



Development of TPACK Based Interactive Media with a Problem Based Learning Model to Improve The 21st Century Skills of Elementary School Students in Pancasila Education Subjects

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Abstract: This study investigates the feasibility, practicality, and effectiveness of TPACK-based interactive media with the Problem-Based Learning model to improve students' 21st-century skills in Pancasila Education. This research uses the Research and Development (R&D) method with the ADDIE (Analyze, Design, Develop, Implementation, and Evaluation) model. The subjects of this research consist of material experts, linguists, media experts, teachers, and 32 students of class V at SDIT Al-Farabi in North Sumatra. The data collection techniques used include observation, tests, and questionnaires. Data analysis techniques use qualitative and quantitative analysis. The results show that (1) the feasibility of the media was validated by subject matter experts with a percentage of 93.8% with very feasible criteria, linguists with 85.4% with very feasible criteria, and media experts with 90.3% with very feasible criteria, (2) practicality was yielded through a practicality test by teachers with a percentage of 100% with very practical criteria and student responses of 98% with very practical criteria, and (3) the effectiveness of students' 21st-century skills was obtained from students' critical thinking skills with an N-Gain (g) of 0.5 in the range of $0.3 \leq g < 0.7$ with the criterion of "Effective" and a Sig. of $0.000 < 0.05$, which proved a significant improvement. Additionally, creative skills, communication, collaboration, and character of students showed a Sig. of $0.000 < 0.05$, indicating a significant improvement, and students' citizenship skills showed a Sig. of $0.023 < 0.05$, proving a significant improvement.

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Introduction

Pancasila education in the Independent Curriculum aims to form students in accordance with the practice of Pancasila values, Pancasila learning is applied through civic practices based on Pancasila, the 1945 Constitution of the Republic of Indonesia, the spirit of Bhineka Tunggal Ika, and has the commitment of the Unitary State of the Republic of Indonesia (Indra et al., 2023). Along with the development of the education paradigm in the 21st century today, Pancasila Education is very important to be implemented starting from elementary school. Educators must help students who not only master technical skills, but also become critical thinkers, creative thinkers, effective communicators, good collaborators, and have strong character and national spirit. Therefore, the emphasis on 21st century skills must be paid more attention by teachers.

21st century skills allow individuals to adapt quickly, solve problems, and innovate. This is in line with the opinion (Anakwe & Uzoamaka, 2021) that students must have 21st century skills (21st century skills) 6C which include Critical thinking, Collaboration, Communication, Creativity, Citizenship/Culture, and Character education/Connectivity. 21st



century skills (6C) are very useful for success in the world of work and community life, so there is a need to make efforts to develop them in the world of education, even from elementary school age (Srirahmawati et al., 2023). Therefore, 21st century skills should be developed from elementary school age through fun learning innovations. However, the reality on the ground is that not all educators are able to develop innovative learning to improve 21st century skills in students.

Based on the results of observations that have been carried out with grade V teachers of SDIT Al-Farabi in North Sumatra, the learning process is still dominated by conventional learning, which is only fixed on one textbook and lecture method. The learning carried out makes students' thinking less developed and not in accordance with the demands of the times. This is not in line with 21st century learning that has emphasized 6C skills by being oriented towards critical thinking, creative thinking, cooperation, communication, character, and citizenship (Kemdikbud, 2022).

Conventional learning is considered not to reflect 21st century skills, especially in Pancasila Education subjects which are often considered less attractive to students. The purpose of Pancasila education is to make good citizens, so that later they can support and actively participate in the administration of the state (Zulfikar & Dewi, 2021). Pancasila education is a subject that focuses on strengthening attitudes, character formation, and national insight through the cultivation of values and morals to form the nation's identity (Tri Wahyuni, 2024). Therefore, Pancasila Education subjects must be carried out even from an early age which is oriented to fun learning, centered on the activeness of students so that later it can be understood through knowledge and applied with skills, so that later it can produce a good attitude as a citizen.

Creating student activeness in the learning process requires interactive learning media. Through interactive media, the delivery of learning materials is carried out from abstract to concrete, making it easier for students to understand the learning material (Fauzi et al., 2021). TPACK based interactive media can be one of the solutions to create innovative learning that is effective and meaningful in involving students in understanding concepts and thinking skills.

