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Implementation Digital Literacy of Textbook of Statistics 1 for Islamic Religious Education Students

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Abstract. This research was motivated by differences in the ability of students in Islamic Religious Education to understand various statistical concepts. So that the study aims to know the impact of using Digital Literacy of Textbook of Stat 1 on Mathematics Understanding Ability of Islamic Religious Education Students at Universitas Islam Riau. This type of research is quasi-experimental research. The population is 4th semester Islamic Religious Education students at the Universitas Islam Riau. The sampling method was purposive sampling with a sample of 90 students for two classes. The instrument and data collection technique used resulted from the Mathematical Understanding Ability test on Statistics Material. The data analysis was the analysis of the result of the Mathematical Understanding Ability test after using Digital Literacy of textbook of statistics 1 in the learning process using a one-sample t-test. The results showed that Digital literacy of Textbook of Statistics 1 affects the mathematical understanding ability of Islamic Religious Education students at Universitas Islam Riau (Islamic University of Riau). It is designed according to the characteristics of students. In addition, books are easy to access anywhere. This digital book has an impact on changing students' understanding of statistical material.

INTRODUCTION

The Industrial Revolution 4.0 is currently causing rapid technological development with the internet network and artificial intelligence. The internet, known as the Internet of Things (IoT), cannot be separated from daily activities and the world of education. The presence of ICT has changed not only as a tool for learning but has become a space in learning; this has become an inseparable part of the current pedagogical process [1]. If the IoT network is united with mobile technology and data analysis, then IoT can provide a new paradigm [2]**.** The new paradigm is education supported by the internet [3]**.**

Using the internet network has also been unavoidable in education since the Covid-19 pandemic. An educator or teacher must carry out the learning process according to the times to make participants understand the material being taught. So, educators or teachers need to understand their students' conditions by using the right technology. Thus, it can make it easier for students to understand the material.

One form of using the internet network in education is literacy. Literacy means skills in reading, understanding, and responding critically to various forms of communication, such as text, language, video, and digital media. Furthermore, with the development of the times, current literacy is associated with a technology called Digital Literacy. According to [4], digital literacy is a person's technological skills and knowledge to develop long-term learning activities and positively contribute to society.

Digital literacy is essential in learning mathematics. Using digital literacy in learning can provide opportunities for interaction, literacy of interesting reading sources, various reference materials, communication, and problem solving [5]. Moreover, Digital literacy makes a person have skills in accessing knowledge and can also hone critical thinking skills in digital literacy.

The problem faced by students in this study was the difficulty in understanding mathematics, especially statistics, because of the different backgrounds of the high school. The Statistics course is a compulsory subject for every study program, so every student must attend the class. Based on teaching experience, it was found that

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generally, students did not like this statistics course which was considered not their field of expertise. Students also have difficulty understanding the concepts obtained through circulating digital media. Hence, they are also challenging to understand the concepts of Statistics from various statistical books that are very diverse. Most of the students are challenged to understand the id; they also have difficulty understanding the different mathematical symbols from the statistics book.

The problems above have caused researchers to be interested in designing textbooks with the application. This is an attempt to make it easier for students to understand statistical concepts to achieve learning objectives. So that the implementation of the government's goals in Law number 12 of 2018 articles 4-6, namely "by developing textbooks the function of higher education can be achieved."

Textbooks is one form of teaching material [6]. Self-designed textbooks that are adapted to the conditions of students and the applicable curriculum, of course, the researchers hope that this textbook of educational statistics I (Descriptive) can make it easier for students to understand existing concepts so that there is an increase in mathematical understanding and interest in learning statistics. Other than that textbooks could be used as learning tools adapted to students' learning speed [7]. In addition, in today's digital era, the role of teachers in developing teaching materials according to current needs is very necessary. One of them is presenting teaching materials in digital form. Digital literacy should be one of the goals in teaching mathematics [8][9].

Aside from the expert's point of view, the results of [10] say that "learning using electronic teaching materials can improve mathematical connection skills". Of course, someone needs a good understanding of a concept to have connection skills. The results of this study indicate that teaching materials have a role in sharpening one's thinking in the learning process. Thus encouraging interest in learning. This textbook has gone through expert validation, and when implemented, this book is presented in digital literacy using a PDF flip builder for easy access for students. Thus, this study aims to see the impact of digital literacy from the Education Statistics I textbook on the Mathematical Understanding Ability of Islamic Religious Education Students at Universitas Islam Riau.

