Development of Vidio Explainer learning media based on case method and network in the Mathematics Economics course to improve students' understanding of concepts

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Abstract. Technology continues to develop into the world of education, especially universities. The development of the world of digital technology is accelerating, even its development is faster than the world of education itself. This era is characterized by the use of technology to process data, including processing, obtaining, compiling, storing, manipulating data in various ways to produce quality, relevant and accurate things. The acceleration of technological progress has also given birth to new policies in the world of higher education, including Universitas Negeri Medan which has issued a decree through the Rector's Decree No. 000119/UN33/KP/2022 which states that learning in Universitas Negeri Medan environment in the Even Semester 2021/2022 is carried out through Hybrid Learning. The characteristics of Hybrid learning include integrating technology in learning. Technology integration in learning is utilizing a tool in developing and using learning tools, such as technology integration in learning media. One of them is the explainer video learning media. The objectives of this study are 1) Developing Case Method Learning Media Vidio Explainer economic mathematics course, 2) Describing the Validity of Case Method Learning Media Vidio Explainer economic mathematics course 3) Describing the practicality and effectiveness of Case Method Learning Media Vidio Explainer economic mathematics course. This research is a development research using the ADDIE type which consists of 5 stages of research, namely 1) Analysis 2) Design, 3) Develop, 4) Implementation and 5) Evaluation. A valid Economic Mathematics course with a validity value of 3.20, is declared as a practical learning medium with a practical value of 3.08 and is effective in increasing students' understanding of concepts and the positive response received by students with an average score of 89.8 with good categories, so it is suitable for use in the learning process.

Keywords: Vidio Explainer, Economic Mathematics, Learning Media.

1 Introduction

The development of technology in mathematics learning has certainly influenced the development of mathematics learning today. There are three functions of technology in mathematics learning, namely technology can function as an alternative tool to replace paper

and pencil media to carry out mathematics learning activities, technology functions as a learning environment to improve certain mathematical skills, technology functions as an independent learning environment to develop conceptual understanding of mathematics learning (Putrawangsa &; Hasanah, 2018). In line with Putri &; Hidayati (2016), the use of technology will expected to improve the quality of education. Innovative efforts to use technology in the learning process are increasingly encouraged by the development of science and technology. The role of technology is not only to help students in learning, teachers also have a great influence. This allows us to create learning methods using innovative and creative media, to create learning methods starting to switch from old learning methods (Awaludin et al., 2019).

Integrating technology into learning media is one way of integrating technology into the learning process.Media is anything that can be used to convey a messages from sender to receiver in order to stimulate students' thinking, interest and attention during the learning process (Hasan et al., 2021). This is in accordance with Diamar et al., (2019) learning media are various types of environmental components in students that can stimulate student learning, but also convey messages stimulating the mind, Stimulate student interest to enhance the teaching and learning process.Based on this, it can be interpreted that learning media as a tool used by lecturers to support the success of the learning process and stimulate understanding of mathematical concepts. Media plays an important role in learning as a tool to facilitate the delivery of material and can clarify the meaning conveyed to understand students. The lack of use of media in mathematics learning will automatically make it difficult to understand student concepts.

In this digital era, there is already learning that utilizes technology-based media in learning, including in the campus or university world, but based on the observations of researchers conducted in the Unimed Mathematics Study Program, there is still minimal use of technology-based learning media, especially in the Economic Mathematics course. So far, the media used is still a presentation of one media in the form of text such as using a powerpoint application, there is still a little use of multimedia to explain course material, such as using video. So that researchers try to develop a multi-media in which there are text, images, infographics and sound, moving images, namely network-based explainary video learning media.

To support the achievement of the university's main performance indicators related to the case-method-based learning process, the learning process must be equipped with learning tools that support the quality of the learning process, to create a case-based learning process, case-methode-based devices are also needed, one of which is the case methode learning media. According to observations of researchers in economic mathematics subjects, there is no support for learning based on the case method, the learning process is still one-way and still dominated by the teacher's activities.Therefore, the researchers were interested in developing the case. Explanatory video learning support based on explanatory videos.

One of the learning media that can be used is Network-based Expaliner Vidio. Why network-based, because to transfer this video to students will be more effective than copying and pasting manually, or using additional devices, such as flash drives. Explainer video. According to Irwan Saputra, "explainer videos are videos that require 1-2 minutes to explain

information or knowledge." [1]Therefore, explainer videos are used on aspects that require visualization from science. Explainer videos are rich in information and straightforward when used in delivering learning materials. Unlike other videos, providing information on an explainer videos gives an impressions and messages is quick, precise and easy to understand

In 2021, researchers developed an economic mathematics digital book as aneducation material for online learning using a flibbook maker application. However, it has not yet developed an assessment that supports the online learning platform, so in 2022 researchers develop web-based assessments and case methods using multimedia applications. However, continuing the need for learning tools based on the results of interviews and student responses, that low student activity and understanding of concepts that have not been achieved optimally, learning media are needed that can increase these activities and understanding.