The TPACK (Technological Pedagogical Content Knowledge) approach becomes relevant if teachers will develop technology based learning innovations. TPACK integrates technological knowledge, pedagogy, and content that allows teachers to develop active and interactive learning (Li et al., 2024). Realizing learning success through the TPACK approach with technology based interactive learning media requires a learning model as a framework for learning activities to be implemented. Problem Based Learning (PBL) is a learning model that can be used in the learning process that emphasizes constructivism learning theory. This is in line with the opinion Subarjo et al. (2023) which states that the PBL model actively involves students in constructivist processes that can improve critical thinking skills, analyzing in depth information to make decisions in solving problems.

The use of technology helps students learn more effectively and deeply, while PBL ensures them to engage in processes that trigger critical thinking, collaboration, and character development skills. It prepares students to face real world challenges with comprehensive skills. However, based on the results of a review conducted at SDIT Al-Farabi school in North Sumatra, the principal and the Foundation are still trying to improve teachers' competence in mastering technology to create a 21st century learning process by starting to train teachers on the implementation of TPACK based learning in schools. However, not all teachers have mastered and applied TPACK based learning to students in the classroom,

because they find it difficult to integrate technology effectively in learning, by combining pedagogical knowledge and learning content, especially in elementary schools.

The lack of teachers in implementing and mastering TPACK based learning makes it difficult for teachers to develop innovative and interactive learning media. The limited media that has been provided by teachers makes students less likely to express their ideas, thus affecting students' creative skills. Students often only read textbooks, listen to and follow the examples given by the teacher, and work on the questions available in the textbook without developing the ideas they have.

Along with the results of the observation of grade V students of SDIT Al-Farabi in North Sumatra, it shows that the subject of Pancasila Education, especially in the material on the relationship between Pancasila precepts, is often delivered only theoretically, without actively involving students with memorization methods. Students tend to only remember each precept of Pancasila, but it is still difficult to distinguish and connect the meaning between the precepts of Pancasila. Students really like to ask questions to teachers that describe students being active in thinking. However, because the conventional learning model makes students less developed and only understand information, without interpreting it.

It is evident from the results of the formative test obtained in the material on the relationship between Pancasila precepts that the learning results of 32 students are still not effective. There were 5 students who achieved completeness with a percentage of 15.6% and 27 other students were said to be incomplete with a percentage of 84.3%. This shows that students' critical thinking skills are low. The limitations of media in learning also make students less likely to express their ideas.

Another impact of conventional learning can be seen in students' collaboration and communication skills. Conventional learning makes students passive (Hadiyanto et al., 2021). The teacher explained that students were still lacking in cooperating, several times the teacher felt that it was not effective in making a study group. Students tend to prefer to study individually or independently. The lack of active participation of students in group activities can also be caused by students not understanding the meaning of Pancasila values which describe students' civic skills are still low. Students do not yet fully have the awareness to actively participate and interpret the attitude of mutual cooperation, tolerance, and social responsibility. The formation of students' character skills has not been able to run effectively, as can be seen in the behavior of students who still show a lack of concern for others and have not fully reflected the values of Pancasila.

This research aims to overcome the problem of low skills in the 21st century of grade V students of SDIT Al-Farabi in North Sumatra in the subject of Pancasila Education. TPACK based interactive media with a problem based learning model is expected to answer these problems to increase students' interest in learning, so that they can improve the 21st century skills of grade V students of SDIT Al-Farabi in North Sumatra. The development of interactive media uses a TPACK (Technological Pedagogical Content Knowledge) approach, which consists of the use of technology in the form of a learning website that can be accessed on various digital devices, the pedagogy used is the Problem Based Learning (PBL) model, and the content used is material on the relationship between Pancasila precepts.

Based on previous research, the TPACK approach with the problem based learning model has been proven to significantly improve the critical thinking skills of high school students in the Pancasila Education subject (Khatimah et al., 2024). The findings show that the integration of technology and problem based learning models can improve one of students' 21st century skills. Therefore, this study aims to analyze the feasibility, practicality,



and effectiveness of TPACK based interactive media with the Problem Based Learning model to improve students' 21st century skills in the Pancasila Education Subject.

