



# Interactive Multimedia Based on the PjBL Model with Public Health Orientation Assisted by Articulate Storyline 3

Ni Luh Trisna Ari Utami<sup>1\*</sup>, I Gede Margunayasa<sup>2</sup>, Ni Wayan Rati<sup>3</sup> 

<sup>1,2,3</sup> Basic Education, Ganesha Education University, Singaraja, Indonesia

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## ABSTRAK

Kurangnya penggunaan media pembelajaran dan model pembelajaran serta penurunan hasil belajar pada pembelajaran IPAS. Penelitian ini bertujuan mengembangkan Multimedia Interaktif berbasis PjBL dengan orientasi kesehatan masyarakat pada materi Sistem Pernapasan Manusia kelas V SD yang layak, praktis dan efektif digunakan dalam meningkatkan hasil belajar siswa. Jenis penelitian ini adalah Research and Development dengan model ADDIE. Subjek penelitian ini adalah 2 ahli media, 2 ahli materi, 3 orang guru dan 6 siswa serta 1 rombel siswa kelas V yang berjumlah 34 siswa. Teknik analisis data yang digunakan yaitu deskriptif kualitatif dan kuantitatif. Metode pengumpulan data yang digunakan adalah kuesioner dan tes dengan instrumen berupa lembar rating scale dan tes pilihan ganda. Desain penelitian yang digunakan adalah pre eksperimen, one shot case study. Hasil penelitian menunjukkan bahwa prototype media yang dikembangkan terdiri dari 3 bagian utama yaitu tampilan pembuka, awal dan inti. Indeks kelayakan media dikategorikan tinggi dan rata-rata skor uji materi sangat layak, Hasil uji kepraktisan oleh guru tinggi dan uji kepraktisan oleh siswa dikategorikan sangat baik. Multimedia Interaktif berbasis model PjBL ini dinyatakan efektif meningkatkan hasil belajar siswa kelas V SD. Disimpulkan media yang dikembangkan layak, praktis dan efektif meningkatkan hasil belajar siswa pada materi Sistem Pernapasan Manusia kelas V SD.

## ABSTRACT

Lack of learning media and models and declining learning outcomes in science learning. This research aims to develop PjBL-based Interactive Multimedia with a public health orientation on Human Respiratory System material for class V elementary school that is feasible, practical, and effective for improving student learning outcomes. This type of research is Research and Development with the ADDIE model. The subjects of this research were two media experts, two material experts, three teachers and six students, and 1 class V group of 34 students. The data analysis techniques used are descriptive, qualitative, and quantitative. The data collection methods were questionnaires and tests with instruments such as rating scale sheets and multiple-choice tests. The research design used was a pre-experimental, one-shot case study. The research results show that the media prototype developed consists of 3 main parts, namely the opening, initial, and prominent displays. The media suitability index is categorized as high, and the average material test score is very decent. The results of the practicality test by teachers are high, and the practicality test by students are categorized as very good. Interactive Multimedia based on the PjBL model was declared effective in improving the learning outcomes of fifth-grade elementary school students. It was concluded that the media developed was feasible, practical, and effective in improving student learning outcomes in the Human Respiratory System material for class V elementary school.

## 1. INTRODUCTION

National education functions to develop abilities and shape the character and civilization of a dignified nation in order to make the nation's life more intelligent, aimed at developing the potential of students to become human beings who have faith and devotion to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent and be a responsible citizen. Based on these educational goals, it is very important for every country to develop its education in a better

direction. Especially at the elementary school level which is the beginning of the introduction of formal education which will influence students' abilities at the next level (Iasha, 2022; Sumendap, 2022).

In the modern era like now, technology-based education is capital that must be owned in providing education. This also refers to various problems in education during the Covid-19 pandemic which are less effective in achieving maximum learning goals and outcomes due to a lack of understanding and application of technology from both schools and students (Friedman et al., 2020; Hanifah Salsabila et al., 2020). Based on these various problems, students and teachers are required to have digital skills and think creatively. The development era of the 21st century offers a new paradigm in education, which of course will be a new challenge for teachers to continue to innovate to achieve a quality teaching and learning process (Friedman et al., 2020; Sumendap, 2022). Education today is no longer just about teaching individuals to read and write, but rather educating them with an attitude of being able to face developments in science and technology. The existence of technology will certainly really help the learning process so that it is not monotonous (Raja & Nagasubramani, 2018; Ratheeswari, 2018). As the development of increasingly sophisticated technology also has an impact on the implementation of education, it becomes more innovative in achieving educational goals and learning outcomes more effectively and efficiently. On the other hand, this is also a big demand for educators in developing skills in mastering technology and learning media.

