student can answer the how and why questions based on the conceptual knowledge that has been obtained in the learning process. The ability to think critically has a basis in analyzing an argument and then generating new thoughts on a fact of the problem. This then makes critical thinking skills are also said to be higher-order thinking skills that can be learned and trained (Kholid, 2018). Another definition of critical thinking is an intellectual process of conceptualizing, applying, analyzing, synthesizing, and evaluating existing information from observations, deepening reflection, and reasoning (Peter, 2012).

Critical thinking skills will lead students to be able to think rationally. When there is information obtained, students will try to explore the information through a set of questions or other instruments that can reveal the truth of the information conveyed. In addition, students will also become more open-minded. Students will find it easier to accept opinions or perspectives submitted by others which can then be used as information in finding the truth and solving problems. As stated by Kamarulzaman that critical thinking aims to solve a problem that is being faced through a series of processes such as evaluation and selection of the best alternative that has been determined (Kamarulzaman, 2015). One madrasah ibtidaiyah teachers also explained that in critical thinking, students are trained to have the ability to solve problems and to identify problems. By thinking critically, students are more confident in the process of learning.

As explained in the introduction, the critical thinking ability of students in Indonesia is low. This is in line with the results of Ahmad Arifuddin's research on students' critical and creative thinking skills in mathematics learning at madrasah ibtidaiyah which shows that the average critical thinking ability of students is in a low category. This is because the learning method still uses the old paradigm where students are not actively involved in learning activities (teacher-oriented). Other causes that also become an obstacle are student interest in mathematics which tends to be low, understanding of basic concepts is not maximized, and minimal encouragement from parents (Arifuddin, 2019).

Some characteristics of madrasah ibtidaiyah students who have critical thinking skills include asking important questions and problems, collecting and assessing relevant information, drawing conclusions based on clear reasons, and being able to overcome confusion. From these characteristics, it can be seen that the problem identification process until its completion is carried out in stages to self-control. Heri Purwanto (teacher) also explained that the ability of students to think critically can make students to be more active in learning and analyzeing solutions while trying to learn and identify problems. This will have a good impact on student learning outcomes. In addition, the critical thinking process can be shown at least in several stages. Namely the stages of clarification, basic support, interpretation, analysis, inference, and explanation (Kholid, 2018). Some of these stages are carried out carefully in practice, especially if you look at the research conducted by Idham Kholid.

Ahmad Arifuddin also explained that the process of improving students' critical thinking skills did not run smoothly. This then causes learning outcomes to be still below the desired standard. Barriers to student concentration in the learning process are also one of the problems, both due to internal factors (from within the

students themselves) and external factors (environment). This is also in line with the results of research conducted by Kurniati and Astuti which showed that students' critical thinking skills tend to be classified into medium and low categories. This can be seen when the experiment uses the form of a one-group pre-test post-test design (Kurniati & Astuti, 2016). The conventional method used by the teacher in the learning process is less effective to realize students who have critical thinking and problem-solving skills. For that, we need a strategy to make this happen.

Problem-solving is one of the most important skills that everyone needs to have to be used in everyday life. Most of the existing problems require a solution as a form of solving the problem. Likewise with problems in learning mathematics. Problem-solving skills are needed by students operationally to solve math problems in various forms. Fundamentally, this is closely related to critical thinking skills. The ability to think rationally is needed. So that when students are faced with a certain problem they can solve it correctly (Rachmantika & Wardono, 2019).

The problem in learning mathematics is a condition where students cannot solve the problem. Mathematical problems can become a problem if the right and relevant way to solve them has not been found. Students who can think critically will certainly be increasingly challenged to be able to solve these problems - math problems that are considered complicated. This is what makes the two abilities interrelated with each other. There are several characteristics of a problem such as requiring more than one step to a solution; there are elements that are interesting and relevant to students' lives and contain realistic mathematical values (Kholid, 2018). Anisatul Hikmah (teacher) explained that learning mathematics is a learning that trains thinking and reasoning patterns in drawing conclusions, developing abilities in solving problems and developing abilities.

Problem-solving is also one of the goals of the mathematics learning process. Where mathematics learning is intended so that students can solve existing problems through a series of processes such as understanding the problem, to interpreting the results obtained for the problem. Problem-solving is not only related to the application of a set of rules that have been taught and mastered but more than that. The rules (e.g. formulas in mathematics) are only used as guidelines in the context of solving the problems at hand (Hardini & Puspitasari, 2012). This is certainly very important for students both for present and future life.

There are at least five problem-solving indicators. First, identify what is already known, asked, and what is needed. This is in Idham Kholid's research conducted by students who are classified as having critical thinking abilities. Second, compiling a mathematical model to solve the existing problems. Third, apply a strategy or mathematical model to solve problems both in the context of mathematics or outside the context. Fourth, interpret the results based on the existing problems. Fifth, there is a meaning to mathematics so there are benefits that can be taken from these activities (Ulvah & Afriansyah, 2016).

Problem-solving ability is very important for students of various levels of education. This ability will have an impact not only in learning mathematics but also in other learning. However, in reality, students still have difficulty solving problems, especially in the mathematics learning process. Students belonging to the category of having problem-solving abilities tend to decrease. Many students know and memorize mathematical formulas but do not understand how to apply them when faced with non-routine/unusual or certain problems. It is often also found that students are confused when faced with questions that are different from what has been explained by the teacher (Nurwahid & Shodikin, 2021). Yudi Santoso (teacher) explained that many students are always constrained in memorizing mathematical patterns and always forget them in math problems.

Based on the various problems that have been described in the previous section, namely the ability to think critically and problem-solving in madrasah ibtidaiyah students tend to be decrase. Therefore, it is necessary to have the right strategy to be used in the mathematics learning process so that the critical thinking and problem-solving abilities of madrasah ibtidaiyah students can be improved. One strategy that can be used is Problem Based Learning.

Problem Based Learning or PBL is a learning model that emphasizes student involvement in the process of solving a problem. By using the PBL model, students will be more motivated and have a high curiosity when the mathematics learning process takes place. This is because the PBL model provides opportunities and space for

students to be able to think more actively, communicate, explore and process data, and conclude. In the learning process, students not only listen to what is conveyed by the teacher but become more active with efforts to find solutions to the problems they face. The problems faced by students become things that can trigger students' curiosity in finding solutions through a series of systematic steps. This PBL model is considered to be one of the right strategies to improve critical thinking and problem-solving skills in madrasah ibtidaiyah students (Nurwahid & Shodikin, 2021).

Problem Based Learning (PBL) is a learning model that emphasizes critical study, analysis, and argumentative centered on students as those who seek solutions to problems so that students can build their knowledge and skills (Zainal, 2022). In Problem Based Learning, there are several characteristics of the problem that need to be considered, as stated by Sockalangan & Schmidt. First, there is conformity with the learning objectives. Second, there is an opportunity for students to learn independently. This shows that students are not only dependent on their teachers, but also have the opportunity to develop their knowledge and skills independently. Third, encourage critical thinking. The problems that arise are not something that can be easily solved, so students will be encouraged to be more critical in responding to them. Fourth, create teamwork. Fifth, develop students' interests and talents. Sixth, by the existing format and provisions. Seventh, the problems raised are clear so as not to confuse students in the learning process. Eighth, encourage students to be able to work carefully and diligently. Ninth, the problems are relevant to mathematical concepts and the real world. Finally, the issues raised are related to the concepts that have been conveyed or taught previously (Zainal, 2022).

The steps that can be taken in the learning process using the Problem Based Learning are at least five stages (Zainal, 2022), namely as follows. First, orienting students to the problem. In this stage, the teacher can explain the problem that will be a topic to be solved by students in groups. The problems defined should be guided by the characteristics of the problems described in the previous paragraph. Then students can observe and understand the problems that have been given. Second, organize students to explore knowledge and skills. This relates to the task of each student in the group. The teacher can provide direction so that each student understands what is his or her task, both individually and in groups. In this stage, students conduct discussions on initial observations of the problem. Then start dividing tasks to find the right solution to the problem.

Third, guide the process of tracking individuals and groups. The involvement of each student in the process of discussion and finding solutions is something that needs to be emphasized in Problem Based Learning. For this reason, the teacher must monitor the discussion process and student tracking so that their involvement in the group can be ensured. In this stage, students look for relevant sources to be material in group discussions. Fourth, develop and present the results of discussions and searches. In this stage, the discussion takes place and can provide results in the form of solutions to the problems given. The teacher can direct students to start making reports on the results of the discussions that have been carried out. The report can then be used as material for the group to present and discuss further. Each group member has a role in the presentation process. Finally, analyze and evaluate the problem-solving process that has been carried out. In this stage, feedback from one party to another can be conveyed. Therefore, the teacher has an important role so that the process can run smoothly and be conducive so that the important points in the feedback conveyed can be absorbed properly. Based on the feedback that has been given, then each group can conclude the discussions and inputs that have been given.

In addition, several steps can also help students in developing critical thinking and problem-solving skills. In addition, this instrument can also be applied to the steps above as a tool so that the learning process can run better and achieve the desired goals. These steps are known as IDEAL. Namely Identify, Define, Enumerate, Analyze, List, and Self-correct. Identifying relates to the identification of the problem at hand. This can be helped by asking the question "what are the problems we are facing?" Define, relates to steps in determining the context of the existing problem. This relates to the question of what facts frame the problem. Enumerate, relates to calculating and considering several alternative solution options available. Whether each of these alternatives is a reasonable thing and can be used. Analyze, in this stage, the available options are analyzed to find out what is the best course of action that can be taken. List, at this stage it is necessary to convey why the selected action is the best thing to do. Need to convey the right reasons for the choices. Self-correct, is this stage students can re-evaluate the things that have been done and correct whether there are things that have been missed (Peter, 2012).

Combining Problem Based Learning with IDEAL can be one of the right strategies to improve students' critical thinking and problem-solving skills. Between the two learning models, there is a continuity that is relevant to each other so that the learning process can be carried out with a more focused focus on achieving goals. Thus, efforts to improve the critical thinking and solving skills of MI students can be carried out more optimally.

4. Conclusion

Based on the explanation above, it can be concluded that critical thinking is a cognitive process that has clear directions and goals to solve problems, make decisions, analyze, and conduct scientific research. Critical thinking and problem-solving skills are very important to be instilled in students through learning mathematics. However, in reality, the critical thinking and problem-solving skills of madrasah ibtidaiyah students are in a low category. For this reason, it is necessary to have a strategy that can improve the critical thinking skills and problem-solving of madrasah ibtidaiyah students. Problem Based Learning can be the right strategy or model to achieve these goals. In addition, by integrating Problem Based Learning and IDEAL (identify, define, enumerate, analyze, list, and self-correct). This is because the strategy emphasizes the involvement of students in the process of solving a problem. Thus, students no longer depend only on the teacher but can also independently find solutions to the problems they are facing.

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TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPCK) ON MATHEMATICS LEARNING: A LITERATURE STUDY

[1]Meilani Safitri, [2]M. Ridwan Aziz
[1] Mathematics Education, Mathematics and Science Education, Faculty of Teacher Training and Education, Sjakhyakirti University, Palembang, [2] Educational Sciences, Doctoral Program, Faculty of Teacher Training and Education, Universitas Sebelas Maret, Surakarta
[1]meilanisafitri05@gmail.com, [2]atharfatih08@gmail.com

Abstract

Technological Pedagogical Content Knowledge (TPCK) is currently gaining popularity as both a learning innovation and a research topic. This study is a literature review using a systematic literature review (SLR) method. The goal of this research is to describe various theories about TPCK, analyze various research results about TPCK, and describe various possibilities for the development and application of TPCK in mathematics learning. This study's data was gathered through a variety of books, articles, and research documents. Data analysis was carried out by synthesizing the results of the data source review. The findings of this study indicate that TPCK is highly likely to support mathematics learning, that TPCK can be developed and implemented in mathematics learning, and that TPCK development can take the form of models, teaching materials, and evaluation in mathematics learning.

Keywords: TPCK, mathematics learning, literature study

1. Introduction

Faced with the 21st century learning era, where students are expected to develop and integrate cognitive abilities with their skills, lecturers as educators must be concerned. In this case, students are expected to achieve success in their future careers by combining subject matter mastery with critical thinking skills, communication, collaboration, and creativity. The abilities are expected to have an impact on his ability to apply his knowledge to solve real-world problems. These demands undoubtedly have implications for classroom learning patterns that are geared toward 21st-century learning and pay attention to future needs, such as the development of learning technology that is expected to make the learning process more effective and efficient. TPACK learning is one of today's learning technologies (Technological Pedagogical Content Knowledge). To achieve learning objectives, TPACK learning focuses on the collaboration of technological, pedagogical, and material content knowledge.

Students in the Z generation primarily use television, the internet, and radio to obtain information. Internet access is an important requirement for students today, as they were born in the digital era. Because nearly 97 percent of teenagers can access the internet at home via mobile devices such as smartphones or iPhones, internet cafes have been replaced by homes. It may be an opportunity for educators to seize this moment to create a learning technology based on current student needs for mobile devices. This is one of the goals of TPACK learning development, which involves using technology in the form of apps on mobile devices to improve educators' pedagogical knowledge when delivering material content so that learning objectives can be met optimally.

Currently, one of the most important methods of providing technological support is to use a framework for integrating complex knowledge problems from pedagogy, content, technology, and various forms of interaction among these elements in the classroom (e.g., Koehler et al. 2007; Ferdig 2006; Mishra and Koehler 2006; Koehler and Mishra 2005; Niess 2005). Mishra and Koehler (2006) created the technological pedagogical content knowledge (TPACK) model, which was based on Shulman's Pedagogical Content Knowledge (PCK) (1986).

In any discipline, Technological Pedagogical Content Knowledge (TPACK) is the perfect union of three knowledge domains (content, pedagogy, and technology) to develop a knowledge base from which a teacher can view a lesson and understand how technology can enhance learning opportunities and experiences for students while also knowing the correct pedagogy to enhance the learning content. A teacher with a TPACK perspective in mathematics education is one who understands the proper pedagogy for using this technology. He will be able

to engage and motivate students as they explore the content of mathematics to a greater extent if he has a proper TPACK. According to the TPACK framework, integrated knowledge of technology, pedagogy, and content is required for effective and innovative classroom teaching with technology (Abbitt, 2011).

Several studies on the use of the TPACK framework in mathematics education have been conducted (e.g., Meng and Sam, 2013; Stoilescu, 2011; Niess, 2009; Richardson, 2009). According to Guerrero (2010), TPACK in mathematics extends beyond the knowledge of learning a technology tool and its operation to the dimension of how to use a piece of technology to improve mathematics teaching and learning. Although this knowledge includes learning the fundamental operational skills, it embodies the aspects of technology that are most relevant to its ability to be used in instruction to improve teaching and learning. Nowhere are the complexities of technology's impact on content and instruction more varied and relevant than in the mathematics classroom, where technology has the potential to change not only what we teach but also how we teach it.

The appearance of TPACK learning can be an alternative to changing students' paradigms from contemporary to computational using devices, making future work easier (Blevins, 2018). It should be emphasized that the twenty-first century generation requires skills to access, evaluate, use, manage, and enrich information through the various media available at this time. Technological literacy can improve the abilities of the digital generation to think, learn, communicate, collaborate, and create (Triling & Fadel, 2009). TPACK learning will guide students to be able to use technology in the digital era as an alternative learning that facilitates the implementation of learning by using tools that contain material content that is so that educators can practice pedagogical skills, particularly in conveying learning.

2. Method

This study is a literature review using a systematic literature review (SLR) method. A systematic literature review (SLR) identifies, selects, and critically evaluates research to answer a specific question (Dewey, A. & Drahota, A. 2016). Before conducting the review, the systematic review should adhere to a clearly defined protocol or plan in which the criteria are clearly stated. It is a thorough, transparent search of multiple databases and grey literature that other researchers can replicate and reproduce. It entails devising a well-thought-out search strategy that has a specific focus or answers a specific question. The review identifies the type of information sought, analyzed, and reported within specified timeframes. The review must include the search terms, search strategies (including database names, platforms, and search dates), and limits. Pittway (2008) identifies seven key principles underlying systematic literature reviews: transparency, clarity, integration, focus, equality, accessibility, and coverage.

The goal of this research is to describe various theories about TPCK, analyze various research results about TPCK, and describe various possibilities for the development and application of TPCK in mathematics learning. This study's data was gathered through a variety of books, articles, and research documents. Data analysis was carried out by synthesizing the results of the data source review. Data were extracted and synthesized through SLR.

Systematic literature reviews have their origins in medicine and are associated with evidence-based practice. According to Grant and Booth (2009, p. 91), "the expansion of evidence-based practice has resulted in an increasing variety of review types." They compare and contrast 14 review types, listing each review's strengths and weaknesses. Tranfield et al. (2003) discuss the origins of the evidence-based approach to conducting a literature review and how it has been applied to other disciplines such as management and science.

3. Results and Discussion

Technological Pedagogical Content Knowledge (TPACK)

TPACK is the knowledge required to use and integrate computers into any mathematics content's teaching and learning activities and processes. As a result, effective computer utilization and integration necessitates knowledge and understanding of this TPACK model during the course of education and training (Mishra and Koehler, 2006; Doukakis et al., 2010; Jang and Chen, 2010; Graham, 2011; Pamuk, 2012; Srisawasdi, 2012; Chai, Koh, and Tsai, 2013; Koehler, Mishra and Cain, 2013; Koehler, Mishra, Akcaoglu, and Rosenberg, 2013; Maeng, Mulvey, Smetana and Bell, 2013; Voogt et al., 2013; Mouza et al. al., 2014).

Koehler, Mishra, and Cain (2013) proposed a method for developing TPACK. Pedagogical Content Knowledge (PK) and Technological Pedagogical Knowledge (TPK) are two of these, both of which are based on core computer knowledge and experience. By defining, designing, and refining instructional objectives to solve specific learning problems, TPACK centers the experience. Harris, Mishra, and Koehler (2009) have expanded the TPACK framework to include not only teaching, learning, and integrating technology, but also encouraging

the development of TPACK-based design professionals and accommodating flexible and inclusive philosophies, strategies, and approaches that enlighten, encourage, and guide the selection of a design that achieves four goals.

The TPACK Model was developed based on a model developed by Shulman (1986) that explained how teachers' understanding of Knowledge and Technology in relation to each other in the creation of effective teaching practices. PCK is generally defined as knowledge developed through the knowledge base, which is a synthesis of three types of knowledge: content knowledge, pedagogy knowledge, and context knowledge. Figure 1.1 depicts Shulman's model as a Venn diagram.

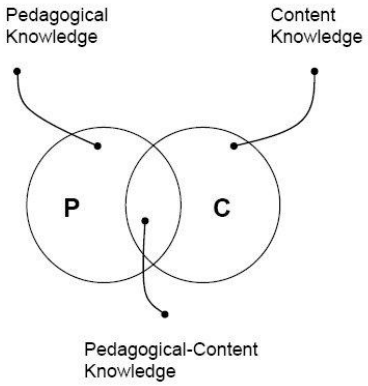

Figure 1.1 depicts Shulman's model as a Venn diagram.

Mishra and Koehler (2006) expanded on this concept by including a third set of Technology and Knowledge, resulting in & TPACK. They are a content-based teaching and learning process that must make use of technological advances. This Model is depicted in Figure 1.2 by the TPACK diagram Venn.

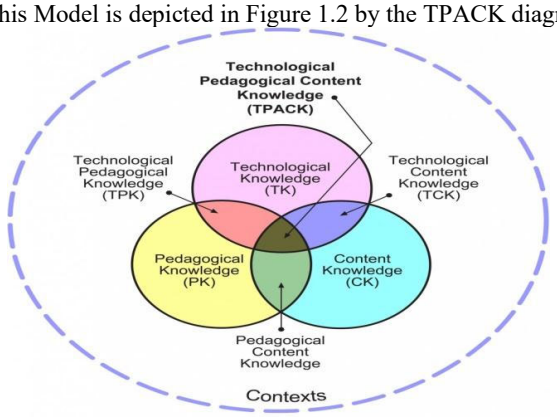

Figure 1.2 TPCK

According to figure 1.2, the TPACK is not only made up of three primary knowledge sets, namely content knowledge, pedagogical knowledge, and technology knowledge, but there are three additional sets of their combined knowledge that are also considered important in the TPACK: pedagogical content knowledge (PCK), technological content knowledge (TCK), and technological pedagogical knowledge (TPK). Furthermore, technological aspects are taken into account in the following ways:

Content Knowledge (CK)

The knowledge about the actual subject matter that is to be learned or taught is referred to as content knowledge. Teachers must be well-versed in their subject matter. This would include, as Shulman (1986) noted, knowledge of concepts, theories, ideas, organizational frameworks, knowledge of evidence and proof, as well as established practices and approaches to developing such knowledge.

