

An Integrated Educational Audio-Visual Media Based Information Service Model in The Era of Industrial Revolution 4.0 for MTs Lab IKIP Al Washliyah Medan Students

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Abstract. Current developments require all aspects of life, one of which is in the field of education, so that they can carry out transformational changes in the face of the industrial revolution 4.0. This situation is what made the government change the education system so that educators can improve their performance as teachers, including counseling teachers, so they can implement guidance and counseling services that are oriented towards the industrial revolution 4.0. This research aims to find out whether information services through audio-visual media can be effective in increasing understanding about education in the era of the industrial revolution 4.0 among Mts Lab IKIP Al Washliyah Medan students. This type of research is quantitative research with the population being 60 students in class VIII MTs Lab IKIP Al Washliyah Medan. Sampling used a random sampling technique which received as many as 30 students. The data collection technique in this research used a questionnaire. The questionnaire used in this research is an educational questionnaire in the era of the industrial revolution 4.0. with statistical data analysis. In this research, the data obtained shows that t_{count} is greater than t_{table} , namely $0.490 > 0.361$ and has led to a better increase than before. This is known from the results of the t test which shows that $t_{count} > t_{table}$ or $16.304 > 2.042$. This shows that information services through audio-visual media can influence students' understanding of education in the era of the industrial revolution 4.0

Keywords: Information Services, Industrial Revolution, Audio Visual, Education

I. INTRODUCTION

As a result, education today is still very focused on building students' ability to give correct answers on tests, not on encouraging the emergence of new and interesting thoughts which are really needed in the future. (Yasin, 2021). The impact on students is that they are encouraged to think that grades are more important than the process of building learning and understanding abilities. Not a few students conclude that their goal in undergoing the current education process is to get good grades, not to learn to think and solve problems (Hasnadi, 2021).

In the world of education, currently the world of education is required to be able to keep up with technological developments that are developing rapidly by utilizing technology as a more sophisticated facility to facilitate the learning process (Atikah & Resisca, 2021).

Technological Pedagogical and Content Knowledge (TPACK) is a concept of integrity from three different elements: technology, pedagogy, and educational content. Knowledge about the three is combined into a comprehensive educational capability in the world of education called TPACK (Tanjung et al., 2022). The three elements united in educational planning, process and evaluation will become a great trio in developing the future educational ecosystem known as the era of digital technology (Farikah & Al Firdaus, 2020).

The current era of digital technology is called the era of industrial revolution 4.0, where the role of technology has become something that cannot be avoided in the world of education. This fourth world

industrial revolution is a technology that is the basis of human life. Everything becomes limitless. and unlimited due to the development of the internet and digital technology(Eko Risdianto, 2019).

The role of the industrial revolution era 4.0 in education also has several very important characteristics and is the basis for change, especially in education, namely the existence of dimensions that have an important part in considering a fourth technological change, namely the demographic dimension, professional dimension and literacy dimension and not only in the part that will be considered, but in this era of the fourth industrial revolution there is also evidence that it has had a big influence on the world of education and this really helps a student in developing the potential or abilities he has, namely artificial intelligence (artificial intelligence). , and internet of things (internet of everything) (Musfah, 2021).

Where the use of digital technology can increase a student's interest in learning because the learning process is more enjoyable and not monotonous because the learning process is based on digital technology which creates a learning appearance and style with various learning methods and media making the learning atmosphere more interesting and enjoyable (Syahril, 2022). Meanwhile, the learning process which is centered on the teacher's monotonous explanatory theories makes students bored and also makes students' thinking dependent on the teacher's explanatory theories and makes it difficult to create new and interesting thoughts. (Oudri & Romanti, 2022).

Learning outcomes are changes that result in people changing their attitudes and behavior as well as the level of mastery achieved by a student in following the teaching and learning process in accordance with the stated educational goals (Rumhadi, 2017a). Learning outcomes are also often used as a measure to find out how far a student understands and masters the material that has been taught (Rumhadi, 2017b)

II. RESEARCH METHODS

This research is research with an experimental design. Sugiyono (2017:107) states that experimental research is a research method used to find the effect of certain treatments on others under controlled conditions. The aim of this experimental research is to investigate whether there is an influence or causal relationship by giving certain treatments to several experimental groups and providing controls for comparison. In this research the author used a pre-experimental design which is often seen as an experiment that is not true or a pseudo-experiment, with pre-test and post-test group types (Arikunto, 2014: 124). In this design, research subjects were subjected to treatment with two measurements taken before being given information services using audio-visual media (pre-test), then a second measurement after being given information services using audio-visual media (post-test). According to Arikunto (2014:124) the design can be described as follows:

Pre-test research design – post-test design

O₁X O₂

Information :

O₁: pre-test is given before providing information services using audio-visual media

X : treatment (providing information using audio-visual media)

O₂: post-test given after providing information services with audio-visual media.