2 Method

The research method used in this study is the development of the ADDIE model (Analysis, Design, Develop, Implement, and Evaluate) developed by Reiser and Mollenda. In this ADDIE development design model, there are five stages of research implementation, which are as follows:

Figure 1 ADDIE Model Stages

This research will be carried out at Medan State University, Faculty of Mathematics and Natural Sciences, Department of Economic Mathematics. The time of this research is planned for the even semester of 2021 – 2022. Students who were the subjects in this study were students majoring in Mathematics which amounted to 1 class. In obtaining research data, instruments are needed. The instruments used in this study are Material Expert Validation sheets, media expert validation sheets and student response questionnaires and Mathematical Concept Understanding tests. To draw a conclusion, the data obtained needs to be compiled and then processed to get a conclusion to describe. The following is a product feasibility scale.

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[1] Irwan Saputra, and Hanif Al Fatta. (2014). Implementation of 2D animation and explainer videos in book alms community television commercials. Amikom

The results of the assessment in the form of letters from material and media experts need to be converted into scores with provisions that can be seen in Table 1 below:

Table 1. Product Feasibility Scale

Categories	Criterion
Not Worth It	1
Less Decent	2
Proper	3
Very Worth It	4

To see the interest use the response questionnaire. The form of the obtained letters is changed into the form of a score as seen in table 2

Table 2. Response Scale

Categories	Value
Totally Agree	4
Agree	3
Disagree Less	2
Disagree	1

3 Result and Discuss

This research produced a learning media product in the form of an explainer video. This video contains an explanation of Economic Mathematics material with animation and motion graphics display. The videos developed are 2 videos according to those implemented in learning, each video has an average duration of 10-20 minutes. Full color video display with a very clear voice (dubbing) when explaining each material, the structure of each video starts from the opening by displaying an animation of an event or problem related to the material, then continued with the explanation of the material while bringing up illustrations according to the sound, for example how to draw lines using the autograph application, then on the screen the autorgaph application will appear moving along with the sound that explains it, Finally, the conclusion as the closing of Vidio. Here are some video displays.
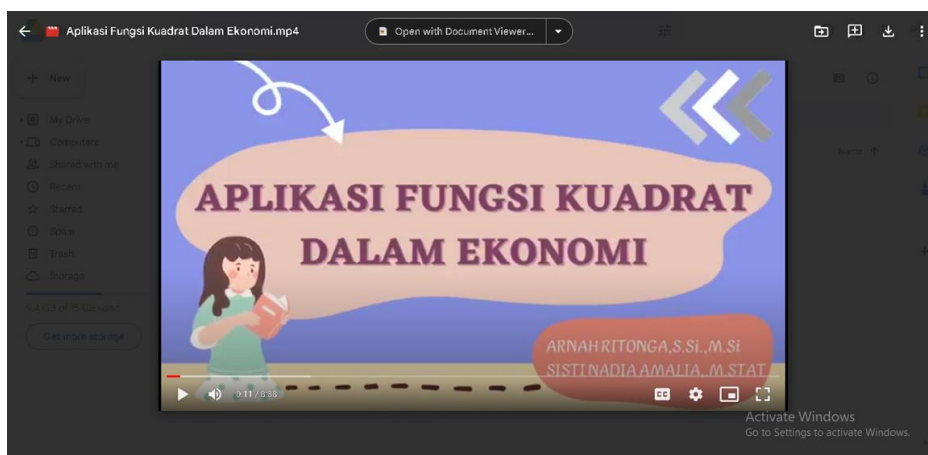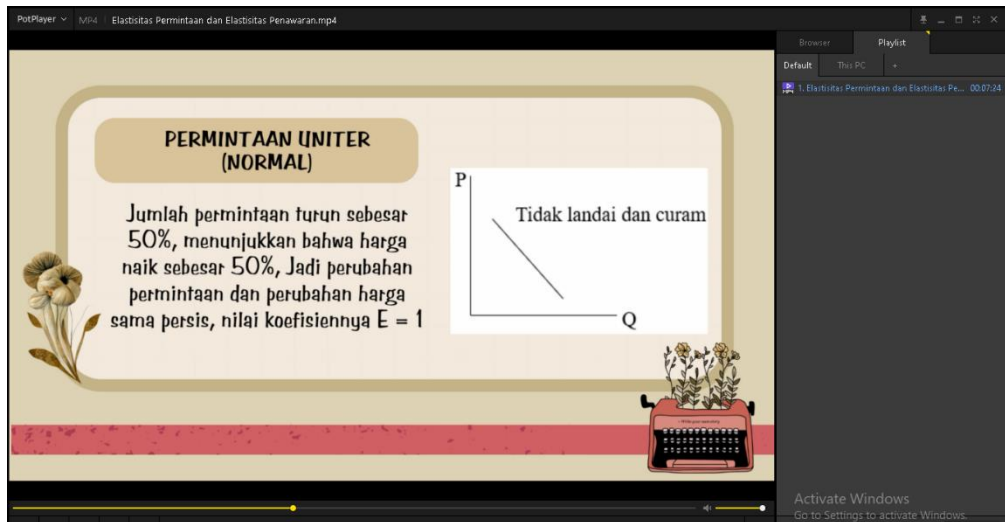
Figure 3 Material Display in Vidio Expaliner 2