In order to create effective and student-centered learning, teachers should have the skills and willingness to increase their creativity in organizing learning (Miftah, 2013; Wahyuningtyas & Sulasmono, 2020). One way is by being able to integrate models, learning media, and other components that can increase students' enthusiasm in participating in learning. These components can be adapted to the characteristics of the class and students faced. Learning media can briefly be defined as something (which can be a tool, material, or situation) that is used as a communication intermediary in learning activities. Apart from that, choosing the right learning model also influences the effectiveness of student learning outcomes (Wahyuningtyas & Sulasmono, 2020).

However, in reality learning is still carried out monotonously using conventional learning models (Artha & Putra, 2021; Putranadi, Ketut, 2021). Apart from that, the use of learning media has not worked ideally in the learning process. Teachers tend to use lecture, question and answer, assignment and discussion methods because the subject matter is very extensive (Artha & Putra, 2021; Pratama & Sujana, 2022). Meanwhile, student activity is low because students just sit and listen to the teacher's explanation. Teachers are too fixated on relying on monotonous methods when there is material that requires real delivery or illustrations and proof that can provide meaning and understanding to students (Anggraini & Wulandari, 2020; Sari & Angreni, 2018). Apart from that, the learning resources or textbooks used are still in the category of not being enough if they are used alone to carry out learning, especially because of the lack of facilities at school.

Regarding the results of the joint interview teacher at SD Negeri 1 Lokapaksa, one of the subjects that really needs learning media in its learning activities is the Natural Sciences (IPA) subject which is currently integrated with Social Sciences (IPS) which is called Natural and Social Sciences (IPAS) content in the Independent Curriculum. As is known, general science (IPA) is relevant to understanding systematic nature, not only a collection of knowledge in the form of facts and concepts, or principles, but also a process of discovery (Angreni & Sari, 2018; Fransiska et al., 2023). This aims to provide students with a science learning process and the opportunity to discover the truth of facts or concepts and material, learn through experiments, equip students with the skills to observe, analyze, prove and draw conclusions from objects and write down a situation or a silent process (Artha & Putra, 2021; Elisabet & et al, 2019).

The lack of optimal learning presentation which tends to be boring using less varied learning models and media causes a lack of student activity (Indarta & et al., 2022; Naziah et al., 2020). This was shown in one of the studies which showed that students' active learning achieved a total score with an average achievement level of 43.45%. This shows that the learning activeness of class VI students at SDN Socah 4 in science learning was included in the less active category (Angreni & Sari, 2018; Badiah, Umi, 2020). Besides that Observations of the science teaching and learning process for fifth grade students at SDN Lanjan 02 before the action was carried out showed that there were problems. The science learning process is still teacher-centered, as a result students become passive and less enthusiastic about learning (Elisabet & et al, 2019; Widiantono, 2017).

From the results of observations made at Lokapaksa State Elementary School, science learning has not shown independent, meaningful and interesting activities. It is still found that science learning tends to be teacher centered, which results in a lack of student activity in science learning which causes learning outcomes to not be achieved optimally. This is shown by the questionnaire results data which shows: 1) 73.5% of students stated that they did not like/interested in science, 2) 61.7% of students stated that science lessons were boring, 3) 55.8% of students stated that they found it difficult understand science

lesson material, 4) 61.7% of students stated that they were less active in asking questions during science lessons. The low use of media by teachers in science learning coupled with the lack of learning through experimental or practicum activities, has resulted in indications that science learning does not have a process of developing skills within the students themselves. Apart from that, there are school facilities that have not been utilized optimally which makes learning less effective, especially when using technology-based facilities. The application of methods that suit the character of Natural Sciences learning needs to be done to overcome these learning difficulties.

