

# **Development of Interactive Media Based Learning on Project- Based Learning in Learning Ipas Class V SD Negeri 2 Karangharjo**

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## **ABSTRACT**

This study aims to develop an interactive learning media based on Project Based Learning (PjBL) in the teaching of Natural and Social Sciences (IPAS) for fifth-grade students at SDN Karangharjo II. The research method used is Research and Development (R&D) with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The analysis phase was conducted to identify the needs and characteristics of the students. The media design was created based on the analysis results and followed by the development phase, which involved creating a prototype of the interactive media. Implementation was carried out through limited trials and revisions based on the feedback received. Evaluation was conducted to assess the effectiveness of the interactive learning media through learning outcomes tests and student satisfaction questionnaires. The results showed that the interactive learning media based on PjBL could increase students' interest and motivation to learn. Students were more actively engaged in the learning process and were able to practically apply the concepts of IPAS. Based on the evaluation results, the developed media received high scores in terms of usability, effectiveness, and student satisfaction. Therefore, the interactive learning media based on PjBL is effective for use in the teaching of IPAS for fifth-grade students at SDN Karangharjo II. This study recommends the widespread use of this media and further development to add more innovative interactive features.

**Keywords:** interactive learning media, Project Based Learning, IPAS, SD Negeri 2 Karangharjo, media development, learning effectiveness.

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## **PENDAHULUAN**

Learning Natural and Social Sciences (IPAS) has an important role in forming students' understanding of the natural and social environment around them. According to (Susanto, 2017), effective science and science learning can develop students' critical thinking abilities and problem solving skills. However, in reality, the traditional learning methods that are still dominantly used are often unable to accommodate students' needs in understanding science concepts in depth. Therefore, innovation is needed in media and learning methods that can increase student engagement and learning motivation.

One approach that is considered effective for improving the quality of learning is Project Based Learning (PjBL). PjBL is a student-centered learning approach, where students learn actively through projects that are relevant to real life (Kinanti, 2021). This approach not only helps students understand the subject matter, but also develops 21st century skills such as collaboration, communication and creativity (A. A. Nugraha &

Mansoor, 2021). However, implementing PjBL in elementary schools still faces various challenges, such as a lack of supportive learning media and time constraints.

PjBL -based interactive learning media can be a solution to overcome these challenges. Interactive learning media is able to attract students' interest and make the learning process more enjoyable (Rahmawati, 2020). Apart from that, the use of technology in interactive learning media can facilitate more effective and efficient learning (Putri, 2021). It is hoped that PjBL- based interactive media can help students apply science concepts in real contexts that are relevant to their daily lives.

This research focuses on developing PjBL- based interactive learning media for science and science learning in class V of SD Negeri 2 Karangharjo . Based on the results of initial observations, it was found that science and science learning in this school was still dominated by the lecture method and the use of textbooks as the main learning source. Students tend to be passive and less motivated in following lessons. This is in line with the findings of (Fauziah, 2018) who stated that monotonous learning methods can cause students' low interest in learning. Therefore, innovation is needed in learning media that can increase student involvement.

The process of developing interactive learning media uses the ADDIE model which consists of five stages: Analysis , Design, Development, Implementation , and Evaluation. The Analysis stage is carried out to identify student needs and characteristics, as well as learning conditions in the classroom (Sugiyono, 2016). The Design stage involves designing learning media that is in accordance with the results of the analysis. Next, the Development stage includes making interactive media prototypes and initial testing. Implementation was carried out through limited trials in class V of SD Negeri 2 Karangharjo, followed by revisions based on the feedback received (Ridwan, 2017). Finally, the Evaluation stage aims to assess the effectiveness of learning media through learning outcome tests and student satisfaction questionnaires.

It is hoped that the results of this research can make a real contribution to improving the quality of science and science learning in elementary schools. It is hoped that the PjBL- based interactive learning media developed will be able to increase students' interest and motivation to learn, as well as help them understand science concepts better. Apart from that, it is also hoped that this research can become a reference for teachers and educational practitioners in developing and implementing other innovative learning media.