Population and Sample

Population is a generalization area consisting of: objects/subjects that have certain qualities and characteristics determined by researchers to be studied and then conclusions drawn.(PD, 2014). Therefore, population is not only people, but also objects and other natural objects. Population is also not just the number of objects/subjects being studied, but includes all the characteristics/traits possessed by subjects and objects. Population is the subject of research (Suharsimi, 2013). The population in this research will be class VIII students, totaling 60 students

The sample is part of the number and characteristics possessed by the population (Agung & Yuesti, 2019). The sample is a part or representative of the population studied. A sample is an example, monster, representative or representative of a population that is quite large in number or a part of the whole that is selected and is representative in nature (Syafnidawati, 2020).

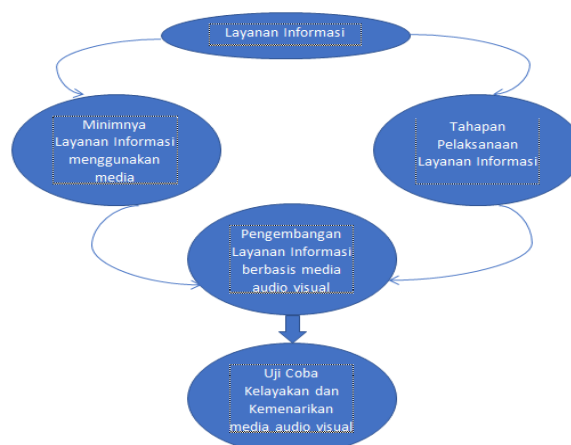
From the opinion above, it can be concluded that the sample is a subject that is the same as the population. The number of samples in this study was 30 students based on random selection carried out by the researcher

Random sampling is a sampling technique where all individuals in the population, either individually or together, are given the same opportunity to be selected as members of the sample (Riadi, 2020). From a total population of 60 students, 30 students were sampled. The sampling method uses a lottery model, where the lottery model is sampling by giving each individual the opportunity to become a member of the sample, where each class is given a number code and written on a small piece of paper as a helper, each student gets a piece of paper that has been rolled up but There is a roll of paper that is not coded with numbers and then it is shuffled to ensure randomness. If a student gets a number code on his roll of paper, it means that student will be part of the researcher's sample. From the explanation above, the researcher took a sample of 30 students.

To obtain the data needed in this research, a tool for collecting data is needed, namely a non-test. The non-test technique used is to use a questionnaire which will be distributed directly by students. Data collection was carried out using questionnaires distributed to students included in the sample. A questionnaire is a number of written questions used to obtain information from respondents in the sense of reports about their personality, or things they know (Suharsimi, 2013). A questionnaire is a data collection technique that is carried out by giving a set of written statements to respondents for them to answer. A questionnaire is an efficient data collection technique if the researcher knows exactly the variables to be measured and knows what to expect from the respondent (quantitative, qualitative and R&D research methods, 2016).

Approach and Research Methods

The model used in this research is the ADDIE development model. According to (Zulkarnaini et al., 2022), the ADDIE development model consists of five stages, which include analysis, design, development, implementation and evaluation. According to (Adeline Hasyim, 2016), the ADDIE development model is a simple and easy procedural model for creating products that can be used in short-term sustainability research. The steps in studying the development of ADDIE in this lesson, if presented in graphic form, are as follows:



Procedure Study Development

The procedure for developing an information service model based on audio-visual media is grouped based on three stages:

1. Analysis (Analysis)
2. Design (Design)
3. Development (Development)

Model Development Steps

1. Preparation
2. Planning Model Development
3. Trials, Model Revision
4. Implementation Model
5. Evaluation

Techniques and Instruments

Data collection techniques are the methods used by researchers to collect research data. This data collection is intended to obtain materials that are accurate, relevant and reliable. The data collection technique used in this research is through questionnaires.