This video obtains data on the validity, practicality and effectiveness of explainer video learning media. The following is product feasibility data taken from 6 experts, consisting of 3 media experts and 3 material experts.

Table 3. Media Validation Value of Vidio Explainer

No.	Validators	Score	Criterion
1	Media Expert	3,40	Highly Valid
2	Media Expert	3,20	Valid
3	Media Expert	3,20	Valid
4	Material Expert	3,10	Valid
5	Material Expert	3,21	Valid
6	Material Expert	3.10	Valid
	Average	**3,20**	**Proper**

Furthermore, practicality data was taken from a practicality questionnaire distributed to 10 students, the following is practical data on explainer video learning media.

Table 4 Practicality Value of Vidio Explainer Media

No.	Validators	Score	Criterion
1	Student 1	2,9	Practical
2	Student 2	3,10	Practical
3	Student 3	3,12	Practical
4	Student 4	3,10	Practical
5	Student 5	3,20	Practical

6	Student 6	3.10	Practical
7	Student 7	2,98	Practical
8	Student 8	3,1	Practical
9	Student 9	3,12	Practical
10	Student 10	3.10	Practical
	Average	**3,08**	**Practical**

The effectiveness of this explainer video learning media can be seen from the comparison of students' mathematical ability results. The following is a description of the data analysis of students' mathematical abilities.

Class	Average Pretest	Posttest average	Increased
Control	37,98	64,56	26,58
Experiment	39,02	74,45	35,43

Table 5 Students' Mathematical Ability Improvement Scores

The experimental data was analyzed by difference test or T-test, the table T value in the pre-test of both classes was 1.67 while the calculated T was 0.188. Based on the criteria (T count < T table.) means that there is no difference in the average pretest value of the control class or experimental class instead in the posttest analysis T count > T table. Effectiveness data is also taken from the value of student response to learning using vido explainer, the average response value from students is 89.8 with good categories. The initial stage of this research is to analyze the needs of the learning process. Needs analysis is an effective way to identify problems that arise in a learning organization (Abidin, Zaenal, 2012), this analysis is carried out on the initial abilities and initial characteristics of learners. This is important to do before developing a learning media as revealed by Ade Fitriazizah (2018) that a result of ability analysis is needed in developing a media. Initial ability is analyzed based on the scores of the students' midterm exams and end-of-semester exams. In terms of students' initial ability from pre-research survey data, it was found that students' mathematical abilities were still low, especially in the Economics Mathematics course, it was seen that the average student score in the Midterm Examination (UTS) was 65.5 with the category "E" as well as in the Final Semester Examination (UAS) the average student score was 74.5 (C). While the standard score is 80 (Criterion B), based on the results of interviews with several students stated that the material in Economic Mathematics is so abstract. So it requires a medium that supports the material to be more real. In line with Murdiani's statement (2018), mathematics is a learning whose material is abstract. Mathematics is not easy to learn, and in the end many are less interested in mathematics. The same thing was also expressed by Siti (2020) in her book entitled "Mathematics Learning Media" stating that, the bastrakan nature of mathematics causes the learning process to require a medium. In terms of the initial characteristics of students, based on the results of the researcher's analysis, students who take the Economic Mathematics course are generation z, (D. Rothman, 2016) believes that Generation Z is the last dynamic generation, born from 1995 to 2012, also known as the Internet generation or Internet generation,so that learning devices or learning media must certainly be adjusted to the characteristics of these students. This was also mentioned by Sri Suhandiah (2020) in her research revealing that generation Z gave birth to a curriculum that requires teachers to master technology in learning. So that learning in the digital era will easily receive material if the

learning is integrated with the digital world. Based on the analysis of some of these things, explainer videos are computer-based learning media that are right for the characteristics of the material and students. At this analysis stage, it is determined that a product to be developed is a network-based explainer video Economic Mathematics Material.