In the literature review, various previous studies have shown that the use of interactive learning media can improve student learning outcomes. For example, research conducted by Puspitasari (2018) found that computer-based interactive learning media can significantly increase students' understanding of concepts. Likewise, research by (Pratama, 2019) shows that information technology-based learning media can increase students' learning motivation. Therefore, it is hoped that the development of PjBL- based interactive learning media can provide similar results.

Apart from that, PjBL as a learning approach has also been proven to be effective in improving students' critical thinking skills and 21st century skills. According to (Wibowo, 2018), PjBL can help students develop critical thinking skills through the process of investigating and solving complex problems. Meanwhile, research by (Anwar, 2018) shows that PjBL can improve students' collaboration and communication skills, because they work in groups to complete projects.

However, although the benefits of PjBL and interactive learning media have been widely researched, there are still gaps in their implementation in elementary schools. This research tries to fill this gap by developing PjBL -based interactive learning media specifically for science and science learning in class V of SD Negeri 2 Karangharjo . It is hoped that the results of this research can provide a more comprehensive picture of the effectiveness of PjBL- based interactive learning media at the elementary school level.

Overall, this research has several main objectives. First, identifying the needs and characteristics of students in science and science learning in class V of SD Negeri 2 Karangharjo . Second, developing PjBL -based interactive learning media that suits student needs. Third, test the effectiveness of PjBL- based interactive learning media in improving student learning outcomes. Fourth, collect feedback from students and teachers regarding the use of interactive learning media. Thus, it is hoped that this research can make a significant contribution to the development of innovative learning media and improve the quality of learning in elementary schools.

This research also has practical implications for teachers and educational practitioners. The results of this research can be used as a guide in developing effective PjBL- based interactive learning media. Apart from that, this research also provides insight into the importance of innovation in learning methods to increase student engagement and learning motivation. By implementing PjBL -based interactive learning media , it is hoped that students can learn more actively, creatively and funly, so that science learning becomes more meaningful.

In conclusion, the development of PjBL -based interactive learning media for science and science learning in class V of SD Negeri 2 Karangharjo is an important step to improve the quality of learning. It is hoped that this media can increase students' interest and motivation to learn, as well as help them understand science concepts better. This research makes a real contribution to the development of innovative learning media and provides practical recommendations for teachers and educational practitioners in implementing PjBL in elementary schools.

## **RESEARCH METHODS**

This research uses the Research method and Development (R&D) with the ADDIE model which consists of five main stages: Analysis , Design, Development, Implementation , and Evaluation (Sugiyono, 2016). This method was chosen because it allows the development of systematic and structured learning media based on student needs and learning conditions in the field.

The first stage in the ADDIE model is analysis. At this stage, the needs and characteristics of class V students at SDN Karangharjo II were identified as well as the conditions for science and science learning at the school. Data collection was carried out through classroom observations, interviews with teachers, and questionnaires to students. The results of this analysis are used to determine learning objectives, competencies that must be achieved, and material that will be delivered through Project Based interactive learning media Learning ( PjBL ) (Fauziah, 2018). The analysis also includes literature studies to understand the theory and best practices in implementing PjBL as well as the use of interactive media in learning (Susanto, 2017).

Based on the results of the analysis, the design stage was carried out to design interactive learning media. Media design includes creating storyboards , learning

scenarios, and developing content that is relevant to the IPAS curriculum. Learning design principles such as clarity, consistency, and student involvement are applied in this process (Rahmawati, 2020). Apart from that, media design also considers the use of interactive elements such as animation, videos and quizzes to increase student participation (Wulandari, 2018). The design process is carried out by involving science teachers to ensure that the media developed is in accordance with learning needs.

The development stage involves creating a prototype of interactive learning media based on the design that has been created. This prototype was developed using software that supports the creation of interactive media, such as Adobe Flash or Articulate Storyline (Putri, 2021). The development process includes creating visual and audio content, coding interactions, and testing media functionality. After the prototype is complete, an initial trial (alpha testing) is carried out by the development team to ensure that the media functions as expected and that there are no technical errors.

