

The useful of Animation Media TPACK-Based in Economic Subject Material to Build Critical Thinking Ability

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ABSTRACT

This study aims to analyze the feasibility, practicality, and effectiveness of TPACK-based animated media on economic activity material to improve critical thinking skills of grade IV students at UPT SPF SDN 101774 Sampali. This media development uses the 4D (four-D) research model, which includes the define, design, develop, and disseminate stages. The research subjects consisted of material expert validators, media experts, teachers, and 30 students. Data collection techniques in this study by conducting unstructured interviews with teachers and students and questionnaire sheets consisting of questionnaire sheets for media experts, material experts, grade IV teachers, and students. The analysis technique used in this research is product feasibility test analysis, product effectiveness test analysis, and product practicality test analysis. The developed media proved to be feasible, practical, and effective as learning media. Validation results from material experts showed 84% (feasible) at stage I and 90% (very feasible) at stage II, while validation from media experts showed 98% (very feasible) at stage I. The practicality test for teachers and students showed an average percentage of practicality of 92.6% from students and 92% from teachers, with an overall average of 92.3% (very practical). Finally, the effectiveness test of TPACK-based animated media in improving students' critical thinking skills has increased significantly, with a pretest score of 48 and increased during the post test of 86 and the results of the gain test show a value of 0.73 which is categorized as high. Thus, the TPACK-based animation media developed is declared feasible, practical, and effective for use in improving students' critical thinking skills and can be used as a new breakthrough in the utilization of digital technology in 21st century learning because this media not only utilizes technology to improve the quality of learning, but also integrates pedagogy and content relevant to the needs of today's students.

KEYWORDS

animation media; TPACK; critical thinking skills

INTRODUCTION

Fitriani (2020), who found that students often face difficulties in understanding economic terms and their relationship to economic activities around them. Other research conducted by Pratiwi (2019), shows that a lack of understanding of basic economic concepts and a lack of experience in economic activities are the main obstacles for students in studying social studies. So according to Ramadia et al (2023) one way to overcome this problem is to realize digital-based media. By using technology, we can display economic activities directly

through digital media. This is in line with Edgar Dale's Theory, namely the Cone of Experience Theory, which explains the quality of learning using learning media. This theory describes learning experiences from the most abstract, including learning by direct experience, observation, learning participation, demonstrations, tourism-based, via TV. , films, audio, images, visual symbols, and the most abstract is verbal (Sari, 2019).

If viewed from a learning perspective, according to Sholikhah (2020), in its implementation there are not many teachers who develop learning media, even the use of monotonous lecture methods is still quite popular among teachers in the social studies learning process. In fact, according to Halpern (2014), he examined various critical thinking teaching methods and concluded that traditional methods such as lectures were less effective in improving students' critical thinking skills. Halpern recommends using more problem-based and interactive methods, such as group discussions and project assignments, which have been shown to be more effective in developing critical thinking skills.

And based on the results of direct observations at UPT SPF SDN 101774 Sampali, it was found that many teachers only use simple learning media, such as pictures without any interesting animation media. If we look at the results of the non-cognitive diagnostic assessment of class IV students at UPT SPF SDN 101774 Sampali.

Of the 30 class IV students, it can be seen that 6 people like the visual learning style, 11 people like the kinesthetic learning style and 13 people like the audiovisual learning style. This means that students like audiovisual-based learning, while teachers do not develop animation media, rarely use focus, and do not develop technological devices. As a result, students easily feel bored during the learning process. According to Pebrianti (2019), learning media is still often neglected for various reasons, including: limited time to make teaching preparations, difficulty finding the right media, and unavailability of funds. In fact, according to Darniyati, et al (2023) animation media has great potential in increasing the effectiveness of social studies learning in elementary schools. By combining engaging visual, audio, and narrative elements, learning media can motivate students, help them understand complex concepts, and enrich their learning experience.