Based on this explanation, there is a need for innovation by teachers to create an active, enjoyable learning process, and can increase students' interest in learning at school and at home. One alternative solution that can be done by teachers is to create technology-based learning media (Puspitarini & Hanif, 2019). Learning media functions to help and facilitate interactions between educators and students so that learning activities are more effective and efficient in improving the quality of education. The use of learning media will also be better if it can be integrated with the right learning model. One of the learning models recommended in implementing the Independent Curriculum is the Project Based Learning (PjBL) model (Nugraheni, 2017; Pratama & Sujana, 2022).

The project-based learning model or Project Based Learning (PjBL) is often referred to as a learning model that uses issues or problems that direct students to increase their creativity in learning with the aim of making it easier for students to understand and absorb the theory provided (Elisabet & et al, 2019; Sari & Angreni, 2018). This model uses a contextual approach which also fosters students' skills in critical and creative thinking. Project Based Learning is a learning activity through projects that focuses on product development or performance (Angreni & Sari, 2018; Sumarni, 2020). In this case, students carry out activities, organize group learning activities, conduct studies or research, solve problems, and synthesize information (Elisabet & et al, 2019; Nugraheni, 2017).

One media that is suitable for integration with learning models PjBL for presenting material on science content is Interactive Multimedia (Mayuni, Komang Ratna, 2019; Pratama & Sujana, 2022). Interactive Multimedia has characteristics that can involve students directly in its operation in the learning process, so that students are more active in learning in order to achieve maximum results. The relevant research related to PjBL-based Interactive Multimedia shows that the results of the validation analysis of the PjBL-based Interactive Multimedia developed are suitable for use in learning (Artha & Putra, 2021; Pratama & Sujana, 2022). However, no previous research has addressed the topic of the Human Respiratory System with a public health orientation which is a differentiator or characteristic of this media from previous research. The advantage of this media is that it creates a learning experience that will indirectly direct students to construct their abilities in understanding the material and problems around them, the PjBL model has an integrated nature with the curriculum so that it does not require any additions in its implementation, students are directly involved in the learning process, students directed at always working together in solving problems, integrated technology as a tool for discovery, collaboration and communication in achieving learning, and increasing teacher expertise in implementing project-related learning. The aim of this media development research is to develop a PjBL-based Interactive Multimedia prototype.

## 2. METHOD

In this research on PjBL Based Interactive Multimedia Development assisted by Articulate Storyline 3, the ADDIE model was used. ADDIE is an abbreviation for Analysis, Design, Development, Implementation and Evaluation (Setiawan et al., 2021; Sugihartini & Yudiana, 2018). The ADDIE model is a model that is used as a guide in the process of developing effective, dynamic learning, and provides support for the learning itself. This development model is designed systematically to help solve problems in learning related to learning resources that suit the needs and characteristics. learners. This is because the stages of this model are continuous in determining and creating appropriate learning media. The advantage of the ADDIE development model is that there is evaluation at each stage so that it can minimize the level of errors or product deficiencies at the final stage of this model (Artha & Putra, 2021; Purnamasari, 2020)

The subjects of this research were 4 experts (2 media experts and 2 learning content experts) to assess the suitability of the media, 3 teachers and 6 elementary school students for the practicality test and one class of fifth grade students for the effectiveness test. The trial design used in this research is a pre-experimental design, one shot case study. The data collection methods used were questionnaires and tests. This research was carried out in several stages, namely: (1) The analysis stage carried out curriculum analysis, needs analysis and analysis of student characteristics; (2) The design stage is carried out by research instrument research by experts, media validation by experts, and practicality testing (teachers and students); (4) The implementation stage was carried out by implementing interactive multimedia based on

the PjBL model for class V students at SD Negeri 1 Lokapaksa; and (5) The evaluation stage is carried out with formatted and summative evaluations. Data collection methods in this research are material expert questionnaires, media expert questionnaires, practicality questionnaires by teachers and students, as well as multiple choice questions used to determine the effectiveness of using Interactive Multimedia based on the PjBL model. The instruments used in this development research are rating scales and multiple choice tests.