After going through the development stage, interactive learning media was tested in class V of SD Negeri 2 Karangharjo. Implementation was carried out in the form of a limited trial (beta testing) involving several students and science teachers. During the trial, students used interactive learning media in daily learning activities and provided feedback regarding their experiences (A. Nugraha, 2019). Teachers also observe the use of media and provide evaluations of its effectiveness in supporting the learning process. Data collected from these trials is used to refine and perfect the media before it is widely implemented.

The final stage in the ADDIE model is evaluation. The evaluation was carried out to assess the effectiveness of PjBL-based interactive learning media in improving student learning outcomes and their satisfaction with the media. Evaluation is divided into two types: formative and summative. Formative evaluation is carried out during the implementation phase to obtain feedback that is used in improving the media. Summative evaluation is carried out after the media is fully implemented to assess the achievement of learning objectives (Ridwan, 2017).

Evaluation data collection is carried out through several methods. First, the learning outcomes test is used to measure the increase in students' understanding of science and science concepts after using interactive learning media. This test includes questions that are relevant to the material being taught and is designed to measure various students' cognitive levels (Pratama, 2019). Second, student satisfaction questionnaires are used to assess their perceptions of learning media, including aspects such as engagement, ease of use, and overall satisfaction (Puspitasari, 2018). Third, interviews with teachers were conducted to obtain their perspectives regarding the effectiveness of media in supporting the learning process and development of students' 21st century skills.

Data obtained from learning outcomes tests, student satisfaction questionnaires, and interviews with teachers were analyzed quantitatively and qualitatively. Quantitative analysis was carried out using descriptive statistics to describe the increase in student learning outcomes and their level of satisfaction with learning media (Anwar, 2018). Meanwhile, qualitative analysis is used to understand students' and teachers' experiences in using media, as well as identifying aspects that need improvement.

Apart from evaluation from users, the interactive learning media developed is also validated by media experts and material experts to ensure its quality. Validation is

carried out using a validation sheet which covers aspects such as clarity of content, suitability to learning objectives, and quality of interactivity (Wibowo, 2018). Feedback from experts was used to make final revisions to the media before it was widely implemented at SD Negeri 2 Karangharjo .

The results of each stage in the learning media development process are presented in the form of descriptions and data analysis. Student learning outcomes test results are compared with scores before and after media use to assess its effectiveness. Data from student satisfaction questionnaires and interviews with teachers were analyzed to evaluate user perceptions of learning media (Fauziah, 2018). The discussion of the results includes an analysis of the advantages and disadvantages of PjBL- based interactive learning media , as well as recommendations for further development.

The conclusion of this research summarizes the main findings regarding the development and effectiveness of PjBL -based interactive learning media in science and science learning in class V of SD Negeri 2 Karangharjo . The conclusions also include practical implications for teachers and educational practitioners as well as suggestions for further research in the development of innovative learning media (Susanto, 2017).

With this comprehensive approach, it is hoped that this research can make a significant contribution in improving the quality of science and science learning in elementary schools through the development of effective and innovative PjBL- based interactive learning media. It is also hoped that this research can become a reference for the development of learning media in other subjects.

## **RESULTS AND DISCUSSION**

### **Analysis of Learning Needs and Characteristics of Class V Students at SDN Karangharjo II in the Social Sciences Context**

Learning Natural and Social Sciences (IPAS) at SDN Karangharjo II requires an approach that can increase students' understanding of the material being taught and foster their interest in learning. Based on the results of observations and interviews with teachers, it was found that the dominant learning method currently used is the lecture method which tends to be one-way. Teachers deliver material, while students listen and take notes, which often results in students becoming passive and less involved in the learning process (Fauziah, 2018).

In the context of science and science learning, it is important to understand the characteristics of fifth grade students in order to design appropriate learning media. Class V students are in the concrete operational cognitive development stage according to Piaget's theory , where they are starting to be able to think logically about concrete objects but still have difficulty with abstract concepts ( Santrock , 2018). Therefore, effective science learning must include lots of hands-on experiences and activities that allow students to see and manipulate real objects.

The results of the questionnaire distributed to students showed that the majority of students felt bored with learning methods that were only teacher-centred. They expressed a desire to learn in a more interactive and fun way, such as through educational games or group projects (Rahmawati, 2020). Apart from that, students also show high interest in the use of technology in learning. Most students have access to a technology device such as a smartphone or tablet at home, and they are accustomed to

using these devices for a variety of activities, including playing games and searching for information.

