International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-37, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

Analysis of Student Needs for Interactive Physics Learning Module Based on Agricultural Systems at SMK Negeri Luyo

Desi Widyaningsih Ahmad[1], Jasruddin[2], Abdul Saman[3]
[1] Graduate Program in Education Science, Universitas Negeri Makassar, Indonesia
[2] Physics Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Makassar, Indonesia
[3] Email: desiwidyaningsihh@gmail.com

ABSTRACT: This study aims to analyze the needs of students at SMK Negeri Luyo for an interactive physics learning module based on agricultural systems in Polewali Mandar. Physics learning at this school still faces several challenges, such as the lack of connection between physics material and students' daily lives, the limited availability of contextual teaching materials, and the use of conventional teaching methods. As a result, students find it difficult to understand physics concepts because the material taught remains abstract and is not sufficiently linked to agricultural practices, which are a significant part of their lives. This study employs a descriptive method with a qualitative and quantitative approach. Data were collected through observations, teacher interviews, and questionnaires distributed to students to determine their needs for an interactive learning module. The results indicate that students require more interactive and context-based teaching materials to understand the relationship between physics concepts and their daily lives, particularly in the agricultural sector. Most students prefer learning media that incorporate interactive simulations, project-based experiments, and case studies that connect physics concepts with agricultural practices in their area. Furthermore, teachers face challenges in developing contextual teaching materials due to time constraints and limited resources. Based on these findings, the study emphasizes the necessity of developing an interactive physics learning module based on agricultural systems to enhance students' understanding, interest, and motivation in learning. The development model used in this study is the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), which enables systematic module design tailored to the needs of students and teachers.

KEYWORDS: Agriculture-based physics, Contextual education, Interactive learning module, Needs analysis, SMK Negeri Luyo.

INTRODUCTION

Education has a very crucial role in building the future of a nation, including Indonesia. As the main pillar in human resource development, education not only serves as a means of science transfer, but also as a tool to improve the quality of life, the welfare of the community, as well as the competitiveness of the nation at the global level. With a quality education system, Indonesia can print individuals who are not only academically intelligent but also have critical thinking skills, creative, innovative, and able to adapt to the Times. One of the main reasons why education is so important is because of its role in reducing poverty levels. A good education opens up opportunities for individuals to obtain more viable jobs with higher incomes. Data show that individuals with. Higher education has a greater chance of obtaining stable jobs than those with low levels of education. Thus, education can be an effective tool in breaking intergenerational poverty cycle. In addition, Education also plays a role in improving the quality of human resources (HR), which is a major factor in the development of a country. Developed countries such as Japan, Germany and SouthKorea have proven that large investments in the education sector can lead to a superior and innovative workforce, ultimately driving economic growth and technological progress. Indonesia, as the fourth largest country in the world, has a great potential to compete at the global level if it is able to improve its education quality.

However, to achieve quality education, Indonesia still faces various challenges, including equal access to education, the quality of educators, and the limited availability of facilities and infrastructure in remote areas. Therefore, a strong commitment from the government, society, and the private sector is needed to continuously improve Indonesia's education system. This effort can be carried out through a more adaptive curriculum reform, enhancing teacher quality, and utilizing technology in learning. With better education, Indonesia can produce a generation that is more prepared to face future challenges in economic, social, and technological fields. Quality education will not only improve individual well-being but also drive progress for the nation as a whole. Therefore,

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-37, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

education must be a top priority in national development so that Indonesia can become a more advanced, prosperous, and highly competitive country on the global stage.

The quality of education in Indonesia still faces several obstacles. Based on the results of the Programme for International Student Assessment (PISA) survey conducted by the OECD, Indonesia's scores in scientific literacy, including physics, remain below the average of other countries. This low ranking indicates that Indonesian students still struggle to understand, apply, and relate scientific concepts to real life. One of the main causes of this poor performance is the conventional teaching methods, where teachers predominantly use a lecture-based approach rather than interactive methods that encourage exploration and problem-solving.

The low quality of education in Indonesia has a significant impact on various aspects of society and the country's development. One of the main consequences is the high unemployment rate, where limited access to quality education results in many individuals lacking the skills and knowledge required in the job market. As a result, they struggle to compete and are more likely to become unemployed. Data shows that the majority of the workforce in Indonesia is still dominated by individuals with low levels of education, primarily elementary school graduates or even those who did not complete elementary school. This condition indicates that the low level of education directly contributes to Indonesia's high unemployment rate.