Teachers who use innovation in learning drive a crucial role in the digitization of education. Technology can improve the quality of learning, making the learning process more exciting and interactive. Therefore, teachers must expand and integrate their pedagogical skills with content and technology (Suprihatiningrum, 2023). Animated video media is an option that can be used by educators when developing learning aids to support the teaching and learning process. Animated video media is a tool for distributing information or messages in the form of a collection of dynamically moving images that can be seen and heard (Huda et al., 2022). Therefore, researchers are motivated to design an innovative and interesting form of learning media, namely TPACK-based animated videos that can meet students' learning needs by providing in-depth understanding, stimulating critical thinking, and encouraging students' active participation during learning. With an attractive video design and clear delivery, it can create student enthusiasm for learning so that learning is more effective and meaningful. This animated video is specifically designed for Economic Activities material in science learning in class IV.

RESEARCH METHODS

This type of research is development research (research and development). According to Abdillah (2021), Development (Research & Development) is a research model that aims to develop a product which begins with needs research and then develops to produce a product that has been tested.

This research will be carried out at UPT SPF SDN 101774 Sampali which is located at Jl. West Irian Sampali Village, Percut Sei Tuan District, Kab. Deli Serdang, North Sumatra Province. The time for conducting the research was in the even semester of the 2023/2024 academic year, namely February to March 2024, in accordance with the estimated research schedule.

In this research, the media development model used is the 4-D development model (Four D Model). The development of the 4-D model developed by Thiagarajan consists of 4 stages, namely define, design, develop and disseminate (Arkadiantika et al. 2020). Task Analysis

This activity is aimed at analyzing students' critical thinking skills that will be developed in learning, so that the material presented in developing this animation media is in accordance with the learning achievements and objectives that have been set.

Analysis of learning objectives is carried out to determine indicators of learning achievement that are in accordance with material and curriculum analysis, making it easier for researchers to know what needs to be designed in creating questions and achieving the learning objectives that have been set.

The formulation of learning objectives to be achieved in this research is as follows: (1) Through animated media displays and discussions, students can properly examine the role of producers, distributors and consumers in the flow of economic activities (TPACK, C4-HOTS); (2) Through group work, students can design, practice and make good buying and selling reports during market day activities (C6-HOTS).

The validity of the TPACK-based animation media developed is based on data obtained by material experts and media experts. The following are the steps for calculating validation instrument data analysis:

- a. Calculate the score of the assessment instrument so that in this research, scores are obtained from all validators involved.
- b. Calculating the index percentage, the formula used in this research is:

$$Percentage = \frac{\text{score obtained}}{\text{High Score}} \times 100\%$$

Then match the index percentage data with the following qualification table;

Table 1. Validity Level Qualification Based on Percentage

Percentage (%)	Validity Level	Description
81% < score ≤ 100%	Very Valid	Can be used
61% < score ≤ 80%	Valid	Can be used
41% < score ≤ 60%	Valid Enough	Partial Revision
21% < score ≤ 40%	Less Valid	Revision
0% < score ≤ 20%	Invalid	Revision

Source: Jannah & Julianto (2018)

TPACK-based animation media will be said to be valid if it gets a minimum percentage of 41% with a fairly valid category even though some of it has been revised. In the second data analysis in the second problem formulation, namely the level of effectiveness, the data will be processed from the post-test results after using TPACK-based animation media on economic activity material to improve critical thinking skills. There are steps to analyze student post-test result data. Give each value using the formula:

$$N = \frac{\text{score obtained}}{\text{High Score}} \times 100\%$$

The level of effectiveness of TPACK-based animation media on Economic Activities material can be obtained from the KKTP implemented in schools, namely 70 through the following index percentage:

$$\text{Percentage} = \frac{\text{number of students who got } \geq 70}{\text{number of students taking the test}} \times 100\%$$

Table 2. Qualification Level of Effectiveness Based on Percentage

Percentage (%)	Validity Level	Description
81% < Score ≤ 100%	Very Valid	Can be used
61% < Score ≤ 80%	Valid	Can be used
41% < Score ≤ 60%	Valid Enough	Partial Revision
21% < Score ≤ 40%	Less Valid	Revision
0% < Score ≤ 20%	Invalid	Revision

Source: Jannah & Julianto (2018)

RESULTS AND DISCUSSION

Table 3. Feasibility of TPACK Based Animation Media

No	Expert	Phase I Percentage	Phase II Percentage
1	Material	84%	90%
2	Media	98%	98%
Average		91%	94%