The designed instrument is said to be valid if it has gone through a content validity test by judges who have competence in the variables being studied. Analysis of the content validity of the questionnaire instrument was tested using the Gregory formula. Meanwhile, the multiple choice test instrument was tested for the validity of the instrument items using point biserial correlation techniques. The reliability of multiple choice instruments uses the Kuder Richardson 20 (KR-20) formula. Apart from that, different strength and difficulty level tests were also carried out using the Microsoft Excel program. After the instrument is suitable for use for data collection, the data that has been obtained is analyzed descriptively qualitatively and descriptively quantitatively. Qualitative data was obtained from reviews by experts. Meanwhile, quantitative data was obtained from the rating scale resulting from expert test validation, the practicality rating scale by teachers and students, and effectiveness test data (Nashruddin & Roslina, 2019; Widiyanto, 2017).

### 3. RESULT AND DISCUSSION

#### Result

This research was conducted to develop Interactive Multimedia based on the PjBL model with a public health orientation assisted by Articulate Storyline 3 in the Respiratory System in Humans class V elementary school material. The implementation of this research uses the ADDIE development model through five stages, namely analysis, design, development, implementation and evaluation. At the analysis stage, a more in-depth investigation or study is carried out regarding the problems at the research site to be used as a reference in creating appropriate media. At this stage, an analysis of the curriculum, student needs and characteristics is carried out. Based on the results of the interview, the curriculum used at SD Negeri 1 Lokapaksa is the Independent Curriculum. However, from the information obtained there are several things that are not yet effective in learning, such as the use of learning models which are still dominated by conventional models and the use of learning media which is not optimal so that learning activities still need to be improved. Then, from the results of distributing questionnaires to students, it was discovered that students preferred visual auditory and kinaesthetic learning styles, were more interested in learning activities using technology, preferred learning using audio visual media, and were more interested in being involved in project activities to be more active in understand the material. Based on this, one of the learning media that can be developed is PjBL-based Interactive Multimedia.

The design stage begins with selecting the software that will be used, followed by creating a design or prototype. Once completed, the prototype is given to the supervisor to provide input and suggestions so that it is suitable to be developed into real media. The Interactive Multimedia Prototype developed consists of 3 main parts, namely the opening display, the initial display, and the main display. The opening display is the display that first appears when opening interactive multimedia which consists of filling in the student's identity such as name and absence number so that they can proceed to the next menu. The initial display contains the material title content as well as buttons leading to the initial menu such as the instructions button, start button, and information button. The core display consists of main menus, namely the material menu which contains explanations regarding the scope of material on the Human Respiratory System starting from understanding, respiratory organs and mechanisms, types of respiration in humans, respiratory diseases and how to overcome them, the project menu consists of project work instructions and a video of public health problems related to the human respiratory system that must be solved to produce a product, then an evaluation menu containing work instructions and 15 multiple choice questions that must be completed by students.

The development stage is carried out by realizing the prototype that has been created and guided. Development of PjBL-based Interactive Multimedia using the Articulate Storyline 3 application. In the development stage, the media created has the color, shape, appearance and function designed in the previous stage. After the media has been created, it will then be guided before being tested with experts. Some examples of media displays that have been created can be seen at [Figure 1](#).



Figure 1. Several Examples of Displays in Interactive Multimedia

The completed interactive multimedia is then tested for its suitability for use in the learning process. This media feasibility test involved four experts, namely, 2 media experts and 2 learning content experts. After obtaining assessments from the four experts, the feasibility test data were analyzed using the Aiken Validity formula to obtain a feasibility index and feasibility qualifications for Interactive Multimedia based on the PjBL model with a public health orientation. The results of the Aiken Validity analysis can be seen in Table 1.

Table 1. Interactive Multimedia Feasibility Test Results based on the PjBL Model

Expert	Item	Evaluator		V	Note
		I	II		
Media	Items 1-21	97	98	0.91	Very High Validity
Learning Content	Items 1-11	52	52	0.93	Very High Validity

After being declared suitable for use in the learning process, interactive multimedia is tested for its practicality in the learning process. Implementation of the practicality test of this development research involves teachers and students as practitioners who use media. The results of the Interactive Multimedia practicality test are then analyzed to determine the practicality of the media being developed. Data analysis was carried out by calculating the percentage of scores obtained through assessment sheets by experts. The data was then converted using a four scale achievement level PAP conversion table to determine the practicality qualifications of the media being developed. A summary of the practicality test results can be seen at Table 2, And Table 3.

