

# The Effectiveness of ARIAS Learning Model Based on Digital Literacy in Terms of Critical Thinking Ability of Elementary School Students

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## ABSTRACT

This study aims to determine the effectiveness of the digital literacy-based ARIAS learning model on the critical thinking skills of elementary school students. This research is quantitative research with experimental research methods. The research design used was a Quasi-Experimental Design with a Posttest Only Control Design type. The sampling technique used was cluster random sampling. Based on the average score of students' critical thinking skills in the experimental class, it was obtained that it was 1698.3 which was higher than the average score of students' critical thinking skills in the control class which was 1556.6. The result of the analysis of the hypothesis test is known that  $T \text{ count } (2.297) > T \text{ table } (1.686)$  then  $H_0$  is rejected or  $H_a$  is accepted. Thus the ARIAS (Assurance, Relevance, Interest, Assessment, and Satisfaction) learning model based on digital literacy is effective in terms of the critical thinking abilities of elementary school students.

**Keywords:** ARIAS Learning Model, Digital Literacy, Critical Thinking Ability

## 1. INTRODUCTION

Education has experienced rapid development as shown by the changes in the educational revolution in the era of the industrial revolution 4.0. This change is inevitable, therefore readiness is needed in all aspects of education [1]. One of the readiness undertaken is to provide more innovative learning to improve student competence so that they have 21st-century skills [2]. 21st-century skills that must be possessed by students are 4C skills (Creative, Critical Thinking, Communicative, and Collaborative) which are applied in the learning process [3]. The innovative learning process is expected to foster students' critical thinking skills [4]. Primary school students' critical thinking skills must continue to be developed in every learning process [5]. This is because the 2013 curriculum, which is now in effect, requires students to be more active [6]. Critical thinking skills are the skills needed to solve a problem [7]. This skill needs to be possessed by students so that students can find problems and then find the right solution to the problems found [8]. Critical thinking skills can be instilled in the learning process with all subjects in elementary schools, one of which is mathematics [9]. Mathematical critical thinking skills are very important for students to be able to be rational and choose the best alternative options [10]. Teachers have an important role in designing and developing more focused learning so that students' thinking skills develop well [11]. For that teachers must always be innovative in every implementation of the learning process.

Critical thinking skills also describe skills such as communication and information skills, as well as the ability to examine, analyze, interpret, and evaluate evidence [12]. In the era of digital literacy where the flow of information is very abundant, students need to have the ability to choose relevant sources and information, find quality sources and assess sources from the aspects of objectivity, reliability, and recency [13]. Concerning the application of digital literacy in schools, students can obtain information in a broader and deeper scope to increase knowledge and complete student tasks in finding information from digital content [14].

An innovative and varied learning process is the key to success in honing students' critical thinking skills. The teacher in each lesson not only explains the material in a monotone but can also provide a new learning model accordingly. ARIAS Learning Model (Assurance, Relevance, Interest, Assessment, and Satisfaction) can be a solution to the problems above. The ARIAS learning model is a modification of the ARCS learning model in which this learning model is developed to make learning that can affect achievement motivation and competency values [15]. Based on the results of previous research, it explains that the ARIAS learning model affects understanding the concept of physics [16]. This is also supported by other research which states that the problem-solving abilities of students in ARIAS learning with performance assessment are better [17]. In line with other research that explains that the ARIAS learning

model is effective for empowering students' motivation and critical thinking on ecosystem material [18]. ARIAS learning model can be developed based on Digital Literacy. Digital literacy is the knowledge and skills to use digital media, communication tools, and make use of it wisely [19]. The digital literacy used must be oriented to a person's ability to think critically and use communicative language [20].