Research Method

This research uses research and development (R&D) methods. Research and development methods are research that is carried out scientifically to research, design, produce and test the validity of a product that has been developed, this activity can also be referred to as the 4Ps (research, design, production, and testing) (Sugiyono, 2019) This research and development is carried out with the ADDIE model which consists of several stages, namely Analyze, Design, Development, Implementation, and Evaluation (Asnur et al., 2025).

The subjects in this study are one teacher in grade V and a class V student at SDIT Al-Farabi in North Sumatra which totals 32 students and the object of this study is the development of TPACK based interactive media with a Problem Based Learning model to improve the 21st century skills of elementary school students in the subject of Pancasila education. Qualitative data was obtained from the results of observations made in class V of SDIT Al-Farabi in North Sumatra in the implementation of learning using TPACK based interactive media with the Problem Based Learning model to improve students' 21st century skills in Pancasila Education subjects. Meanwhile, quantitative data is obtained from the results of the assessment of each instrument that has been developed using the Likert scale. Product effectiveness is measured using the N-Gain Score based on the pretest and posttest on critical thinking skills and the one sample t test - Wilcoxon Signed Rank Test. The effectiveness of creative, communication, collaboration, and citizenship skills using the one sample t test - Wilcoxon Signed Rank Test was obtained by comparing the average student skill results with the criteria for achieving predetermined learning objectives of 75. The effectiveness of character skills uses a one sample t test obtained from comparing the average of students' skills with the criteria for achieving predetermined learning goals of 75.

Results and Discussion

Analyze

The analysis phase is carried out to find sources of information based on problems in schools through observation. The analysis carried out is to analyze needs, analyze students, analyze learning tools, and analyze curriculum and materials. Based on this analysis, the use of interactive learning media based on TPACK is one of the solutions to create relevant learning. The use of technology in media that displays images, videos, audio, and buttons can make students directly involved in learning. The use of the problem based learning model can offer contextual learning based on problems in the surrounding environment, so that students can become good problem solvers by building communication and teamwork.

Design

The design phase is carried out in two stages, namely product design and compiling research instruments. The preparation of the product begins with compiling a teaching module according to the syntax of the problem based learning model first to find out the stages of learning and the chosen material, namely the relationship between Pancasila precepts in the Pancasila Education subject class V. Furthermore, the product design process is carried out through the design of visual elements using aplikasi ilustrasi digital Procreate versi 5.3.14 dan aplikasi desain grafis dari Canva Pro.

After the design, an instrument was prepared, consisting of: 1) a validation instrument for material, media, and language experts, 2) a practicality test instrument to see the response

of teachers and students to the developed media, 3) an effectiveness test instrument consisting of critical thinking skills instruments through objective tests, creative thinking skills instruments through subjective tests, observation sheet instruments for communication and collaboration skills, and self assessment and peer assessment for civic character skills.

Development

The development phase is the process of making the design a reality. The preparation of TPACK based interactive media with a problem based learning model was carried out using Articulate Storyline 360 software and then exported in HTML5 format and published through GitHub Pages as an interactive learning website. The following is a display of the media that has been developed:

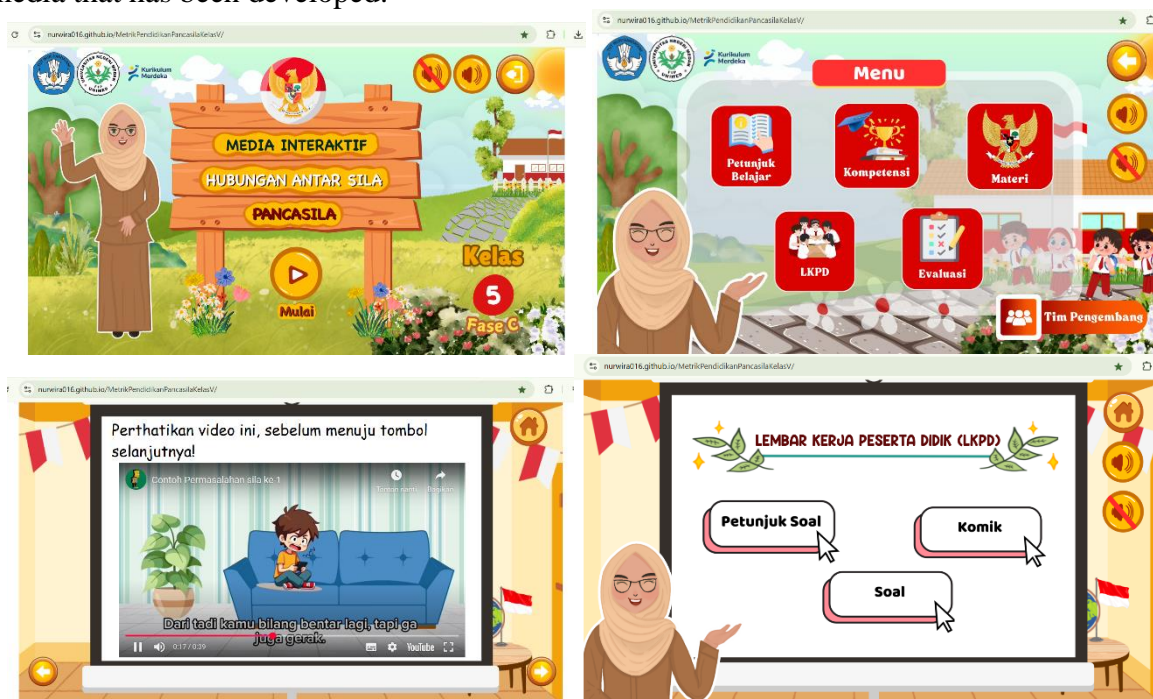


Figure 1. TPACK Based Interactive Media Display with Problem Pased Learning Model
After the product is developed, then product validation and instrument validation are carried out. The following is a recapitulation of product validation based on the results of the assessment of material, language, and media experts.

Table 1. Recapitulation of TPACK Based Interactive Media Validation with PBL Model

No.	Validator	Interactive Media Validation Results	
		Eligibility Percentage	Category
1.	Material Expert	93,8%	Very Feasible
2.	Language Expert	85,4%	Very Feasible
3.	Media Expert	90,3%	Very Feasible
Total Amount		269,5%	Very Feasible
Average		89,9%	

Based on table 1. The recapitulation of TPACK based interactive media validation with the PBL model obtained a percentage result of 89.9% with the category "Very Feasible". The product has gone through revision based on expert advice which can then be tested in the field. The validation of the material obtained a score of 93.8% with the category "Very Feasible" that can be tested in the field. This shows that the material in TPACK based interactive media with the Problem based Learning model to improve students' 21st century

skills in the Pancasila Education subject class V SDIT Al-Farabi in North Sumatra is in accordance with the material feasibility standards.

In line with research conducted by Adam & Mulyani (2023) who developed interactive media assisted by articulate storyline in Indonesian learning obtained the validation results of 92% of subject matter experts in the category of "Very Feasible". Although the context of the material in the study is not the same, the similarity of these results shows that to develop interactive media, valid or feasible materials are needed to reflect the suitability of the material with the curriculum, the accuracy of the concept, and the level of understanding of students.

The results of the Language Validation obtained a percentage of 85.4% with the category "Very Feasible" that could be field tested. Based on the results obtained, it shows that the language in TPACK based interactive media with the PBL model to improve the 21st century skills of students in the Pancasila Education subject class V SDIT Al-Farabi in North Sumatra is good and correct. A similar research was conducted by Setiyowati et al. (2023) who developed the design of teaching materials containing 6C to obtain a linguist's validation of 96% in the category of "Very Feasible". This shows that the use of language that is simple, clear, and in accordance with the level of development of students is one of the keys to success in developing learning tools that support skills in the 21st century of students

