

DEVELOPMENT OF INTERACTIVE MULTIMEDIA-BASED PROJECT BASED LEARNING (PJBL) LEARNING MODEL IN PKN LEARNING IN ELEMENTARY SCHOOLS

Susanti¹, Hendri Marhadi², Riandi Marisa³

Universitas Terbuka

susantioppo034@gmail.com¹, hendri.marhadi@lecturer.unri.ac.id²,

riandi.marisa@ecampus.ut.ac.id³

Abstract

The application of the interactive multimedia-based project-based learning (PjBL) learning model in PKN learning in elementary schools is a strategic step to improve the quality of student learning experience. Interactive multimedia is expected to be able to make it easier for students to learn the learning materials they experience. The objectives of this study: 1. To determine the effectiveness of the interactive multimedia-based project based learning (PjBL) model in elementary school learning in Banyuasin III district; 2. To find out the practicality of developing an interactive multimedia-based project based learning (PjBL) model in elementary school learning in Banyuasin III sub-district; 3. Determine the validity of the development of an interactive multimedia-based project based learning (PjBL) model in elementary school learning in Banyuasin III district. The sample used was 175 respondents. Data analysis was carried out using qualitative and quantitative research and for data analysis using descriptive analysis with the help of SPSS 25 for windows. The results of this study show that: 1 The development of an interactive multimedia-based project based learning (PjBL) model received a very valid assessment by validators and media experts; 2 This development product received a practical assessment both theoretically and practically by the validator team which showed the category of 'very practical; 3 The product of the development of a project-based learning model (PjBL) based on interactive multimedia was also declared effective with the increase showing a moderate improvement category.

Keywords: Project Based Learning, Interactive Multimedia, PKN, Elementary School



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INTRODUCTION

Education in Indonesia cannot be separated from the influence and progress of the world in the 21st century, technological advancement is one of the key things in the implementation of various activities. According to Kurniyawati and Aninditya, the impact of 21st century progress also occurs in the field of education, one of which is technology-based learning.¹ The characteristics of the 21st century are characterized by the increasingly interconnected world of science, so that the synergy between the two becomes faster, so that the role of education is very important in preparing students to have 21st century skills. In line with the above opinion, Mahanal said that to face the challenges of learning in the 21st century which is increasingly sophisticated, a teacher must at least have learning objectives consisting of the 4Cs, namely communication, collaboration, critical thinking and problem solving, creativity and innovation.²

The development of an interactive multimedia-based Project Based Learning (PjBL) model is very important in PPKn learning in elementary schools because 21st century abilities require students to be active, creative, collaborative, and able to solve problems.³ PKn as a subject that forms a democratic and responsible character needs to be presented through contextual and meaningful learning. The subject of PKn is very important to learn. In PKn subjects there are several basic competencies that must be mastered by students, one of the Basic Competencies (KD) is to respect the diversity of ethnicities, religions, races and intergroups in the framework of Bhinneka Tunggal Ika. with indicators of achievement of basic competencies, namely: 1) prioritizing values in the diversity of norms, ethnicity, religion, race and inter-group in the framework of Bhinneka Tunggal Ika in the form of appreciation as citizens; 2) respect and carry out the obligations, rights, and responsibilities as citizens; 3) to appreciate and apply the diversity of norms, ethnicities, religions, races and intergroups within the framework of Bhinneka Tunggal Ika honestly; 4) respect and support provisions on the diversity of norms, ethnicities, religions, races and inter-groups within the framework of Bhinneka Tunggal Ika in a fair manner.⁴

The Project Based Learning (PjBL) model is a learning model that emphasizes in-depth investigation activities through product creation as a result of solving real problems.⁵ According to Arends, project-based learning is able to create a hands-on experience so that students better

¹ Shobiroh Ulfa Kurniyawati and Aninditya Sri Nugraheni, "Pengembangan Media Pembelajaran Interaktif Berbasis Gawai Pada Pembelajaran PPKn Kelas 3 SD/MI Di Masa Pandemi COVID-19," *ELSE (Elementary School Education Journal): Jurnal Pendidikan Dan Pembelajaran Sekolah Dasar* 5, no. 2 (2021).