METHODS

This research is quantitative research [11] which is quasi-experimental. The research design used was a non-equivalent/untreated control group design with posttest only [12]. This design will involve two classes; both classes use Digital literacy of the Education Statistics I (Descriptive) textbook. The research was conducted at Islamic Religious Education Universitas Islam Riau in 4th-sem students. The research time was for one semester, namely the even semester in 2020 years.

The research population was all 4th semester Islamic Religious Education students who took the Education Statistics 1 (Descriptive) course. The sample in this research was taken through the purposive sampling technique with 90 students. As for the consideration is the class that the researcher teaches and the initial abilities of the two classes are almost the same.

The research instrument used was a mathematical understanding ability test sheet. The mathematical understanding ability test sheet in this research aims to see the impact of using digital literacy of the Education Statistics I textbook on mathematical understanding ability in the learning process. Mathematical understanding ability test which will be measured based on the following indicators of Sanjaya [13]: 1) identify and make examples and non-examples; 2) using models, diagrams, and symbols to present a concept; 3) Changing one form of representation to another form of representation; 4) Recognize the various meanings and interpretations of concepts; 5) Compare and contrast concepts; and 6) Identify the properties of a concept and recognize the conditions that determine a concept.

The technique of mathematical understanding ability test is given to students who have been designed according to the indicators of mathematical understanding. The test results were collected from the posttest results. Guidelines for scoring mathematical understanding abilities [14] and [15] can be seen in the following Table 1:

TABLE 1. Guidelines of achieving the mathematical understanding ability.

Understanding Level	Assessment Criteria	Score
Understood	The answer is correct and contains all scientific concepts	4
Understand Partially	The answer is correct and contains at least one concept, and does not contain a conceptual error	3

Understanding Level	Assessment Criteria	Score
Partial Misconception	The answers provide some of the correct information but also indicate a conceptual error in explaining	2
Misconception	The answer shows a fundamental misunderstanding of the concept being studied	1
Not Understanding	Wrong answers, irrelevant answers or answers just repeating questions and empty answers	0

The category of mathematical understanding ability level is described in Table 2 as follows:

TABLE 2. Category of Mathematical Understanding Ability.

Presentation Score (%)	Category
$66{,}66 < x \leq 100$	High
$33{,}33 < x \leq 66{,}66$	Medium
$0 < x \leq 33{,}33$	Low

Descriptive statistics and inferential analysis process analysis of mathematical understanding ability. The following is a description of what will be done. Descriptive statistical analysis was carried out, namely the highest and lowest scores, analysis of the mathematical understanding ability test, and mean and analysis of the standard deviation of the mathematical understanding ability test results. Analysis of the mathematical understanding ability test results using a one-sample t-test. The score used is the test results of mathematical understanding ability—processed inferential analysis in this study through SPPS 20.

RESULTS AND DISCUSSION

Result

In this research, the class that applied Digital literacy of Textbook Statistics 1 with flip builder pdf was two classes with 90 students. Statistical analysis carried out was descriptive statistical analysis and inferential analysis with one-sample t-test using Digital Literacy of Textbook Statistics 1. Two experts have validated this bo with validation results of 79,22 with good category and can be used in the process of learning.

The onstage of this research is to implement Digital Literacy of Textbook Statistics 1 developed. This digital literacy of Textbook Statistics 1 (Descriptive) has been presented for an online version so that students can easily read whenever and wherever via their smartphone. To access the Digital Literacy of this book, click the link https://online.flipbuilder.com/zaxqh/lvqz. Before describing these two things, here are some presentations of Digital Literacy of Textbook Statistics I with development using flip pdf/flip builder.

There are three digital literacy concepts implemented in the learning process on statistics material, which is described as follows:

1) Planning: integrating digital literacy activities into the statistical learning process

The analysis is carried out on students at this stage, consisting of various high school educational backgrounds. In addition, in general, all students already have smartphones. Few people do not have laptops, especially since the covid-19 pandemic hit, so using digital literacy using smartphones will make it easier for them to access. The ability of students to access technology is quite good. When collaborative learning media through digital technology will make it easier to read and understand statistical concepts. Thus, there was a plan to develop a Statistical textbook on digital literacy in the learning process. The Digital Literacy used in this research is media literacy.