In addition, low education levels also contribute to a cycle of poverty that is difficult to break. Individuals with limited education tend to have fewer job opportunities and lower incomes, making it difficult for them to meet basic needs and improve their standard of living. This issue not only affects these individuals but also extends to the next generation, as economic constraints often hinder their children's access to proper education. This cycle continues to repeat itself, posing a major challenge to poverty alleviation efforts in Indonesia. Furthermore, low-quality education often fails to develop students' critical thinking and creativity. As a result, they struggle with problem-solving, innovation, and adapting to change. This impact is evident not only in daily life but also in the industrial sector, where the lack of skills and competitiveness among Indonesian workers becomes a major obstacle to the growth of technology- and innovation-based economic sectors.

One of the factors contributing to the low quality of education in Indonesia is the limited availability of teaching materials, particularly in science subjects such as physics. Physics is a subject that requires a deep understanding of abstract and applied concepts. However, the scarcity of teaching resources makes it difficult for students to grasp and connect theoretical knowledge with real-world applications. This directly affects students' conceptual understanding and academic performance. The lack of interactive and contextual learning materials often results in students merely memorizing theories without truly comprehending the fundamental principles of physics. Textbooks used in schools frequently present material in the form of text and formulas without illustrations, experiments, or applications that could clarify concepts. Consequently, students' learning outcomes in physics tend to be low, further contributing to Indonesia's poor science scores in international assessments such as the Programme for International Student Assessment (PISA).

Furthermore, the limited availability of physics teaching materials also leads to a lack of student interest in this subject. Physics is often perceived as difficult and unappealing because the material is delivered using uninventive methods and is not connected to everyday life. If the available teaching materials consist only of theoretical explanations without a contextual approach that links physics concepts to students' experiences, they are likely to lose motivation to learn. Experiment-based learning and interactive simulations are essential to make physics more engaging, yet many schools still rely on lecture-based teaching methods without the support of innovative learning materials. The lack of diverse teaching resources also limits students' creativity and critical thinking abilities. Physics is not just about understanding theories; it is also about applying them to solve real-world problems. If teaching materials consist solely of theoretical content without experiments, simulations, or case studies, students will not develop analytical and critical thinking skills. As a result, they will rely on rote memorization and lack the ability to connect physics concepts with real-world phenomena.

The impact of limited physics teaching materials is not only felt by students but also by teachers in the teaching process. Teachers who do not have access to innovative teaching materials must make extra efforts to create engaging and effective teaching methods, but time and resource constraints often become obstacles. Consequently, many teachers continue to rely on lectures as the primary method of teaching physics. However, if interactive learning modules based on experiments or digital technology were available, the learning process could become more effective and engaging for students. The long-term impact of the lack of physics teaching materials also affects students' readiness to face challenges in technology-based industries and the job market. Physics serves as the foundation for various fields such as engineering, energy, and manufacturing. If students do not have a strong understanding of

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-37, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

physics due to limited teaching resources, they will struggle to compete in an increasingly STEM (Science, Technology, Engineering, and Mathematics)-oriented job market. Many schools in rural areas, particularly in remote and underdeveloped regions, still rely on standard textbooks that are often outdated and not aligned with the latest developments in science and technology. The teaching materials used also tend to be abstract and disconnected from students' daily lives, making it difficult for them to understand and apply physics concepts.

In Polewali Mandar Regency, specifically at SMK Negeri Luyo, this issue is even more apparent. Physics education still relies heavily on theoretical teaching methods with minimal connection to local contexts. Most students come from farming families, where their daily activities are closely related to physics principles, such as soil mechanics in land cultivation, hydrodynamics in irrigation systems, and energy and pressure in agricultural tools. However, the lack of relevant teaching materials makes it difficult for students to understand and relate physics concepts to their everyday experiences. Teachers also face challenges in developing context-based teaching materials due to time and resource constraints.