² Daryanto, *Sumber Belajar Dalam Pembelajaran Abad 21* (Gava Media, 2021).

³ Kahfi Anshori et al., "Multimedia Interaktif Pada Mata Pelajaran PKN," *Jurnal Media Dan Teknologi Pendidikan* 2, no. 2 (2022), <https://doi.org/10.23887/jmt.v2i2.49946>.

⁴ Qonita Al-Ishmah et al., "Peran Multimedia Interaktif Dalam Pembelajaran PPKn Di SD," *Renjana Pendidikan Dasar* 3, no. 2 (2023).

⁵ John W. Thomas, *A Review of Research on Project-Based Learning* (The Autodesk Foundation, 2000).

understand the values and concepts of citizenship.⁶ Therefore, interactive multimedia integration makes the learning process more interesting and encourages optimal student involvement.⁷ Meanwhile, interactive multimedia is a medium that combines text, images, audio, and animations that can be operated or controlled by users.⁸ In the context of elementary school education, the combination of PjBL and interactive multimedia allows students to explore Pancasila values, norms, and social rules through real projects assisted by technology.

The problems of learning PKn in elementary school generally include low interest in learning, the dominance of lecture methods, and the lack of interesting media, which makes the concepts of morality and citizenship difficult to understand in depth. According to Hosnan, learning that is not varied causes students to be passive and lack critical thinking.⁹ In addition, many teachers have not used technology as a tool in PPKn learning due to limited abilities and lack of digital teaching materials that meet the needs of elementary school students.¹⁰ PKn learning in elementary schools in general still faces obstacles in the use of multimedia learning. Teachers only use one learning medium in the classroom, this has an impact on the lack of student activity and low student participation in participating in learning. Therefore, it requires media to create a more interesting learning experience.¹¹

Based on the results of the research Dewi through an interview with class V A educators, he said that so far the media used are printed books, modules, student worksheets, clippings, and *power points*.¹² In line with the results of the research Safira, the technology-based learning media is still limited in its use in mathematics learning. In mathematics learning in class, teachers provide learning materials from learning videos on *YouTube*, students are asked to record the material as a summary and at the end of the learning students work on the problems and then collect.

A number of studies have shown the effectiveness of using PjBL and multimedia. Research by Wena concluded that PjBL improves high-level thinking skills and collaborative

⁶ Richard I. Arends, *Learning to Teach*, 9th ed. (McGraw-Hill, 2012).

⁷ Irdalisa Irdalisa et al., "Project-Based Learning on STEAM-Based Student's Worksheet with Ecoprint Technique: Effects on Student Scientific Reasoning and Creativity," *Jurnal Inovasi Pendidikan IPA* 10, no. 2 (2024), <https://doi.org/10.21831/jipi.v10i2.77676>.

⁸ Munir, *Multimedia: Konsep Dan Aplikasi Dalam Pendidikan* (Alfabeta, 2015).

⁹ M. Hosnan, *Pendekatan Saintifik Dan Kontekstual Dalam Pembelajaran Abad 21* (Ghalia Indonesia, 2014).

¹⁰ Ni Kadek Ayu Nanda Wulandari et al., "Komik Bergambar Pancasila sebagai Nilai Kehidupan: Upaya Meningkatkan Kompetensi Pengetahuan PPKn Siswa," *Jurnal Media dan Teknologi Pendidikan* 4, no. 2 (2024), <https://doi.org/10.23887/jmt.v4i2.66332>.

¹¹ Atika Nur Hidayati and Ridwan Santoso, "Transformasi Pendidikan Maksimalkan Potensi Belajar Dengan Media Pembelajaran Interaktif," *Al Banin: Jurnal Ilmiah Pendidikan Dasar* 1, no. 1 (2023).