This condition is in line with research conducted by (A. Nugraha, 2019) which found that the use of technology-based learning media can increase student motivation and participation in learning. Interactive media that utilizes technology not only attracts students' interest but can also provide more varied and in-depth learning resources. The use of interactive learning media also allows for more flexible learning, where students can learn according to their own pace and learning style.

In addition to technological aspects, it is also important to consider pedagogical approaches that can increase student engagement. Project Based Learning ( PjBL ) is an approach that has been proven effective in increasing student engagement and learning motivation. In PjBL , students are involved in projects that are relevant to real life and require them to apply the knowledge and skills they have learned (Wulandari, 2018). This approach not only helps students understand course material better but also develops critical thinking, collaboration, and communication skills.

However, implementing PjBL in class V of SD Negeri 2 Karangharjo requires thorough preparation, especially in terms of providing supporting learning media. Based on interviews with teachers, one of the main challenges in implementing PjBL is limited time and resources. Teachers often have difficulty designing projects that fit the curriculum and limited time available (Anwar, 2018). Therefore, developing interactive learning media that can facilitate the implementation of PjBL is very important.

PjBL- based interactive learning media developed in this research aims to overcome these challenges. This media is designed to help teachers create interesting and relevant projects , as well as providing the tools necessary to facilitate more active and collaborative learning. For example, this media can include structured project modules, explanatory videos, and interactive quizzes that help students understand science concepts in more depth.

In the process of developing this learning media, feedback from teachers and students is very important. Teachers provide input regarding the suitability of the content to the curriculum and learning needs in the class, while students provide feedback regarding their involvement and comfort in using the media (Putri, 2021). Through this iterative process , it is hoped that the interactive learning media developed can better meet the science and science learning needs in class V of SD Negeri 2 Karangharjo .

The results of this analysis also highlight the importance of support from the school in implementing interactive learning media. Schools need to provide adequate facilities and infrastructure, such as stable internet access and sufficient technological devices (Pratama, 2019). Apart from that, training for teachers regarding the use of interactive learning media and the implementation of PjBL is also very important so that they can integrate this media into the learning process effectively.

Overall, the analysis of the learning needs and characteristics of class V students at SD Negeri 2 Karangharjo shows that the use of PjBL- based interactive learning media has great potential to improve the quality of science and science learning. This media can not only increase student motivation and involvement but also help them understand science concepts better. Therefore, the development and implementation of interactive learning media is expected to make a significant contribution in improving the quality of education at SD Negeri 2 Karangharjo (Ridwan, 2017).

In a broader context, these findings also have implications for the development of learning media in other schools. A student-centred approach, supported by technology and innovative learning methods such as PjBL , can be an effective model for improving the quality of education at the primary level. Further research is needed to explore how this interactive learning media can be adapted and implemented in various other learning contexts.

Thus, this research emphasizes the importance of innovation in media and learning methods to answer educational challenges in the digital era. The development of PjBL -based interactive learning media is a concrete step that can be taken to create a more engaging and effective learning experience for students. It is hoped that the findings from this research can inspire the development of other learning media that are more creative and relevant to the needs of the times.

### **Based Interactive Learning Media Learning**

Based interactive learning media Learning ( PjBL ), there are several stages that must be passed to ensure that the media produced is in accordance with students' learning needs and is effective in improving the quality of learning. The ADDIE model, which consists of five main stages, namely Analysis, Design, Development, Implementation, and Evaluation, is used as a framework in this development process (Sugiyono, 2016).

The design stage is a very crucial initial stage in developing learning media. At this stage, the first step taken is the formulation of learning objectives that are specific and in accordance with the class V science curriculum. Learning objectives must be formulated clearly so that they can serve as a guide in designing content and activities that will be presented in learning media (Rahmawati, 2020). After the learning objectives have been determined, the next step is to prepare an outline or content framework for the learning media. This outline includes the topics that will be covered, the order in which they will be presented, and the types of activities that will be included. At this stage, learning design principles such as clarity, consistency and student involvement are the main considerations (Wulandari, 2018).