The results of media validation obtained a result of 90.3% with the category "Very Feasible" but can be tested after revision according to expert advice. Based on these results, it is shown that TPACK based interactive media with the PBL model to improve the 21st century skills of students in the Pancasila Education subject class V of SDIT Al-Farabi in North Sumatra has met the aspects of visual, audio, and learning design assessments that are suitable for use in the learning process. In line with research Nabilah et al. (2020) that developed articulate storyline assisted learning media in science materials which obtained media expert validation results of 86.16% with the category "Very Feasible". This shows that the choice of media in learning is very important. Media that is able to attract students' attention can foster the spirit of learning in achieving learning goals. Media selection by utilizing the use of technology can be a consideration in developing media to help an effective and interactive learning process. Based on the average percentages obtained from the three expert validations, it shows that TPACK based interactive media with a problem based learning model is suitable for strengthening students' 21st century skills in Pancasila education subjects in class V SDIT Al-Farabi in North Sumatra.

Validation is also carried out on students' 21st century skills instruments carried out by experts to see the feasibility of the content of the instrument. The following is a recapitulation of the validation of 21st century skill instruments for students in the Pancasila Education subject.

Table 2. Student 21st Century Skills Instrument Validation Recapitulation

No.	Validator	Interactive Media Validation Results	
		Eligibility Percentage	Category
1.	Critical Thinking Skills Test Instrument	94,1%	Very Feasible
2.	Creative Skills Assessment Rubric Instrument	96%	Very Feasible
3.	Communication and Collaboration Skills Observation Sheet Instrument	91%	Very Feasible
4.	Character and Citizenship Skills Assessment Instrument	92,8%	Very Feasible
Total Amount		374%	Very Feasible
Average		93,5%	

Based on table 2. The 21st century skill instrument validation recapitulation results obtained a percentage result of 93.5% with the category “Very Feasible”. So that this instrument can be carried out field tests on grade V students of SDIT Al-Farabi in North Sumatra in Pancasila education subjects to measure critical thinking, creativity, communication, collaboration, character and citizenship skills.

Products and instruments that have been declared feasible are then followed by practicality tests to see the extent of the practicality of the products that have been developed based on the responses of teachers and students. The following are the results of the practicality test obtained.

Table 3. Recapitulation of TPACK Based Interactive Media Practicality with Problem Based Learning Model

No.	Practitioners	Results of Interactive Media Practicality	
		Percentage of Practicality	Category
1.	Teacher	100%	Very Practical
2.	Students	98%	Very Practical
Total Amount		198%	Very Practical
Average		99%	

Based on table 3. The recapitulation of the practicality of TPACK based interactive media with the PBL model obtained a percentage result of 99% with the category "Very Practical". Therefore, the interactive media that has been developed has met the practicality standards for use in field trials. No improvements were made based on comments as the results of the practicality test received an overall positive response. So it can be concluded that TPACK based interactive media with the PBL model is declared "Very Practical" to be used as a learning medium to improve students' 21st century skills in the Pancasila Education subject class V SDIT Al-Farabi in North Sumatra. According to Fitra & Maksum (2021) practical media is a medium that can be used easily and according to the user's ability

Implementation

After the TPACK based interactive media with the PBL model of TPACK based interactive media with the PBL model that has been developed is declared feasible and practical, it will then be used for field trials in grade V students of SDIT Al-Farabi in North Sumatra totaling 32 students to see the effectiveness of the product. This trial stage was carried out to acquire students' 21st century skills, including critical thinking skills, creative skills, communication skills, collaboration skills, character skills, and citizenship skills.

The results of the critical thinking skill effectiveness test were seen based on the results of the pretest and posttest scores that obtained an N-Gain of 0.5 with the criterion of "effective" with a completeness of 100% learning outcomes. Followed by the Wilcoxon Signed Rank Test on the results of the critical skills test obtained sig. 0.000 < 0.05. This shows that H_0 was rejected and H_a was accepted. This means that the average posttest score of 59 is greater than the average pretest score of 80. Therefore, it can be interpreted that the use of TPACK based interactive media with the PBL model in the Pancasila Education subject has a positive and significant influence on improving the critical thinking skills of grade V students of SDIT Al-Farabi in North Sumatra. This is strengthened by research that obtained sig. 0.000 < 0.05 which proves that interactive media can improve Pancasila educational learning. This is reinforced by research (Sari & Mutiara, 2022) which obtained sig. 0.000 < 0.05 which proves that interactive media can improve Pancasila educational learning.