**2. METHOD**

This research is quantitative research with experimental research methods. The research design used was a Quasi-Experimental Design with a Posttest Only Control Design type. In this design, the researcher conducted research twice, namely in the experimental class and control class, the experimental class, namely as a class using the ARIAS learning model based on digital literacy. The following is a research design using the Posttest Only Control:

**Table 1. Posttest-Only Control Design Research Design**

Class	Variable	Posttest
R (Experiment)	X	O <sub>1</sub>
R (Control)	Y	O <sub>2</sub>

The sampling technique used was cluster random sampling. The sample in this study were all students in grade V elementary school of 02 Winongo as many as 20 students as the experimental class and class V elementary school of 01 Winongo as many as 20 students as the control class. This study uses 1 independent variable (independent) ARIAS learning model based on Digital Literacy (X), and 1 dependent variable critical thinking ability (Y). This variable was tested to determine the effectiveness of the ARIAS learning model based on Digital Literacy on the critical thinking skills of elementary school students.

Data collection techniques in this study were documentation, observation, and tests to collect data on critical thinking skills. The instrument in the form of this test is to measure students' critical thinking skills. The researcher gave a post-test test to the experimental class and the control class. The test used was a multiple-choice written test. The test instrument before being given as a posttest was tried out at the elementary school of Ngegong. The test consists of 30 items that will be tested for validity, reliability, distinction, and level of difficulty. But getting 10 questions was not valid, so the researcher only used 20 items for the posttest.

Data analysis to test the hypothesis using statistical methods. Before conducting the post-test analysis test of students' critical thinking skills, first, the prerequisite analysis tests were conducted in the form of normality tests and data homogeneity. The normality test used is the Lilliefors test because the sample used is  $\leq 100$ . The testing criteria are based on a significance level of 0.05, namely: if the significance value of the learning outcome data test  $> 0.05$  then H<sub>0</sub> is accepted, vice versa if the significance value of the learning outcome data test  $< 0.05$  then H<sub>0</sub> is rejected. So it can be concluded that the test

decision is that if H<sub>0</sub> is received, the data is normally distributed and if H<sub>0</sub> is rejected, the data is not normally distributed. The homogeneity test used the F test with the criteria for the significance level or alpha is 5%, namely: if the significance value of the learning outcome data test  $> 0.05$  then H<sub>0</sub> is accepted, and vice versa if the significance value of the learning outcome data testing  $< 0.05$  then H<sub>0</sub> is rejected. So it can be concluded that the test decision is that if H<sub>0</sub> is received the data is homogeneous and if H<sub>0</sub> is rejected then the data is not homogeneous.

The final test analysis is by testing the hypothesis. This study uses the t-test hypothesis test (t-test). the pooled variant t-test formula. Furthermore, the results of the t count are compared with the t-table with an error level of 5% = 0.05, namely: if the significance value of the learning outcome data testing  $> 0.05$  then H<sub>0</sub> is accepted, on the other hand, if the significance value of the learning outcome data testing  $< 0.05$  then H<sub>0</sub> is rejected. If t count  $< t_{table}$  then H<sub>1</sub> is rejected and H<sub>0</sub> is accepted, if tcount  $> t_{table}$  then H<sub>1</sub> is accepted, and H<sub>0</sub> is rejected.

**3. RESULT AND DISCUSSION**

**3.1 Description of Research Data**

Before this research was carried out in the field of the research sample, a test instrument that had been made as many as 30 items was tested. Test questions were carried out on fifth-grade students of elementary school Ngegong. The indicator of the items that had been tested for validity showed that 20 items were declared valid and 10 items were invalid. By taking 20 valid items as posttest control class and experimental class. The reliability results show that r count (0.922)  $> r_{table}$  (0.514), so the data instrument above is said to be reliable.