The results of the analysis above show that the development of TPACK-based animation media for learning Economic Activities material has produced products with high feasibility, practicality and effectiveness. In the validation stage by material experts and media experts, this product received a positive assessment with a high percentage. In stage I, the results of the material expert assessment showed a percentage of 84%, which indicated that the product was suitable for use with several revisions according to expert advice. Then, after carrying out improvements and reassessment in stage II, the assessment percentage increased to 90%, reaching a very feasible level. Meanwhile, the results of the media expert assessment in stage I showed a percentage of 98%, which indicates a very feasible level. This indicates that the product is very suitable for use in learning. Suggestions from material experts to adapt learning objectives to learning outcomes and package the material better have been taken into account in the development of this product.

In addition, the results of the media expert's assessment show that the product has reached a very feasible level in terms of media and presentation in accordance with John Dewey's constructivism theory. In the context of John Dewey's constructivist theory, the development of TPACK-based animation media can also be understood from a relevant perspective. This theory emphasizes the importance of direct and interactive experiences in learning, where students are actively involved in the learning process to build their understanding of economic activity material. John Dewey's constructivism emphasizes that learning is not a passive process where students receive information from teachers or the media, but is an

active process where students actively construct their own knowledge through direct experience, reflection, and social interaction.

In the context of developing TPACK-based animation media, the implementation of John Dewey's constructivism theory can be seen in two aspects. First, TPACK-based animation media is designed to facilitate direct and interactive experiences for students. By presenting learning material through animations that are interesting and easy to understand, students are encouraged to be actively involved in the learning process. They can explore concepts of the flow of economic activity through visual simulations that allow students to build their own understanding of the material.

Second, TPACK-based animation media also creates opportunities for students to reflect and interact socially. Through discussions, assignments, or project-based activities included in these media, students can reflect on their experiences, share ideas, and work together to understand the concepts being taught. Thus, TPACK-based animation media not only presents information to students, but also helps them in building their own knowledge through direct experience, reflection, and social interaction.

Thus, the animation media does not only aim to convey information, but also to help students actively engage in the learning process and build their own understanding of the material being taught. This is in line with previous research by Farizi et al (2019) that the use of TPACK-based animation media can make a positive contribution to the quality of learning in the classroom.

Tabel 4. Product Practicality Assessment

No	Validity	Percentage	Criteria
1.	Student	Very Practical	Very Practical
2.	Teacher	Very Practical	Very Practical
Average		92,3%	Very Practical

Furthermore, the results of the product practicality test show that TPACK-based animation media is very practical for students and teachers to use in learning. The test results of 30 students showed an average achievement of 92.6%, which is considered very practical. Meanwhile, the test results for teachers reached an achievement percentage of 92% which was categorized as very practical. By calculating the results of the practicality tests of students and teachers, an average achievement of 92.3% was obtained, which is also included in the very practical category. In this case, the level of practicality of TPACK-based animation media can be seen as the result of applying the principles of John Dewey's constructivism. This media is very easy to use by students and teachers, this indicates that the media is able to facilitate direct and interactive experiences in learning. Students can easily access and use this media to explore learning concepts, while teachers can effectively integrate this media into the classroom learning process. This media not only provides information to students, but also helps them build their own understanding through direct experience and active interaction with learning material. Therefore, the selection of appropriate learning media must be adjusted to the learning objectives, student characteristics, and the teacher's teaching style (Nasution and Setiwan 2022). Quality learning media will help create a quality learning process.

Table 5. Recapitulation of Pretest and Post-test Results for Class IV Students

Respondent	Score Pretest	Score Post-test
R01	80	90
R02	40	100
R03	60	100

Respondent	Score Pretest	Score Post-test
R04	20	90
R05	20	80
R06	40	90
R07	40	90
R08	40	80
R09	80	90
R10	60	80
R11	80	100
R12	80	100
R13	20	80
R14	20	80
R15	40	90
R16	20	80
R17	20	80
R18	20	80
R19	60	100
R20	60	80
R21	60	80
R22	60	90
R23	60	80
R24	20	60
R25	20	60
R26	40	60
R27	80	100
R28	40	100
R29	80	100
R30	80	90
Total	1440	2580
Average	48	86
The highest score	80	100
Lowest Value	20	60
Mode	20	80
Median	40	90