To address these issues, a comprehensive effort is needed to improve the quality of education in Indonesia. This includes enhancing a more contextual curriculum, improving teacher competencies, providing better facilities and infrastructure, and ensuring equal access to education across all regions of Indonesia, including remote areas. The development of an interactive physics learning module based on agricultural systems is a suitable solution to overcome the limitations of teaching materials in physics education, particularly at SMK Negeri Luyo. This module is designed to help students understand physics concepts through a more contextual and application-based approach. According to the dissertation, the module is structured so that students can relate physics theories to agricultural activities they are familiar with, such as fluid mechanics in irrigation systems, thermodynamic laws in crop drying, and mechanical energy in agricultural tools. By adopting a Problem-Based Learning (PBL) approach, the module presents various case studies and problem-based projects, allowing students to develop critical thinking and problem-solving skills in the context of agriculture.

Furthermore, this module is equipped with interactive digital media such as barcode scans, educational videos, and digital simulations to clarify the physics concepts being taught. The use of digital technology aims to enhance students' motivation and engagement in the learning process. Teachers can also utilize this module as a more engaging and effective teaching aid compared to conventional lecture-based methods. Research findings indicate that this module is relevant to students' needs and effective in improving their understanding of physics concepts, as they find it easier to grasp theories through their application in everyday activities. In the long run, this module is expected to serve as an innovative learning model that can be implemented in other regions with similar characteristics, particularly in vocational schools with an agricultural focus. By developing more interactive and contextual teaching materials, the quality of physics education can be improved, ensuring that students not only gain a better conceptual understanding but also become more prepared to face challenges in the technology-driven workforce and industry. Therefore, the development of an interactive physics learning module based on agricultural systems is a strategic step in enhancing the quality of education in rural areas and ensuring that physics learning becomes more meaningful and relevant to students.

The development of this interactive physics learning module based on agricultural systems in this study will utilize the ADDIE development model (Analysis, Design, Development, Implementation, Evaluation). This model was chosen due to its systematic approach to designing effective teaching materials tailored to students' needs. The Analysis stage is conducted to identify students' needs and challenges in learning physics at SMK Negeri Luyo. The Design stage focuses on structuring the module, including material organization, interactive media, and problem-based learning methods. The Development stage involves creating and refining the module based on the designed framework. The Implementation stage aims to test the effectiveness of the module by using it in classroom learning. Finally, the Evaluation stage assesses the success of the module and provides feedback for further improvements. By applying the ADDIE model, this module is expected to be optimally developed and capable of enhancing physics education with a more contextual and application-based approach for students.

This study aims to analyze students' needs for an interactive physics learning module based on agricultural systems at SMK Negeri Luyo. This needs analysis serves as the initial step in developing more effective and applicable teaching materials that align with students' conditions and characteristics. With this module, physics learning is expected to become more contextual, engaging, and meaningful, equipping students to better face challenges in both academia and the workforce, particularly in technology-based agriculture. Therefore, this research emphasizes the importance of developing innovative teaching materials that not only improve students' understanding of physics but also help them apply this knowledge in their daily lives.

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-37, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

RESEARCH METHOD

The research method used in this study aligns with the title of the article, "Analysis of Students' Needs for an Interactive Physics Learning Module Based on Agricultural Systems at SMK Negeri Luyo." This study employs a Research and Development (R&D) approach using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), which enables a systematic analysis of students' needs and the development of a module tailored to their conditions.

The Analysis stage in the ADDIE model focuses on identifying students' needs through observations, interviews with teachers, and the distribution of questionnaires to determine the difficulties they face in understanding physics as well as the limitations of the teaching materials used. This method is relevant to the article's objectives as it not only analyzes students' needs but also develops innovative learning solutions.

Additionally, the Design, Development, Implementation, and Evaluation stages in the ADDIE model ensure that the developed module is not only based on students' needs but is also tested for effectiveness before being widely implemented. Thus, this research method supports the article's objective of understanding students' needs for an interactive physics learning module based on agricultural systems while also providing a structured approach for developing and implementing the module at SMK Negeri Luyo.

RESEARCH RESULTS

The research results indicate that students at SMK Negeri Luyo have a high need for an interactive physics learning module based on agricultural systems. Physics education at this school still faces various challenges, particularly in terms of the relevance of the material to students' daily lives. Observations and interviews with teachers revealed that physics lessons at SMK Negeri Luyo still rely on conventional teaching materials, such as standard textbooks that lack direct connections to agricultural activities—the background of most students. The absence of interactive and contextual-based teaching materials makes it difficult for students to understand physics concepts, as the material taught remains abstract and is not linked to their real-life experiences in agriculture.