Pedagogical Knowledge (PK)

Pedagogical Knowledge is in-depth knowledge of the processes, practices, or methods of teaching and learning, and it includes (among other things) overall educational purposes, values, and aims (Koehler & Mishra, 2008).

Technology Knowledge (TK)

Technology knowledge (TK) refers to knowledge of both basic technologies, such as books and chalk and blackboards, and advanced technologies, such as the Internet and digital video. This includes the abilities required to use specific technologies.

Pedagogical Content Knowledge (PCK)

Shulman's concept of knowledge of pedagogy that is applicable to the teaching of specific content is consistent with and similar to pedagogical content knowledge. PCK addresses the core business of teaching, learning, curriculum, assessment, and reporting, including the conditions that promote learning and the connections between curriculum, assessment, and pedagogy. An understanding of common misconceptions and alternative approaches to them, the importance of forging links and connections between different content ideas, students' prior knowledge, alternative teaching strategies, and the flexibility that comes from exploring alternative approaches to the same idea or problem are all necessary for effective teaching (Koehler & Mishra, 2008).

Technological Content Knowledge (TCK)

Technological pedagogical knowledge (TPK) is the knowledge of the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, as well as knowing how teaching and learning settings may change as a result of using specific technologies (Koehler & Mishra, 2008).

Technological Pedagogical Knowledge (TPK)

TPK is knowledge about improving pedagogical practices and components (such as teaching, assessment, motivation, and so on) through the incorporation of technology into teaching and learning activities. In this knowledge base, teachers must look for ways to enrich or support their teaching through the use of specific technology (Koehler & Mishra, 2008).

Technological Pedagogical Content Knowledge (TPACK)

TPACK is an emerging model for knowledge that extends beyond all of its components (content, pedagogy, and technology). Technological pedagogical content knowledge is a comprehension that results from the interaction of content, pedagogy, and technology knowledge (Koehler &Mishra, 2008). TPACK aims to help teachers improve their ability to acquire and explain how technology-related subject-specific knowledge is applied during teaching and learning activities (Koehler & Mishra, 2009).

TPACK learning can be combined with models or methods that teach students to find new knowledge on their own while still receiving teacher guidance. This demonstrates that TPACK learning is a student-centered learning approach that encourages students to find and construct their own knowledge in order to gain new knowledge (Irmita & Atun, 2017). According to global education trends in the framework of 21st century learning, professional educators should have TPACK competencies, which include the four main competencies of educators such as pedagogical, professional, personality, and social, as well as the integration of skills in learning such as communication, collaboration, creativity, and critical thinking (Nofrion, Wijayanto, Wilis & Novio: 2012).

TPCK on Mathematics Learning

The majority of the TPCK discourse on mathematics education has centered on its importance in the curriculum, professional development models, and measurement methods (Angeli & Valanides, 2009; Archambault, Wetzel, Foulger, & Williams, 2010; Polly, 2011). Several TPACK-related scales have been developed to investigate teachers' perceptions of integrating technology, content, and pedagogy in areas such as Internet use (Lee & Tsai, 2010), preservice education (Schmidt et al., 2009), online distance education (Archambault & Crippern, 2009), and science education (Graham et al., 2009). The TPCK model has been useful in mathematics education for exploring conceptually how teachers articulate content, pedagogy, and technology and for enriching the discourse on using ICTs within the subject area (Grandgenett, 2008; Johnston-Wilder & Pimm, 2004; Niess, 2005; Niess et al., 2009; Polly & Barbour, 2009).

The new educational paradigm necessitates new knowledge and understanding of how technology can be used to improve mathematics learning. As a result, computer skills and teacher competencies are critical in integrating mathematics teaching efforts. The TPACK model identifies the specific knowledge and comprehension required to learn how to integrate instructional design. It also necessitates a design that allows

teacher knowledge to be redefined in order to interact with the sole purpose of addressing new teaching and learning strategies. The TPACK model combines content knowledge (CK), technological knowledge (TK), and pedagogical knowledge (PK) with the primary goal of preparing preservice teachers to integrate computers into the mathematics teaching and learning process (Mishra and Koehler, 2006; Harris, Mishra and Koehler, 2009; Gera and Verma, 2012; Koehler, Mishra and Cain, 2013).

Various Related Research

Research conducted by Handal, Campbell, Cavanagh, Petocz, & Kelly (2013) on the integration of technology, pedagogy, and content in secondary mathematics teaching was investigated among 280 secondary mathematics teachers in the Australian state of New South Wales. The study used the technological pedagogical content knowledge (TPCK) model and administered a 30-item instrument called the TPCK-M. The instrument was made up of three major theoretically based constructs: technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPCK) (TPCK). According to the findings, PowerPoint and Excel are the two TCK modal technological capabilities, whereas TPK scores revealed teachers' lower capacity to deal with general information and communications technology goals across the curriculum, such as creating digital assessment formats. TPCK-M scores appear to indicate a healthy standard of technological skills in teachers across a range of mathematics education goals. However, given that the study identified a number of instructional, curricular, and organizational factors seriously impeding the integration of technology into teaching and learning, the magnitude of such influence in practice needs to be determined further. In general, in order to take advantage of more novel learning technologies, teachers must be trained in the use of online tools (webquests, wikis), mobile learning, and interactive whiteboards, as well as the creation of digital learning resources.

Research conducted by Rufaida and Nurfadilah (2021) aims to create a device learning based on TPACK (Technological Pedagogical Content Knowledge) in the form of hyper content modules in electronics courses that combine technological, pedagogical, and material content knowledge by using QR code as a learning navigation tool so that it acts as open resources for learning. This device supports the 21st century system and independent learning by allowing students to begin learning the subject needed non-linearly and by facilitating learning styles by providing a variety of learning resources such as site addresses, journal texts, videos, audio, and images that can be accessed with a QR code reader, making learning feel contextual and directing students to think creatively in learning. The Borg and Gall models are used in research and development, with the steps of collecting information, planning, developing product formations, testing, revising, disseminating, and implementing the product. This study demonstrates that device learning based on TPACK in the form of hyper content modules is valid, practicable, and effective for use in electronics courses, as evidenced by improved student learning outcomes.

Research conducted by Ali & Agyei (2016) examines technological, pedagogical, and preservice teacher content knowledge (TPACK) in utilizing Merrill's First Principle to solve problems in polynomial equations to demonstrate their relevance in modern technology discourse. A quasi-experimental and mixed exploratory sequential design was adopted in 25 preservice teachers at the Department of Primary Education, University of Education, Winneba in Ghana. The data collection instrument consisted of 12 items of open-ended knowledge and computer applications using polynomial equations. Thematic analysis and single-subject t-test hypotheses revealed the low pedagogical basis of technology and content knowledge of preservice teachers in solving polynomial problems. Therefore, there is a need to champion the sacred principles of curriculum design with the integration of technology in the teaching and learning of mathematics in primary schools.

4. Conclusion

In the application of TPCK, it is necessary to pay attention to the time for the teacher in delivering the material. This is due to the dense curriculum, whereas the most successful mathematics materials are those that have a good balance of application between digital technology and 'traditional' teaching methods. However, the lack of time to deliver the subject matter is an inhibiting factor for teachers in using TPCK.

The findings of this study indicate that TPCK is highly likely to support mathematics learning, that TPCK can be developed and implemented in mathematics learning, and that TPCK development can take the form of models, teaching materials, and evaluation in mathematics learning. These instructional, curricular, and organizational factors, in general, reveal a variety of issues concerning the translation of TPCK into teaching and learning. All of these factors put additional strain on many teachers, who, while eager to incorporate technology, are constrained by multiple demands as well as limitations inherent in school settings.

Given these considerations, initiatives to improve mathematics education through technology must be innovative and well-thought-out. The responses of teachers indicate that change cannot be limited to providing professional development or logistical resources. Local school factors such as instructional, curricular, and organizational issues must be identified and negotiated with teachers so that change incorporating TPCK becomes more feasible.

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INNOVATION IN ENGINEERING MECHANICS LEARNING IN VOCATIONAL HIGH SCHOOLS: PRELIMINARY STUDY OF V-LAB DEVELOPMENT

Aisyah Khilawatun Niswah[1], Roemintoyo[2], Triana Rejekiningsih[3]
[1,2,3] Universitas Sebelas Maret
[1]aisyahniswah05@gmail.com, [2]roemintoyo@staff.uns.ac.id, [3]triana_rizq@staff.uns.ac.id

Abstract

As one of the basic subjects that are important to be mastered by students, Engineering Mechanics subject has the aim that vocational school students have competence in calculating the behavior (deflections and forces) of structures against loads acting on building structures. This study aims to identify the problems faced by students during the implementation of learning. The research method is a quantitative approach by adopting a survey model. The research subjects consisted of first grade students majoring in civil engineering at public vocational high school 2 Surakarta. The data collection technique used a questionnaire followed by the data collection instrument using a questionnaire, the questionnaire was distributed in the form of a google form whose results were analyzed in percentage terms to describe the identification results. The findings of this study indicate that students need a variety of learning methods, considering that so far learning activities have been dominated by lectures and presentation slides. As many as 58.33% of students stated that the Engineering Mechanics learning tends to contain material that is difficult to understand, in addition 50% 'agree' and 29.17% 'strongly agree' students agree that the learning process tends to be boring. A total of 62.50% of students stated 'strongly agree' and 37.50% 'agree' had a strong learning motivation to understand the material in the Engineering Mechanics subject. The results of the study show that if an innovation is needed to support learning activities, especially Engineering Mechanics learning so that learning becomes more dynamic and active so as not to give students a sense of boredom.

Keywords: Engineering Mechanics, Innovation, Learning Methods

1. Introduction

The development of science and technology (IPTEK) is very fast giving rise to equipment and applications that are very easy to learn and use in the learning process. One of them is to see the learning media. In this 21st century, it is easy for teachers to have the ability to develop learning media because the use of learning media is the only factor that encourages the development of competence in learning (Mulyanto, 2009:2). In line with the statement Sanaky (2009), that the benefits of learning media include: (a) By using learning media the learning process will be more interesting, so that it can lead to student learning motivation; (b) Can clarify learning materials, so that students can easily understand the material and enable students to master the learning objectives, (c) By using learning media, the learning process becomes more varied. The material is not only delivered orally, so that students do not get bored quickly and are more effective and efficient; and (d) Students listen to the material delivered by the teacher, do more learning activities such as: observing, doing, demonstrating, and others. Learning media features can provide experiential experiences so as to increase student learning engagement (Puspitarini YD et al. 2019).

The use of learning media can be applied at various levels of education, one of which is in Vocational High Schools. Prosser and Quigley (1950), stated that the essence of vocational education is to apply a pattern of habituation of thinking and practicing that is done repeatedly and continuously. Vocational schools have the main mission to prepare their students to enter the workforce. The learning provided allows students to gain practical skills through experimentation and gives them the opportunity to have a deeper understanding of the

content (Aljuhani et al. 2018). Through the subjects given by vocational schools to students, it is hoped that they will be able to produce middle-level workers who are ready to work in accordance with their fields or majors.

Engineering Mechanics is one of the basic subjects of the skill program in Vocational High Schools (SMK) for the Construction and Property Business (BKP) expertise program given in first grade students. This subject is the main field of science for the behavior (deflections and forces) of structures or machines against loads acting on these structures (Weni Murfihenni, 2014). This mechanical engineering knowledge can equip students to later enter the world of work as an estimator, contactor, field supervisor, architect and others.

Engineering mechanics needs to be considered because it is the basis of other science subjects. Without understanding the science of engineering mechanics, students do not have a handle on calculating the forces acting on building structures that will affect the design level and building safety level. This is the basis for researchers wanting to examine how engineering mechanics is taught in the classroom and whether there are problems that occur. The learning process will be seen how the response of students to the learning of engineering mechanics that has taken place. The things that are considered are the level of complexity/difficulty of learning, the level of student motivation, and their level of understanding of the subject matter of engineering mechanics. In addition, the learning process carried out by the teacher needs to be reviewed whether it has deficiencies or not.

Learning that is able to provide concepts and direct experience is very important to develop students' abilities (Arista and Kuswanto 2018). Based on the Cone of Experience by Edgar Dale, the most effective learning is learning that is directly involved with purposeful learning experiences. The level of abstraction in this learning model is very low, making it easier for students to absorb new knowledge and skills. Virtual Laboratory was chosen to instill understanding of the material and provide hands-on experiences to students.

A virtual laboratory is a tool that supports conventional live laboratory experiments because it provides an experimental platform for students that collects the basics underlying experiments, their pre-visualization (video, simulation) and data generation. This is what makes the virtual lab very useful in learning (Domingues et al. 2010). Various studies have found that the use of v-lab in learning can display an experimental process (David Barkley, 2012), help students in pre-lab preparation, strengthen students' conceptual understanding, and as a substitute or complement to real labs because students can repeat practical simulations that are not understood (Hawkins and Phelps 2013). The learning experience using a virtual lab will reduce monotonous and one-way interactions when conducting distance learning, and at the same time enrich the student learning experience (Chua and Bong 2022). Activities in the laboratory also allow students to observe and interact interactively to investigate phenomena, relate data to disciplinary principles, and work with others in teams (Nolen and Koretsky 2018).

Engineering mechanics needs to be understood by students because it becomes their provision for future learning. Based on various findings, both practical and theoretical, it becomes an important point to assess the learning that has taken place to innovate, especially in the learning of engineering mechanics. Innovation is needed so that the learning of engineering mechanics can attract students' interest, provide variations in learning, and provide meaningful experiences to students. Therefore, this study aims to identify problems faced by students during the implementation of engineering mechanics learning so that students' needs for learning media that support learning mechanics can be identified.

2. Method

This study uses a quantitative approach with survey data collection. Kerlinger states that survey research is research conducted on large or small populations, but the data studied are data from samples taken from that population, to find relative occurrences, distributions, and relationships between sociological and psychological variables (Annison 2011). Methods Survey research deals with questions about one's own beliefs and behavior. The research took place at public vocational high school 2 Surakarta in the Construction and Property Business (BKP) skill program class. A sample of 24 people’s was chosen to represent the existing population.

The researcher asked several respondents about past or present beliefs, opinions, characteristics of an object and behavior. Data collection is done by making a form-assisted questionnaire regarding students' opinions on the ongoing learning of mechanical mechanics. The things that are considered are aspects of attention, pleasure, learning activities and student interest in learning mechanical mechanics (Siti Rahayu, in Aziz FA, 2015). From this aspect, questions were made about the level of complexity/difficulty of learning, the level of student motivation, how the teacher teaches methods and how the level of their understanding of the subject matter of engineering mechanics is made. The rating scale used is SS (strongly agree), S (agree), TS (disagree) and STS (strongly disagree) for each statement item given.

3. Results and Discussion

The data obtained from the survey regarding students' problems with learning engineering mechanics will be described as follows. In this section, the results of the survey related to the level of difficulty of the subject matter of engineering mechanics will be presented and the results obtained are as follows.

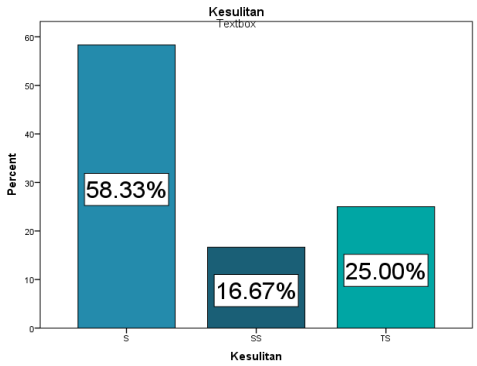

Figure 1. Students' opinions regarding the difficulties of engineering mechanics.

Figure 1 shows that 58.33% of students agree, 16.67% strongly agree, and 25.00% disagree regarding the statement of difficult engineering mechanics material. Then it can be seen that the majority of students consider engineering mechanics difficult for them.

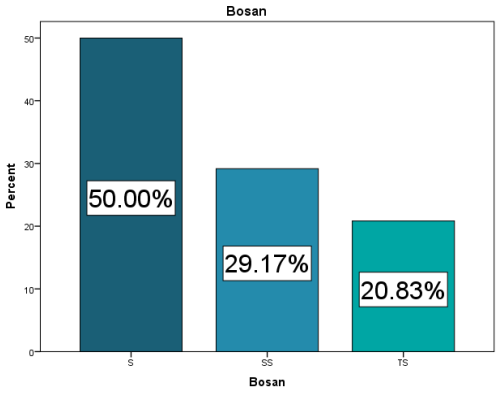

Figure 2. Students' opinions related to feeling bored with engineering mechanics subjects.

Figure 2 shows that 50.00% of students agree, 29.17% strongly agree, and 20.83% disagree regarding the statement of students' feeling of boredom in learning mechanical mechanics. So it can be seen that the majority of students consider learning mechanical engineering boring so that the level of student motivation is low. In addition, based on observations made in the field, it is known that teachers only teach using e-modules, modules, and power-points.

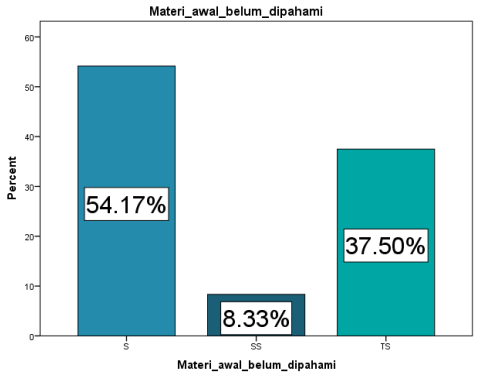

Figure 3. The opinions of students related to not understanding the initial materials of engineering mechanics.

Figure 3 shows that 54.17% of students agree, 8.33% strongly agree, and 37.50% disagree regarding the statement that they have not understood the initial materials of engineering mechanics. So it can be seen that the majority of students have not mastered the initial material of engineering mechanics. As explained earlier, engineering mechanics material becomes the basis of subjects at the next level. It can be suggested that teachers need to pay attention to how they teach. Teachers can improve the delivery of material even better, one of which is by utilizing a variety of learning media to instill concepts understanding in students.

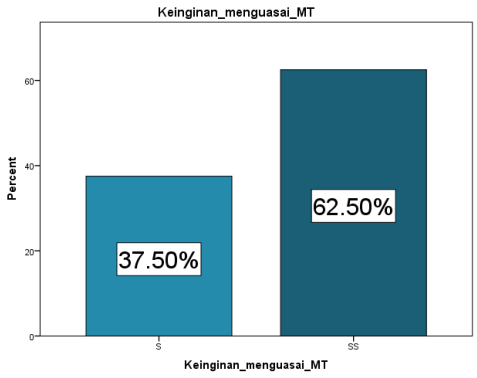

Figure 4. Student opinion regarding students' desire to master engineering mechanics.

Figure 4 shows that 37.50% of students agree and 62.50% strongly agree that students have a desire to master engineering mechanics. To respond to this desire, teachers can facilitate students by providing better and more meaningful learning of engineering mechanics than before.

Based on the results of student observations regarding the need for learning media needed for engineering mechanics learning, students agree with the statement that they like the delivery of learning with the help of visualization of the material (pictures or videos about the material) and want varied engineering mechanics

learning media not only with lectures and power point presentations. just. In addition, it is known that all students have android smartphones and they want learning to be able to use their smartphones.