Next, a storyboard is created that visually describes how the content will be presented. This storyboard functions as a guide for the development team in visualizing the ideas that have been formulated in the outline . Storyboards include images or sketches from each media screen, including text, images, animations and interactions that will be displayed (Putri, 2021).

After the design stage is complete, the next stage is developing a learning media prototype. This prototype is an initial version of the media developed based on a storyboard . The development process includes creating visual and audio content, coding interactions, and testing media functionality. The software used to develop this learning media can be Adobe Flash , Articulate Storyline , or other software that supports creating interactive media (Susanto, 2017). Creating visual content involves graphic design that is attractive and relevant to the IPAS material. Visual elements such as pictures, diagrams and animations are used to help explain the concepts being taught. In addition, audio in the form of narration or sound effects is added to provide additional explanations and improve the student learning experience (Pratama, 2019).

coding is carried out to create interactive elements in media, such as quizzes, drag - and -drop activities , and simulations. This interaction aims to make students more

actively involved in the learning process and help them understand the material in a more enjoyable way (Wibowo, 2018). After the prototype has been developed, an initial trial (alpha testing) is carried out by the development team to ensure that the media functions as expected and that there are no technical errors.

The implementation phase involves testing prototypes of interactive learning media in real environments. A limited trial was carried out in class V of SD Negeri 2 Karangharjo involving several students and science teachers. The aim of this trial is to evaluate the effectiveness of the media in actual learning contexts and obtain feedback from users (A. Nugraha, 2019). During the trial, students used interactive learning media in daily learning activities. Students are asked to complete projects designed using this media, while the teacher observes the learning process and provides an evaluation of the media used. Feedback from students and teachers is very important to identify the strengths and weaknesses of the media as well as aspects that need to be improved (Fauziah, 2018).

The evaluation stage is the final stage in the ADDIE model which aims to assess the effectiveness of the learning media that has been developed. Evaluation is carried out in two forms, namely formative and summative evaluation. Formative evaluation is carried out during the development and implementation stages to obtain feedback that is used in improving the media (Ridwan, 2017). Summative evaluation is carried out after the media is fully implemented to assess the achievement of learning objectives. The methods used in evaluation include learning outcomes tests, student satisfaction questionnaires, and interviews with teachers. Learning outcome tests are used to measure students' increased understanding of science and science concepts after using interactive learning media. Student satisfaction questionnaires assess their perceptions of the media, including aspects such as engagement, ease of use, and overall satisfaction. Interviews with teachers were used to obtain their perspectives regarding the effectiveness of media in supporting the learning process (Rahmawati, 2020).

PjBL -based interactive learning media is effective in increasing students' understanding and involvement in science learning. Students showed significant improvements in learning test results and stated that they were more motivated and interested in learning using this medium. Teachers also report that this media helps them in compiling and managing learning projects that are more structured and interesting (Wulandari, 2018).

Based on the evaluation results, it can be concluded that the PjBL- based interactive learning media developed has met the learning objectives and needs of class V students at SD Negeri 2 Karangharjo . This media not only improves student learning outcomes but also makes learning more fun and meaningful. Therefore, it is recommended to implement this learning media more widely in other schools and continue to carry out research and development to perfect this media (Putri, 2021).

Recommendations for further development include improving content and media design based on user feedback, as well as developing more diverse and challenging project modules. Apart from that, training for teachers regarding the use of media and the implementation of PjBL also needs to be improved so that they can integrate this media more effectively in the learning process (Susanto, 2017).

Thus, the development of PjBL- based interactive learning media is a significant step in improving the quality of science and science learning in elementary schools. It is

hoped that this research can become a reference for the development of other innovative learning media and make a meaningful contribution to the world of education in Indonesia.

### **Implementation of Interactive Learning Media in Class V and Results of Limited Trials at SDN Karangharjo II**

Based interactive learning media Learning ( PjBL ) in class V of SD Negeri 2 Karangharjo is an important step in this development process. This stage aims to test the effectiveness of the media in actual learning contexts and obtain useful feedback for further improvements. Implementation was carried out through a limited trial involving several students and teachers of science subjects.