According to Sugiyono (2017: 199) a questionnaire is a data collection technique that is carried out by giving a set of written statements to respondents for them to answer. A questionnaire is an efficient data collection technique if the researcher knows exactly the variables to be measured and knows what to expect from the respondent. Questionnaires are also suitable for use in very large numbers and spread over a wide area, namely submitting a statement form accompanied by answer choices.

The questionnaire was submitted to a predetermined research sample of 30 students. A questionnaire was given to each respondent. The desired data is the information services provided to students as well as independence in learning. The questionnaire used in this research is a closed questionnaire with a graded scale. Where the questionnaire in this research uses a Likert scale, this Likert scale questionnaire uses 4 alternative answers which state favorable (support) and unfavourable (not support) each alternative answer in the form of a score, namely:

Table 3.5.2
Questionnaire Assessment Criteria

No.	Positive Statements		Negative Statements	
	Score	Information	Score	Information
1	4	Strongly agree	1	Strongly agree
2	3	Agree	2	Agree
3	2	Don't agree	3	Don't agree
4	1	Strongly disagree	4	Strongly disagree

Data Analysis Techniques

Data analysis is a way to analyze or process data obtained during research. In this research, the data analysis technique used is the t-test, which is to see whether students have increased understanding of education in the era of the industrial revolution 4.0 after being provided with information services using audio-visual media. The difference test technique formula used is as follows:

$$t = \frac{Md}{\sqrt{\frac{\sum X^2 d}{N(N-1)}}$$

Information :

Md : Mean of deviation (d) between post-test and pre-test

Xd : Difference between divisions and mean deviation
N : Number of subjects
df : Or db is N-1

Validity test

Validity is a measure that shows the levels of validity and validity of an instrument. A valid or valid instrument has high validity, whereas an instrument that is less valid means it has low validity (Arikunto, 2014: 211)

To determine the validity test of the instrument in this research, the item validity analysis technique was used with the Pearson product moment correlation formula as follows:

$$r_{xy} = \frac{(N\sum xy - (\sum x) - (\sum y))}{\sqrt{\{N\sum x^2 - (\sum x)^2\}\{N\sum y^2 - (\sum y)^2\}}} \text{ (Arikunto 2013: 213)}$$

Information:

r_{xy} : Correlation Coefficient Between Variables X and Y
N : Number of Respondents
 $\sum x$: Total score of variable x
 $\sum y$: Total score of variable y
 $\sum xy$: The number of times the x and y scores are multiplied
 $\sum x^2$: The sum of the squares of the x distribution scores
 $\sum y^2$: The sum of the squares of the y distribution scores

Reliability

According to Arikunto (2014: 221) reliability shows in one sense that an instrument is trustworthy enough to be used as a data collection tool because the instrument is good. The concept of reliability is a measuring instrument to find and find out to what extent the measurement results can be trusted if the results are the same several times when the measuring instrument is tested. According to Arikunto (2014: 239), the Alpha formula is used for reliability

$$r_{11} = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum \sigma_b^2}{\sigma^2 t}\right)$$

Information:

r_{11} : Instrument reliability
k : The number of questions
 $\sum 2\sigma_b$: The amount of item variance
 $\sum \sigma t^2$: Total variance

III. RESULTS AND DISCUSSION

RESULTS

Discussion of research results and obstacles in research regarding understanding education in the era of the industrial revolution 4.0 using information services through audio-visual media at MTs Lab IKIP Al Washliyah Medan. In the sub-chapter, the research results explain the description of the students' initial conditions before

carrying out information services, see how students understand the understanding of education in the era of the industrial revolution 4.0, describe the actions carried out in the information service process, and describe an understanding of education in the era of the industrial revolution 4.0 after implementing information services. held.:

Analysis

After the questionnaires have been collected, an analysis of the questionnaires is carried out by creating a value format based on the scores in each questionnaire. Then the scores representing the subject's choices for each question item are tabulated for the purposes of analyzing the validity of the questionnaire items.