¹² Dewi Rahmawati, "Pengembangan Media Pembelajaran Interaktif Berbasis Powerpoint Untuk Keterampilan Membaca Intensif," *Jurnal Pancar (Pendidik Anak Cerdas Dan Pintar)* 6, no. 1 (2022), <https://doi.org/10.52802/pancar.v6i1.287>.

skills.¹³ Another study by Herlin shows that interactive multimedia significantly increases the motivation and learning outcomes of elementary school students.¹⁴ However, research that integrates interactive multimedia-based PjBL specifically in PPKn elementary school subjects is still very limited, so it is necessary to develop a more contextual model with the characteristics of civic learning.

This research is relevant to the demands of the Independent Curriculum which emphasizes project-based learning and the use of technology. PPKn as a character education requires an approach that encourages students to apply values through real projects. The integration of interactive multimedia makes learning more concrete, in accordance with the characteristics of the development of elementary school students who are still in the concrete operational stage.¹⁵ Therefore, this research is very much in line with the direction of curriculum policy and the development of modern pedagogy.¹⁶

Theoretically, this research contributes to the development of the PjBL model combined with interactive multimedia in PPKn learning. The results of the research are expected to be a reference for the development of character- and technology-oriented learning theories. For teachers, this study provides a learning model that is easy to implement and able to increase student participation and learning outcomes. For students, this model can foster motivation, creativity, the ability to work together, and understand civic values in a more contextual way. For schools, this model can support digitalization programs and improve the quality of PPKn learning. In addition, this research can help the government and education policy makers in providing a reference for the development of a more modern, effective, and consistent PPKn learning model in accordance with the Pancasila Student profile.

Based on the description above, it is necessary to develop an interactive multimedia-based learning model as an innovation in PKN learning. Thus, the questions of this study are (1) How effective is the interactive multimedia-based *project based learning* (PjBL) model in elementary school learning in Banyuasin III District? (2) How is the practicality of developing an *interactive multimedia-based project based learning (PjBL) model in elementary school learning in Banyuasin III District?*

¹³ Made Wena, *Strategi Pembelajaran Inovatif Kontemporer* (Bumi Aksara, 2011).

¹⁴ Herlin Herlin et al., "Pengembangan Media Pembelajaran Interaktif Berbasis Canva Pada Mata Pelajaran PPKn Kelas II," *Inteligensi: Jurnal Ilmu Pendidikan* 7, no. 1 (2024), <https://doi.org/10.33366/ilg.v7i1.5810>.

¹⁵ Jean Piaget, *The Child's Conception of the World* (Rowman & Littlefield, 2007).

¹⁶ Ignasius Bayu Setya Nugraha et al., "Pengembangan Multimedia Interaktif Pada Pembelajaran Pancasila Kelas Iv Sekolah Dasar," *Journal Education and Government Wiyata* 2, no. 3 (2024), <https://doi.org/10.71128/e-gov.v2i3.121>.

RESEARCH METHODS

The research used in this study is quantitative research and development (R&D) is a research method used to develop and validate educational products, where development research is research that has the goal of producing a product.¹⁷ In the context of developing an interactive multimedia-based *project based learning* (PjBL) model in PKn learning in elementary schools in Banyuasin III district, the R&D approach is the right choice because of its ability to produce valid, practical, and effective learning products. The R&D research model used by the researcher is the one created by Borg & Gall, this model was chosen because it provides a comprehensive systematic research step in the development and validation of educational products.¹⁸ The research design used by the researcher is a 4D model with stages that include: *define, design, develop, and disseminate*.

At the dedefine stage: This stage aims to identify problems and needs in PKn learning, especially the obstacles faced by teachers and students in achieving learning goals. The results of this analysis are the basis for designing relevant and targeted media.

Design stage: At this stage, the researcher begins to design interactive learning and multimedia models according to instructional design principles. In the learning activity, the interactive multimedia-based *project based learning* (PjBL) model was selected according to the correct syntax or steps, while for interactive multimedia, the researcher chose the tutorial technique.