During the implementation process, interactive learning media is used in daily teaching and learning activities in class V. This media is designed to support the PjBL method which emphasizes learning through real projects that are relevant to students' lives. Through these projects, students are invited to work together in groups, plan and carry out assigned tasks, and present the results of their work in front of the class (Fauziah, 2018).

In the initial stage of implementation, the teacher provides an explanation of the learning objectives and the steps to be taken. Students are then introduced to the interactive learning media that has been developed. This media includes various features such as videos, animations, interactive quizzes, and simulations designed to help students understand IPAS concepts better. Apart from that, the media also provides step-by-step guidance in completing a given project (Pratama, 2019).

During the learning process, students use interactive learning media as a tool to complete their projects. Each group of students is given a different assignment but still related to the main topic being studied. For example, one group may be given a project to create a simple model of a particular ecosystem, while another group makes a presentation on the impact of pollution on the environment (Wibowo, 2018).

Teachers act as facilitators who help students if they experience difficulties and provide constructive feedback. Teachers also observe and record students' learning processes to assess the extent to which interactive learning media helps them understand the lesson material. In addition, teachers provide formative tests periodically to measure increases in students' understanding of the material being taught (A. Nugraha, 2019).

The results of limited trials show that the use of PjBL- based interactive learning media has a positive impact on student learning. Students demonstrate high enthusiasm and active involvement in completing their projects. They are more motivated to learn and understand the concepts taught through this media more easily. Learning outcome tests carried out after implementation showed a significant increase in student scores compared to before using interactive learning media (Wulandari, 2018).

In addition, feedback from students is also very positive. They stated that interactive learning media makes learning more fun and less boring. Students feel that it is easier for them to understand the lesson material because it is presented in an interesting and interactive way. They also appreciate having real projects that allow them to apply the knowledge they have learned in more practical situations (Rahmawati, 2020).

Teachers also provide positive feedback regarding this interactive learning media. They stated that this media was very helpful in managing the class and making the learning process more structured. Teachers feel that they can provide clearer and more in-depth explanations with the help of this media. Apart from that, this media also makes it easier for teachers to provide evaluation and feedback to students more effectively (Ridwan, 2017).

However, there were several challenges faced during implementation. One of the main challenges is the limited technological facilities in schools. Not all students have the same access to the technological devices needed to use interactive learning media. Apart from that, some students also experience difficulties in using this technology due to a lack of basic skills in using computer or tablet devices (Putri, 2021).

To overcome this challenge, it is recommended that schools improve the available technological facilities and provide basic training to students regarding the use of technological devices. Apart from that, teachers also need to be given further training regarding the use of interactive learning media and the PjBL method so that they can integrate this media more effectively in the learning process (Susanto, 2017).

Overall, the implementation of PjBL- based interactive learning media in class V of SD Negeri 2 Karangharjo showed very positive results. This media not only improves student learning outcomes but also makes the learning process more interesting and meaningful. With this media, it is hoped that students can learn in a more enjoyable and effective way, and have better skills in working together and solving problems (Fauziah, 2018).

This research makes a significant contribution to the development of innovative learning media in Indonesia. It is hoped that these findings can become a reference for the development of other interactive learning media that can be applied at various levels of education. Apart from that, the results of this research also emphasize the importance of using the PjBL method in learning to improve students' critical and creative thinking skills (Rahmawati, 2020).

Thus, it is hoped that the use of PjBL- based interactive learning media can continue to be improved and implemented more widely in various schools. Improvement steps need to be carried out continuously to ensure that this media is always relevant and effective in supporting the learning process in the classroom.

### **Evaluation of the Effectiveness of Interactive Learning Media in Increasing Student Understanding and Engagement**

Based interactive learning media Learning ( PjBL ) was carried out to assess the extent to which this media succeeded in increasing students' understanding and involvement in science and science learning in class V of SD Negeri 2 Karangharjo . Evaluation is carried out using quantitative and qualitative methods to get a comprehensive picture of the impact of using this media on student learning outcomes.