Validity Test of Educational Questionnaires in the Industrial Revolution Era 4.0

The questionnaire trial function is to find out whether the instrument is suitable to be used to obtain data on students' understanding of education in the era of the industrial revolution 4.0 by using the formula *Product Moments* the calculation of which is as follows:

Example of calculation for item No.1

$$\begin{aligned}\Sigma x &= 105 & \Sigma y &= 4105 \\ \Sigma x^2 &= 385 & \Sigma y^2 &= 568213 \\ \Sigma xy &= 14533 & n &= 30\end{aligned}$$

$$\begin{aligned}r_{xy} &= \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{\{n(\Sigma x^2) - (\Sigma x)^2\}}\sqrt{\{n(\Sigma y^2) - (\Sigma y)^2\}}} \\ r_{xy} &= \frac{30(14533) - (105)(4105)}{\sqrt{\{30(385) - (105)^2\}}\sqrt{\{30(568213) - (4105)^2\}}} \\ r_{xy} &= \frac{4965}{\sqrt{(11550 - 11025)(17046390 - 16851025)}} \\ r_{xy} &= \frac{4965}{\sqrt{(525)(195365)}} \\ r_{xy} &= \frac{4965}{\sqrt{102566625}} \\ r_{xy} &= \frac{4965}{10127,51} \\ r_{xy} &= 0,490\end{aligned}$$

Based on the results of the correlation coefficient calculation, the validity of item number 2 obtained $r_{\text{count}} = 0.490$ at a significance level of 5%, it is known that $r_{\text{table}} = 0.361$. From these results it can be seen that r_{count} is greater than r_{table} , namely $0.490 > 0.361$, so it can be concluded that question item number two is declared valid and can be used in data collection.

Furthermore, from the 40 questionnaire items that were tested on 60 students, 34 valid statements were obtained, namely those that could be used in data collection, while 6 items were invalid, namely numbers 1, 4, 6, 8, 22 and 23. After the r_{count} , it was compared with the r_{table} in the significance level is 5%, so of the 40 questions that were tested, 6 statements were found to be invalid, so that 34 statements were valid and were used to collect research data.

Reliability Test of Educational Questionnaires in the Industrial Revolution Era 4.0

Reliability (reliability) of the Industrial Revolution Era 4.0 educational questionnaire using the formula alpha :

$$r_{11} = \left(\frac{k}{k-1} \right) \left(1 - \frac{\sum \sigma_b^2}{\sigma_t^2} \right)$$
$$r_{11} = \left(\frac{34}{34-1} \right) \left(1 - \frac{23,914}{217,072} \right)$$
$$r_{11} = \left(\frac{34}{33} \right) (1 - 0,110)$$
$$r_{11} = 1,030 (0,89)$$
$$r_{11} = 0,916$$

Mean

From the calculation above, $r_{11} (0.916) > r_{table} (0.316)$ is obtained, so this calculation is reliable or trustworthy as a data collection tool. Average (Mean)

The average price is calculated using the formula:

$$M = \frac{\sum XA}{N}$$

Information:

$\sum XA$: Number of pre-test algebra

N : Number of samples

From the distribution of students' pre-test educational scores in the era of the industrial revolution 4.0, the average scores were obtained as follows:

$$M = \frac{2323}{30} = 77,43$$

Standard deviation (SD)

The standard deviation obtained from the distribution of students' pre-test scores on understanding education in the era of the industrial revolution 4.0 is:

$$SD = \sqrt{\frac{n \cdot \sum X^2 - (\sum X)^2}{n(n-1)}}$$

Information :

$\sum X^2$: Algebraic sum of squares from pre-test data

n : Number of samples

Results :

$$SD = \sqrt{\frac{30.179951 - (2323)^2}{30(30-1)}}$$

$$SD = \sqrt{\frac{5398530 - 5396329}{30.29}}$$

$$SD = \sqrt{\frac{2201}{870}}$$

$$SD = \sqrt{2529}$$

$$SD = 50,28$$

Identification of Trend Levels of Research Variables

To determine the trend of each variable, the following criteria are used:

1. If $M_o > M_i$, then the variable tends to be high
2. If $M_o < M_i$, then the variable tends to be low

To calculate the Empirical Mean (M_o) the formula is used:

$$M_o = \frac{\sum XA}{N}$$

By using research data for the variable understanding of education in the industrial revolution 4.0 era, students can calculate the Empirical Mean (M_o), namely:

$$M_o = \frac{2318}{30} = 77,26$$

Meanwhile, the Hypothetical Mean (M_i), namely:

$$M_i = \frac{\text{Skor tertinggi ideal} + \text{Skor terendah ideal}}{2}$$

$$M_i = \frac{80+76}{2} = 78.00$$

From the calculation results, it is obtained that $M_o = 77.26$ and $M_i = 78.00$. With the calculation results $M_o < M_i$ or $77.26 < 78.00$. Based on these results, it can be concluded that students' understanding of education in the era of the industrial revolution 4.0 at MTs Lab IKIP Medan before being given information services tends to be low.