Mechanical mechanics is a basic learning that must be mastered by elementary grade students of building vocational school. Mechanical mechanics needs to be mastered by students because it is the basis for calculating other subjects. Thus, the inculcation of concepts and direct experiences from learning needs to be considered by the teacher so that the material presented can be understood by students (Arista and Kuswanto 2018), One of them is by using learning media (Puspitarini YD et al. 2019).

Based on the Cone of Experience by Edgar Dale, the most effective learning is learning that is directly involved with purposeful learning experiences. Virtual Laboratory is recommended because it has the benefit of instilling an understanding of the material and providing hands-on experiences to students through virtual practicums.

Practicum activities for vocational students play an important role because it aims to make students skilled in using tools and materials. It also supports scientific learning in a field by enabling learners to acquire practical skills through experimentation and giving them the opportunity to have a deeper understanding of the content (Aljuhani et al. 2018). Activities in the laboratory also allow students to observe and interact interactively to investigate phenomena, relate data to disciplinary principles, and work with others in teams (Nolen and Koretsky 2018). The results of the survey data show that students believe the laboratory experience strengthens and improves students' understanding of the concepts presented in lectures and because the use of the v-lab has helped them perform better in the learning process (Rowe et al. 2018).

Learning innovations need to be carried out on engineering mechanics subjects so that the material can be accepted by students. Researchers suggest for teachers to develop android-based virtual laboratory learning media for engineering mechanics learning. Especially in the matter of compiling the equivalent force which is the basic material for calculations from engineering mechanics. Many virtual laboratory platforms that can be accessed online are related to the proposed platform. Compared to this literature, the virtual laboratory that the author created is a laboratory platform that is easily accessible via Android by students and teachers. This is done to make the best possible use of the function of the student's smartphone so that it can also be used in learning. In addition, because the basic platform for this learning media is Ms. Powerpoint, it is hoped that teachers can develop it according to the material they will convey and provide variations of the learning media used. Virtual laboratories for engineering mechanics subjects are also not widely developed.

4. Conclusion

Based on the survey data, it is known that 58.33% of students stated that Mechanical Engineering learning tends to contain material that is difficult to understand, in addition 50% 'agree' and 29.17% 'strongly agree'. Students agree that the learning process tends to be boring. A total of 62.50% of students stated 'strongly agree' and 37.50% 'agree' had a strong learning motivation to understand the material in the Mechanical Engineering subject. The results of the study show that if an innovation is needed to support learning activities, especially learning mechanics techniques so that learning becomes more dynamic and active so as not to give students a sense of boredom. The researcher suggests utilizing the use of learning media, namely virtual laboratories. It is hoped that the use of a virtual laboratory can solve the problem. In addition, the use of virtual laboratories can provide students with meaningful concepts and experiences regarding the material presented.

5. Acknowledgement

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PLACE: INTERACTIVE LEARNING MEDIA AUGMENTED REALITY (AR) 3D IN "PLANT CELL" FOR 11TH GRADE STUDENTS

Adimas Nanda Nugraha[1], Dias Aziz Pramudita[2]
[1,2] Universitas Muhammadiyah Surakarta
[1]a710170070@student.ums.ac.id, [2]dap207@ums.ac.id

Abstract

The era development, the rapid of technology, and the availability of mobile phone use for students in facilitating learning should be accompanied by familiarization of the use of media as one to support the learning. Biology is considered as a subject that requires more understanding and interpretation through its visualization. Moreover, the one focuses on "Plant Cell" material is rare. This research is further aimed at: (1) developing an interactive learning media Augmented Reality (AR) 3D in Biology material "Plant Cell" for11th grade students, (2) conducting the feasibility test of the interactive learning media, and (3) examining the effectiveness of the interactive learning media. Research and Development (R&D) was employed, and ADDIE model was adapted. The participants were 20 students. Questionnaires were utilized as the instruments. The steps in developing the media included: Needs Analysis, Design Making, Design Implementation, Alpha Testing, Revision, Beta Testing, and Media Improvement. Next, validity test and reliability test from two experts were conducted. The results of the research reveal: (1) validity test by using Aiken V was in the medium (0,5-0,75) and high category (0,875), and reliability test was in the perfect category (0,961), (2) the media effectiveness level by using Aiken V was in the medium category (0,73), and by using SUS was acceptable (71-100), and margin high (51-62). In this research, last, the suggestions in the form of some revisions to the media were provided.

Keywords: augmented reality, biology, interactive learning media, plant cell

1. Introduction

Along with the rapid development of technology, learning media are arranged according to the conditions of school infrastructure and developing technology. Agustina (2019, p. 1) states that media is categorized as proper to apply if it can help creating two-way communication between teachers and students. However, teachers tend to still apply conventional media such as Torso or other teaching aids. In terms of relevance, this type of media is considered less attractive to students in learning. Hence, there is a necessity for teachers to use technology today in the media as one of the main learning resources. (Alwi & Rahmawati (2014) in Susilo et al., 2017, p. 105). In addition, conventional learning media does not provide a good interpretation of students. Essentially, teachers must be able to create a more interactive classroom atmosphere and various kinds of tools to attract students' interest in understanding a material. One of them is through learning media, which in this case serves to assist students in interpreting the concept of the material itself. (Mustaqim & Kurniawan, 2017, p. 36)

Learning media is a tool that is created to facilitate the delivery of material concepts in learning activities. According to the research conducted by Budi (2019, p. 1), learning media will make it easier to visualize an object. Thus, Biology learning is one the right choices for applying media.

Currently, the use of AR 3D specifically in Indonesia can be considered as rare due to the lack of public recognition about this technology. As known that AR is widely used in the video games, image processing, film industry, mobile phone navigation, and medicine. In other words, it is rarely used as a facility that can help in the education field (Mustaqim & Kurniawan, 2017, p. 38). The material in the 11th Biology subject is considered as one to be difficult for students in understanding and interpreting it.

In case of Biology, it is considered as difficult to visualize the material about "Plant Cell" directly. Thus, it requires media assistance. AR 3D technology can be utilized, in which through this technology, three-dimensional objects can be displayed (Romadon et al., 2017, p. 89). "Plant Cell" learning media can be created in an AR 3D-based Mobile application. Based on what had been explained, this research is aimed at: (1). (1) developing an interactive learning media Augmented Reality (AR) 3D in Biology material "Plant Cell" for11th grade students,

(2) conducting the feasibility test of the interactive learning media, and (3) examining the effectiveness of the interactive learning media.

2. Method

This research had Research and Development (R&D) as its design, which was aimed to develop an interactive learning media AR 3D for "Plant Cell" in Biology material. 20 students were participated in this research. The development model used in this research was adapted from ADDIE one and employed seven stages, to be mentioned as: Needs Analysis, Design Making, Design Implementation, Alpha Testing, Revision, Beta Testing, and Media Improvement. The elaboration of each stage will be briefly described after the following figure.

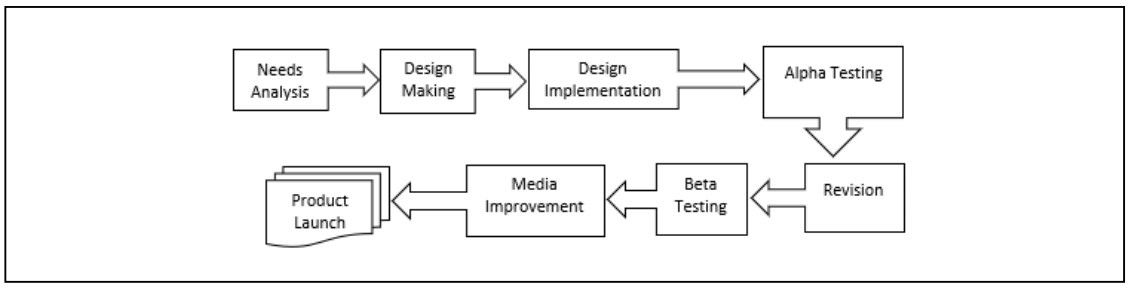

Figure 1. Research and Development (R&D) stages by Sudaryono (2011, p. 30)

Fig. 1 shows stages, the first one is namely Needs Analysis. In this stage, the concept of learning media was created by firstly collecting the information from the teachers and students. Next was the Design Making. After that, the Design Implementation was carried out, in which it was aimed to plan the program that would be created, and the tools that would be used. In this research, the tools refer to *Unity 3D*. The fourth stage was Alpha Testing, which was carried out by the experts or examiners to assess the media. The revisions from the experts/examiners were then conducted. After that, Beta Testing was carried out. In this stage, testing was carried out on the participants of this learning media and referred to the users. After making further revisions from Beta Testing was carried out, media improvements were then created based on the suggestions provided by the experts/examiners.

- Needs Analysis

At this stage, the researcher collected information about the learning materials and the problems experienced by the teachers and the students during the learning process. In addition, hardware and software requirements are needed to build AR 3D "Plant Cell".

- Design Making
  - Application Making

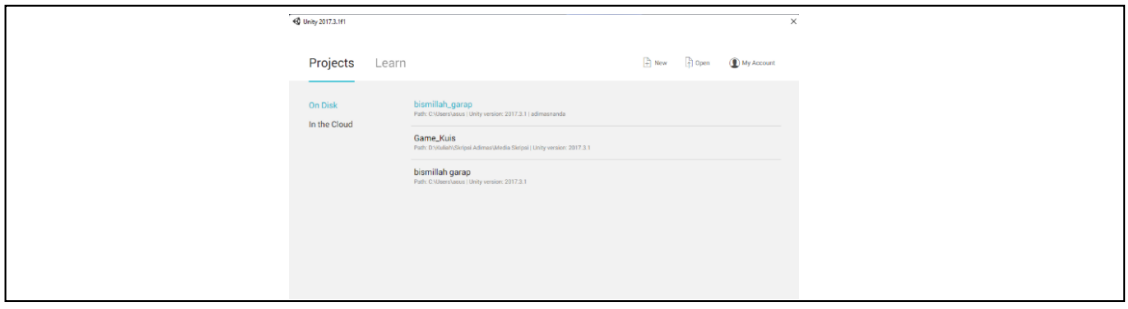

Figure 2. *New Project* Starting Menu

Fig. 2 is the starting menu to enter the *Unity* software. First, by creating a *New Project* and specifying whether a 3D or 2D application that would be created. Second, by selecting the location to save a project that would be created. Then go to the next stage, which was choosing the layout size by using the size that would be used. After that adding the required asset package, setting the function used for the media, and soon following the steps that would be carried out as needed

- Use Case Diagram

Use Case Diagram contains a brief description of what features that are available to be used by the users.

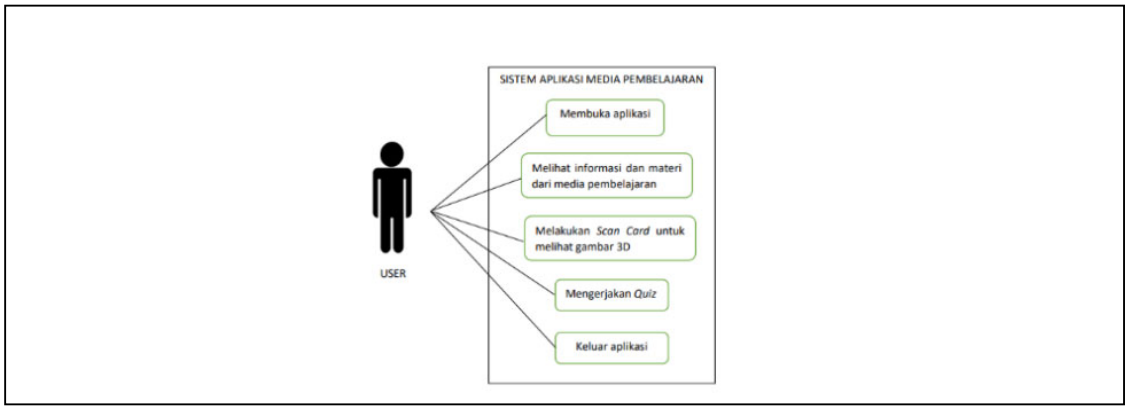

Figure 3. Use Case Diagram

- Motor Wireframes

Table 1. Product Flow (Wireframe)

No	Name	Note
1.	Home Screen and Main Menu 	In the Main Menu, there are five features, namely: Profile, Information, Material, Scan Card, and Quiz. In the right point, there is an 'Exit' button to exit this media. Then, there is 'Profile' menu that contains the Author's Profile. Below is 'Information' menu that contains a brief description of this media. Then, there is a 'Material' menu containing the 11th grade Biology e-book. Next to it is 'Scan Card' menu, which is used to display 3D "Plant Cell" images. Last, there is 'Questions' menu that contains a collection of questions for evaluating the students' learning.
2.	Profile Menu 	The Profile Menu contains the Author's Profile consisting of the author's name, date of birth, address, student number, photo, and supervisor. Then in the right point there is a button to return to the main menu
3.	Information Menu	The 'Information' menu contains a brief description of "Plant Cell" AR 3D learning media. Then in the right point there is a button to return to the main menu

		
4.	Material Menu 	The 'Material' menu contains a brief material about "Plant Cell". Then in the bottom right, there is a menu to link to the Biology e-book for 11th grade students. To return to the main menu, the users can press the arrow button on the top right.
5.	Scan Card Menu 	The 'Scan Card' menu contains a bar code that when it is scanned, a 3D "Plant Cell" image will appear.
6.	Question Section Menu 	The 'Questions' menu contains of questions related to "Plant Cell". After all of the questions are answered, the score will appear and there is a red menu in the upper right corner to exit or return to the main menu.

- Diagram Activity

The diagram activity is used to describe the workflow on the AR 3D "Plant Cell" learning media. The picture below is taken as an example, namely the activity diagram for the main display on the "Plant Cell" AR 3D learning media.

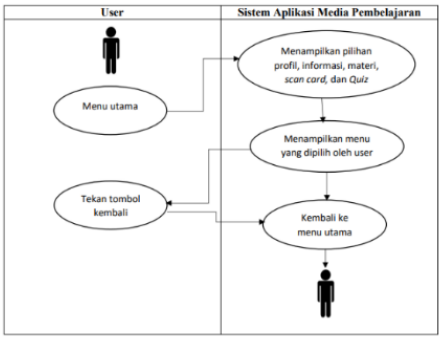

Figure 4. Activity Diagram Display

In the display of the initial menu of learning media, the user can choose 5 menus consisting of a Profile Menu, Information, Material, Scan Card, and Questions. At the beginning, the user opens the 'Information' menu to find out the purpose and how to use the learning media. Furthermore, the user is asked to get the 'Material' menu to get an understanding of the material to be delivered. If the user has understood the material, he/she is asked to press the 'Scan Card' menu and open the provided *bar code*. Then a 3D "Plant Cell" image will appear. After that, the users are asked to work on questions as the learning evaluation.

- Design Implementation

Figure 5. Media Menu Display

Fig. 5 is a display menu on "Plant Cell" AR 3D learning media, the display of the media is also suitable for 11th grade students, because it is simpler and easier to understand. The background describes the natural atmosphere; where it is expected that user can immediately understand what the media is using. This AR 3D "Plant Cell" learning media also makes it easier for them to understand the parts of "Plant Cell" in the form of 3D images.

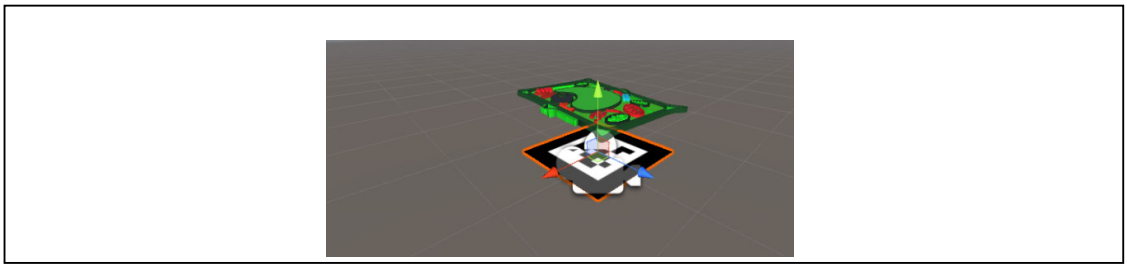

Figure 6. "Plant Cell" 3D Display

Fig. 6 is a 3D image of the "Plant Cell" that forms 3D on each part of the organelle itself.

- Alpha Testing

The test of the AR 3D "Plant Cell" learning media application was assisted by 2 lecturers, consisting of 2 expert lecturers of Information Technology Education, Universitas Muhammadiyah Surakarta. Alpha testing was conducted to get the results of the quality analysis of the software.

- Black Box Test Results

Based on the results obtained from 20 users with 11 categories 0 failed and 11 succeeded, it can be concluded that the media is 100% successful according to its functionality.

- Media Validation

$$Mean = \frac{V\ Total\ Value}{Item\ Number}$$

$$Mean = \frac{17{,}625}{24} = 0{,}73$$

Based on the media test, it was showed that there were 2 examiners whose results from Aiken V items 1-24 were 17,625 and an average of 0.73. This figure showed the medium validation value. In accordance to the interpretation, if the value of V < 0.4, the validity was low, if the value of V lies between 0.4 - 0.8, the value of validity was moderate, and if the value of V > 0.8, the value of validity was high.

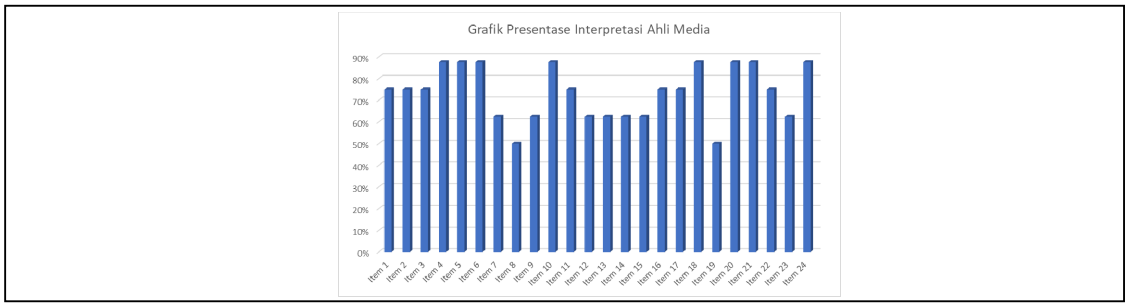

Figure 7. Media Expert Interpretation Percentage

The rating results by using interpretation within the results of items 1 to item 24 in Fig. 7 showed a graph of media expert interpretation for 24 items. The results of the analysis showed Aiken V were medium and high. Medium yields were at 0.5 – 0.75 and high yields were at 0.875.

Case Processing Summary

		N	%
Cases	Valid	2	100.0
	Excluded[a]	0	.0
	Total	2	100.0

a. Listwise deletion based on all variables in the procedure.

Figure 8. Media Expert Case Process Summary

Reliability Statistics

Cronbach's Alpha	N of Items
.961	24

Figure 9. Media Expert Reliability Statistics

The reliability test conducted by 2 media experts in Fig. 8 is a case processing summary, which contains information about the number in the SPSS program as many as 2 media experts. Since all answers were filled in, the valid number was 100%. Furthermore, Fig. 9 represented the reliability statistics. There were 24 N of items and they had a Cronbach's alpha of 0.961. Because Cronbach's alpha 0.961 was in the 0.9 category, it could be concluded that the 24 items were included in perfect reliability.

- Validation Material

$$Mean = \frac{V\ Total\ Value}{Item\ Number}$$

$$Mean = \frac{16{,}25}{23} = 0{,}706$$

The results of the media test showed that there was a user that had the results of Aiken V items 1-24 were 16.25 with an average of 0.706. This figure showed the media validation value was in the medium category. In accordance with the interpretation, if the value of V < 0.4, then the validity was low, if the value of V was between 0.4 - 0.8, the value of validity was moderate, and if the value of V > 0.8 then the value of validity was high.