The evaluation methods used include learning outcomes tests, student satisfaction questionnaires, and interviews with teachers. Learning outcome tests are used to measure the increase in students' understanding of the material taught before and after using interactive learning media. Student satisfaction questionnaires are used to measure students' perceptions of the learning media used, while interviews with teachers aim to obtain their views regarding the effectiveness of this media in the learning process (Sugiyono, 2016).

PjBL- based interactive learning media . Before using this media, the average student score was in the fair category, but after implementing the media, the average score increased to the good category. This shows that this interactive learning media is successful in helping students understand science concepts better (Rahmawati, 2020).

In addition, data analysis from student satisfaction questionnaires shows that the majority of students are satisfied with the use of interactive learning media. Students stated that this media made learning more interesting and enjoyable. They feel more motivated to learn and understand the material taught more easily. Some of the aspects most appreciated by students include the use of interesting animations and videos, as well as interactive quizzes that help them test their understanding directly (Putri, 2021).

Interviews with teachers also revealed positive views regarding this interactive learning media. Teachers feel that this media is very helpful in conveying lesson material in a clearer and more interesting way. Teachers also stated that students were more actively involved in the learning process and more enthusiastic in completing the projects given. According to teachers, this media also makes it easier for them to provide feedback to students in a more effective and structured manner (Wulandari, 2018).

Evaluation was also carried out on the technical aspects and functionality of interactive learning media. The evaluation results show that this media has a user-friendly design and is easy for students to use. All interactive features function well and there were no significant technical obstacles during implementation. However, there are several suggestions for improvement from students and teachers, such as adding more complex simulation features and improving the visual appearance to make it more attractive (A. Nugraha, 2019).

PjBL- based interactive learning media is effective in increasing students' understanding and involvement in science learning. The increase in learning outcome scores shows that this media has succeeded in helping students understand the material better. In addition, high student satisfaction and positive feedback from teachers indicate that this media is well received and has a positive impact on student learning motivation (Susanto, 2017).

However, the evaluation also revealed several challenges and areas for improvement. One of the main challenges is limited access to technology for some students. Not all students have adequate devices to use interactive learning media optimally. Therefore, it is important for schools to provide adequate technological facilities and ensure that all students have equal access to this learning media (Ridwan, 2017).

In addition, although this media has shown positive results, improvements to the content and design still need to be made. Improvements can include adding new features that are more interactive and challenging, as well as improving the visual appearance to make it more attractive and in line with student preferences. Training for teachers also needs to be improved so that they can be more effective in using this media and implementing the PjBL method in daily learning (Fauziah, 2018).

By considering the results of this evaluation, recommendations for further development include several things. First, developing project modules that are more diverse and relevant to students' daily lives can help increase learning engagement and motivation. Second, improving technological facilities in schools and training for students on the use of technological devices is also very important. Third, further training for

teachers regarding the use of interactive learning media and the application of the PjBL method needs to continue so that teachers can integrate this media more effectively in the learning process (Pratama, 2019).

Thus, evaluating the effectiveness of PjBL -based interactive learning media shows that this media has a positive impact in increasing students' understanding and involvement in science learning. This media not only helps students understand the material better but also makes the learning process more interesting and meaningful. Therefore, implementation and improvement of this media needs to continue to be carried out to ensure that this media is always relevant and effective in supporting the learning process in the classroom (Wibowo, 2018).

This research makes a significant contribution to the development of interactive learning media in Indonesia. It is hoped that the results of this research can become a reference for the development of other learning media and provide inspiration for educators and media developers to continue to innovate in creating effective and interesting learning media (Rahmawati, 2020).

Thus, it is hoped that the use of PjBL- based interactive learning media can continue to be improved and implemented more widely in various schools. Improvement steps need to be carried out continuously to ensure that this media is always relevant and effective in supporting the learning process in the classroom. Successful implementation of this media can have a significant positive impact on improving the quality of education in Indonesia.

### **Discussion of Main Research Findings and Practical Implications for the Development of Innovative Learning Media**

Based interactive learning media Learning (PjBL) in increasing students' understanding and involvement in class V of SD Negeri 2 Karangharjo . These findings provide valuable insights for further development and practical implementation of innovative learning media.