Post-Test Data on Understanding Education in the Industrial Revolution Era 4.0

Based on data obtained from research results with a total of 30 students as respondents, the highest score was 109 and the lowest score was 82, with an average (Mean) standard deviation (SD) as follows:

Mean

The average price is calculated using the formula:

$$M_o = \frac{\sum XB}{N}$$

Information :

$\sum XB$: Number of post test algebra

N : Number of samples

From the distribution of post test scores on students' understanding of education in the era of the industrial revolution 4.0, the average scores were obtained as follows:

$$M_o = \frac{2901}{30} = 96,70$$

Standard Deviation (SD)

The standard deviation obtained from the distribution of students' post test scores on understanding education in the era of the industrial revolution 4.0 is:

$$SD = \sqrt{\frac{n \cdot \sum X^2 - (\sum X)^2}{n(n-1)}}$$

Information :

$\sum X^2$: Algebraic sum of squares from pre-test data

n : Number of samples

$$SD = \sqrt{\frac{30.281501 - (2901)^2}{30(30-1)}}$$

$$SD = \sqrt{\frac{8445030 - 8415801}{30.29}}$$
$$SD = \sqrt{\frac{29229}{870}}$$
$$SD = \sqrt{3359}$$
$$SD = 5795$$

Identify the Level of Understanding of Education in the Industrial Revolution Era 4.0

To determine the trend of each variable, the following criteria are used:

1. If $M_o > M_i$, then the variable tends to be high
2. If $M_o < M_i$, then the variable tends to be low

$$M_o = \frac{\sum XB}{N}$$

By using research data for the variable understanding of education in the industrial revolution 4.0 era, students can calculate the Empirical Mean (M_o), namely:

$$M_o = \frac{2901}{30} = 96,70$$

Meanwhile, the Hypothetical Mean (M_i), namely:

$$M_i = \frac{\text{Skor tertinggi ideal} + \text{Skor terendah ideal}}{2}$$

$$M_i = \frac{109 + 82}{2} = 95,5$$

From the calculation results, it is obtained that $M_o = 96.70$ and $M_i = 95.50$. With the calculation results $M_o > M_i$ or $96.70 > 95.50$. Based on these results, it can be concluded that students' understanding of education in the industrial revolution 4.0 era after being given an audio-visual-based information service model tends to be high.

Hypothesis testing

The hypothesis in this research is to test the influence of information services with the media *audio visual* towards education in the era of the industrial revolution 4.0 for class VIII MTs Lab IKIP Medan, to test this hypothesis using product moment correlation.

$$t = \frac{Md}{\sqrt{\frac{\sum x^{2d}}{N(N-1)}}$$

Before testing the hypothesis, first look for the mean difference and standard deviation, namely making a pre-test and post-test data table.

Obtained different mean:

$$MD = \frac{\sum (XB - XA)}{N}$$

$$MD = \frac{578}{30} = 19,26$$

$$MD = 19.26$$

So test the differences:

$$t = \frac{Md}{\sqrt{\frac{\sum x^{2d}}{N(N-1)}}}$$
$$t = \frac{19,26}{\sqrt{\frac{12142}{30(30-1)}}}$$
$$t = \frac{19,26}{\sqrt{\frac{12142}{870}}}$$
$$t = \frac{19,26}{\sqrt{\frac{12142}{870}}}$$
$$t = \frac{19,26}{\sqrt{\frac{12142}{870}}}$$
$$t = \frac{19,26}{\sqrt{13,956}}$$
$$t = \frac{118,13}{19,26}$$
$$t = 16,304$$

From the calculation results, it is obtained that $t_{count} = 16.304$ at the 5% significance level with $db = N - 1 = 30 - 1 = 29$ at the $\alpha = 5\%$ obtained by 2.045. So $t_{count} > t_{table}$ or $16,304 > 2,045$. Based on this, it can be stated that "The Information Service Model with Audio-Visual Media for Education in the Era of the Industrial Revolution 4.0 for Class VIII MTs Lab IKIP Medan" is acceptable

IV. CONCLUSIONS

Based on these results, it can be concluded that students' understanding of education in the industrial revolution 4.0 era after being given an audio-visual-based information service model tends to be high. With the significant influence of information services through audio-visual media on education in the era of the industrial revolution 4.0, information services are one of the appropriate counseling services and are able to influence a student's understanding of educational information in the era of the industrial revolution 4.0.

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