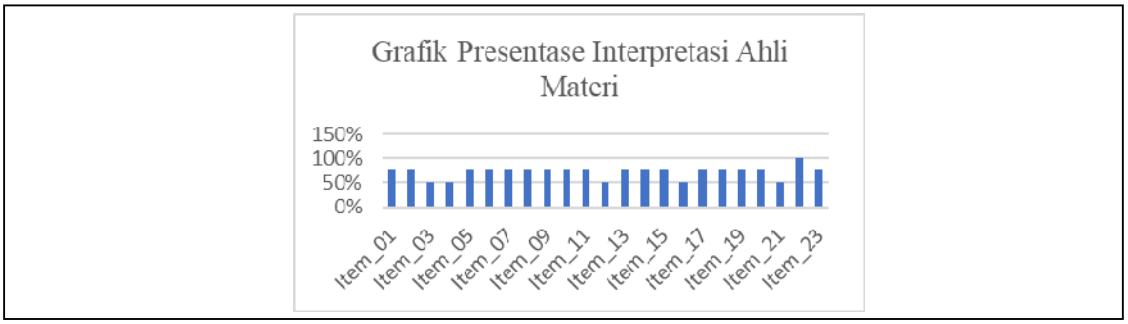

Figure 10. Material Expert Interpretation Percentage

3. Results and Discussion

- Beta Testing

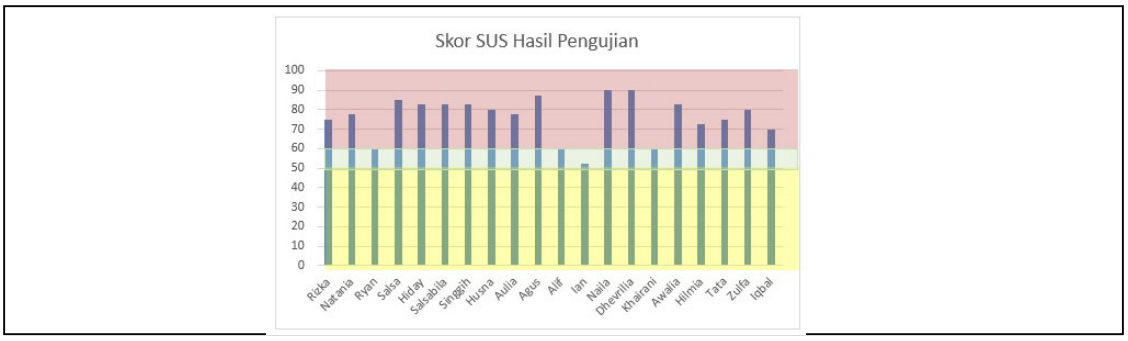

Figure 11. Usability Graph

Note:

: *Not Acceptable*

: *Margin High*

: *Acceptable*

Fig. 11 is a usability graph obtained from the calculation of SUS (System Usability Scale). From this data, none of the acceptability ranges criteria was included in the unacceptable category because the value range was above 50. However, there were 4 users who got scores in the high margin category where the range of values in the high margin was 51-62, the user named Ryan, Alif and Khairani got a score of 60 and the user named Ian got a score of 52.5. While the other 16 users were included in the acceptable category with the range of acceptable values were 71-100, then 4 users with scores above the average and were included in the acceptable category.

- Media Improvement

After testing the media to 20 users, there were several suggestions that can be used as guidelines for improving the media, such as: by adding images to the "Plant Cell", adding sound to make it more ear- catching, and changing the background for each section so that it does not look monotonous.

The effectiveness of AR 3D interactive learning media for "Plant Cell" Biology material showed by the results of this research are supported by the previous relevant researches' results which generally led to the similar conclusion on the positiveness of using 3D AR media specifically for Biology. However, it should be understood that there are at least three kinds of different factors that had been found regarding the reasons on why it can be considered as the positiveness. First, the researches carried out by Kalana, Junaini, and Fauzi (2020, p. 579-585) & Labib, Subiantoro, and Hapsari (2020, p. 899-905) both emphasized how AR as one of the forms of the transformation of the conventional way in Biology learning, is able to be accessed by mobile phone by the students specifically during Covid-19 pandemic, and can finally able to support their learning activities. Second, Weng, Otanga, Christianto, and Ju-Chun Cu (2019: p 1-24) & Damopolii, Paiki, and Nunaki (2022, p. 348-355) similarly found about the positiveness on using AR 3D that it improves the students' critical thinking, and their learning outcomes specifically in the analyzing (C4) level. Third and last, the factor is related to the ones coming from the students themselves and considered as the responses while AR 34 is implemented. Zulfarina, Syafiii, and Putri (2019, p. 417-424), Destiara (2020, p. 117-122), Liono, Amanda, Pratiwi, and Gunawan (2021, p. 144-152) & Omurtak & Zeybek (2022, p. 55-74) respectively found that AR 3D is able to create more interesting, and efficient learning activities. Besides, the students' interest improves, AR 3D thus has good readibility criteria and the teaching material is considered as pratical, AR 3D, moreover, is considered as interesting by the students in term of their visualization and it motivates them more in learning. Last, it is also stated that the fact that AR 3D looks more concrete in displaying the objects in the form of learning material makes the students think that the learning activites become fun. Finally, it can be emphasized that the results of this research are in line with the previous relevant researches that they all cover the positiveness of AR 3D in supporting the Biology learning.

4. Conclusion

The effectiveness of the media that is showed through the research results and gained through the tests conducted to the experts/examiners and the users reflect that this AR 3D interactive learning media is generally easy to understand and use. It is also in line with the results from the previous researchers where AR specifically for Biology learning is suitable that there are many different supporting factors for the reasons on why it is suitable. However, due to limitation in the research process which were conducted under Covid-19 pandemic, the adaptations or modifications were prevailed in some stages for the product making and during the research process. In the future, the similar researches are open to the others or new researchers. This kind of research is also crucial to be further developed.

5. Acknowledgement

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IMPLEMENTATION OF THE NATIONAL SONG IN THE FORMING OF RELIGIOUS CHARACTER AND NATIONALISM IN CLASS IV STUDENTS IN SD NEGERI CILAME

Siti Kurniasih[1]
[1] Universitas Pendidikan Indonesia
[1]sitikurniasih@upi.edu

Abstract

Planting a National Song in the Formation of Religious Character and Nationalism in Grade IV Students at SD Negeri Cilame, aims to shape the character of students, especially in religious and nationalist characters through national songs, therefore in shaping the character of students can be done in various ways, one of which is by getting used to sing the national anthem to students, so that little by little students will apply the moral messages contained in the song to everyday life, so that students become better individuals and have character. This study used a qualitative descriptive method, data collection techniques were carried out by observation, interviews, and documentation studies. The results showed that the fourth grade students of SD Negeri Cilame carried out the planting of the national song in character building in learning. Like before and after learning all students sing the compulsory song.

Keywords: Planting, Formation, Character, Religion, Nationalism.

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1. Introduction

The development of science and technology in this era of globalization affects various parts of life, including education. Education is one of the important strategies in an effort to create quality and intelligent human resources, besides that education is also a process of directing students to be able to adapt to good changes.

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual, religious, self-control, intelligence personality, noble character, and skills needed by themselves, society, nation and state (Article 1 paragraph 1 of the National Education System Law No. 20 of 2003).

Character education is essentially an integral part of the nation's character building. Character education is directed at achieving the goals of national education (Article 3 of Law Number 20 of 2003 concerning the National Education System), namely to develop the potential of students to become human beings who believe and fear God Almighty, have noble character, are healthy, knowledgeable , capable, creative, independent and become a democratic and responsible citizen. To realize this goal, character education should be given to children as early as possible. One way to do this is to shape the character of the children through the habit of singing the national anthem which has positive values and moral messages in it.

According to Permendikbud Number 23 of 2015 concerning the Growth of Character, that habituation is a series of activities that must be carried out by students, teachers, and education staff that aims to cultivate good habits and form a generation of positive character. For example, after praying every start of the learning day, teachers and students sing the national anthem Indonesia Raya, a national anthem or a recent song that describes the spirit of patriotism and love for the homeland. In addition, before praying at the end of the learning day, the teacher and students sing a folk song (folk songs throughout the archipelago). The moral values contained in the lyrics of the national anthem are intended to educate the psychological development of a child.

There is an assumption that national songs and struggles are not modern, making the younger generation forget the spirit of patriotism contained in the song. The younger generation now tends to choose modern songs whose lyrics and songs are not educational. The current content of the song contains the most love stories, endless pleasures and complaints in living a life full of hardships. Therefore, their daily lives are always filled with these types of songs or music, the mentality of the younger generation who are fans also becomes whiny,

weak-hearted, and doesn't like to work hard. The mandatory Indonesia Raya song is only sung, without any effort to understand the meaning and philosophy contained in the song. Many young people do not know the history and chronology of the composition of these struggle songs. The habit of singing national songs can be one way to form a strong character for students.

For this reason, it is necessary to inculcate the national anthem in shaping the character of elementary school students, especially for religious and nationalist characters. Because in shaping the character of students can be done in various ways, one of which is by getting used to singing the national anthem to students, so that little by little students will apply the moral messages contained in the song in everyday life, so that students become better individuals and have character. .

Based on the description above, the researcher will conduct research on "Planting National Songs in Formation of Religious and Nationalist Character Values for Fourth Grade Students of Cilame State Elementary School".

2. Method

This research was conducted at SDN Cilame, Kab. Bandung. This study used descriptive qualitative method. Data collection techniques used in this study are observation, interviews and documentation studies. The population of the study were fourth grade teachers and fourth grade students at Cilame State Elementary School, Kutawaringin District, Bandung Regency.

3. Results and Discussion

The research was conducted in the IV grade SDN Cilame, Kab. Bandung. This school has 7 educators and 264 students. Cilame State Elementary School has a principal, namely Mr. Agus Nurdin, S.Pd. I. and Mr. Agung Purnama Sidik, S.Pd. are teachers who teach in class IV and he is also the homeroom teacher for class IV with a total of 48 students. To support the learning process, the facilities and infrastructure owned by SDN Cilame are adequate. This school has 6 study rooms, 1 office room, 1 teacher room, 1 library room which is combined with a prayer room, 1 warehouse room, 7 toilets, and is equipped with a fairly large field.

The results of the interview with Mr. Agung, the character built for fourth grade students, is prioritized to form good morals. The purpose of character planting through the national song at SD Negeri Cilame is, so that students can develop good morals and character according to the character education itself contained in the content of the national song. Like the song Indonesia Raya, which has a religious character and a nationalist character that becomes a role model for students' daily behavior, so that it can be applied by students which can be seen from their attitude to friends, teachers, school principals and the people around them. The form of instilling religious and nationalist characters through the national anthem is taught and sung through the habit of praying before studying and before going home from school.

The results of interviews with fourth grade students at SD Negeri Cilame, students memorized pop songs or songs with the theme of love better than national songs. Where the average student only memorizes the national anthem which is already commonly sung, the national songs include the songs Indonesia Raya, Garuda Pancasila, Satu Nusa Satu Bangsa, and Dari Sabang Sampai Merauke.

Discussion

After the researchers collected data from the research results obtained from observations, interviews and documentation, the next researcher would conduct data analysis to explain further from the research results. In accordance with the data analysis technique chosen by the researcher, namely by using descriptive qualitative analysis by analyzing the data that has been collected during the research.

Instilling religious and nationalist character values. Based on the results of the study, it can be seen that the way educators in inculcating student character at SD Negeri Cilame is one of them through the national anthem Indonesia Raya. The goal is that students can develop good morals or attitudes according to the character values in the song.

At SD Negeri Cilame, character value education through the national anthem is implemented through singing. Before studying, the students read a prayer, then continued with singing the national anthem guided by the teacher. This is done regularly by students because it has become an agenda that must be implemented every day. This habit is a determining factor in the formation of student character values through the national anthem. By getting used to singing the national anthem during formal or non-formal activities, the lyrics of the Indonesia

Raya anthem will stick in the minds of students, so that they become an encouragement or stimulus in implementing positive values in school life or outside of school, such as religious values and nationalism.

There are obstacles to planting national songs in the formation of religious and nationalistic characters in fourth grade students at SD Negeri Cilame, students memorize pop songs or songs with the theme of love more than national songs, because students hear more modern songs than national songs, here the teacher has not fully provide an explanation of the meaning and content of the national anthem sung by students. So that students are less active to show themselves in front of the class, for example being the conductor of the national anthem or singing the national anthem in front of their friends. This is because the teacher is not optimal in giving assessments to students in singing the national anthem.

4. Conclusion

From the results of this study, it can be concluded that the fourth grade students of SD Negeri Cilame carry out the planting of the national song in the formation of religious character and nationalism in learning. Like before and after learning all students sing the compulsory song. The obstacles in the implementation of the cultivation of religious characters and the character of nationalism in SD Negeri Cilame are obstacles related to teacher competence. So for solutions in overcoming obstacles in the implementation of planting religious characters and nationalist characters, Cilame State Elementary School is carried out by establishing good relations with students so that students are comfortable, carrying out various school activities and utilizing available learning media.

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3. Agung Purnama Sidik, S.Pd., as the homeroom teacher for grade IV at SD Negeri Cilame.
4. Fourth grade students of Cilame State Elementary School.
5. All parties who cannot be mentioned one by one, thank you for everything.

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LITERATURE REVIEW: ARE CONTEXTUAL-BASED E-BOOKS EFFECTIVE IN LEARNING?

Ardita Dwiki Putri P.[1] , Kristiani[2] , Leny Noviani[3]
[1,2,3] Master of Economic Education, Faculty of Teacher Training and Education, Universitas Sebelas Maret
[1]arditaputri09@student.uns.ac.id, [2]kristianieko4@gmail.com, [3]lenynoviani@staff.uns.ac.id

Abstract

This study aims to analyze and find out whether the use of contextual-based e-books can be effective in improving students' critical thinking skills during the learning process. This type of research is using a literature study approach. The method used in writing this article uses the literature review method, the source of which was obtained on the Google Schoolar website with the issue of the past 4 years. From the 10 articles, it was found that the development of contextual-based learning e- books in some subjects was very effectively used in the learning process by using the ADDIE, 4-D, and Borg and Ball development models. The data collection technique in this research is to collect data using various scientific articles that are relevant to the research topic. The data that has been collected then be analyzed further and presented in scientific writing. In this literature review, the articles that will be used and analyzed were obtained using data from Google Scholar between 2019 and 2022. The results of this literature review show that the use of contextual-based e-books in the learning process is effective for improving students' critical thinking skills.

Keywords: E-book, contextual approach, critical thinking skills

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1. Introduction

Education is one of the important aspects to improve the quality of human resources in supporting the progress of a nation. Rusyada and Nasir (2022) state that education will provide many benefits for individual change or human resources, both intellectually, spiritually, and emotionally. Another opinion by Zakiya (2019) explains that education is a means of interaction between teachers and students which can be used as the delivery of ideas and learning materials so that they are channeled properly and usefully. So, it can be concluded that education is a very important aspect in the progress of a nation because with education an individual can acquire and improve his abilities in terms of knowledge, attitudes, and so on as well as a means to improve the quality of existing human resources.

The role of education in the modern era as it is today must be able to adapt to the times, especially with increasingly rapid technological developments. More advanced technology is very useful to support the learning process (Ardiva, 2019). One of the roles of technology that can be felt in the world of education is the development of various kinds of learning media and available teaching materials. The use of multimedia learning will help students to form mental models so that learning materials will be easier to understand (Baharudin, 2018). Zubaidah (2017) explains that the understanding of students during the learning process will have an impact on mastering their critical thinking skills. The ability to think critically is a very important aspect to be mastered by students.

Critical thinking skills as currently required by every individual (Nanda and Kustijono, 2017). In line with this, Ambarwati (2019) argues that the ability to think critically is the goal of education because skills with critical thinking make students learn more deeply where students are trained to think about what they learn, not just what other people think. According to Liberna in Ridho (2021), critical thinking skills are problem-solving skills for everyone to be able to do activities through serious thinking, being active, analyzing thoroughly in absorbing the information received, and being able to provide rational reasons for the actions to be taken. Thus, focusing on the learning process is more important, not only reading media that displays memorization content but must accommodate students' critical thinking (Ridho, 2021). Therefore, teachers must be able to deliver learning materials well and follow the characteristics of students to suit modern learning, active inquiry, and explore problems to encourage students to build critical thinking powers (Changwong, 2018). The solution to improve students' critical thinking skills is to apply innovative learning media (Fajari, 2020).

Use The right learning media is an important part of learning activities as a means to make it easier for teachers and students to master the competencies that need to be mastered. Learning media can be used as intermediaries to convey messages or communicate something. The characteristics of learning media, learning media can be divided into four types, namely *audio* media, *visual* media, *audio-visual media,* and multimedia (Ambhara et al, 2017). Multimedia is a combination of two words, namely "multi" and "media". Multi means many while media is the plural form of medium which means intermediary. Multimedia is one type of learning media that unities digital and analog technology in the fields of *entertainment*, *publishing*, *communication*, *marketing*, *advertising*, and also *commercial* (Asyhar, 2012: 75). One of the multimedia referred to is *e-books* or digital books. This *e-book* or digital book is a development of textbooks adapted to technological developments. In its use, this *e-book* has several weaknesses that must be improved by displaying simulations by combining video, audio, or images that are packaged attractively into the form of a learning *e-book.* But on the other hand, the use of this *e-book* also has several advantages, namely this *e-book* can be used easily anytime, anywhere, and can be used by anyone because users can use it online or offline.

The development of contextual-based learning media is one of the alternative learning media that can be used to improve students' critical thinking skills. Contextual learning is a learning concept that will train teachers to connect the subject matter being taught with real-world situations that are often encountered by students in everyday life and to encourage students to build relationships between their knowledge and its application in everyday life. (Komalasari, 2017). Contextual-based learning is expected to be able to create learning situations that are more realistic and related to the real world, making it easier for students to understand the subject matter being studied. Based on research by Oktaviani (2017), Satriawan (2019), and Rahmawati (2019), it can be concluded that the use of contextual-based learning media can improve students' critical thinking skills. Because with contextual-based learning, students find it easier to analyze examples and relate the material they learn to their real lives. Based on the explanation above, therefore the researcher wants to study further the effectiveness of the use of contextual-based *e-book* learning media and whether it has an effect on improving students' critical thinking skills during the learning process.

Books as Learning Resources

R. Abdullah (2012) explained that learning resources can come from people, messages, materials, techniques, tools, and settings used by students and teachers during the learning process in the classroom and outside the classroom to create good quality learning and according to learning objectives. Prastowo (2012) states that learning resources can be grouped into several types, namely in the form of books, magazines, brochures, posters, encyclopedias, or modules. Choosing the right learning resources according to Romizowski in Abdullah (2012) is to consider the factors of learning methods and learning objectives that will be used during the learning process, as well as cost and time factors in their use. There are various forms of teaching materials, one of which is *electronic books* or digital books that are considered by increasingly advanced technological developments. *E-books are* presented with a combination of digital information in the form of text, images, video, and audio that are packaged in the form of files that can be used with the help of computers, Android *phones,* or other electronic devices. *E-book* teaching materials are expected to make it easier for students to understand the learning material being studied (Septi & Susanti, 2019). The advantage of using *e-books* according to (Indrayanti, 2010) is to increase student interest in learning, as a measure of learning outcomes, students can achieve results according to their abilities, as well as teaching materials that can make students more motivated to use them in learning. In addition to the advantages of using *e-books,* in its use, this *e-book* also has several disadvantages that must be refined again by displaying simulations by combining video, audio, and images that are packaged attractively into *e-books*.

Contextual-Based Learning E - book

Contextual-based *e-books* will be prepared by linking the subject matter to be studied with real-life situations that occur in the daily environment of students. Contextual-based *e-book* teaching materials are expected to make it easier for students to learn and understand the material because it is associated with everyday life that they often encounter. This *e-book* is used as a complementary teaching material that is compatible with the basic competencies used in the stage of observing and gathering information in the learning process. *Contextual-based e-books* have the advantage that it makes it easier for students to master the material being studied and students easily gain knowledge and can solve problems in everyday life to prepare them for when they enter the world of work. According to Listiyadi (2014), another advantage of using contextual-based *e-books* is that students can learn independently, making it easier for students to understand the material that has been presented in the *e-book* even without the help of the teachers. The contextual approach is defined as a learning approach that is used to help teachers connect the material studied with real life and be able to motivate students to link their knowledge by applying the subject matter in everyday life (Zakiyah, 2019).