The critical thinking skills of grade V students of SDIT Al-Farabi in North Sumatra are obtained through objective tests. After doing the critical thinking skills test after using



interactive media based on problem based learning, students are able to analyze the problem of applying the precepts of Pancasila as a complete agreement, students are able to evaluate the impact of not applying one of the precepts to a complete unity, and students are able to design a solution to a problem based on the application of Pancasila as a complete unity.

The test of the effectiveness of the creative skills assessment based on the results of the Wilcoxon Signed Rank Test on the results of the creative skills test was obtained sig. $0.000 < 0.05$. This shows that H_0 was rejected and H_a was accepted. This means that the average score of students' creative skills is higher than 75 according to the KKTP with a percentage of 100% completeness in the category of very good. This shows that students have met the standards that have been set. Therefore, it can be interpreted that the use of TPACK based interactive media with the PBL model in the Pancasila Education subject has a positive and significant influence on improving the creative skills of grade V students of SDIT Al-Farabi in North Sumatra. This is reinforced by research Siregar et al. (2021) that the development of TPACK based media significantly improves students' creative thinking skills.

The improvement of creative skills was carried out after using TPACK based interactive media with the PBL model in the Pancasila Education subject class V SDIT Al-Farabi in North Sumatra which was seen based on the assessment rubric that had been prepared. The aspect of assessing creative skills is how far students analyze problems, assess the relationship between Pancasila precepts on problems, and design solutions to problems in the comic "Garbage Comes, Floods Attack". The assessment of creative skills is also assessed based on the results of presentations made by students in groups.

The test of the effectiveness of the communication skills assessment based on the results of the Wilcoxon Signed Rank Test on the results of the communication skills test was obtained sig. $0.000 < 0.05$. This shows that H_0 was rejected and H_a was accepted. This means that the average score of students' communication skills is higher than 75 according to the KKTP with a completion percentage of 93.8% and has a very good category. This shows that students have met the standards that have been set. Therefore, it can be interpreted that the use of TPACK based interactive media with the PBL model in the Pancasila Education subject has a positive and significant influence on improving the communication skills of grade V students of SDIT Al-Farabi in North Sumatra. Research Ariyanti (2020) strengthens that the use of problem based learning models can improve students' communication skills. The increase occurs because the learning process is more focused on student activity which is carried out through discussion activities, exchanging ideas to solve problems.

The improvement of communication skills was carried out after using TPACK based interactive media with the PBL model in the Pancasila Education subject class V SDIT Al-Farabi in North Sumatra which was seen based on group discussions and presentations. This assessment is carried out based on the observation sheet that the teacher assesses. The assessment is based on indicators of communication skills, including students must be able to express opinions, listen to the opinions of friends, convey the results of discussions systematically, and be able to ask and answer questions from teachers and friends.

The test of the effectiveness of the collaboration skills assessment based on the results of the Wilcoxon Signed Rank Test on the results of the collaboration skills test was obtained sig. $0.000 < 0.05$. This shows that H_0 was rejected and H_a was accepted. This means that the average score of students' collaboration skills is higher than 75 according to the KKTP with a completion percentage of 93.8% and has a very good category. This shows that students have met the standards that have been set. Therefore, it can be interpreted that the use of TPACK based interactive media with the PBL model in the Pancasila Education subject has a positive and significant influence on improving the collaboration skills of grade V students of SDIT

Al-Farabi in North Sumatra. In line with research Fatwiyah et al. (2024) that passing the problem based learning model can be used as an effort to increase student collaboration, such as cooperation, social skills, and student responsibility.

The improvement of collaboration skills was carried out after using TPACK based interactive media with the PBL model in the Pancasila Education subject class V SDIT Al-Farabi in North Sumatra which was seen based on group discussions and presentations. This assessment is carried out based on the observation sheet that the teacher assesses. This assessment is based on indicators of collaboration skills, including students must have a sense of responsibility, work actively, have the ability to compromise, and have flexibility.