The gain test results from the class IV pretest and posttest scores are as follows:

$$Gain (g) = \frac{86 - 48}{100 - 48} = 0,73$$

From the calculations that have been carried out, the gain result is 0.73. This result is in the high category. The product effectiveness test results show a significant increase in students' understanding of Economic Activities material after using TPACK-based animation media. This can be clearly seen from the results of the pretest and post-test in class IV on economic activity material taught using TPACK-based animation media. The results of the pretest carried out on 30 students showed an average score of 48. Then, after implementing TPACK-based animation media and carrying out a post-test, the students' scores increased significantly with an average score of 86 from 30 students. Next, the resulting data was analyzed using a gain test which produced a value of 0.73 which was categorized as high. During the process of implementing TPACK-based animation media on economic activity material in class IV, it was seen that students began to show increased enthusiasm and active involvement in learning. Students are more motivated to follow

lessons and engage in discussions, because animation media presents material in an interesting and easy to understand way. In addition, students are directed to think critically about the concepts taught in the Economic Activities material. In the analyzing stage (C4), students actively identify the roles of distribution, production and consumption through the animated video shows shown. Apart from that, students also discuss what activities a distributor, producer and consumer can carry out in economic activities that are often found in the students' surroundings. Next, in the evaluating stage (C5), students are given a project to create a practical plan for buying and selling activities. Students in groups must determine who will act as distributors, producers and consumers. Apart from that, students also discuss what strategies must be implemented so that consumers are interested in selling them. In the creating stage (C6), students are challenged to run a market day project. Students can use creativity to develop products to be sold and determine the price of the products to be sold.

The above is in line with the constructivism theory promoted by John Dewey. In his approach, John Dewey emphasized the importance of direct experience and student interaction with subject matter. According to John Dewey, learning should be active, contextual, and emphasize students' critical thinking processes. Thus, with TPACK-based animation media, students can channel their ideas, encourage students to think critically and creatively, and apply their knowledge in real contexts. Through the activities contained in TPACK-based animation media, students not only learn concepts of economic activity material but also develop critical thinking skills. The existence of project-based learning contained in the developed animation media makes the learning process more fun and challenging, as well as being effective in improving students' critical thinking skills. The results of the pretest and post-test show an increase in students' critical thinking skills in the "high" category, indicating that TPACK-based animation media is a suitable, practical and effective learning tool in improving critical thinking skills at elementary school level.

CONCLUSION

Based on the results and discussion of the research, it can be concluded as follows:

1. The results of the feasibility of the product that has been developed are assessed by material experts and media experts. In stage I, the material expert gave an assessment percentage of 84%, indicating that the material in the product being developed was feasible but needed revision. Then improvements and reassessment were carried out and the results of the phase II assessment reached 90%, which shows that the material in the product being developed is very feasible. Furthermore, the results of the media expert assessment in stage I showed a percentage of 98%, which indicated that the product being developed was very feasible. From these results, it can be concluded that the assessment from material experts and media experts' states that TPACK-based animation media for Economic Activities material is suitable for use in classroom learning.
2. To determine the level of practicality of the product being developed, trials were carried out on students and teachers. The results of trials on 30 students showed an average of 92.6%, indicating that the product developed was very practical. Meanwhile, the test results for teachers reached an achievement percentage of 92% which was categorized as very practical. So we get an average achievement level of product practicality of 92.3%, which is also included in the very practical category. Students also show interest in TPACK-based animation media because it contains activities that involve students in fun learning. Contemporary, and easy to access. So, when there is this media, it can trigger curiosity to think critically and be able to learn independently. Teachers are also enthusiastic about using this media because it helps

explain the material in an interesting way. Thus, from the test results and usage experience, it can be concluded that TPACK-based animation media is very practical to use.

3. To determine the level of effectiveness of the product being developed, a pretest and post-test were carried out on students with material on economic activities using TPACK-based animation media. The gain test results show a value of 0.73 which is categorized as high in improving students' critical thinking skills. However, the test results show that there are differences between before and after using TPACK-based animation media, as seen from the results of the pretest 48 and posttest 86. Thus, it can be concluded that TPACK-based animation media shows a high level of effectiveness in improving students' critical thinking abilities.

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