2) Learning Process: Multilevel learning that differentiates

Analysis in the learning process on this statistics material has been carried out for approximately five years of teaching this course. In this section, students are very heterogeneous. Generally, students do not like mathematics, and when asked to bring statistics books, most do not get them. Since the Covid-19 pandemic hit, researchers analyzed the need for solutions to overcome the diversity of student conditions in understanding the concept of statistics material. Thus, the idea of educational statistics textbooks emerged in the online version as digital literacy that is easy for students to access via their respective smartphones.

3) Assessment: evaluation of student learning outcomes

The assessment section is conducted through tests to see learning outcomes after applying Digital Literacy of Textbook Statistics 1. The form of the test given is students' mathematical understanding ability. The results are described in the mathematical understanding ability test results.

Furthermore, the Digital Literacy of Textbook of Statistics 1 (Descriptive) consists of 6 chapters. The materials contained therein are 1) Introduction to Basic Statistics; 2) Data Presentation; 3) Measures of Central Tendency; 4) Measures of Dispersion; 5) Kurtosis and Skewness; 6) Gaussian distribution. These materials are the basis for further understanding the Inferential Statistics section.

Each chapter contains a summary of the content summary and practice questions with varied questions, which are expected to improve students' mathematical understanding ability. If the student wants to go to a specific chapter, the student can return directly by clicking the Table of Contents button at the top. In the table of contents, when you click on the specific chapter, it will be growly to the material in question.

Furthermore, the description of the results of the analysis of mathematical understanding ability using the Digital literacy of Textbook of Statistics 1 (Descriptive) is explained in Table 3:

TABLE 3. Result of Mathematical Understanding Ability.

	Class		**Total**
	class 1	**class 2**	
High Score	95	100	-
Low Score	0	0	-
Mean	59,01	64,35	61,44
Standard Deviation	23,19	24,61	23,78

As shown in Table 3 above, the results of the descriptive statistics show that the average of the two classes is almost the same as the distribution of the data for the two classes, which is also quite large. This shows the ability in both classes is very heterogeneous. The two classes that use the Education Statistics textbook 1 are also almost the same for the highest and lowest grades. Then the results of the mathematical understanding ability test for each indicator can be seen in Table 4 below:

TABLE 4. Result of Mathematical Understanding Ability Each Indicator.

No	Indicator of Mathematical Understanding Ability	Class 1	Class 2	Mean	Category
1	identify and make examples and non-examples	88,09	78,13	83,11	High
2	using models, diagrams, and symbols to present a concept	60,12	61,45	60,79	Medium
3	Changing one form of representation to another form of representation	75,00	53,65	64,33	Medium
4	Recognize the various meanings and interpretations of concepts	42,28	64,58	53,43	Medium
5	Compare and contrast concepts	77,38	81,51	79,45	High
6	Identify the properties of a concept and recognize the conditions that determine a concept	36,61	20,05	28,33	Low

Based on the table above, it can be seen that there two are two indicators with high category and one low category. Students achieve the high category on the indicators of defining and making examples and not examples and comparing and contrasting concepts, meaning that in this section, students have good mathematical understanding. Students' mathematical understanding abilities are in the medium category on indicators 2, 3, and 4. The errors that occur in students are errors in the use of concepts, errors in the use of symbols, and errors in interpreting the meaning of the questions given. For indicators that get low scores, namely indicator number 6, the student answer sheets are blank; for students who answer, some students are wrong in identifying the concepts used so that the formula's determination becomes wrong.

After performing descriptive statistical tests on the data resulting from students' mathematical understanding abilities, then inferential statistical tests one-sample out with one-sample t-test. Previously, the results of the normality test data were normally distributed. Look at the following Table 5.

TABLE 5. Result of Normality Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	A score	Statistic	Df	Sig.
Score of Mathematical Understanding Ability	0,118	90	0,003	0,952	90	0,002

The distribution of data using leaf diagrams can be seen as follows in the Figure 1:

```
Frequency    Stem &  Leaf

    5.00       0 .  00111
   14.00       0 .  22222333333333
   14.00       0 .  44444555555555
   38.00       0 .  66666666666667777777777777777777777777
   17.00       0 .  88888888889999999
    2.00       1 .  00

Stem width:  100.0
Each leaf:       1 case(s)
```

FIGURE 1. Diagram of Stem and Leaf.