The next stage is Design, At this stage the researcher conducts 1) Partitioning the Number of Videos according to the Chapter on Economic Mathematics Material, 2) Developing Vidio Story Boards, 3) Designing Images, Text or Illustration of Teaching Materials, 4) Recording Sound and Images, 5) Finaalization of Draft Video Explainer, So that At this stage a draft of 1 Video explainer is produced. Effectiveness data is also taken from the value of student response to learning using vido explainer, the average response value from students is 89.8 with good categories. Table 5 presents data analyzing of each aspect of the mathematical spatial ability of students with high mathematical spatial ability. Orientation is the ability to recogniza the shape or position of a geometric object from a certain perspective, Out 10 students, 8 students answered correctly and 2 students answered but incorrectly. An aspect of spatial visualization is the ability to construct and represent geometric models drawn on a flat plane. In this aspect, out of 10 students, 9 students answered correctly. Spatial perspective is the ability to show the position between elements of the spatial structure at a certain perpective, questions related to this aspect can be answered correctly by 8 students, and the last aspect is integral or the ability to study geometric objects, only 7 students could answer correctly. These 10 students with excellent spatial abiliteswere able to solve geometric problems accurately and precisely. The next stage is the development stage (Development), Draft 1 of the results of the design stage is given to 6 material experts and media experts. Based on Table 3, it can be seen that the explainer video developed is suitable for use with several notes from experts, including: 1) Video packaging such as color and animation are more varied, 2) The writing on the Video is not nominant, more nominan to the image, 3) the sound to explain lacks intonas vaiation. Based on the revised results of experts, then draft 1 was changed according to the input of the validator team, so that draft 1 that has been revised becomes a new draft which our researchers call draft 2 explainer video. The next stage is the Implementation (Implemantation) stage, which is the stage of testing the practicality and effectiveness of explainer videos. This practicality test is to see if students understand the content of the explainer video developed. Based on Table 5.2 that the average practicality score of 10 students is 3.08 with practical criteria or easy to understand the explainer video content. Then this expaliner video is implemented in the learning process to take data on student responses to learning using explainer videos. The average student response score is 89.8 with a good category, which means that students like or give a positive response to learning using explainer video learning media.at the end of the implementation student ability test data was taken, based on table 5 it was illustrated that the increase in students' mathematical abilities in classes that use explainer video media is higher than classes that do not use explainer videos as learning media. From the statustic analysis using the t test, it illustrates that there is a significant difference between the scores of students who use expaliner videos and those who do not use them. This effectiveness is in line with previous research on the use of explainer videos in learning, including the research of Andreas Krämer Sandra Böhrs (2017) that explainer videos effectively convey complete facts to target groups in a very short time. The visualization on the Explainner video includes animated illustrations, graphics, photos, and text. Explainer videos are evolving and potentially further for online learning, a significant improvement in understanding the subject. as well as research by Hanifatul Mafazah, Cepi Safruddin Abdul Jabar (2020) that the Development of Explainer

Videos with rich literacy is able to produce creative and meaningful media. Plus the development of this explainer video is made a task for research subjects will provide meaningful learning so as to increase student understanding. Explainer videos are a form of collaboration of subjects with IT skills, a future skill needed in the world of education. In the future, video media in learning will become a means of development to achieve goals and quality learning processes, especially improving student's understanding of mathematics materials, the mathematical symbols are so abstract that they can be achieved through an explainer video, thereby making the material more concrete and easier to understand, this video not only show the material being demonstrated but also includes an explanation. The beauty is that it helps promote a good understanding of mathematics, as well as the characteristics of students know as generation Z, specifically the multitasking generation capable of doig many things the same time, so that, with this explainer video.

4. Conclusion

The developed Vidio Explainer received a validity score from 6 experts consisting of 3 material experts and 3 media matters, the average validation value from experts was 3.20 with a valid category or worthy of being used as a learning medium, especially in the Economic Mathematics course. Vidio Explainer has a practicality value of 3.08 with practical categories to be used in the learning process. The use of Vidio Explainer also has an effect on the ability to understand students' concepts by seeing an increase in the understanding of the concepts of students who use video explainer in learning, as well as compared to classes that do not use there is an average difference in the value of student concept understanding between students who use video explainer in learning with students who do not use media. Students with a high levels of mathematical spatial ability were able to meet all indicators used by the researchers use in this study. Students with average levels of mathematical spatial ability were able to meet two of the four spatial ability indicesused by the researchers. in this study. Students with the low levels of mathematical spatial ability had difficulty completig several indicators of spatial ability that the researchers used in this study.

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