Learning topics designed with a contextual approach will be closer to the real lives of students so that they can help practice their critical thinking skills (Sheila, et al, 2021). The contextual approach will focus on various examples of cases in real life that exist around students so that they can increase learning motivation and improve critical thinking skills in solving problems (Fitriah, 2017) and (Yunita & Hermansyah, 2018). It can be concluded that the contextual approach is a learning concept that can help teachers to convey material by connecting with case examples in everyday life to encourage students to form relationships from their knowledge of everyday life.

Effective Use of E-Book

Effectiveness is one indicator that shows the achievement of various aspects and the achievement of the targets that have been designed in the learning process. The aspects of effectiveness according to Muasaroh (2010) are aspects of tasks or functions, aspects of planning or programs, aspects of provisions and regulations, and aspects of goals or ideal conditions. *E-books* are learning media in the form of electronic books that can be used with computers and smartphones. An electronic book is a digital version of a printed book consisting of a collection of papers containing descriptions of material and images that are made into digital form (Yusup & Istifarida, 2018). Digital books are flexible digital learning resources that can be used to facilitate learning activities so that teachers can access both groups and individuals (Mawarni & Muhtadi, 2017). *E-books* have many advantages, namely interactive content, affordable prices, and easy to store on computers and smartphones (Hidayat, Suyatna, & Suana, 2017). According to (Pustpitasari & Rakhmawati, 2013) the e-book teaching materials developed at this time consist of video, audio, and images so that they have an attractive appearance, with an attractive appearance, students are easier to understand and remember the concepts in the material.

2. Methods

The analysis used in this literature review research uses literature review method, the source of which was obtained on the Google Schoolar website with the issue of the past 4 years. From the 10 articles, it was found that the development of contextual-based learning e- books in some subjects was very effectively used in the learning process by using the ADDIE, 4-D, and Borg and Ball development models. The data collection technique in this research is to collect data using various scientific articles that are relevant to the research topic. To get maximum results in writing this literature review, it is based on the Research Question (RQ). The purpose of this Research Question (research question) is structured to focus more on the review of literature and can facilitate researchers in searching for related data. Research Questions (RQ) in this study are:

Table 1. Research Question

ID	*Research Question*	Motivation
RQ 1	What are the models used in the development of contextual-based learning e-books?	Identify the methods used in the development of contextual-based learning e-books
RQ 2	Is the use of contextual-based learning e-books effectively used to improve critical thinking skills?	Identify the effectiveness of using contextual-based learning e-books to improve critical thinking skills

Source: Hidayatul Islami (2020)

The articles used in this *literature review* are articles obtained using *Google Scholar* using the keywords contextual-based *e-book development* to improve critical thinking skills, contextual-based e-book development, and contextual-based e-book *development* on economics subjects. The articles were then selected according to the research topic so that 10 research articles were collected which were considered representative of all research articles on contextual-based *e-books* to improve students' critical thinking skills.

3. Results and Discussion

Contextual-Based E-book Development Model

The results of the *review* obtained are 3 contextual-based e-book development models, namely the ADDIE development model (Analyze*, Design, Development, Implementation, Evaluation)*, 4D (Define*, Design, Development, Disseminate)*, and Borg & Gall as well as 2 experimental models. The following is table 2 regarding the widely used contextual-based learning e-book development model:

Table 2. The Contextual-Based Learning E-book Development Model used

No	Development style	Reference
1.	ADDIE	(Zakiyatus S., 2020), (Kiki A., & Hadma, 2021)
2.	4D	(Septi R. & Susanti, 2019), (Artika V., & Susanti, 2020), (Izzah & Yuni, 2022), (Mujtahidatul A., 2019), (Artika V., & Susanti, 2020)
3.	Borg & Gall	(Yuliana, Siti, & Ikbal, 2021)
4.	Experiment	(Tika Aprilia, 2021), (Najmul & Nurjanah, 2019)

Source: Edited by the author 2022

Based on the results of the analysis that has been done by the author, it is known that the contextual-based learning *e-book development model* to improve critical thinking skills that are widely used is the 4D development model (Define*, Design, Development, Disseminate)*. This model is carried out in four stages, namely the stages of defining, designing, developing, and distributing. However, on average, the articles that have been analyzed for development only reach the third stage due to various obstacles and limitations experienced by researchers. Unlike the 4D development model which only goes through 4 stages, the ADDIE development model is carried out in 5 stages, namely *analysis, design, development, implementation,* and *evaluation.* Another development model that is often used in development research is the Borg & Gall development model. The Borg & Gall model is carried out in 10 stages, namely Research and Information Collecting, Planning, Develop Preliminary Form of Product, Preliminary Field Testing, Main Product Revision, Main Field Testing, Operational Product Revision, Final Product Revision, Dissemination, and Implementation. In this Borg and Gall model, not many people use it in development due to the many stages that researchers have to go through. And research models other than development that are sometimes used are experimental research models with *True-experimental (pretest only control group design).*

The Effectiveness of Using Contextual-Based Learning E-books

Based on the results of the article analysis that has been done by the author, it is known that the use of contextual-based learning *e-books* to improve students' critical thinking skills can be said to be effective in their use based on the feasibility of developing the *e-book*. The *e-book display is* equipped with illustrations and pictures to make it easier for students to observe and understand when studying, there are *motivation quotes notes*, as well as *a mini quiz* with HOTS-based questions. Based on the appearance, language components, materials, and graphics, this *e-book* is considered very suitable for use in learning. The students also responded well and stated that they were quite helped in understanding the material by using this contextual-based *e-book.* So, it can be concluded that using this contextual-based *e-book learning media* can train students' critical thinking skills and can increase students' learning motivation because the teaching materials provided have been linked to students' daily lives.

Based on the results of the literature review, several development models were found that are often used in development research. Among them are ADDIE, 4D, and Borg & Gall models. The Borg & Gall development model develops and validates items from the world of education. The resulting output is not only about existing products, but also discoveries about knowledge from answers to practical problems or questions. The 4D development model has 4 stages of development, namely, define, design, develop, and disseminate. The 4D development model is more often used to develop learning tools, but in research, this model is usually only carried out until the 3rd stage. And finally, the ADDIE development model provides an approach that focuses on providing feedback for continuous improvement. In several research articles regarding the development of learning media to improve students' critical thinking skills, researchers mostly use the 4D development model. In line with the opinion of Mulyatiningsih (2016), the 4D development model was chosen because this model has simpler and more systematic stages, in which each stage in the 4D model has been adapted to the learning implementation plan, and the disseminate stage can be carried out with limited distribution to teachers and students only. In addition, the 4D model includes a complete development process. For example, the define stage, is equivalent to analysis, at the development stage includes validation, revision, implementation, and evaluation activities, and the last stage is the disseminate stage. Therefore, this 4D development model is preferred and used by researchers for the contextual-based e-book learning media development model.

At this time learning in schools has been using *e-books* as a medium of learning in the learning process. To increase the activeness of students in learning, it is necessary to approach the use of learning *e-books*. One of

these approaches is contextual-based learning *e-books* used by teachers and students in schools. Contextual-based learning *e-books* are designed by connecting subject matter with everyday life so that students are motivated to learn and improve learning achievement. Contextual-based *e-books* can make it easier for students to learn and understand subject matter because it is related to real life, this *e-book* is positioned as a companion teaching material that has conformity with basic competencies used in the stage of observing and collecting information in the learning process (Septi, 2019).

The use of contextual-based *e-books* has a positive impact on learning carried out in the classroom and outside the classroom. Several previous studies found that the use of contextual-based learning *e-books* could increase students' learning motivation (Septi, 2019) and (Tika Aprilia, 2021). In addition, the use of contextual-based *e-books* can also improve learning outcomes and students' critical thinking skills in several subjects such as accounting, science, citizenship education, and mathematics lessons (Artika Vivi, 2020), (Izzah Rosydah, 2022), (Mujtahidatul A., 2019), and (Zakiyatush S., 2020). So, it can be concluded that the use of contextual-based *e-books* does provide many benefits and is very effectively used in the learning process. This article only discusses the effectiveness of using contextual-based e-books as teaching materials to improve students' critical thinking skills, it is hoped that further research can examine further the effectiveness of other learning media as a means to improve students' critical thinking skills and other high-level abilities.

4. Conclusion

This research has succeeded in identifying and analyzing the contextual-based *e-book development model* and the effectiveness of using contextual-based *e-books* to improve students' critical thinking skills based on *Research Questions*. Based on several articles obtained from *Google Scholar* as many as 10 articles were reviewed. The results of the articles that have been analyzed are a contextual-based *e-book development model* to improve students' critical thinking skills. 3 development models are often used, namely the 4D development model, ADDIE, and Borg & Gall. However, the most widely used module development model is the 4-D model (Define, Design, Development, Disseminate). Based on the results of the review, it can be concluded that the use of contextual-based learning *e-books* in various subject areas is considered very feasible and effective as a learning medium for students at various school levels. In addition, contextual-based *e-books* will increase students' learning motivation, and learner independence in learning, and improve learning outcomes because the subject matter delivered is easier to understand so that it can train students' critical thinking skills.

Based on the results of the *literature review*, it has been found that the use of contextual-based *e-books* to improve students' critical thinking skills is very effectively used in the learning process. Then in the use of contextual-based learning *e-books, it is very feasible to use during the learning process because before using this contextual-based e-book* students are less able to understand the subject matter well and students are less enthusiastic about participating in learning activities because learning only depends on the teacher's explanation and less exercise. With this contextual-based *e-book*, students become more enthusiastic about participating in the learning process and their critical thinking skills can be said to increase. So, from 10 articles on the development of contextual-based *e-books* to improve students' critical thinking skills, it was found that the use of contextual-based *e-books* was effectively used as one of the learning media for teachers and students during the learning process.

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THE USE OF ANIMATION-BASED FAIRY TALES MEDIA TO IMPROVE THE LISTENING SKILLS OF ELEMENTARY SCHOOLS STUDENTS

Nofia Fitriyana[1], Cahyo Hasanudin[2]
[1,2] Faculty of Language and Arts Education, Indonesian Language and Literature Education, IKIP PGRI Bojonegoro, Indonesia
[1]21110078@ikippgribojonegoro.ac.id, [2]cahyo.hasanudin@ikippgribojonegoro.ac.id

Abstract

This study aims to find out how animation-based fairy tale media can play a role in improving listening skills in elementary school children. The method in this study uses the literature study method with secondary data sources originating from national and international journals and books. The procedure in this study uses the theory of Mary W. George which has been developed. The results of the research are discussion topics that focus on the role of collaboration between fairy tales and animation media to improve skills. Collaboration between fairy tales and animation can be done by developing and designing fairy tale scripts that have been written so that they can be delivered with animated media.

Keywords: listening skills, elementary school, fairy tales, animation

1. Introduction

Listening skills are the first thing that can be mastered by humans (Subhayni and Iqbal, 2021) as a basis for mastering language as a means of communication with others (Sorraya and Sriwlandari, 2019). Listening is a skill in perceiving, managing, classifying, and involving the five senses (Laia, 2020) which in its realization forms a concentration to gain an understanding (Pamuji and Setyami, 2021) by listening to sound symbols, identifying, and assessing what people say (Kurniaman and Huda, 2018). Based on the explanation, it can be seen that listening skills are the first activities that humans can master through the senses of hearing to capture and manage messages in the form of sound symbols as the basis of communication.

Many things can affect the human ability to master listening skills. Massitoh (2021) states that if there are external factors and internal factors that become a benchmark for the success of listening skills, external factors are in the form of the environment while internal factors include psychological, physical, attitude, and gender. Meanwhile, Ibda (2019) explains that in listening, one must pay attention to the hearing device and inner condition. Tarigan (2015) in more detail mentions that factors that can affect listening skills include physical, psychological, experience, attitude, gender, environment, role, and motivation.

Various kinds of goals and benefits of listening skills can be one of the supporting factors or encouragement as a motivation. Tarigan (2015) states that there are various goals and benefits that can be received, namely knowledge, enjoying the beauty of the speaker, assessing the listening material, enjoying and appreciating the listening material, communicating ideas, distinguishing sounds, and being able to solve problems. Triyadi (2015) said that listening can be a means of communication, communication skills, art, process, response, and as a creative experience. In addition, listening skills are also useful as language acquisition and can easily understand the instructions that are heard (Budyawati and Hartanto, 2017).

According to Budyawati and Hartanto (2017) the ability to master language and understand instructions from listening skills is important at the age of children. Magdalena, Ulfi, and Awaliah (2021) say that listening skills can develop logical thinking, especially among elementary school children. In line with what was said by Juannita and Mahyuddin (2022), the basic ability that elementary school children should have been listening

skills, so that children will be able to easily speak, read, and write. Based on the following various opinions, it can be concluded that listening skills are very much needed as language acquisition and logical thinking development at the elementary school level.

Elementary schools are educational institutions that carry out processes and learning for approximately 6 years (Kurniawan, 2015) for children aged 6-12 years (Suryandi, Hariyanto, and Metrikayanto, 2018; Aini, 2018). In elementary school, children will begin to recognize theoretical and practical education (Nugraha, et al., 2020), where they are still in the developmental stage (Magdalena, 2021). The development of children in elementary schools can continue to be improved through an application of learning (Mirdanda, 2019). It is understood that children aged 6-15 years at the developmental stage can receive theoretical education and practical education through a lesson.

Learning in the compulsory curriculum at the elementary school level based on PP 2021 Number 57 Article 40 Paragraph (2) includes Citizenship Education, Religion, Mathematics, Science, Social Studies, Cultural Arts, and Language (Zainuddin, Sadiyah, and Wardana, 2021). The scope of language learning itself concerns language, ability to understand, appreciation of literature, and language skills which include listening, speaking, reading, and writing (Hidayah, 2015). The four aspects of language skills bind each other strongly, where listening skills are the first order to master other skills (Nuryaningsih, 2021). Therefore, in order for Indonesian language learning to run smoothly at the elementary level, more skills in listening skills are needed.

The important listening skill becomes a new obstacle to learning. Massitoh (2021) in his research found problems in language learning in the form of minimal listening skills in elementary school children, causing obstacles in the form of misperceptions or imperfect material captured by students (Bagus, 2017). Satria (2017) further revealed that the condition of students was very attentive because listening skills were not ignored.

From the research that has been done by Satria (2017), it proves that if the efforts of the teacher are needed in solving problems in students' low listening skills, this effort can be done by involving models and learning media (Febriana, Ekowati, and Fantiro, 2017). Berliana (2015) also agrees that developing listening skills requires the accuracy of learning media. So that the teacher's role in improving listening skills can be done by providing a learning media.

Learning media can be called a bridge between the transmitter of material and the recipient of the material that can stimulate logic, heart, attention, and encouragement in participating in learning (Nurfadhillah, et al., 2021). Learning media can also be a place to transmit material (Kustandi and Dermawan, 2020) by using audio, visual, and audio-visual media to improve learning in the classroom (Lestari, et al., 2018). Octivasari and Nasriah (2020) continue that classroom learning can provide learning experiences, one of which is using fairy tales for developing listening skills. Based on this explanation, it can be seen that one of the media that can be a bridge between teachers and students as a means of delivering material in elementary school classes is fairy tales.

Fairy tales are fantasy or absurd stories that never happen as entertainment and can provide positive benefits or educational value (Shofiyulloh and Muhid, 2020) because there are moral and social values that can develop children (Habsari, 2017). Ardini (2012) explains that fairy tales are fictional stories that are passed down from generation to generation through writing or orally. Not only hereditary, fairy tales have also been embedded in people's lives as an inspiration to behave (Puspitasari, Rustono, and Bakti, 2013). Broadly, it can be obtained the meaning of fairy tales, namely stories from factions that are passed down from generation to generation and have been attached to people's lives that provide positive benefits because they contain moral messages and social messages.

Sutardi (2007) wrote that there are four types of fairy tales, namely animals, ordinary, jokes, and formulas. Trianto (2007) describes animal tales as fairy tales with animal characters acting like humans, ordinary fairy tales that talk about the joys and sorrows of the main character, and tales of jokes are fairy tales with funny stories about characters. Meilani (2016) further discusses if the animal fairy tale character that is often used in Indonesia is the mouse deer, ordinary fairy tales generally use the ups and downs of human characters, anecdotal

fairy tales are fairy tales that can make listeners laugh, and formulaic fairy tales are fairy tales with a repetition structure. Through the previous discussion, it can be seen that the type of fairy tale can be known through the characters and the storyline.

The storyline of fairy tales that tend to be easy to accept does not make children immediately understand the meaning of the story content, so it is important for educators to master the media of fairy tales. For children, fairy tales can be given through a story and include a conclusion (Fitroh and Sari, 2015), where this can be done by everyone, especially among educators (Zaitun, et al., 2016). Based on the research of Polina and Pramudiani (2018), the fact is that it is not easy to use fairy tales in learning, there are several difficulties, among others, storytelling is considered less attractive by children and the delivery of fairy tales is not very memorable so that it results in children's interest in listening to fairy tales. Fatimah, Hasanudin, and Amin (2021) also explained that the way teachers tend to be old-fashioned can affect students' interest. Therefore, a new means of conveying fairy tales is needed that is more interesting. One of these innovations can be done by conveying fairy tales in the form of animation.

Animation can be interpreted as a mixture of technology and art (Soenyoto, 2017) which comes from a collection of objects and is arranged regularly using a certain speed (Enterprise, 2020). Luhulima, Dongeng, and Ulfa (2027) reveal animation as the dynamic motion of an object to make it look attractive. In line with what was expressed by Apriansyah (2020), that the combination of audio and visual in animation can attract attention. From these various opinions, it can be seen that animation is a moving image that comes from a collection of objects arranged at a speed which is a mixture of technology and art as well as a combination of audio and visual to make it look more attractive.

Bloop Animation in Helianthusonfri (2018) states that there are several types of animation, including traditional animation, 2D animation, stop motion, motion graphics, and 3D or computer animation. Meanwhile, Yudhanto and Purnomo (2017) classify the types of animation in general into three, namely stop-motion, 2D animation, and 3D animation. Saputra, Piarsa, and Sasmita (2015) also explain that animation is only divided into traditional animation and computer animation. Broadly speaking, it can be concluded that there is 2D animation and there is also computer animation (3D).

Animation in 2D and 3D has more advantages or functions. Utami (2011) says that the use of animation can be very helpful in explaining an event and attracting attention and building self-motivation in the form of motivation. Novitasari (2010) explains that animation currently has many benefits, namely as entertainment, advertising, science, auxiliary media, complementary media, and as assistants in making presentations. More clearly, Novitasari (2010) also explains that using animation as an assistant in a presentation can attract focus because of the sound and movement, facilitate the delivery of material, and give a beautiful impression on the presentation.

Based on this explanation, this animation concept will be used as the basis for the fairy tale media. Considering the basis of this animation has not been done by previous researchers, it is important to do this research. In the end, this animation base is a unified learning media which is expected to help elementary school students to improve their listening skills.

2. Method

The method used in this research is a literature study method. Jaelani, et al. (2020) describes literature study as part of a qualitative approach by means of secondary data analysis starting from problem identification, data collection, and conclusions or resolution. The literature study method can be described as a method that reviews a concept based on references from previous research through relevant schemes regarding research issues (Suswandari, 2021) so that it is considered the basis for research and development on any topic (Aldianto et al., 2018). Thus, literature study is part of a qualitative approach that reviews and uses secondary data from previous research so that it can be relevant and become the basis of research problems.

Based on this explanation, the source of data in this research is secondary data related to research topics, such as fairy tales, animation, listening skills, and elementary school children. Secondary data that is intended can come from books and journal articles as well as proceeding articles published nationally and internationally.