The effectiveness test of character skill assessment based on the results of the calculation of the one sample t test on character skills was obtained 11,578 with a significant 0.000. Referring to the basis for decision making, the $t_{count} > t_{table}$ is $11.578 > 1.695$ with a Sig. value of $0.000 < 0.05$. This shows that H_0 was rejected and H_a was accepted. This means that the average student score is significantly higher than the KKTP score (75) with a completion percentage of 100% in the very good category. Therefore, it can be concluded that the use of TPACK based interactive media with the PBL model in the Pancasila Education subject has a positive and significant influence on improving the character skills of grade V students of SDIT Al-Farabi in North Sumatra. Strengthened by research Rohman et al. (2025) that in the 21st century Pancasila education subjects must be able to shape the character of students. So that students are not only smart in terms of knowledge, but must be habituated to make good citizens.

Character skills improvement was carried out after using TPACK based interactive media with the PBL model in the Pancasila Education subject class V SDIT Al-Farabi in North Sumatra which was seen based on group discussions and presentations. This assessment is carried out based on self assessment sheets and peer assessments. The assessment is based on indicators of character skills, including that students must get used to religious attitudes and manners, respect differences of opinion, have the ability to cooperate, be responsible for organizing the decisions taken, and have the ability to solve problems.

The results of the Wilcoxon Signed Rank Test on the citizenship skills assessment were obtained sig. Sig. $0.023 < 0.05$. This shows that H_0 was rejected and H_a was accepted. This means that the average student score is significantly higher than the KKTP score (75) with a completion percentage of 71.9% in the good category. Therefore, it can be concluded that the use of TPACK based interactive media with the PBL model in the Pancasila Education subject has a positive and significant influence on improving the citizenship skills of grade V students of SDIT Al-Farabi in North Sumatra. This is reinforced by research Mukhlisotin & Rahmandani (2023) that the application of the PBL model can improve citizenship skills to provide understanding by looking for information and solutions to create citizens who are sensitive to social phenomena that occur in the surrounding environment.

The improvement of citizenship skills was carried out after using TPACK based interactive media with the PBL model in the Pancasila Education Subject class V SDIT Al-Farabi in North Sumatra which was seen based on group discussions and presentations. This assessment is carried out based on self assessment sheets and peer assessments. The assessment is based on civic skill indicators, including that students must have an attitude of social concern, respect for diversity, actively participate, and realize democratic values.

Based on the results of the effectiveness test obtained, it shows that TPACK based interactive media with a problem based learning model has an influence on improving students' 21st century skills in the Pancasila Education subject class V SDIT Al-Farabi in North Sumatra. Based on the results of initial observations regarding the problems and needs



of students in the Pancasila Education subject of the material on the relationship between Pancasila precepts class V SDIT Al-Farabi in North Sumatra, there is an increase in students' critical and creative thinking skills due to the selection of appropriate media and learning models to meet the needs of student learning outcomes.

There is an increase in communication and collaboration skills where initially students tend to prefer to study individually or independently and students are less able to listen and respond to the opinions of their peers. After using the developed media, students have a spirit of learning in groups because all students are very interested in learning so they feel the need to actively participate.

There is an increase in character and citizenship skills because students' understanding of Pancasila values is increasing. This results in students almost fully having the awareness to actively participate and interpret the attitude of mutual cooperation, tolerance, and social responsibility. Therefore, it can be concluded that TPACK based interactive media with a problem based learning model can improve students' 21st century skills in the Pancasila Education Class V subject of SDIT Al-Farabi in North Sumatra has been successfully developed.

TPACK based Interactive Media facilitates students' access to information, analysis tools, and simulations that help in the learning process. Meanwhile, the PBL model encourages students to think critically and creatively through solving real problems, encourages students to be able to communicate and collaborate to communicate their ideas and create active interactions, and encourages students to develop character and citizenship skills through ethical stimulation contained in the values of Pancasila to become active and responsible citizens.