In the table of Normality-Test results above, it can be seen that the value of sig. <0.05 means that the data is not normally distributed. Next, the one-sample t-test in both classes using Digital literacy of Textbook of Statistics 1 will be seen. The proposed Ho and Ha are as follows:

Ho: Digital Literacy of Textbook of Statistics 1 does not affect the results of the mathematical understanding ability of Islamic Religious Education students

Ha: Digital Literacy of Textbook of Statistics 1 affect the results of the mathematical understanding ability of Islamic Religious Education students

Because the data in this study were not normally distributed, the statistical test carried out was the non-parametric One-Sample Chi-Square Test. The test results obtained are presented in the following table:

TABLE 6. Effect of Test Mathematical Understanding using Literacy Digital of Textbook of Statistic 1.

Null Hypothesis	Test	Sig.	Decision
The Categories of Score of Understanding Mathematical Ability occur with equal probabilities	One-Sample Chi-Square Test	0.19	Reject the null hypothesis

By testing criteria:

If value sig. < 0,05 then Ho is rejected

If value sig. > 0,05 then Ho accepted

From One-Sample Chi-Square test. the table above shows that the value of sig. <0.05 means that the digital literacy of statistics 1 textbook affects the mathematical understanding ability of Islamic Religious Education students. Thus, the digital literacy of textbook of statistics 1 has an impact on the better ability of students to understand mathematically.

Discussion

Utilization of digital literacy in the form of educational statistics textbook 1 by presenting it in the form of a link using the flip builder application, so that students can easily access the book in the teaching and learning process. This is in line with the expression that digital literacy is independent learning because students have the ability to access, manage and use information using technological devices [16].

After using this textbook, the research results showed that in indicator 1, defining and making examples and not examples; there were 92,22% who completed 90 students. In this first indicator, students have a high mathematical understanding ability with an average of 83,11. Likewise for indicator 5 compares and contrasts concepts with an average of 79,45. In indicator 5; 75,6% who complete or about 68 people who get a higher score are equal to 75.

For indicators in the medium category, indicator 2 uses models, diagrams, and symbols to present a concept, indicator 3 Changes one form of representation to another form of representation, indicator 4 Recognizes various meanings and interpretations of concepts. In indicator 2, completeness reaches 55,6% or 60 people complete their understanding. In indicator 3 there are 50% who complete their understanding or about 45 students. In indicator 4 of 71,11% complete mathematical understanding or about 64 people.

The indicator that still needs improvement because it is still in the low category is indicator 6. Indicator 6 is about identifying the characteristics of a concept and recognizing the conditions that determine a concept. The average value obtained is 28,33. Only 6,67% of students complete their mathematical understanding or about 6 people. This indicator part is an error made by students who are confused in determining the concept of the two problems given so that, in general, many answer sheets are empty.

Based on descriptive analysis, the students' mathematical understanding ability is quite good, although the average score obtained is still 61,44 for mean and standard deviation that is still quite large, namely 23,78. However, from the one sample inferential test results, the data obtained are not normally distributed. Therefore, the test to see the impact of using digital literacy of Textbook of Statistics 1 uses a non-parametric test. By using software SPSS 20, it is found that the digital literacy of Textbook of Statistics 1 affects the mathematical understanding ability of Islamic Religious Education students. Thus, digital literacy of Textbooks already has the role of technology as doing mathematics, technology to practicing skills in mathematics, technology to improve and develop conceptual understanding in learning mathematics ([17], [18]).

Talking about literacy in education, technology is needed that focuses on pedagogy and content from media literacy [19]. Digital literacy that has been developed is media literacy and technology literacy in the form of textbooks ([19], [20], [21]). For today's learning, it is very important to present teaching materials in the form of digital literacy, the same thing was revealed [22] that learning resources such as blackboards, textbooks and others are important to be represented in digital literacy. Based on the research results obtained, this Digital literacy of Textbook of Statistics 1 can provide an understanding when students study statistics. This book affects the mathematical understanding ability of Islamic religious education students at Universitas Islam Riau.

CONCLUSION

The conclusion from the results of this research is that Digital Literacy of Textbook of Statistics 1 affects the mathematical understanding ability of Islamic Religious Education students at Universitas Islam Riau (Islamic University of Riau). Based on the description above, it can be said that the basic principles the used of literacy digital like this textbooks in mathematics learning is technology not used as an alternative to the use of conceptual understanding, but in the other hand technology plays a role in improve and develop students' conceptual understanding of mathematical idea. The limitation of digital literacy from educational statistics textbook 1 is that it must be accessed on a strong internet connection so that it is easy to access. In addition, this textbook can still be maximized by adding learning videos related to statistics material. Thus, this study contributes to the implementation of digital literacy as media literacy in the form of a textbook.

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