This study used the post-test scores of students from the experimental class and the control class at the elementary school of 02 Winongo and the elementary school of 01 Winongo. The experimental class used the ARIAS learning model based on digital literacy while the control class used the thematic learning model

**Table 2. Results of the Experimental Class**

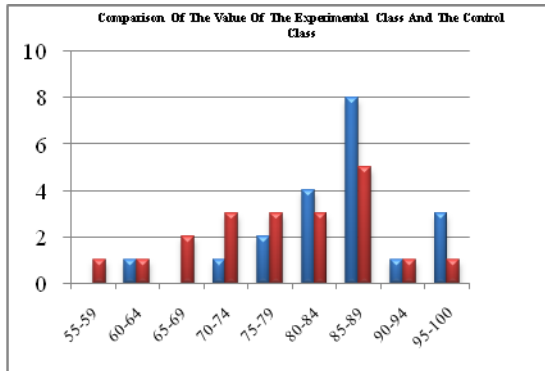
Value	Frequency
60 - 64	1
65 - 69	-
70 - 74	1
75 - 79	2
80 - 84	4
85 - 89	8
90 - 94	1
95 - 100	3

Based on the average score of critical thinking skills in the experimental class above, the total value of 1698.3 was obtained with a mean = 84.9; median = 85.8; mode = 86.6 highest score = 100; lowest value = 60; standard deviation = 9.25; and variance = 85.59.

**Table 3. Results of the Control Class**

Value	Frequency
55 – 59	1
60 – 64	1
65 – 69	2
70 – 74	3
75 – 79	3
80 – 84	3
85 – 89	5
90 – 95	2

Based on the average score of critical thinking skills in the control class above, the total value of 1556.6 is obtained with a mean = 77.8; median = 79.5; mode = 86.6 the highest score = 95.8; lowest value = 55.8; standard deviation = 10.22; and variance = 104.63. To get a clearer picture of the results of the average score of students in the experimental class and control class, it can be seen in the graph below:



Graph 1. Comparison of critical thinking skills scores in the experimental class and the control class

Based on the picture above, it can be explained that the number of samples is 40 students, consisting of two classes of the experimental class and the control class. The class that uses the ARIAS learning model based on digital literacy has the highest score of 100 and the lowest score of 60, while the experimental class has the highest score of 98.3 and the lowest score of 55.8.

Before testing the hypothesis, first, do a normality test and a homogeneity test. The normality test is used to determine whether the sample comes from a population with a normal distribution or not. The normality test in this study used the Liliefors method. Normality testing was carried out in both classes, namely the experimental class and the control class.

**Table 4. Summary of Normality Test Results**

Class	$L_{count}$	$L_{table}$	Decision	Conclusion
Experimental	0,156	0,190	Ho accepted	Data is normally distributed
Control	0,158	0,190	Ho accepted	Data is normally distributed

The table above shows the results of the normality test for the experimental class and the control class, both

of which come from normally distributed populations because of the  $L_{count} < L_{table}$ .

Homogeneity testing is used to determine whether the population comes from the same variance or not. The researcher tested the homogeneity of the experimental class and the control class using the F-test with a significant level. The following are the results of the homogeneity test analysis of the student test results:

**Table 5. Summary of Homogeneity Test Results**

$F_{count}$	$F_{table}$	Criteria	Decision
1,161	2,17	$F_{count} < F_{table}$	$H_0$ accepted

Based on the table above, shows that the experimental class and control class come from populations that have homogeneous variances.

Hypothesis testing used in this study is to use the t-test. The use of the t-test in this study was used to determine whether there were differences in the conceptual understanding test scores achieved from the experimental class and the control class. Based on the results of the calculation, the results are:

**Table 6. T-Test Analysis of Students' Critical Thinking Ability**

$S1^2$	$S2^2$	Dk	$T_{count}$	$T_{table}$	Decision
85,59	104,63	38	2,297	1,686	$H_a$ accepted

Based on the hypothesis test above, it can be seen that  $T_{count} (2.297) > T_{table} (1.686)$  then  $H_0$  is rejected or  $H_a$  is accepted. Thus the ARIAS (Assurance, Relevance, Interest, Assessment, and Satisfaction) learning model based on Digital Literacy is effective for the critical thinking skills of elementary school students.