Evaluation

The evaluation phase is carried out at each stage starting from Analyze, Design, Development, to Implementation. The evaluation is carried out to improve the problem analysis that has been carried out and improve 21st century skills products and instruments that have been developed in accordance with expert advice to make them suitable for use and practical to use. The practicality test was carried out with a small group trial by looking at the response of one teacher and 10 grade V students of SDIT Al-Farabi in North Sumatra to the media that had been developed.

The results of the teacher's response fidelity test found that TPACK based interactive media with the PBL model to improve students' 21st century skills in Pancasila Education subjects met the practicality assessment criteria which included aspects of suitability of needs, ease of use, attractiveness of presentation, and benefits. Practitioners say that the interactive media that has been developed meets his expectations. This medium can enhance students' 21st century skills. In addition, students' motivation to learn increases due to students' interest in using technology in learning. This media is also a reference for teachers to develop TPACK based learning media.

Some of the students' responses to the kerpaktistan test said that the features in the developed media were easy to use and gave them a spirit of learning. Problem based materials and questions in this media encourage them to think critically and creatively in solving a problem. The application of this media also encourages them to be able to work together in a study group. However, there are some responses from students who feel that they do not fully feel confident in using digital devices in the learning process because there is no self habituation, still afraid of making mistakes in trying to use them.

After a small group trial, a field trial was then carried out to measure the final success of the product to see the effectiveness of TPACK based interactive media with a problem

based learning model that can improve the 21st century skills of elementary school students in Pancasila education subjects. The effectiveness test that has been carried out shows an improvement in the 21st century skills of grade V students of SDIT Al-Farabi in North Sumatra. This increase is seen based on hypothesis tests that show a positive and significant influence on the improvement of critical thinking, creativity, communication, collaboration, character, and citizenship skills.

TPACK based Interactive Media facilitates students' access to information, analysis tools, and simulations that help in the learning process. Meanwhile, the PBL model encourages students to think critically and creatively through solving real problems, encourages students to be able to communicate and collaborate to communicate their ideas and create active interactions, and encourages students to develop character and citizenship skills through ethical stimulation contained in the values of Pancasila to become active and responsible citizens.

Conclusion

TPACK based interactive media with a Problem Based Learning model to improve the 21st century skills of elementary school students in the Pancasila Education subject has been successfully developed. This media can be an alternative learning media for Pancasila Education learning that can be accessed by teachers and students. There are several conclusions obtained from this research and development. TPACK based interactive media with a Problem Based Learning model to improve the 21st century skills of elementary school students in the Pancasila Education subject is feasible, practical, and effective to be significantly used in the learning process.

The feasibility test was obtained through the validation of material experts with a percentage of 39.8% with very feasible criteria, the validation of linguists was 85.4% with very feasible criteria, and the validation of media experts was 90.3% with very feasible criteria. The practicality test was obtained through a practicality test by the teacher who got a percentage of 100% with very practical criteria and a student response of 98% with very practical criteria. Finally, the test of the effectiveness of students' 21st century skills obtained from students' critical thinking skills obtained an N-Gain (g) of 0.5 in the range of $0.3 \leq g < 0.7$ with the criterion of "Effective" and obtained a Sig. of $0.000 < 0.05$ which proved that there was a significant improvement, creative skills, communication, collaboration, and character of students obtained a Sig. of $0.000 < 0.05$ which proved that there was a significant improvement, and the students' civic skills obtained Sig. $0.023 < 0.05$ which proved that there was a significant improvement, and the students' citizenship skills obtained a Sig. of $0.023 < 0.05$ which proves that there has been a significant improvement.

Recommendation

TPACK based interactive media with *the developed Problem Based Learning* model can be used as an alternative learning media in improving students' 21st century skills and understanding of Pancasila Education subjects, material on the relationship between Pancasila precepts in class V SDIT Al-Farabi in North Sumatra which can be used independently or in groups. Teachers can use this as a reference and learning means to be able to understand, use, and master digital technology according to the development of science and technology to achieve a 21st century educational paradigm that can help develop interesting and interactive learning, especially in the subject of Pancasila Education material on the relationship between Pancasila precepts.



Future research is expected to utilize software or websites capable of displaying test results without an internet connection or online database. Future researchers can also conduct research and development on interactive TPACK based media with a problem based learning model that covers a broader range of material.

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