Additionally, students tend to be passive during the learning process. When teachers deliver lessons, students remain silent and rarely engage in discussions or answer questions. The limited use of innovative learning models, such as problem- based learning or project-based learning, is also a factor contributing to low student engagement. Teachers face challenges in developing more contextual teaching materials due to limited resources. As a result, they rely solely on existing textbooks without supplementary modules that connect physics concepts to students' familiar agricultural activities.

Based on the needs analysis, both students and teachers expressed that there is a strong need for more interactive and agriculture-based teaching materials to make physics lessons more engaging and easier to understand. Students prefer a module that goes beyond just theory and formulas and includes illustrations, case studies, simple experiments, and interactive digital media to help them grasp physics concepts in real-life contexts. Moreover, they expect practical examples of physics applications in agriculture, such as fluid mechanics in irrigation systems, thermodynamic laws in crop drying processes, and mechanical energy in the use of agricultural tools.

The research findings highlight the urgent need to develop an interactive physics learning module based on agricultural systems as a solution to the challenges faced by both students and teachers. This module is designed to bridge the gap between theoretical physics taught in schools and its practical applications in the agricultural sector. With this module, students are expected to gain a better understanding of physics concepts, increase their learning interest, and develop critical thinking skills to solve real-life problems related to their daily activities. The correlation between the material in the module and the measured variables is presented in Table 4.1 below.

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-37, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

No	Main Topics of the Interactive Physics Module Based on the Agricultural System in Polewali Mandar			Aspects of Polewali Mandar
	Subtopic: Work and Energy	Subtopic: Electromagnetic Waves	Subtopic: Static and Dynamic Fluids	
1	Photos related to agricultural activities associated with the topic of work and energy, followed by diagnostic assessment questions related to the photos.	Photos related to agricultural activities associated with the topic of electromagnetic waves, followed by diagnostic assessment questions related to the photos.	Photos related to agricultural activities associated with the topic of static and dynamic fluids, followed by diagnostic assessment questions related to the photos.	Identifying issues, Explaining phenomena, Using scientific evidence
2	Provided with materials and photos showing the relationship between the agricultural system in Polewali Mandar and the topic.	Provided with materials and an instructional video demonstrating the relationship between the agricultural system in Polewali Mandar and the topic	Provided with materials and an instructional video demonstrating the relationship between the agricultural system in Polewali Mandar and the topic.	Identifying issues, Explaining phenomena, Using scientific evidence
3	Provided with a barcode link to an instructional video explaining the connection between work and energy and the agricultural system.	Provided with a barcode link to an instructional video explaining the connection between electromagnetic waves and the agricultural system.	Provided with a barcode link to an instructional video explaining the connection between static and dynamic fluids and the agricultural system.	Identifying issues, Explaining phenomena, Using scientific evidence
4	Organizing students for learning by working on the provided student worksheets (LKPD).	Organizing students for learning by working on the provided student worksheets (LKPD).	Organizing students for learning by working on the provided student worksheets (LKPD).	Using scientific evidence
5	Students present the results of their discussions based on the student worksheets (LKPD).	Students present the results of their discussions based on the student worksheets (LKPD).	Students present the results of their discussions based on the student worksheets (LKPD).	
6	Evaluation in the form of questions about the topics that have been studied.	Evaluation in the form of questions about the topics that have been studied.	Evaluation in the form of questions about the topics that have been studied	

CONCLUSION

Based on the research findings, it can be concluded that students at SMK Negeri Luyo have a high need for an interactive physics learning module based on agricultural systems. Physics education at this school still faces various challenges, particularly due to the lack of relevant and innovative teaching materials. The material taught remains abstract and is not sufficiently linked to students' daily lives, especially in the agricultural sector, which is their primary background. As a result, students have low conceptual understanding of physics, limited learning motivation, and underdeveloped critical thinking skills in solving science-based problems.