Development and trial stage: developing an initial prototype of learning media and applying an interactive multimedia-based *project based learning* (PjBL) model. This prototype is an initial form of product that can be tested to determine the initial feasibility of the medium in terms of appearance and functionality. The prototypes that have been developed are then tested on a limited scale to see their effectiveness. The researcher collected data from users (students and teachers) related to the clarity of the material, ease of use, and student involvement in PKn learning activities by applying an *interactive multimedia-based project based learning (PjBL) model*.

This research was carried out in elementary schools in Banyuasin III district, Banyuasin district as a research location because elementary schools in Banyuasin III district mostly have adequate facilities for the development of *project based learning* (PjBL) models based on interactive multimedia in PKn learning. The samples in this study were taken using *the simple random sampling* technique, so that each school has the same opportunity to be selected. Based on

¹⁷ John W. Creswell and J. David Creswell, *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (Pearson, 2020).

¹⁸ K. A. Aka, "Integration Borg & Gall (1983) and Lee & Owen (2004) Models as an Alternative Model of Design-Based Research of Interactive Multimedia in Elementary School," *Journal of Physics: Conference Series* 1318, no. 1 (2019), <https://doi.org/10.1088/1742-6596/1318/1/012022>.

the results of random draws, 3 schools in Banyuasin III sub-district were obtained as research samples, namely teachers and students in grade V of SD Negeri 41 Plus, SD Negeri 30 and SD Negeri 15 as experimental groups in the application of *the project based learning* (PjBL) model based on interactive multimedia in PKn learning, while as the control class of teachers and students in grade V of SD Negeri 1 Banyuasin III amounted to 31 who used conventional learning methods.

The research instrument used tests given to students before and after the implementation of the interactive multimedia-based PJBL learning model to measure knowledge and skills related to PKn materials.

The effectiveness test is carried out by: (a) The researcher provides pretest and posttest of norm material to students before and after learning with interactive multimedia through the application of the PjBL model. b) Pretest and posttest that the researcher has obtained, then the researcher calculates based on the test of research assumptions. c) After conducting an assumption test, the researcher then concludes the test results based on the product effectiveness category.

The practicality test in this study is divided into practical tests in theory and practically. The practical test in theory was obtained through an assessment by an interactive multimedia expert, namely, one teacher of SD Negeri 41 Banyuasin III who was active in teaching PKn subjects in class V. Practical practicality test was obtained through a student response questionnaire, the following are the steps to test the practicality of the development product: (a) The researcher tested interactive multimedia in joint learning; (b) After the trial is completed, the researcher then distributes a theoretical practicality assessment sheet to education practitioners and a questionnaire on the practicality of using interactive multimedia to students; (c) Assessment sheets by education practitioner experts and student response questionnaires that have been obtained by the researcher then recapitulated and the researcher concluded according to the category of determining practicality.

The data analysis of the effectiveness of interactive multimedia based on PjBL was carried out by providing pretests and posttests to students. The calculation of pretest and posttest scores uses the N-Gain formula. N-Gain calculation is by comparing the highest gain scores obtained by students in an experimental class. Interactive multimedia is declared to be able to train or improve student learning outcomes if the N-Gain results show a minimum increase in the 'medium' category. The categories of N-Gain score assessments are as follows:

Table 1. Interactive Multimedia N-Gain score assessment criteria

Score Range	Interactive Multimedia Category
$g > 0.7$	Height
$0.3 \leq x \leq 0.7$	Medium
$g < 0.3$	Low

The prerequisite test of data analysis was carried out to analyze the correlation of PjBL-based interactive multimedia research data on PKn learning, namely the analysis of normality and homogeneity tests. to measure the difference in the average data in the same sample but with different results (data before and after the treatment of the interactive multimedia-based PjBl model, a *Paired Sample T-test* was carried outIf the data is known to be normally distributed through the normality of the data and the data is fairly homogeneous

Analysis of validation data is carried out to determine the level of validity of a product developed. Product validity analysis is carried out by providing expert validation sheets to validators, media experts and material experts. PjBL-based interactive multimedia can be declared valid if the validator concludes validity with a minimum value of 'B' (can be used through minor revisions) as defined in the table below:

Table 2. Validity Criteria

Value Code	Categories
A	Can be used without revision
B	Can be used but through a series of minor revisions
C	Can be used with major revisions
D	Not usable

PjBL-based interactive multimedia can be declared practical in theory if the expert validator of educational practitioners concludes practicality with a minimum value of 'B' (can be used through minor revisions) as defined in the table below:

Table 3. Criteria for Practicality

Value Code	Categories
A	Can be used without revision
B	Can be used but through a series of minor revisions
C	Can be used with revision of the font
D	Not usable

RESULTS AND DISCUSSION

Results of the Validity Test of Interactive Multimedia Experts

The expert validity data on interactive multimedia test instruments is shown in the following table:

Table 4. Results of Interactive Multimedia Expert Validity Data Calculation

No	Validator Name	Average Score	%	Value Code	Remarks	Comments
1	Rima Selly Novtania, S. Pd., M.Pd.	82	82,00	B	Good	Question number 2 needs to be adjusted to the indicators made

Source : Primary Data, 2025

Based on the table above, it is known that the validity of interactive multimedia questions has a good category. The data from the validator shows that question number 2 interactive multimedia needs to be adjusted to the indicators made. About use

Interactive Multimedia Trial Results Data

The questions that have been decided to be feasible by expert validators are then tested on the respondents. Respondents to the interactive multimedia trial were a number of class V students who had received the norm learning material first compared to the limited trial class of the development product. The questions tested were 10 description questions and all of them were declared valid, because each calculation with *the Pearson correlation formula* showed a greater value compared to the *r* table value for 31 respondents, which was 0.355. The results of the validity test can be seen in the following table:

Table 5. Results of Interactive Multimedia Trials

No	Calculated value (CITC= <i>Corrected Item-Total Correlations</i>)	Value <i>r</i> table $\alpha = 0.05$ $n = 31$	Remarks
1	0,369	0,355	Valid
2	0,412	0,355	Valid
3	0,339	0,355	Valid
4	0,375	0,355	Valid
5	0,307	0,355	Valid

6	0,375	0,355	Valid
7	0,380	0,355	Valid
8	0,349	0,355	Valid

Source : Primary Data, 2025

The table above shows that based on the results of the calculation of the validity test of the material test conducted on 31 respondents with a statement of 8 questions, on average the value of r calculated per item of the indicator is above the r_{table} value = 0.355. In other words, the statement item regarding the material is declared valid because the whole calculation (CITC) > the table at a significant level of 5%.

Data on the Validity Test Results of the *Development of the Project Based Learning (PjBL) Model*

The validity test of the student response questionnaire only uses an expert validity test, because the response questionnaire is only given to limited trial classes that have applied the PjBL learning model with interactive multimedia. The results of the validity test of the response questionnaire experts are described in the following table:

Table 6. Results of Data Calculation of PjBL Model Validity

No	Validator Name	Average Score	%	Value Code	Remarks	Comments
1	Rima Selly Novtania, S. Pd., M.Pd.	92	92,00	A	Excellent	-

Source : Primary Data, 2025

Based on the table above, it is known that the validator gave a very good score to the respondent's questionnaire research instrument and the percentage result showed 92%. The conclusion of the results of the expert validity test on the response questionnaire research instrument is feasible to be tested without revision.

Interactive Multimedia Instrument Reality Test Results Data

The reality test of the interactive multimedia test with the help of SPSS version 25 *for windows* shows the results described in the following table:

Table 7. Interactive Multimedia Reliability Test

Question Type	N	Cronbach's Alpha Values	Reliability Limits	Remarks
Description	31	0,482	0,355	Reabel

Source : Primary Data, 2025

Based on the table above, the calculation results with *the cornbach's alpha formula* show a value of 0.782, where this value is greater than the value of the realism limit which is 0.355, so that the conclusion of the results of the reality test is 'reliable' with a 'high' level of realism and is suitable for use as a research instrument

Students' Interactive Multimedia Pretest and Posttest Results Data

The data on the results of the pretest and posttest of students in the control class test is presented in the following table:

Table 8. Results of Presest Data Frequency Distribution

Likert Scale	F	%	Valid Percent	Cumaltive Percent
1	0	0,0	0,0	0,0
2	2	6,45	6,45	6,45
3	8	25,80	25,80	25,80
4	6	19,35	19,35	19,35
5	15	48,39	48,39	48,39
	31	100	100	100

Source : Primary Data, 2025

Table 9. Results of the frequency distribution of Posttest Data

Likert Scale	F	%	Valid Percent	Cumaltive Percent
1	0	0,0	0,0	0,0
2	1	3,22	3,22	3,22
3	3	9,68	9,68	9,68
4	9	29,03	29,03	29,03
5	18	58,07	58,07	58,07
	31	100	100	100

Source : Primary Data, 2025

After obtaining the results of the students' pretest and posttest data in the control trial class, the researcher then analyzed the average score obtained by the students using qualitative analysis with the assistance of the SPSS version 25 program *for Windows* which the researchers show in the following table:

Taberl 10. Results of Average Calculation of Pretest and Posttest Data

Results	N	Range	Min Score	Max Score	Red
Pretest	31	30	36	80	62.5
Posttest	31	26	40	95	87.2

Source : Primary Data, 2025

Based on the data in the table above, for the pretest sor is at least 36 and a maximum score of 80 with a percentage value of 62.5%, while for the posttest the score is at least 40 and a maximum score of 95 with a percentage value of 87.2%. The results of the normality test calculation with the help of SPSS version 25 are presented in the following table:

Table 11. Data Normality Calculation Results

Results	N	Red	<i>Kolmograv Smirnov</i>		<i>Saphiro Wilk</i>	
			Statistics	Sig	Statistics	Sig
Pretest	31	20,97	0,158	0,129	0,887	0,055
Posttest	31	39,35	0,159	0,122	0,995	0,070

Source : Primary Data, 2025

It can be seen in the table that the value in the Saphiro Wilk formula of the pretest data shows a value of 0.07 greater than the significance level of 0.05 which means that the pretest data is normally distributed. Likewise, the posttest data with the Saphiro Wilk formula shows a value of $0.070 > 0.05$, so the posttest data is proven to be normally distributed. The results of the media practicality test in theory by the interactive multimedia expert validator are very practical and suitable for use without revision, as shown in the table below:

Table 12. Interactive Multimedia Proficiency Test

Validator	Total Score	%	Categories	Value	Remarks	Validator's Advice
Rima Selly Novtantia, S. Pd., M.Pd.	95	95	Very Practical	A	Can be used without vision/repair	Layah published

Source : Primary Data, 2025

The hypothesis test was carried out by analyzing the Paired Sample T-Test to find out the significant average difference between the pretest and posttest, then to determine the increase in the difference with the help of the N-gain test.

Table 13. SPSS Paired Sample T-Test Output Results

t	df	Sig. (2.tailed)		
Pair-1	Pre post	-635	31	0,000

Based on the table above, it is known that the significance value of the pretest and posttest in the *Paired Sample T-Test* is $0.00 < 0.05$, so the decision obtained is H_0 rejected or there is a significant average difference between the pretest data and the interactive multimedia posttest.

After obtaining the conclusion of the Paired Sample T-Test, the researcher then calculated the increase that occurred from the difference between the pretest data and the interactive multimedia posttest data with the N-gain test. The results of the recapitulation of N-gain data for the pretest and posttest of the limited class trial are presented in the table below:

Table 14. Results of Distribution of Student N-gain Calculation Frequency

Interval		Categories	Frequency	Percentage
0,0	3	Low	8	24%
0,4	8	Medium	22	65%
0,8	13	Height	6	18%

Source: Primary Data, 2025

Based on the table above, each student has increased from the low, medium to high category. The results of the average calculation of the N-gain Test with the help of SPSS version 25 for windows are presented in the following table:

Table 15. Results of Calculation of Average Student N-gain

Results	N	Red	Min	Max	Devision Standards
Ngain Score	31	0,50	0,08	0,90	0,25

Source: Primary Data, 2025

Based on the table above, it is known that the average N-gain value of pretest and posttest data is 0.50 and is classified as an increase in the 'medium' category. Thus, there is an increase in the use of the *project-based learning* (PjBL) model after learning with interactive multimedia

The learning process that occurs in elementary schools consists of several components such as teachers, students, learning models, methods, learning materials, learning media and strategies, and learning resources. These components complement each other to achieve the desired learning objectives. One of the most important components of learning is the teacher. The success or failure of the learning process depends on the quality of the educator's teaching and learning process that has been carefully designed and planned in accordance with the educational objectives. Teachers need a good teaching model to make classroom learning quality and fun to attract students' interest and enthusiasm in learning. One of them is in learning PKn on norm materials. Teachers need the right learning methods and models and learning media, so that the norm material can be well understood by students. The selection of learning media is able to help students in understanding the material about norms. One of the right learning media tools is interactive multimedia.

The application of the interactive multimedia-based *project-based learning* (PjBL) model in Civic Education (PKn) learning is an effort to create a more active, creative, and meaningful learning process. Through a project approach enriched by the use of interactive digital media, students not only understand the concepts of citizenship, but also engage directly in exploratory activities that foster collaboration, problem-solving, and digital literacy skills.

Interactive multimedia is the right medium to mix the components of images, text, audio, music, and video games to be able to create interactions that occur between students and teachers. Interactive multimedia combined with a *project-based learning* (PjBL) model makes learning more effective and efficient in improving learning outcomes. This happens because during learning with a model (PjBL) of *project-based learning* combined with interactive multimedia is able to strengthen students' knowledge and understanding, teach students to conduct investigative activities on problems related to the material being studied, provide experience of complexity related to the material being discussed until students are able to create an individual product or work group.

The interactive multimedia-based *project based learning* (PjBL) model developed by the researcher is an interactive multimedia to improve student learning outcomes in norm materials. The development of a *project-based learning* (PjBL) model using interactive multimedia based on 3D is developed through define, design. Researchers develop interactive multimedia by testing, effectiveness, practicality, and validity. The following is a discussion of the effectiveness, practicality, and validity data of the effectiveness, practicality, and validity of interactive multimedia.

The average result of N-gain shows a score of 0.50 which is classified as a medium improvement criterion. A 'moderate' increase is still considered an increase in the score on the posttest results. Septiawati stated that information stimulus in the form of knowledge, attitudes, and science process skills, which are comparable to students' creative thinking skills, can arise if the application of interactive multimedia is carried out in a learning process to cause active interaction between educators and students. Learning that combines the application of interactive multimedia with *the project-based learning* (PjBL) learning model has fulfilled Ausubel's learning theory which contains the process of relating new information to relevant concepts contained in students' cognitive structures. Not only that, students are also actively involved in exploring project planning, implementation, and assessment activities. This is supported by research by Septiawati who stated that interactive multimedia is able to provide a stimulus for students to plan, make and engineer a product until it becomes a work. Thus, learning that utilizes interactive multimedia based on *the project-based learning* (PjBL) model makes students finally get a very deep and meaningful learning experience to experience an increase in their learning outcomes. As Afriani argues that interactive multimedia can improve students' learning outcomes, foster their motivation to learn. The use of *an* interactive multimedia-based project based learning (PjBL) model fulfills the learning theory according to Piaget which states that knowledge is not only transferred verbally but must be constructed and reconstructed by students. The realization of Piaget's theory is when learning activities with interactive multimedia make students cooperative, active, and participatory in learning.

As in the features contained in interactive multimedia based on *the project based learning* (PjBL) model, it contains features that provide an initial stimulus to students to carry out the problem-solving process. As in the *project-based learning* (PjBL) learning model, students strive to solve problems and complete learning activities and strive to actively participate, explore and review all information related to learning materials until students can find new ideas

Learning activities by applying *an* interactive multimedia-based project based learning (PjBL) model can provide an increase in the level of development and potential of students. As expressed by Vygotsky's theory which emphasizes sociocultural talents in learning. According to this theory, there are two levels of learning, namely developmental and potential levels. The level of development is the ability to solve problems under the guidance of teachers with their cooperation also with peers who are more capable, the second level of potential development can be channeled through cooperative learning models such as *the project based learning* (PjBL) model Based on the discussion above, it can be concluded that learning activities by applying *the project based learning* (PjBL) model based on interactive multimedia can improve student

defense outcomes and development in the cognitive aspects of students, build knowledge and find concepts so that students' potential can develop optimally.