The process of data collection stages using a nine steps modification of Mary W. George's theory into four steps as shown in Fig. 1

Figure 1. Chart of literature study stages

The modification of George's procedures in this study will be developed in steps that include, 1) choosing a topic which will focus on the use of animation-based fairy tales, 2) forming a picture when animation-based fairy tales are used to support children's listening skills at the school basic level, 3) choosing a strategy in the form of an animation-based fairy tale media development design, 4) making a conclusion if to apply animation-based fairy tale media so that it can play a role in children's listening skills in elementary schools, they can take advantage of the animation-based fairy tale media development design so that educators can provide a lot of fairy tales variety in the form of animation for children in elementary school. The reason the researcher using these four steps is because the four steps which include topic selection, imagination, strategy, and conclusion will be the most important things and points for research results.

3. Results and Discussion

a. Topic Selection

Improving listening skills in elementary school children cannot be said to be easy, educators must be able to design learning media as well as possible to be able to attract students' interest in listening material. Without learning media, students will easily feel bored and not be able to listen to what is conveyed by the teacher properly (Istihanah, 2013). Learning media that are deemed appropriate to improve students' listening skills and can also foster imagination and fantasy and understanding abilities can be in the form of fairy tales (Kurniaman and Huda, 2018). Unfortunately, the lecture method of delivery carried out by educators is considered to give a sense of saturation and lack of interest (Kadir and Djafar, 2022), so a new method is needed in the form of the use of animation that can support learning to listen to fairy tales so that learning objectives to improve listening skills can be achieved (Ahmad, Hajar, and Almu, 2018). Based on this explanation, the topic in this study will focus on developing animation-based fairy tale media so that they can play a role in improving students' listening skills.

b. An Overview of the Use of Animation-Based Fairytale Media

There are many ways to convey fairy tales, starting from educators who provide facts in fairy tales to involving students to mention the characteristics of characters and convey the ending of fairy tales freely (Hanafi, 2017). Soetantyo (2013) also explains if the fairy tale can be read by educators first, which can then involve students in playing a role in fairy tales. However, in practice, many educators cannot tell storytelling for several reasons, such as not knowing the technique of telling fairy tales (Rosidah and Rusminati, 2017), so educators need the help of traditional teaching aids or use information technology applications in the form of animation (Fitroh and Sari, 2015). The use of animated media itself not only plays a role in helping educators, but also increases interest, curiosity, and increases motivation in participating in learning so that students gain

understanding of listening and are able to listen better (Yasmine, Agustina, and Rini, 2020). Based on this explanation, the use of animation-based fairy tale media is to assist educators in conveying fairy tales and to accompany them as listening material to improve students' listening skills.

c. Animation-Based Fairytale Media Design Strategy

To be able to achieve the use of fairy tale media, educators as storytellers must consider the thinking, language, and grasping abilities possessed by children with an elementary school age range (Suaibun, 2019) so educators must first prepare fairy tales that are easy to master, able to entertain and captivate students. , able to optimize children's imagination, and can educate (Patimah, 2015). Unfortunately, many educators cannot tell stories because of the need to compose scripts (Kusmiadi, Sriwahyuningsih, and Nurfalah, 2008) and educators' understanding of fairy tales is still very low, plus there is no media to convey fairy tales are also the reason for educators not to use fairy tales in learning (Kusmiadi in Ardini, 2012). Therefore, media is needed in the form of designing animation-based fairy tales that can assist educators in providing learning (Fakhrurozi, Fajar, and Trisnawat, 2021), because animation is considered very appropriate to improve students' listening skills (Munar and Suyadi, 2021). Based on this explanation, to apply animation-based fairy tale media so that it can play a role in improving listening skills in children in elementary schools, educators need the following stages:

1) Fairy Tale Script Writing

Adisaputera, Lubis, and Hutagalung (2019) explain that there are several general stages for writing a fairy tale script, namely a) choosing the type of fairy tale, b) determining the time and place setting, c) making the storyline, d) using simple sentences, e) paying attention to PEUBI or EYD, f) using references from previous fairy tales, and g) giving moral messages. Furthermore, Puspitasari, Hidayatullah, and Jupri (2018) conveyed the stages of writing a fairy tale script in a simple way, including, a) the preparation of the storyline, b) determining the setting of the fairy tale, c) making the plot and setting, d) determining the character of the characters, and e) writing stage. Based on this explanation, writing a fairy tale script can be done with the following stages and examples:

1. Choose the type of fairy tale: fable.
2. Determine the setting of place and time: Country of Rabbits and morning and evening.
3. Create a storyline: a bunny named Ala is afraid to meet a wolf because she doesn't listen to Rabbit Mother's advice.
4. Determine the character of the characters: Rabbit Mother is loving and caring, Ala is stubborn and likes to ignore other people's messages, Ali and Ela are obedient, and Wolves are evil and afraid of fire.
5. Giving a message: do not ignore the message and listen to advice from others if you do not want to regret.
6. Writing stage:

Like the Stubborn Rabbit

In the peaceful Land of Rabbits, there lived a family consisting of Rabbit Mother and her three cubs. This morning, three rabbits named Ala, Ali, and Ela are getting ready to play in the garden. As usual, Rabbit Mother will help Ala, Ali, and Ela prepare their things to head to the Park.

"Go home as soon as the sun goes down, don't wait for the night," said Rabbit Mother to her three children.

"Okay ma'am." Ali and Ela nodded obediently.

Unlike her two siblings, Ala actually frowns and doesn't like hearing her mother's advice. "Why do you have to go home in the afternoon?"

"Because the night is dangerous because it is dark, there is no light that will help you to get home."

Hearing the mother's answer, Ala just bent her face in disapproval.

"It's very dangerous if you meet a wolf," continued Mother Rabbit.

Ali and Ela immediately nodded obediently, but Ala didn't listen at all. In Ala's mind, she just wanted to play until the evening and would only come home when she was happy. Ala really likes to play, especially in the Rabbit Park which is so wide and shady.

After Ala, Ali, and Ela said goodbye, the three immediately headed for the Garden. The atmosphere in the park was very crowded with other rabbits full of laughter. Play time seemed very short because the bunnies enjoyed it, until the sun was almost setting to the west.

"Ala, let's go home," said Ali and Ela who were already getting ready to go home.

"I don't want to go home; I will play until I'm satisfied."

"Mother ordered us to go home in the afternoon." Ali is still trying to persuade his brother. “Mother said the night was very dangerous. We won't be able to find the light and meet the wolves."

"I didn't hear it."

Ali and Ela decide to leave Ala who is stubborn, they think Ala will not listen even though she has been persuaded many times. When the sky was getting dark, Ala just felt fear. There is no moonlight tonight because the weather is cloudy. The little rabbit finally decided to go home, but unfortunately on the way Ala met a wolf.

"What is the little bunny doing hanging around at night like this?" asked The wolf blocking Ala's path.

"I want to go home."

"There's no going home at night little bunny."

Ala starts to cry, remembering her mother's message asking to go home early because the wolves might come, but she doesn't listen. The little rabbit began to feel sorry and promised to listen to his mother from now on. He wanted to go home and play with Ali and Ela again.

"I want to go home," Ala whined as the Wolf began to approach.

"No little bunny."

As soon as the wolf approached, a reddish glow emerged from the bushes with smoke which frightened the wolf and backed away. As the reddish light that turned out to be fire drew nearer, the Wolf ran in fright from the Garden. Rabbit Mother, Ali, and Ela who were hiding in the bushes while carrying a torch immediately approached Ala who was still crying.

"Mother, I'm sorry, I will listen to what you have to say from now on," said Ala hugging Rabbit Mother.

Mother rabbit smiled a little with a nod. "Now let's go home," said Mother Rabbit to her three children

2) Animation Based Fairy Tale Development

After making a fairy tale script, the design process for developing animation-based fairy tale media requires storyboarding, animating, and voice acting (Fakhrurozi, Fajar, and Trisnawat, 2021). Prabowo and Warjiyono (2014) further explain that the development of animation-based fairy tales requires the initial steps in designing storyboards, making animations which include creating characters and creating backgrounds, and preparing sound effects. The same thing was also conveyed by Tanuwijaya and Wibowo (2020), developing animation-based fairy tale media compiled from storyboards, preparing animation materials such as back sound or audio, the process of making animation or animating, and testing. Based on the following explanation, the development of animation-based fairy tales certainly includes several stages, which include:

a) Storyboard Design

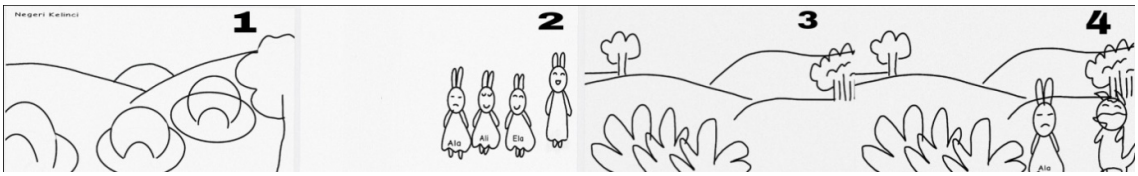

Figure 2. The display of the storyboard for the story of the Stubborn Rabbit

b) Animation

Technology that is developing rapidly at this time makes it easier to make animation (Nainggolan, 2017), one proof of which is the presence of software and applications that are specifically designed to create animation (Badaruddin, et al., 2021). One of the android applications that is here to make it easier for users to make simple animations is FlipaClip (Retnawati, et al., 2021). Based on this explanation, the process of animating or making animation can now be done more easily with the presence of one of the android applications, namely FlipaClip. In using the FlipaClip application itself requires several stages which include:

(1) Download FlipaClip app on PlayStore
(2) Open the FlipaClip APP
(3) Age verification

Fig. 3.

Figure 3. The initial screen of the FlipaClip application

(4) Press the sign (+)

Fig. 4

Figure 4. FlipaClip application screen

(5) Specify the animation name and choose the background, canvas size and frame rate

Fig. 5.

Figure 5. FlipaClip application screen

(6) Start animation

3) Audio Feed

To add audio or sound effects to animations, educators don't need to bother because the FlipaClip application has provided a feature to enter audio by pressing the button indicated by the red arrow.

Fig. 6.

Figure 6. FlipaClip application screen

Development and innovation in learning is one thing that must continue to be done in the world of education. Innovations in learning media themselves can include more varied media, strategies, and teaching techniques from educators so that learning can create an active and fun atmosphere (Arifin, et al., 2018). This is considered capable and efficient to achieve learning outcomes in the form of knowledge, behavior, and every skill that exists in students (Nurrita, 2018). One of the skills that is an important object of study as a spearhead of the learning process, especially at the elementary school level which is the beginning of the next level of education is language skills which include reading and speaking as well as writing and listening (Syofiani, et al., 2018). Therefore, in this study, the researcher of the concept of development of learning media on fairy tales in collaboration with animation as a new strategy to assist educators in delivering more enjoyable learning, so as to improve and achieve listening skills in elementary school students is considered feasible.

Students at the elementary school level are considered to still be unable to carry out the teaching and learning process independently, so they still need assistance to understand learning so that there is no wrong understanding of the material by students (Puspitasari, 2020). The ability of educators to choose media and direct innovative learning to assist students is one of the factors that determine the success of the teaching and learning

process (Nasrun, Faisal, and Ferdiansyah, 2018). Thus, this study reveals that animation-based fairy tales are used as educators' assistants in delivering fairy tales as learning media to assist students and as additional listening material which is expected to improve students' listening skills.

To be able to help and assist students, educators need an ability that can help the learning process (Khakiim, Degeng, and Widiati, 2016). One of them is the creative ability of educators in finding ways to convey knowledge so that the acceptance of learning by students is maximal (Judiani, 2011). The creativity of educators can be demonstrated by planning innovative learning using learning media that attracts students' attention (Lestari, Mudzanatun, and Damayani, 2017). Based on this explanation, this study describes more clearly how educators can make learning media in the form of fairy tales which are then developed into animations as a guide in developing educators' creativity in making learning media to attract interest which can have an effect on increasing students' listening skills.

4. Conclusion

This study concludes that the role of animation-based fairy tale media to improve children's listening skills in elementary schools as listening material that is able to attract learning interest, increase motivation, and make it easier for educators to carry out learning, can be done by designing animation-based fairy tale media. Designing an animation-based fairy tale begins with making a fairy tale script with steps including, 1) selecting the type of fairy tale, 2) determining the setting of place and time, 3) making a storyline, 4) determining the character of the characters, 5) giving the mandate, and 6) stages writing, then the fairy tale script will be developed in the form of animation with stages, among others, 1) storyboard design, 2) animating, and 3) audio giving.

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ANALYSIS OF ENTREPRENEURSHIP EDUCATION ACHIEVEMENTS USING THE PROJECT BASED LEARNING (PjBL) MODEL IN MBKM CURRICULUM

Sofiatul Khotimah [1], Andi amrullah [2], Dini Octoria [3], Siti Aenandari Hadatul Aysi [4]
[1,2,3,4] Doctoral Student of Economic Education, Universitas Sebelas Maret
sofiatul_k@yahoo.com

Abstract

The purpose of this research is to analyze the achievement of entrepreneurship learning using the project-based learning (PjBL) model in the MBKM curriculum at Jenderal Soedirman University. The achievement indicator of MBKM in entrepreneurship activity at Jenderal Soedirman University is the students can practice entrepreneurship by using a comprehensive understanding of entrepreneurial concepts. The research method used is quasi-experimental (quasi-experimental) with data analysis used paired sample t-test to see whether there is an influence on learning achievement with the valuation of cognitive (knowledge), affective (attitude), and psychomotor (capability). Data was collected using pre-test and post-test on students. The results of paired sample t-test on learning achievement in cognitive, affective, and psychomotor are 0.001 < 0.05, 0.000 < 0.05, dan 0.000 < 0.05, respectively. Based on this research it can be concluded that the implementation of the PjBL model affects the understanding level of students both cognitively, affectively, and psychomotor.
Keywords: Entrepreneurship Education, MBKM, Project-Based Learning (PjBL), Cognitive, Affective, and Psychomotor

1. Introduction

Unemployment is one of the problems faced by many countries, such as Indonesia. According to data from The Central Statistics Agency of Indonesia (BPS) as of August 2021, Indonesia's Open Unemployment rate (TPT) is 6.49 percent of the total workforce of around 9.1 million people. In this regard, education level makes a significant contribution to unemployment, such as at the higher education level. Over 1 million bachelors are jobless in Indonesia. Unemployment is one of the macroeconomic issues that can stymie a country's development and generate additional issues (Susan A.Yehosua, Tri O. Rotinsulu, 2019). Unemployment problems come as a result of a gap between the number of employees and the job opportunity. Entrepreneurship can be used to increase job opportunities, which will have an impact on the economy of the people (Jabeen et al., 2017). Now, entrepreneurship as soon must be developed and improved for the young generation. This can provide for in the future, especially to support the development of the Indonesian young generation (Lies Sunarmintyastusi et al., 2021). Thus, the role of universities is not only to develop quality human resources, but also to create strong, leadership, and a high entrepreneurial spirit in human resources (Marlinah, 2019). Education has a specific purpose of forming a good character or personality for its students.

The purpose of national education is stated in Article 3 of Law no. 20 of 2003 which states that The National Education functions to develop the capability, character, and civilization of the nation for enhancing its intellectual capacity, and is aimed at developing learners'potentials so that they become persons imbued with human values who are faithful and pious to one and only God; who possess morals and noble character; who are healthy, knowledgeable, competent, creative, independent; and as citizens are democratic and responsible. The quality of human resources is one of the keys to the economic development of a country because it will grow into agile entrepreneurs, talented employees, and smart capital owners. That means that an increase in the number of entrepreneurs is compelling for creating human resources that drive economic development (Oni et al., 2019). The Central Statistics Agency of Indonesia (BPS) as of 2021 concludes that the number of entrepreneurs in Indonesia is only 3.4 percent. This figure is low compared to other countries such as Malaysia and Singapore. That is related to the problems in research on entrepreneurship education which states that the interest in entrepreneurship of the Indonesian people is still low compared to surrounding countries. Education is needed to grow the spirit of entrepreneurship, especially for students to be prepared with the determination and confidence to start a business (Luis & Moncayo, 2020).

Presidential Regulation Number 06 of 2009 stipulates that the Ministry of Education and Culture by the Directorate General of Secondary Education and the Directorate General of Higher Education has implemented entrepreneurship education as one of the efforts to increase the spirit of creativity, innovation, sportsmanship, and entrepreneurship in the educational approach of creative economy development. Another purpose of entrepreneurship education is to prepare students who are not only focused on finding jobs but independently create jobs for themselves and others (Khairat, 2020). The application of entrepreneurship education is enhanced by Merdeka Belajar Kampus Merdeka (MBKM) of Entrepreneurship Activities. Based on Ministry of Education and Culture Regulations Number 03 of 2020 concerning the National Standards for Higher Education which contains one of the policies related to Merdeka Belajar Kampus Merdeka (MBKM), that is the right of students can be studied for three semesters outside of their studies program. The forms of MBKM are internships, research, humanitarian projects, student exchanges, teaching assistance, entrepreneurial activities, independent projects, and thematic student study services (Dirjen Dikti Kemendikbud, 2020). MBKM aims to encourage students to have more scientific mastery in their field of expertise to be beneficial to entering the professional world (Susilawati, 2021). The implementation of entrepreneurship education can be carried out with several types of educational and training processes to influence attitudes, behavior, values, and intentions of individuals so the application of entrepreneurship can be realized in the community. Thus, entrepreneurship education is one form of implementation of MBKM.

Based on research (Cavallini et al., 2019) claim that the entrepreneurship education in Italy has been reduced to the core of certain subjects in universities program, this is can support the post-graduation student job choices, especially by becoming entrepreneurs. Entrepreneurship education integrated the social field through team activities, special consultation with employers, and intense project work. Project-based learning is one method that refers to a learner-centered instruction approach that involves students in knowledge construction with project completion assignments and product development in the real world (Guo et al., 2020). Project-based learning is an educational model that requires students to resolve problems in detail in a group. This shows that project-based learning is the learning process that is applied through a series of experiences. So, gives students to construct their knowledge (Diana et al., 2021). Project-based learning (PjBL) emphasizes developing an understanding of knowledge and career readiness skills with a problem-centered learning design, requiring direct investigation, and the involvement of students in the real world.

Jenderal Soedirman University is one of the state universities that implemented of MBKM curriculum, especially in entrepreneurship, where students are given the freedom to study in other universities to carry out entrepreneurial activities independently. Entrepreneurial activities that are carried out can be converted into courses with the same competencies. The achievement of the MBKM program is being to able practice a comprehensive concept of entrepreneurship. Meanwhile, students who have a business can join the program with a different purpose, that is business development or business innovation (Silabus MBKM Kewirausahaan Unsoed: 2021). The syllabus also explains the assessment of entrepreneurial MBKM activities which refer to as the Course Learning Outcomes (CPL) covering 3 areas that are assessed that is skills, attitudes, and knowledge. The assessment is carried out by accompanying lecturers or mentors in stages based on the student's process in carrying out their entrepreneurial projects. This is following Bloom's Taxonomy theory which states that learning outcomes are the result of a person's ability after carrying out learning activities which are classified into three types of domains, that is cognitive, affective, and psychomotor (Arifin; 2013). That can be concluded that the entrepreneurship learning activities are implemented by the project-based learning model (PjBL). Therefore, based on the explanation of the background and problems, the author is interested to analyze the achievement of entrepreneurship learning using the project-based learning (PjBL) model in the MBKM curriculum at Jenderal Soedirman University.

2. Method

The research was structured using a quantitative research approach and a quasi-experimental design method. Werang, Basilius Raden (2015:16) Basilius Raden (2015:16) suggests that quantitative research is to examine a particular population or sample to test the hypothesis formulated based on the philosophy of positivism. The data from this method uses an instrument that is analyzed statistically. In addition, a quasi-experimental is an experimental research design carried out under conditions that do not allow manipulating all relevant variables (Danim, 2013:62). The quasi-experimental research design is supported by a one-group pretest-posttest type of research design (single-group initial test-end test). The population of this research is the students of Jenderal Sudirman University, the researcher conducts experiments on one class group randomly

with a total of 52 students. Following the research model, the data was obtained from the results of the test twice, that is before being given treatment (pre-test) and after treatment (post-test). The data is compared with the achievement of entrepreneurship learning before and after the implementation of the MBKM entrepreneurship curriculum in three domains. Data analysis used paired sample t-test, the test is one of the data analysis methods used to test the effectiveness indicated by the difference in average before and after being given treatment on two interconnected samples (Widiyanto: 2013).