To address these issues, an interactive physics learning module based on agricultural systems was developed using the ADDIE

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 08 Issue 03 March 2025
DOI: 10.47191/ijcsrr/V8-i3-37, Impact Factor: 8.048
IJCSRR @ 2025
www.ijcsrr.org

model (Analysis, Design, Development, Implementation, Evaluation). The needs analysis results indicate that students require more contextual and interactive learning materials that connect physics concepts with agricultural activities they are familiar with. The module was designed using a Problem-Based Learning (PBL) approach and incorporates digital media, such as photos, instructional videos, barcode scans, and student worksheets (LKPD). This approach allows students to better understand physics concepts in real-life contexts, such as fluid mechanics in irrigation systems, thermodynamic laws in crop drying processes, and mechanical energy in the use of agricultural tools.

The study also found that the use of this module enhances student engagement in the learning process, as they become more active in discussions, explore physics phenomena around them, and participate in experiment- and project-based activities. Teachers also benefit from the module as it serves as a more effective teaching aid compared to the lecture-based methods that have traditionally dominated physics instruction. With diagnostic assessments, conceptual understanding questions, and LKPD discussions, the module ensures that students truly grasp the concepts being taught in a more applied and meaningful way.

Overall, this study confirms that the development of an interactive physics learning module based on agricultural systems at SMK Negeri Luyo is an effective solution for improving physics education quality. The module not only helps students understand physics concepts more concretely but also enhances learning motivation, critical thinking skills, and their readiness to face challenges in both academia and the workforce. Therefore, these findings provide a strong foundation for the development of similar teaching materials in other schools with students from agricultural backgrounds, ensuring that physics education becomes more contextual and meaningful.

REFERENCES

1. Aji, L. J., Hendrawati, T., Febrianti, R., Wulandari, N. D., Gilaa, T., Abdullah, G., Rukmana, L., Rohman, T., Sahib, A., & Simal. (2024). Model- model pembelajaran dalam dunia pendidikan. Banjarnegara: Penerbit Qriset Indonesia
2. Arifi, M. F., Lesmono, A. D., & Handayani, R. D. (2021). Analisis konsep fisika pada penggunaan alat pertanian cangkul oleh petani sebagai bahan pembelajaran fisika. Jurnal Pembelajaran Fisika, 10(3), 121-129.
3. Hidayat, D., Abdurrahman, M., & Nurbayan, Y. (2007). Ilmu dan aplikasi Pendidikan. Bandung: Penerbit IMTIMA
4. Lesmono, A.D., S. Wahyuni, dan R.D.N. Alfiana. 2021. Pengembangan Bahan Ajar Fisika Berupa Komik pada Materi Cahaya di SMP. Jurnal Pembelajaran Fisika. 1(1): 100-105.
5. Libman, Z. 2010. Integrating Real-life Data Analysis in Teaching Descriptive Statistics: A Constructivist Approach. Journal of Statistics Educations. 18(1): 1-23.
6. Suparno, P. 2007. Metodologi Pembelajaran Fisika. Yogyakarta: Universitas Sanata Dharma
7. Naufal, E. M. (2021). Asiknya pembelajaran fisika dalam jaringan di tengah pendemi (antologi esai mahasiswa pendidikan fisika). Yogyakarta: UAD Press.
8. Murniyati, S. (2012). Upaya meningkatkan aktivitas belajar dan hasil belajar siswa menerapkan pembelajaran problem based instruction (pbi) pada materi pokok kinematika siswa kelas xi mia-1 semester gagal man 1 pati tahun ajaran 2017/2018. Jurnal Pendidikan Empirisme,, issn:2301-5845.
9. Setiawan, A. M. (2017). Belajar dan Pembelajaran. Ponorogo: Uwais Inspirasi Indonesia.
10. Subagyo, A. (2022). Media enikki dalam pembelajaran ips. Yogyakarta: Jejak Pustaka.
11. Sumarsono, P., Inganah, S., Iswatiningsih, D., & Husamah. (2020). Belajar dan pembeajaran di era milenial.
12. Sutianah, C. (2021). Belajar dan pembelajaran. Pasuruan: CV. Penerbit Qiara Media. Malang: UMM Press.

Cite this Article: Ahmad, D.W., Jasruddin, Saman, A. (2025). Analysis of Student Needs for Interactive Physics Learning Module Based on Agricultural Systems at SMK Negeri Luyo. International Journal of Current Science Research and Review, 8(3), pp. 1328-1333. DOI: https://doi.org/10.47191/ijcsrr/V8-i3-37