The practicality data in this study was obtained through two stages, namely practical in theory and practicality in practice. Practicality in theory is carried out by providing practicality assessment sheets to a team of experts, while practicality is practically obtained through the results of student responses. Practicality in theory gets a score from a total score of 85 and indicates a percentage with a score of 100%. Meanwhile, the practical results showed a score of 85 out of a total of 100 and showed a percentage of 97.5%. Both percentages obtained from theoretical practicality and practical practicality are percentages that are classified as 'very practical'. The *interactive multimedia-based project based learning* (PjBL) model improves student learning outcomes is classified as a practical category because expert validators categorize interactive multimedia as interactive multimedia with a value of 'very practical' because interactive multimedia has met the criteria very well.

The presentation of interactive multimedia is very interesting and efficient in explaining the norm material to students. Students can also operate interactive multimedia independently and can be repeated outside of learning hours. Students do not need to spend a lot of money to access interactive multimedia, considering that this medium can be accessed *online* as well as *offline*. Students have a positive response to interactive multimedia in collaboration with *the project-based learning* (PjBL) model, as many as 49.39% of students think that this interactive multimedia makes it very easy for them to learn and understand norm material. As many as 34.48% of students also think that interactive multimedia is very accessible without requiring a lot of money. As many as 48.39% of students stated that interactive multimedia media based on *the project based learning* (PjBL) model was very helpful for them to understand the normative material in PKn learning.

The results of the research from the media validity data stated that the learning instruments and media contained in this study were considered 'very good/valid and 'suitable for use without revision'. The percentage of validity based on the assessment of media expert validators shows a percentage of 92%. No revisions are suggested by media expert validators. The validity data of the material was also considered 'very valid' with a percentage of 92% and was suitable for use without revision. The material expert validator assessed that interactive multimedia based on *the project-based learning* (PjBL) model had met the aspects of a material that was stated to be very good. The validator of the interactive multimedia expert stated that it was well presented so that it could attract students' enthusiasm. The presentation of interactive multimedia is also in accordance with the PKn learning material about norms. The use of interactive multimedia is very accessible online and offline.

CONCLUSION

The conclusion of this study is that the development of an interactive multimedia-based *project based learning* (PjBL) model in PKn learning norm materials received a very valid assessment by experts, validators, material experts, and media experts. This development product received a practical assessment both theoretically and practically by a team of validators who showed the category of 'very practical'. Practical practicality assessment by students using a response questionnaire showed the category of 'very practical'. The development product of *the interactive multimedia-based project based learning* (PjBL) model was also declared effective because it could improve student learning outcomes after learning with development products, with the improvement category showing the 'moderate' improvement category. The research suggestion, namely that the *interactive multimedia-based project based learning* (PjBL) model is very effective in improving student learning outcomes, therefore the *project based learning* (PjBL) model should always be used to help students understand concepts, increase motivation, and facilitate independent learning in the classroom. In implementing *project-based learning* (PjBL) based on interactive multimedia, it is better to provide a digital assessment rubric that can assess project processes and products, including creativity, technology utilization, information accuracy, and presentation skills using interactive media. Teachers should prepare work instructions, rubrics, and sample project products in the form of interactive multimedia so that students can more easily understand the material they teach. The context in which interactive multimedia is used can be in the form of videos, digital interactive modules, or infographics that make it easier for students to understand the learning material. Providing opportunities for teachers to participate in educational and training activities in implementing learning models related to the use of learning models and the application of interactive multimedia, project management, and based assessment techniques, so that learning activities in the classroom can be carried out properly.

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