3. Results and Discussion

Pre-test and post-test have been given to 46 students of Faculty of Economics and Business, Jenderal Soedirman University. This data has been analyzed with SPSS 20.0 version for windows, the data give shows that the average learning achievement of pre-test and post-test on cognitive is 55.0652 < 61.6957, affective is 73.1739 < 86.8913, and psychomotor is 60.0217 < 89.0435. Furthermore, the results of pre-test and post-test are shown in table 1.

Table 1. Results of Descriptive Statistic

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Pre-test Cognitive	46	37,00	38,00	75,00	55,0652	10,3846
Post-test Cognitive	46	49,00	40,00	89,00	61,6957	13,0074
Pre-test Affective	46	9,00	68,00	77,00	73,1739	2,2539
Post-test Affective	46	7,00	83,00	90,00	86,8913	2,0787
Pre-test Psychomotor	46	51,00	37,00	88,00	60,0217	9,8578
Post-test Psychomotor	46	18,00	80,00	98,00	89,0435	5,2997
Valid N (listwise)						

The requirement of Paired sample t-test is the difference between two groups of data is normally distributed. Then, a normality test is needed on the differences between of two groups which are pre-test and post-test. Normality tests are conducted in the three-section that is cognitive, affective, and psychomotor. Based on the results of the SPSS 20 version for windows show that the pre-test section of cognitive is Sig. = 0.123 > 0.05 and normality test on post-test is Sig. = 0.103 > 0.05. The results of the pre-test section of affective are Sig. = 0.088 > 0.05 and normality test on post-test is Sig. = 0.059 > 0.05. Last, the results of the pre-test section of psychomotor are Sig. = 0.200 > 0.05 and normality test on post-test is Sig. = 0.051 > 0.05. The results show that the pre-test and post-test of the cognitive, affective, and psychomotor sections are normally distributed. Then, all of the pre-test and post-test data can be analyzed. The results of normality are shown in table 2.

Tabel 2. Results of Normality Test

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
Pre-test Cognitive	.118	46	.123
Post-test Cognitive	.117	46	.130
Pre-test Affective	.121	46	.088
Post-test Affective	.127	46	.059
Pre-test Psychomotor	.093	46	.200
Post-test Psychomotor	.0130	46	.051

After doing the statistical analysis pre-requisite test which is the normality test, the next test can do with paired sample t-test to see the different achievement indicators before-after using the MBKM curriculum in entrepreneurship. The test was conducted to see the hypothesis that was formulated following:

$$H_0 : \mu 1 = \mu 2 \qquad H_1 : \mu 1 \neq \mu 2$$

Where:

H_0 There is no different achievement indicator of entrepreneurship learning before-after MBKM curriculum

H_1 There is different achievement indicator of entrepreneurship learning before-after MBKM curriculum

The learning achievement of entrepreneurship used the project-based learning (PjBL) model in the MBKM curriculum

The learning achievement of entrepreneurship in a normal curriculum

The basis decision of the hypothesis test is H_0 is accepted if t-table≤ t-count (Sig. ≥ 0.05) and rejected if t-count < t-table (Sig. < 0.05). Based on the analyzed data results show that the achievement learning in the cognitive section on the pair sample t-test is 0.001 < 0.05, so H_0 is rejected and H_1 is accepted. The affective and psychomotor sections produce the same value on the pair sample t-test which is 0.000 < 0.05, so H_0 is rejected and H_1 is accepted. It can be concluded that is different learning achievement in cognitive, affective, and psychomotor among the student who gets entrepreneurship course before-after using PjBL in the MBKM curriculum. The results of paired samples test of cognitive, affective, and psychomotor shown in table 3, table 4, and table 5.

Table 3. The Results of Cognitive Paired Samples Test

		Paired Samples Test		
		t	df	Sig. (2-talled)
Pair 1	Pre-test Cognitive & Post-test Cognitive	-3.589	45	.001

Table 4. The Results of Affective Paired Samples Test

		Paired Samples Test		
		t	df	Sig. (2-talled)
Pair 1	Pre-test Affective & Post-test Affective	-36.819	45	.000

Table 3. The Results of Psychomotor Paired Samples Test

		Paired Samples Test		
		t	df	Sig. (2-talled)
Pair 1	Pre-test Psychomotor & Post-test Psychomotor	-20.195	45	.000

Based on the analyzed results of paired sample t-test obtain the significant value of learning achievement in the three-section is smaller than the significance of 0.05. Therefore, the results show the differences in learning achievement of entrepreneurship among the students before-after using the PjBL model in the MBKM curriculum. The success of learning achievement can be measured with cognitive, affective, and psychomotor grades on the pre-test and post-test. The pre-test is the evaluation of the student who gets an entrepreneurship course with a normal curriculum before the MBKM curriculum is implemented. While the post-test is an evaluation of the students who get an entrepreneurship course with the PjBL model after the MBKM curriculum is implemented. The results were used to measure student understanding levels about learning materials, learning values, and learning practices.

1) Learning achievement in Cognitive section (entrepreneur knowledge)

Analysis of data obtained that the value of learning achievement in the affective section on the pair sample t-test is 0.001 < 0.05, which means the difference between learning achievement of entrepreneurship before-after using the PjBL model in the MBKM curriculum. Based on Bloom's theory define results in the cognitive section is related to the knowledge and capability of the students. Learning results in the cognitive section involve students in thinking processes such as remembering, understanding, analyzing, relating, and problem-solving. The assessment of entrepreneur projects in the implementation of the MBKM curriculum based on the cognitive section is understanding of business opportunities, production processes, managerial, marketing, financial management, the latest technology, entrepreneurial processes, creativity, and business innovation.

Some related study obtains the significant influence of using the PjBL model in an entrepreneur course, the increase of the students learning results both in numbers and values. Based on the research (Muchlis, 2019) related to efforts to improve learning achievement, obtained the results that the implementation of the PjBL model improves the learning achievement of entrepreneurship courses, can be seen based on increased average learning results of the students. Another study obtained the same results that the implementation of the PjBL model in the entrepreneurship course significantly improves the learning achievement based on an increase in learning results and the average value of the students (Merangin *et al.,* 2018; Khairat, 2020). The increase in average value is the learning results obtained from the knowledge improvement and academic capability of the student, it is related to the studies topic after implementation of the learning process based on the project and direct student's involvement.

The study was condected in the education unit in Maluku and obtained that the implementation of the PjBL models is more effective to improve the students learning achievement in the entrepreneurship course than other educational models (Tahapary & Tikollah, 2021). The improvement of cognitive competence is related to improving students' mastery of entrepreneurship courses in the PjBL model. Active involvement can increase the knowledge of students. According to (Rachmawati, 2018) research that the cognitive abilities of students increase significantly as a result of increasing conceptualized knowledge with the provision of courses and practices (projects). The MBKM curriculum is specifically designed to be project-based that provides hands-on experience for students to increase their knowledge, especially related to entrepreneurship as a preparation for entering the professional world.

2) Learning achievement in Affective section (entrepreneur attitude)

Analysis of data obtained that the value of learning achievement in the affective section on the pair sample t-test is 0.000 < 0.05, which means the difference between learning achievement of entrepreneurship before-after using the PjBL model in the MBKM curriculum. Based on Bloom's theory define results in the psychomotor section related aspects of feeling and emotion to some stimulus that can see in four characteristics which are interests, attitudes, self-concept, and values. Research by (Anggreadi & Sutaya, 2019) obtained that the learning results of the affective section increase the affective, average class, and student absorption aspects through PjBL implementation with authentic assessment in an entrepreneurship course. Apart from being viewed from the cognitive section, the students learning results can be reviewed from achievement in the affective section with certain assessment instruments. The assessment of entrepreneurship projects in the MBKM curriculum based on the affective section involves honesty, discipline, responsibility, tolerance, courtesy, and self-confidence.

The implementation of the PjBL model in the entrepreneurship course increases students' entrepreneurial interest. Specifically, the PjBL model is taken by learning activities outside the classroom so that explore the ideas, creative abilities, and skills of the students (Lestari, 2019). The same study was conducted on student's

Galuh University and resulted that the entrepreneur activity of students intends to increase, students get learning with the PjBL model in a BSF Maggot cultivation practicum (Afifi & Yulisma, 2020). The results of that study same as the purpose of the entrepreneur program in the MBKM curriculum which is to increase students' interest in entrepreneurship, develop businesses early and guided, and deal with unemployment problems among undergraduates. Entrepreneur interest is the psychological problem of a person who focused his attention and behavior on entrepreneur activity with pleasure feeling because can bring benefit to himself. Entrepreneur's interests are also defined as a person's desire to work independently (self-employed).

3) Learning achievement in Psycomotor section (entrepreneur abilities)

Analysis of data obtained that the value of learning achievement in the psychomotor section on the pair sample t-test is 0.000 < 0.05, which means the difference between learning achievement of entrepreneurship before-after using the PjBL model in the MBKM curriculum. Based on Bloom's theory define that learning results in the psychomotor section involve movement behavior, physical coordination, motor skills, and physical abilities of the students. Skills that develop in this section can measure based on distance, speed, accuracy, technique, and implementation. The study related to one of the education units in Yogyakarta obtained that implementation of the PjBL model can increase students' learning performance to 18.75% measured from the I and II cycle (Mulyadi, 2016). Performance is work results obtained from people qualitatively and quantitatively as the implementation of its capabilities.

Other research conducted in the USA related to the influence of orientation on the performance-based project generates the conclusion that the implementation of entrepreneurship in a collaborative project can develop a significant entrepreneurship capability (Sabahi & Parast, 2020). The capability is related to the technical ability of students from learning and practice entrepreneurship projects. Technical ability is needed to provide future an entrepreneur's activity. The grades of activity or entrepreneurship project in the MBKM curriculum are based on the psychomotor includes several components, which are conceptual skill, initiative & enterprise skill, managerial skill, technical skill, technological skill, marketing skill, financial skill, human skill, decision making skill, and time managerial skill.

4. Conclusion

The achievement indicator of MBKM in entrepreneurship activity at Jenderal Soedirman University is the students can practice entrepreneurship by using a comprehensive understanding of entrepreneurial concepts. The practice of entrepreneurship conducted is an implementation of the learning concept of Project-based Learning (PjBL). The achievement indicator is graded by three-section that is cognitive, affective, and psychomotor. Based on this research are conclude: 1) there is a different achievement indicator in the cognitive, affective, and psychomotor section before-after using the PjBL model on the MBKM curriculum, the value of the t-count is smaller than Sig. value; 2) the Sig. value of the cognitive, affective, and psychomotor sections are 0.001 < 0.5, 0.000 < 0.05 and 0.000 < 0.05, respectively.

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DEVELOPMENT OF BLENDED LEARNING MODEL BASED JIGSAW TO ENCHANCE SCIENCE MOTIVATION COLLEGE STUDENTS

Sheren Dwi Oktaria[1], Badeni[2], Alexon[3]
[1] Lampung University, [2] Bengkulu University, [3] Lampung University
[1]sheren.dwi@fkip.unila.ac.id

Abstract

The purpose of this research is to produce a quality jigsaw-based Blended learning model to increase science motivation. This development research adopts the development step with the ADDIE model which consists of the Analysis, Design, Develop, Implement and Evaluate stages. Data collection was obtained through internal validation and external validation. This development research produces a product in the form of a blended learning model based on the components and devices of the learning model. Student science motivation gave a good response and had an impact on increasing learning motivation such as intrinsic motivation, self-efficacy, self-determination, grade motivation, and career motivation with an average of 3.36 in the very good category.

Keywords: *Blended learning, Jigsaw, Science Motivation*

1. Introduction

Education is the most important part in the process of developing a nation and also plays a role in the formation of quality human persons who are able to compete in the disruptive era. Therefore, the Indonesian government is very serious in dealing with the education sector. With a good education system, it is hoped that it can produce quality human resources and be able to adapt and compete in the era of globalization. The rapid development of technology in the era of increasingly sophisticated disruption has an impact on the world of education in Indonesia. Therefore, the education system in Indonesia is slowly starting to innovate by adjusting the development of ICT and still maintaining the main essence of education in order to achieve the right learning goals in the era of disruption.

Adopting and integrating ICT-based instructional strategies has its challenges, but if you have a good understanding you can achieve successful online learning in college. The role of the lecturer has a large part because the lecturer is required to multi-task in conveying knowledge, training, encouraging, stimulating (Purnawinadi, 2021). E-learning is currently a necessity in higher education which continues to develop and then becomes something that is commonly used in learning. Online learning offers the opportunity to reach a large number of students, regardless of time and space. However, Blended learning is still controlled by the lecturer based on a predetermined learning design design from a distance (Patrick & Sturgis, 2015). According to (Prohorets & Plekhanova, 2015) this research, the combination of asynchronous and synchronous can increase students' motivation and interest in learning and also have an impact on increasing learning success.

The application of Blended learning is one type of learning that adheres to health protocols and is useful in increasing students' knowledge and skills (Mulyadi et al., 2021). By developing the Blended learning model, it is hoped that it can provide innovation in the learning model to increase science motivation in higher education. Science motivation in education is very difficult to measure, therefore it is hoped that this learning model can be a transformation of learning model innovations with ICT in education. Of course, changing instructional approaches is not an easy task, especially when technology is involved in the education system.

The success of a learning depends on the creativity and quality of a lecturer in motivating students during the learning process by adjusting the needs and interests of students in the learning process. In relation to learning problems, learning technology has an important role in solving learning problems experienced by students. With the development of learning technology, it can be used as a way to overcome learning problems faced by students today (Oktaria et al., 2018)(Oktaria & Budiningsih, 2018). Because it provides opportunities for active learning and creative training. The use of technology to promote student-centered teaching strategies that facilitate student self-learning, collaboration and active learning is strongly encouraged. Therefore, it is necessary to design a system that can accommodate the specific needs of students so that relationships between

students are maintained so that an effective learning process can be achieved between online learning and traditional learning.

Blended learning is a new innovative concept that maintains the advantages of traditional classroom teaching and online learning with ICT. Blended learning has the scope of collaborative learning between constructive learning and online learning with ICT (Lalima & Lata Dangwal, 2017),(Oktaria et al., 2018). This model can combine various strategies, approaches, and methods that will attempt to achieve learning goals in the era of disruption (Trisnowati & Firmadani, 2020). Blended learning balances conventional and online learning. The humanistic element in conventional learning is still used because students also need direct interaction with the teacher, as a form of psychological support and some things that need to be explained directly, especially in affective and psychomotor abilities. The development of the Blended learning model that will be carried out in this study will integrate with the addition of the Jigsaw Technique. Adding Jigsaw to research (Karacop, 2017) can see the contribution and cooperation between groups in completing a task or project by integrating e-learning can encourage efficient and effective cross-group collaboration during learning (Chang & Benson, 2020). Online learning and traditional learning methods used in conjunction with each other create a superior learning style (McDonald et al., 2018). Based on the reasons above, it can be seen that this development resulted in a jigsaw-based Blended learning model that can increase collage students' science motivation.

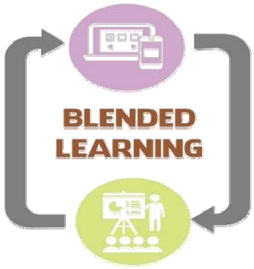
2. Method

The rearch objectives of this study were to develop Blended Learning model Based Jigsaw to enhance motivasi sains. Accordingly, the research methods used in this *Research and Developmen* with ADDIE model yang meliputi *analysis*, *design*, *develop*, *implement* dan *evaluate* (Shelton & Saltsman, 2006), (Roblyer, 2015).

3. Results

The result of the research consists of the result of the analysis, design, development, implementation and evaluate. Analysis is the initial stage carried out to analyze the importance of developing new learning models. The analysis process carried out includes three things, namely, analysis of learning problems, needs analysis, analysis of student characteristics. At the design stage, the researcher will take steps to describe the prototype model and design the instruments to be used in the research, design the blended learning model that will be developed and design e-learning guides for students and lecturers.

Furthermore, at the Development stage, the researcher begins by developing and compiling the components of the blended learning model, e-learning guide for lecturers and students that will be used in the learning process. This stage will begin with the development of the main components of the Blended Learning model, namely: syntax, social system, principle of reaction, support system, instructional effect. Then develop the e-learning guide for lecturers and students by compiling a systematic e-learning guide for lecturers and students. In the e-learning system, the lecturer acts as a course creator and the student acts as a student (user). At this stage of development, internal validation was carried out by media, model and material experts. Validation is



carried out to assess the developed product and provide suggestions and comments on the developed model which will later be used as the basis for researchers to make improvements to the developed product.

Figure 1. Blended Learning model

The implementation stage is limited to students in Bengkulu province for product try-outs. Evaluation was carried out in this study by providing formative evaluation and summative evaluation. The results of this evaluation will be used as feedback for the model developer. Product improvements will be made based on the evaluation results that need to be improved. Then learning is carried out for 3 weeks with a model that has been

developed. After that, a questionnaire was given to determine the students' science motivation after the learning trial.

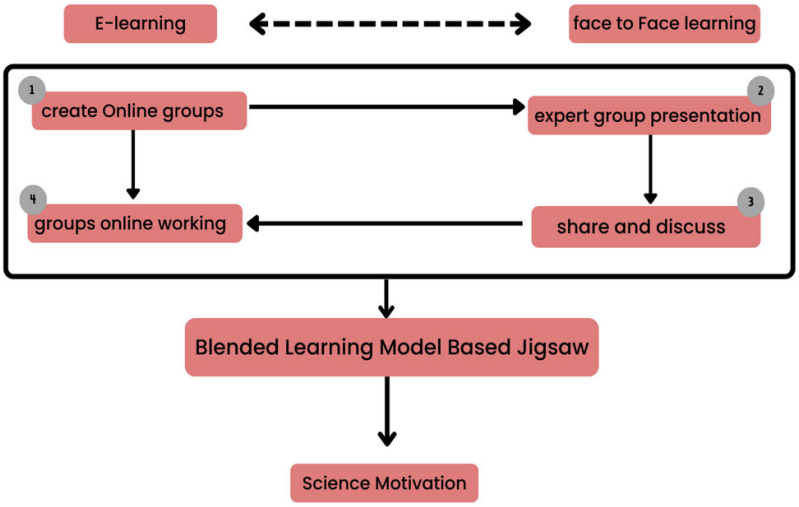


Figure 2. Conceptual framework of the Blended Learning Model based Jigsaw to enhance Science Motivation for college students

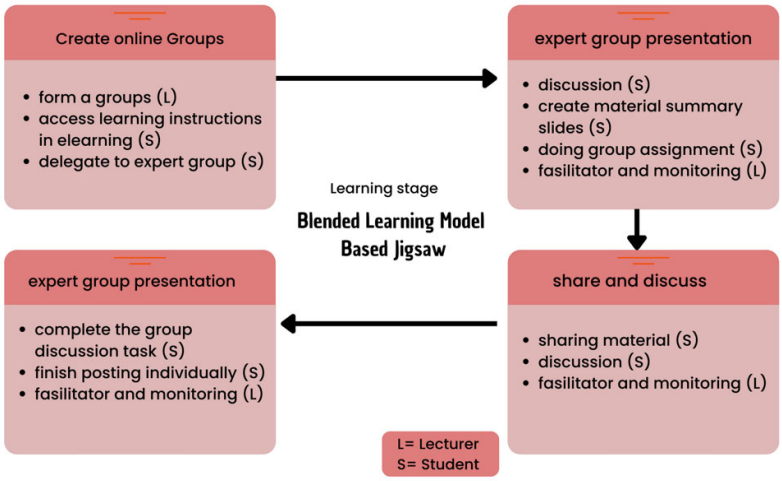


Figure 3. Blended Learning Model based Jigsaw to enhance Science Motivation for college students

Learning with the jigsaw-based blended learning model (BLBJ) provides facilities for groups to complete tasks together. Discussion activities can also be carried out online and offline. Lecturers can maximize learning time and ensure students can take responsibility for thinking and demonstrate understanding of concepts. At the same time, certain competencies are even more important to success in BLBJ because of the complexity involved with providing instructions that involve interaction between groups of experts for discussion and working.