One of the main findings is a significant increase in students' understanding of science material after using interactive learning media. Before implementation, test results showed that students' understanding of basic science concepts was still relatively low. However, after using this media, there was a significant increase in student learning test results. This shows that PjBL -based interactive learning media is effective in helping students understand lesson material in a more interesting and in-depth way (Rahmawati, 2020).

Apart from increasing understanding, other findings show that interactive learning media is successful in increasing student involvement in the teaching and learning process. Students show higher enthusiasm and participate more actively in learning activities. This media provides various interactive features, such as videos, animations and quizzes, which make learning more interesting and fun for students. This high involvement is important because it is directly related to student motivation and learning outcomes (Putri, 2021).

Findings from the student satisfaction questionnaire show that the majority of students are satisfied with the use of interactive learning media. They appreciate the use of visual and interactive elements that help them understand the material better. Students also feel that the projects given in the PjBL method are more relevant to their daily lives, so they are more motivated to learn. This shows that a contextual and

relevant learning approach is very effective in increasing students' interest and motivation to learn (Wulandari, 2018).

From the teacher's side, the findings show that interactive learning media helps them convey lesson material more effectively. Teachers feel that this media makes it easier for them to explain complex concepts and provide feedback to students. Apart from that, this media also helps teachers in managing the class and makes learning more structured. Teachers appreciate the step-by-step guide in this media which helps them in designing and implementing learning projects (A. Nugraha, 2019).

However, there are several challenges faced during the implementation of this interactive learning media. One of the main challenges is limited access to technology. Not all students have adequate devices to use this media, so efforts are needed to improve technological facilities in schools. In addition, some students experience difficulties in using technology due to a lack of basic skills in using computer or tablet devices. Therefore, basic training regarding the use of technology needs to be given to students (Nurjanah & Suprihatin, 2023).

The findings also show that although this media is effective, improvements are still needed to improve its quality. Some suggestions for improvement from students and teachers include adding more complex simulation features and improving the visual appearance to make it more attractive. Apart from that, efforts need to be made to integrate this media with other learning methods which are also effective in improving student learning outcomes (Ridwan, 2017).

The practical implications of these findings for the development of innovative learning media include several things. First, it is important to ensure that interactive learning media are designed taking into account student needs and characteristics. Media must provide interactive elements that are interesting and relevant to students' daily lives. Second, there needs to be adequate technological support in schools so that all students have equal access to this learning media. Third, training for teachers regarding the use of interactive learning media and the PjBL method needs to be improved so that they can integrate this media more effectively in the learning process (Pratama, 2019).

The development of interactive learning media must also consider feedback from users to make continuous improvements. Feedback from students and teachers is invaluable in identifying the media's strengths and weaknesses as well as aspects that need improvement. A continuous evaluation process is important to ensure that learning media is always relevant and effective in supporting the learning process (Wibowo, 2018).

In addition, collaboration between media developers, educators and educational experts is very important in developing innovative learning media. This collaboration can help ensure that the media developed is not only visually appealing but also based on strong pedagogical principles. Thus, interactive learning media can have a greater impact on improving the quality of education (Rahmawati, 2020).

Overall, the findings of this research indicate that PjBL -based interactive learning media has great potential in increasing students' understanding and involvement in learning. The practical implications of these findings provide valuable guidance for the development and implementation of innovative learning media at various levels of

education. With adequate support and continuous improvement efforts, interactive learning media can be an effective tool in improving the quality of education in Indonesia.

## CONCLUSION

The conclusion of this research shows that the development of interactive learning media is Project Based Learning ( PjBL ) in class V Natural and Social Sciences (IPAS) learning at SD Negeri 2 Karangharjo succeeded in increasing students' understanding and involvement positively. This media has proven effective in improving students' understanding of science material, with test results showing significant improvement. In addition, this media increases student engagement and motivation through interactive features such as videos, animations, and quizzes, as well as PjBL projects that are relevant to students' daily lives. Teachers also feel the benefits of this media, with ease in delivering material and managing the class. However, this research identifies challenges such as limited access to technology that need to be overcome by providing adequate facilities and technology training for students. Overall, this research contributes to the development of interactive learning media in Indonesia, provides references for innovative learning media, and encourages continuous improvement efforts to improve the quality of education.

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