Table 2. Summary of Practicality Test Results by Teachers

Practitioner	Score	Percentage	Average Percentage	Category
Practitioner I	45	100%	97.04%	Very good
Practitioner II	43	95.56%		
Practitioner III	43	95.56%		

Table 3. Summary of Practicality Test Results by Students

Practitioner	Score	Percentage	Average Percentage	Category
Student I	50	100%	98%	Very good
Student II	49	98%		
Student III	48	96%		
Student IV	50	100%		
Student V	47	94%		
Student VI	50	100%		

The implementation stage is carried out after the media is declared suitable and practical to use in the learning process. At the implementation stage, a media trial was carried out on fifth grade elementary school students to determine the effectiveness of the media on learning outcomes. Based on the results of trials conducted, Interactive Multimedia was declared effective in improving student learning outcomes. Media effectiveness tests were carried out through pre-experimentation with a one shot case study design. Analysis of media effectiveness was carried out using the one sample t-test formula. The prerequisite test that must be carried out is the normality test of data distribution. Based on the results of hypothesis testing using the one sample t-test technique, a significance value (2-tailed) was obtained of 0.000. These results show that the significance value is smaller than 0.05 (5% significance level) or  $p < 0.05$ . This means that  $H_0$

is rejected and  $H_a$  is accepted, so that Interactive Multimedia based on the PjBL model with a public health orientation assisted by Articulate Storyline 3 is effective in improving student learning outcomes in the Human Respiratory System material in class V elementary school.

The evaluation stage was carried out during the research, namely with formative evaluation and summative evaluation. Formative evaluation is a data collection process carried out at each stage of development. The aspects that are looked at in formative evaluation are the course of the research process and the products produced at each stage. Meanwhile, summative evaluation is a data collection process carried out at the end of the program to determine the effectiveness of the learning media developed. There are several inputs and suggestions during development that were used as evaluation material to improve the quality of the media, including paying attention to colour contrast in the media, improving the numbering of learning objectives and project instructions, shortening explanations on the media, and making sure the media can be accessed offline. Meanwhile, the evaluation carried out at the end of each stage shows data in the form of numbers with very good qualifications. Overall, the research activities went well, although there were several obstacles which were generally related to time and the level of difficulty in making the product, but it was still completed on time and produced media that attracted students' enthusiasm for learning. Based on the research stages that have been carried out, it can be concluded that PjBL-based Interactive Multimedia with a public health orientation is declared feasible, practical and effective to be used to improve the learning outcomes of class V students at SD Negeri 1 Lokapaksa on the Human Respiratory System material.

## Discussion

This multimedia is good for use in learning because it has gone through feasibility, practicality and effectiveness tests. This Interactive Multimedia has its own characteristics compared to other interactive multimedia, namely because it is based on the PjBL learning model with a public health orientation. The topic of material in interactive multimedia based on the PjBL model is also only devoted to material on the Human Respiratory System, the content in Interactive Multimedia is adapted to the syntax of the PjBL model and contains a project menu which contains instructions and videos on public health problems related to the respiratory system which are used as benchmarks in making products.

Learning using the PjBL model has been implemented several times at SD Negeri 1 Lokapaksa, although its implementation has not been optimal, but students have been assigned to create a project. By carrying out projects students will get direct experience because students can learn by doing. From the project implementation process, students are required to develop critical thinking skills to solve problems, find solutions to produce a product. The PjBL learning model is very good for developing students' different thinking abilities, quality decision making, activity skills, problem solving abilities which can also develop students' self-confidence and self-management (Ingtyasningsih, Puji, 2022; Pratama & Sujana, 2022). A similar opinion states that implementing learning using the PjBL model helps students discover new concepts, new experiences, and can increase interest and learning outcomes (Elisabet & et al, 2019; Sari & Angreni, 2018). Apart from that, students also become more creative and innovative in solving problems or creating projects so that learning becomes more fun and meaningful (Irfana, Saidatul, 2022; Pratama & Sujana, 2022).

Previous research showed that an average percentage of 83% of respondents strongly agreed with the application of the Project Based Learning learning model on energy source material, which can have a significant effect on students' science learning outcomes before being given treatment with an average pretest score of 76.00 and increased after being given learning using the Project Based Learning learning model with an average posttest score of 83.00. Based on the results of the analysis, it can be seen that the Project Based Learning learning model is one of the appropriate and effective learning models applied to the learning process even online (on the network) during the current pandemic (Nisah, Nurul, 2021; Sari & Angreni, 2018).