Blended learning is an effective method of teaching science, and reflects positively on student performance in certain subjects. This method is considered important because of the use of both, e-learning and traditional methods and as a result, students' achievement in science and their skills is improved. The use of mixed learning strategies plays a major role in transforming the educational environment into a creative and interactive one; involve students and teachers in the educational process (Almasaeid, 2014).

Figure 4. Simulation of activities on the jigsaw-based Blended Learning model

Students conceptualize their motivation to learn science in 5 dimensions, that is intrinsic motivation, self-efficacy, self-determination, career motivation, and grade motivation (Verma, 2019), (Glynn et al., 2011), (Glynn et al., 2009), the findings are viewed in terms of socio-cognitive learning theory, and directions for future research. This study conducted product trials to see the scientific motivation of students after BLBJ was applied.

Table 1. The average science motivation of students in the trial of the jigsaw-based Blended Learning model

Factor	Average	Details
Intrinsic Motivation	3.17	Good
Self-Efficacy	3.37	Excellent
Self-Determination	3.36	Excellent
Grade Motivation	3.51	Excellent
Career Motivation	3.51	Excellent
Average	**3.38**	**Excellent**

In intrinsic motivation, students realize that learning science is for their own sake because it is interesting, fun and very relevant for the future. Similar to Self-efficacy, students are confident in their ability to achieve learning goals. Observe peers and work together in groups during online learning and Face-to-face learning. Self-determination highlights the importance of self-development and behavioral regulation. The motivation to learn in the field of science refers to the control that students believe that they have completely mastered science learning. Career motivation is motivation that arises from students' perceptions of students' future careers by developing the skills needed for future careers. Grade motivation is motivation that includes other components such as student preferences and passion and also involves grades with levels.

They still need to be able to maximize instructional time, teach rigorous content, ensure students are responsible for thinking in the classroom, and provide plenty of opportunities to demonstrate understanding. Motivation is considered a very significant factor for learning success. I investigate student success in learning English as a second language. The key factors that determine student success or failure are student enthusiasm, commitment, and persistence (Radosavlevikj, 2015). At the same time, certain competencies are even more important for success in mixed classes because of the complexity involved with providing highly personalized instruction.

We know that the BLBJ model follows a hybrid pattern that combines face-to-face learning activities in traditional classes. BLBJ offers continuous improvement to the factory-based class system, but doesn't interfere with it. The more disruptive models, however, are positioned to transform class models and become engines of change in the long run, especially at the mid-level. Various mixed learning hybrids will most likely fail as pure distraction gets good enough (Christensen et al., 2013), (Oktaria & Hadiwinarto, 2020). Each group in BLBJ Learning has the responsibility to master a material because each group will be tasked with being an expert group to present material and discuss. In addition, the online working group will also play a role in completing assignments and understanding the material presented by the expert group during the BLBJ. Interactive learning activities between online learning and face to face learning can empower students to manage their own learning and support collaboration between students. In line with research from (Meikleham et al., 2018) states that if the Blended learning model is applied to the teaching and learning process it becomes effective with the transition of students to a higher level in acquiring knowledge and developing skills.

4. Conclusion

The jigsaw-based blended learning model to increase science motivation in students' collages consists of principles, learning processes. The learning process of the BLBJ model consists of stages of online learning and face-to-face learning which, if translated into online groups, expert group presentations, sharing and discussion, and expert group presentations. The findings from the research and development of the BLBJ model can be a strong support for developing students' science motivation. They still need to be able to maximize instructional time, teach rigorous content, ensure students are responsible for thinking in class, and provide plenty of opportunities to demonstrate understanding. Motivation is considered a very significant factor for learning success. This study conducted product trials to see students' scientific motivation after BLBJ was applied.

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HEUTAGOGY IN RESEARCH-BASED LEARNING AT SANGGAR ANAK ALAM (SALAM) YOGYAKARTA

Indri Ajeng Setyoningrum[1], Viena Rusmiati Hasanah[2], Sardin[3]
[1,2,3] Community Education, Universitas Pendidikan Indonesia
[1]indriajengs@upi.edu

Abstract

This study described the design of the heutagogy approach applied at Sanggar Anak Alam (SALAM) Yogyakarta. Heutagogy is the study of self-determined learning. Heutagogy provides opportunities for students to choose what to learn and how to learn it freely. SALAM is one of the alternative schools that has applied the concept of a heutagogy approach for a long time. The learning model used by the SALAM learners is research-based learning. This research design is qualitative with a descriptive type of research where data collecting from interviews, observations, field notes, and personal documentation described in the form of descriptive narratives. The research findings show that SALAM applies the design concept of a heutagogy approach in the research-based learning process which includes self-determination of learning contracts, flexible curriculum formation, self-directed questions, flexible and negotiable assessments, reflective exercises, and collaborative learning. Through a heutagogy approach with research-based learning, SALAM students can face the challenges of the 21st century needs.

Keywords: Heutagogy, Research-based learning, Alternative education, Sanggar Anak Alam (SALAM)

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1. Introduction

The 21st-century education is required to prepare students to learn and innovation skills, use and utilize information technology and media, also work and survive using life skills. Learning in the 4.0 education era is carried out by utilizing digital technology, open-source content, and global classrooms in the application of lifelong learning, a flexible education system (Huang et al., 2020; Joan, 2013) and personalized learning (DiMartino et al., 2001; Patrick et al., 2013).

The learning approach developed to face the challenges of education 4.0 is heutagogy. Heutagogy studies self-determined learning (Haze & Kenyon, 2000). Heutagogy is a learning approach that does not focus on learning content but learns how to learn and acquire learning content (Stewart Hase, 2016; Narayan & Herrington, 2014). Hase & Kenyon (2013) stated that heutagogy allows students to choose what to learn and how to learn it freely. This heutagogy approach is closely related to constructivist and humanist theory (Blaschke & Hase, 2016; S. Hase, 2014; Stewart Hase, 2016; Stewart Hase & Kenyon, 2013).

Heutagogy requires students to act as the principal-agent in their learning. In this case, the learner decides what he will learn, when, and how the learning structure will be. Heutagogy makes students to have an interest in learning and must reflect on themselves, regarding whether they need to learn specific topics and need to reflect on themselves from those topics or whether they still need to learn from subtopics whose values are still poorly understood. The most important thing about heutagogy is self-reflection after evaluation. In addition, if the curriculum or material is lacking, it can rearrange the curriculum and learning needs (Dewantara, 2021).

One of the learning models that can be applied in the heutagogy approach is project-based learning. Project-based learning challenges students to hone their investigation skills and find more learning resources (Farris, 2015). There are six steps in project-based learning based on (Foundation, 2005); (1) determine the essential questions; (2) design the project design; (3) arrange a schedule; (4) monitor project progress; (5) test the process & learning outcomes; (6) evaluate the experience.

Sanggar Anak Alam (SALAM) is one of the alternative schools that has implemented a heutagogy approach with research-based learning for a long time. SALAM is a form of educational institution that started its activities in 2000 in Nitiprayan Village, Kasihan, Bantul, Yogyakarta. SALAM has an institutional operating permit as a Community Learning Center (PKBM), but they facilitate students like in a formal school. There are several levels of education, ranging from Playgroup, Kindergarten, Elementary School, Junior High School, and Senior High School. The pursuit of Elementary School is taken for six years like elementary school in a formal school. Meanwhile, Junior High School and Senior High School is carried out for three years.

Rahardjo (2018) describes four main characteristics that distinguish alternative schools from mainstream schools: first, the philosophical aspect that underlies alternative schools in carrying out their education is philosophically humanistic. It is because alternative education seeks to build a complete human being in the educational process. Second, child-oriented. It indicates that alternative education values students as growing individuals, so they are treated according to their physical and psychological development—third, a holistic approach to the learning process. With a holistic approach, subjects are not delivered separately by conventional schools but are presented thematically over a certain period. Fourth, there is a democratic relationship between teachers, students, and parents. So that together they create a good education in one community. From this description, it can be said that alternative education focuses on student's individual development and is carried out democratically between students, parents and facilitators.

SALAM conducts learning planning using the constructivist paradigm, where learning planning is carried out through interest and talent analysis activities. Furthermore, the implementation of learning and evaluation of learning uses a critical pedagogical paradigm; besides that, the learning methods used are research and discussion methods.

SALAM is a school that seeks to form critical education, drive the economy and be able to live in the surrounding environment. According to Rahardjo (2018), SALAM is a school without uniforms, schools without teachers, schools without subjects, and a research-based curriculum, bringing schools closer to real life and liberating their students. The implementation of education in SALAM involves all elements, such as students, facilitators, parents, managers, and the community, as inputs so that it is expected that the output formed in SALAM is a learning community.

SALAM develops its curriculum according to the child's needs and adjusts to the child's age, only taking indicators from the national curriculum, but SALAM educators themselves develop the rest. SALAM has a program of activities inside and outside the classroom, healthy food, health, environment, arts, and culture with a curriculum that focuses on exploring children's surroundings, which is fun, respects differences, and loyalty.

The learning method generally uses research methods whose themes are determined by students, starting from planning to presentations in front of other students. The research carried out differs from one student to another according to their respective interests. The learning model used to achieve the goals and context is called the learning cycle. SALAM provides more free time for students to learn so that they are happy and free to develop their respective interests, potentials, and interests in learning.

Research-based learning applied at SALAM aims to facilitate the learning needs of each student where they have different learning needs. Through research learning, students are given the freedom to learn according to their wishes. Students are directed to think structured through research, experience the cause and effect of an event, and find their knowledge by utilizing existing resources in the surrounding environment.

Through this learning, SALAM has applied heutagogy as its learning approach. Based on Stewart Hase & Kenyon (2007), the application of heutagogy approach-based learning must pay attention to several conditions in the design process, including; (1) learning contract, where students determine their learning path, what is learned, how to learn, how to assess it. Students make learning contracts based on what they decide; (2) curriculum flexibility, what is meant by a flexible curriculum is a curriculum that provides opportunities to be negotiated, which adapts and develops according to learning needs. Based on Stewart Hase & Kenyon (2013), in a heutagogy learning environment, students are the drivers who create curriculum flexibility; (3) questions for

students, where questions are asked to be discussed to provide direction to help students understand learning. These questions are in the form of guiding reflection questions for students; (4) a negotiated and flexible assessment, apart from learning materials and processes, the assessment is also an important point. The assessments used in learning are flexible and negotiable; (5) reflection is an essential element of heutagogy. Reflection will direct the transformation of learning.

This article describes implementing the heutagogy approach design in research-based learning at Sanggar Anak Alam (SALAM). This research is expected to contribute to developing the science and practice of the heutagogy approach in learning, especially in the non-formal education path.

2. Method

This study uses a qualitative approach with a descriptive type of research. Data was collecting from interviews, observations, field notes, and personal documentation described in the form of descriptive narratives. The research subjects were selected based on the snowball sampling technique, including the founder, chairperson of SALAM, facilitators, students, and parents of SALAM students. The research was carried out at the Sanggar Anak Alam (SALAM), located in the village of Nitiprayan, Jomegatan, Ngestiharjo Village, Kasihan District, Bantul Regency, Special Region of Yogyakarta.

Data analysis was carried out based on Miles and Huberman, through: 1) data reduction, namely by explaining, choosing necessary things, and focusing on things that were important to the content of data from the field; 2) data presentation, namely displaying data simply in the form of words, sentences, and narratives; 3) and concluding/verification.

The study uses two credibility standards, member checks, and triangulation. Member check is carried out at the end of each interview activity. The researcher tries to repeat the outline of the interview results based on the notes made so that the information obtained can be used in writing reports following what is meant by the data source. Triangulation in this study uses data examination through sources, data collection techniques, and data collection time.

3. Results and discussion

SALAM implements a curriculum called the teaching and learning process or learning cycle. The learning cycle is more directed at each student's interests in SALAM. The learning cycle consists of the stages of doing, expressing, analyzing, drawing conclusions, and applying. From these stages, SALAM emphasizes 4 (four) perspectives: food, health, environment and socio-culture. The learning cycle uses research methods whose themes are determined by students starting from planning to the presentation of results by each student.

As an alternative school, SALAM has its term regarding educators. Educators at SALAM are called facilitators. The mention of the term facilitator in SALAM is because the task of educators is not to teach (teachers) but to facilitate students to learn. Based on Romo Mangun Wijaya, students are masters of themselves, so the role of educators is to provide space for them to carry out their learning process.

The learning model in SALAM follows the principles of the Heutagogy approach. Based on Stewart Hase & Kenyon (2013), the principles of the heutagogy approach include: (a) students can learn what they choose to learn, not just what is determined by the curriculum; (b) learners experience their empowerment to take direct responsibility for their learning as active learners; (c) learners understand more about the learning process and become more proficient in learning for themselves; (d) students are more confident in carrying out the learning process for themselves and seek learning resources and experiences that contribute to and enhance their learning; (e) the facilitator also learns. Below will be discussed the design of the heutagogy process that occurs in learning at SALAM based on the following: (1) self-determination of learning contracts; (2) flexible curriculum; (3) self-directed questions; (4) flexible and negotiable assessment; (5) reflective exercise; (6) collaborative learning.

Self-determination of learning contracts

Research-based learning requires students to decide about a framework (SchoolNet, 2000). Learners are fully responsible for their learning activities so that the focus of learning is based on inquiry, and the learning

process is viewed as long-term. The facilitators, students, and parents of SALAM hold a meeting at the beginning of the semester to discuss the research plan that each child will carry out. The research carried out is based on the interests and desires of the students themselves. Learner community of SALAM start the new semester by discussing and choosing research themes, compiling indicators, and determining their research schedule. Research design takes one to two weeks and will be used as a guide for each child in carrying out their independent research for one semester.

The steps of the research-based learning process in SALAM have six stages, including the planning stage, namely the selection of research themes, observation of research objects, planning for one week's lesson by the facilitator, and making research schedules by students. The second stages are implementation and mentoring by facilitators and parents accompanying students to clarify the chosen research object, re-observation, developing questions as research capital, searching for references related to research objects, interviewing permission, conducting data collecting with resources, joint review to share experience between students. The third is the data processing stage, where the facilitator links student data with indicators that must be achieved, and student mission solving is related to research data. Fourth is the practice stage, where students conduct research according to the themes and guidelines from the previous planning results. Fifth is the evaluation and reports writing stage, where students, together with the facilitator and parents, evaluate the research process and results. The students write their research reports. Sixth, the presentation stage, namely the research learning process in one semester, is presented by students in front of the facilitator, parents, other friends, and the committee. Presentations are not only made by students, but the facilitator also makes presentations as reports to parents on the achievement of indicators and the relationship of research with indicators. In this case, the role of educators in heutagogy is to foster efforts to unite opportunity, context, relevance, and complexity to encourage collaboration and curiosity (Hotimah, 2020).

Flexible curriculum

Learners make learning maps, and educators function as a compass in the heutagogy approach. Students determine their curriculum and the material to be studied. After that, students will adapt to the curriculum they have made (Baharman, et al., 2022; Stewart Hase, 2009).

Research in research-based learning is the core of the curriculum, not a compliment to the curriculum. Projects become learning strategies; students experience and learn the core concepts of a discipline through projects (Pearlman & Thomas, 2000).

The curriculum applied in SALAM is based on each student's interests. Students and facilitators meet to determine the curriculum based on the needs of each child each semester. Learning at SALAM uses research methods for elementary, middle, and high school levels. This method is guided by the learning cycle, a series of processes to plan, implement and evaluate research. The learning cycle is chosen because the sequence of processes allows students to achieve awareness and understanding of the reality being studied.

The first step in the learning cycle is planning. The facilitator and students plan the research they will do, including making a list of questions and preparing learning resources and equipment needed. The second step is conducting the process where students carry out the research they have planned. Students conduct research by looking at natural environmental conditions as the starting point for the following process. The third step is disclosing data, the process in which students express by restating what they have experienced, both in the form of their responses and impressions of the experiences experienced by students.

Furthermore, the fourth step is analyzing, the process where students analyze the research results, they have done. The fifth step is reflection, the process where students learn to formulate the meaning and reality they have encountered as a full new understanding or understanding. At this final stage, students are expected to be able to create new realities from the results of their analysis and reflection.

Self-directed questions

Learners' design processes aim to determine solutions to proposed problems or challenges (SchoolNet, 2000). Before conducting research, students compile a list of questions related to the research details to be carried out. These questions come from brainstorming between students and facilitators. The questions that arise will become material for making research designs for each student.

One of the biggest obstacles in applying the heutagogy approach is to ensure that students know the questions they will ask are relevant to the learning content (Suhaimi & Tajudin, 2020). In this case, the class facilitator is tasked with asking and directing students to come up with questions and ideas under the research context and learning materials.

Flexible and negotiable assessment

Self-determined assessments by students are proven to increase motivation and reduce feelings of threat from the assessment (Stewart Hase & Kenyon, 2007). According to Hase (2009), learning contracts determined by students can be used as a method to integrate consultation and negotiation during the ongoing assessment process.

Each student presents the achievements of the indicators of learning success. Some children presented their results by practicing directly the research themes they chose. Some show their work for one semester through exhibitions and PowerPoint presentations. Self-monitoring is essential to check whether students as learners have carried out the learning process that has been determined and agreed upon from the start so that the learning process can be carried out better (Fauzi, 2021).

A learning process at SALAM is highly valued and appreciated, not the result being the only assessment. The evaluation process is carried out continuously, and the final product of the activity will be evaluated qualitatively. Learning situations tolerate mistakes and changes (SchoolNet, 2000).

Reflective exercise

Students present indicators of learning success each semester in the final presentation. They closed it with a conclusion containing their assessment of learning achievements. Other students also provide reflections on the learning outcomes of each student. In heutagogy, peers provide feedback on student learning outcomes (Musliah et al., 2022; Porto et al., 2011; Zelani et al., 2021). At the end of the presentation, the class facilitator discusses with parents and students. Parents tell about their children's difficulties in conducting research and then reflect on them together.

Research conducted by SALAM students is not always successful; sometimes, there are failures. However, SALAM builds a learning ecosystem that makes research failures normal and natural and makes these failures a new forum for learning together. Research failures are often awaited by the people studying at SALAM because from these failures emerge new discussions and engaging additional lessons from these failures.

Collaborative learning

The learning atmosphere needs to be packaged to facilitate students to work together with other colleagues. In working on projects, students need to be equipped with an understanding of how to appreciate each person's strengths and be able to adapt quickly (Dewantara, 2021). Communicating with other communities is the essential component of heutagogy. By being interconnected, students' intrinsic motivation will increase because of the same learning environment as the community (Rashid et al., 2021; Zelani et al., 2021).

Research conducted by SALAM students requires learning resources from resource persons related to their project. In addition to digging information from sources, they can also collaborate with various parties to conduct the research. Through the research, discussions, and interactions were built between students, resource persons, and facilitators who facilitated their respective research.

Learners are collaboratively responsible for accessing and managing information to solve problems (SchoolNet, 2000). The affordability of technology in the form of digital media can be in the form of the ability

to explore and find information; create and share new knowledge; cooperate with others in creating new information; connect and network with others on the internet; and reflect the knowledge that has been obtained and construct it on the value system and knowledge of a learner (Blaschke & Hase, 2019).

4. Conclusion

Sanggar Anak Alam (SALAM), as an alternative educational institution, has implemented a heutagogy approach through a research-based learning process conducted by its students. The heutagogy learning designs applied in SALAM include; self-determination of learning contracts, flexible curriculum formation, self-directed questions, flexible and negotiable assessments, reflective practice, and collaborative learning. Through research-based learning, SALAM students can answer the challenges of the 21st century needs. The heutagogy approach has long been implemented in SALAM without realizing it. It opens opportunities for other formal and non-formal educational institutions to adopt the approach.

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