### 3.2 Discussion

This study aims to determine the effectiveness of the digital literacy-based ARIAS (Assurance, Relevance, Interest, Assessment, and Satisfaction) learning model on the critical thinking skills of grade V elementary school students. The data were obtained from student test results which were distributed to fifth-grade students of elementary school 01 Winongo and elementary school 02 Winongo. Based on the research hypothesis test, the ARIAS (Assurance, Relevance, Interest, Assessment, and Satisfaction) learning model based on digital literacy is effective in terms of the critical thinking skills of elementary school students. In the experimental class using the ARIAS (Assurance, Relevance, Interest, Assessment, and Satisfaction) learning model based on digital literacy in terms of students' critical thinking abilities. In the initial stage, the opening is carried out by saying greetings, asking about the news, and making apperception by asking students about style material (Assurance). At the core stage, students are asked to read the narrative on social media that has been prepared, then the researcher asks students to express their opinion about the building space associated with objects around the student's environment (Relevance). The researcher divided the students into 4 groups and then asked the students to make observations about

objects in the environment related to space (Interest). Students write reports on the results of their observations in the book (Assessment). After all the material is delivered, the researcher gives a game so that students better understand the material that has been described (Interest). Furthermore, after the game is over, the researcher provides a posttest (Assessment) question sheet. After all, students have finished working, the researcher gives a reward to the student who won the game (Satisfaction).

Based on the average score of students' critical thinking skills in the experimental class, it was obtained that it was 1698.3 which was higher than the average score of students' critical thinking skills in the control class which was 1556.6. The result of the analysis of the hypothesis test is known that  $T \text{ count } (2.297) > T \text{ table } (1.686)$  then  $H_0$  is rejected or  $H_a$  is accepted. Thus the ARIAS (Assurance, Relevance, Interest, Assessment, and Satisfaction) learning model based on digital literacy is effective in terms of the critical thinking abilities of elementary school students. This is in line with the results of research [21] which states that the ARIAS learning model based on a scientific approach to learning the concept of natural events influences the critical thinking skills of grade V elementary school students. There are differences in students' critical thinking abilities before and after being given treatment using the ARIAS learning model based on the scientific approach. This is shown based on the average post-test score which is greater than the pre-test, which is 80.50 greater than 68.00.

Understanding of mathematical concepts in students showed better differences using the ARIAS learning model [22]. Based on the results of the study, it was stated that the application of the ARIAS learning model and the numerical talents of students provided opportunities for students to explore their abilities in the numerical field. This is because ARIAS is a learning model that contains five main components in a lesson, namely Assurance, Relevance, Interest, Assessment (assessment or evaluation), and Satisfaction. Which can provide opportunities for students to be active individually. Based on this description, it can be concluded that there is an interaction between the ARIAS learning model and numerical talent.

Students' critical thinking skills in today's era of technological development need to be balanced with the ability to use digital media or digital literacy. These two things are important because currently digitization has increased and streamlined the learning process in terms of finding the latest information, finding learning materials easily and quickly, and students' dependence on technology increasing so that the range of material becomes wider. Students must be able to evaluate digital content so that they can access accurate content. Without a critical evaluation stage, students can easily access content without any finding process [23].

## 4. CONCLUSION

The conclusion in this study is that the application of the ARIAS (Assurance, Relevance, Interest, Assessment, and Satisfaction) learning model based on digital literacy is effective in terms of the critical thinking abilities of grade V elementary school students in Madiun City. This can be proven by using the hypothesis test that has been obtained that  $t \text{ count } > t \text{ table}$ , namely  $t \text{ count } (2.297) > t \text{ table } (1.686)$  so that it can be said that there are differences in the application of the ARIAS learning model (Assurance, Relevance, Interest, Assessment, and Satisfaction based on digital literacy in review). of the critical thinking skills of elementary school students.

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