In Interactive Multimedia based on the PjBL model there are learning videos and project problem videos. Learning with video media is related to the cone of experience in Edgar Dale's Cone of Experience theory, video media is located in the "watch videos/films" section. This position states that video media is better than audio or image media. Video media is an intermediary that can be seen and heard so that students are able to gain knowledge. Learning with video media makes students use their senses. If more sensory organs are used in the learning process, the greater the possibility that information can be understood (Pambudi, 2018; Zaharah & Susilowati, 2020). At SD Negeri 1 Lokapaksa, the learning process uses video learning media which is accessed via YouTube. Using video as a learning medium can increase students' enthusiasm in participating in learning. Video displays that attract students' attention can make it easier for students to understand the material. This statement is supported by research which shows student learning outcomes using learning videos on the water cycle material in class V of SD Negeri Lontar

II Surabaya, the average learning outcome reached 86.43. This happens because it is influenced by the media used by teachers in delivering material during the teaching and learning process. This proves that the high level of influence of videos on student learning outcomes at SD Negeri Lontar II Surabaya (Mawanto, 2022; Pratama & Sujana, 2022).

Learning with Interactive Multimedia based on the PjBL model on the Human Respiratory System material is in line with Ausubel's learning theory. This is because the material discussed is understood by relating it to real conditions in the environment around students. Like the problems presented in Interactive Multimedia based on the PjBL model which relate to public health in the Human Respiratory System. Ausubel's theory explains that to guide students to understand new knowledge from material, it requires initial concepts that students already have which are related to the concept to be studied so that it really determines the success of the learning process (Rasvani & Wulandari, 2021).

This opinion is supported by research with the title Interactive Learning Multimedia Oriented to Ausubel Learning Theory on Science Content, Energy Source Material, it is stated that the validity of the product developed as a whole has obtained very good qualifications so that it is suitable and effective for use in learning activities and is very effective in attracting students' interest so that learning becomes better. Interactive and can improve student learning outcomes significantly. Interactive Multimedia Development is also supported by constructivism theory which states that students need to build their knowledge from experience (Aryani & Ambara, 2021a; Suparlan, 2019). This is said to be appropriate because in using Interactive Multimedia, students can be directly involved in operating it. In Interactive Multimedia students are also involved in project-based activities and direct students to carry out activities aimed at solving problems and producing products (Aryani & Ambara, 2021b; Pratama & Sujana, 2022). Activities that involve students directly in the learning process will provide students with experience to understand the material being studied in depth.

Based on the results of feasibility, practicality and effectiveness as well as relevant research, Interactive Multimedia can be said to be one of the learning innovations that can be developed to improve student learning outcomes. No previous research has addressed the topic of the Human Respiratory System with a public health orientation which is different or new in this media from previous research. The advantage of this media is that it creates a learning experience that will indirectly direct students to construct their abilities in understanding the material and problems around them, the PjBL model has an integrated nature with the curriculum so that it does not require any additions in its implementation, students are directly involved in the learning process, students directed at always working together in solving problems, integrated technology as a tool for discovery, collaboration and communication in achieving learning, and increasing teacher expertise in implementing project-related learning. The limitation of this research is that it only covers material on the Human Respiratory System, with the number of subjects involved in the application of this product only being 34 people using a One Shot Case Study research design. Apart from that, the implementation of the research was hampered by time due to the large number of holidays for testing media in elementary schools and certain cell phones still lacked support and required a good signal, but this has been overcome by providing media in file form. In future research, it is hoped that the media will be able to develop other and more innovative material coverage to create effective and enjoyable learning activities for students.

#### 4. CONCLUSION

Based on the research that has been carried out, PjBL-based Interactive Multimedia has been produced which has three main displays, namely, opening display, initial display and closing display with the entire display designed with images, text and video which can improve the quality of learning activities. This is also supported by test results which state that PjBL-based Interactive Multimedia with a public health orientation is feasible, practical and effective in improving the learning outcomes of class V students at SD Negeri 1 Lokapaksa on the Human Respiratory System material.

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