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Analysis of the Development Needs of Student Worksheet Based on Local Wisdom of Biotechnology Material at the Senior High School, Kupang City

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Abstract

This study aims to obtain an overview of the formulation of student worksheed (called as LKPD) based on local wisdom that needs to be developed in learning the biology of conventional biotechnology materials at SMA N 5 Kupang City, which is adapted to the learning achievements and objectives. The subjects of this study were 3 teachers who taught in Class X of SMAN 5 Kupang City, and 175 students who were randomly selected from all students of Class X who are interested in science at SMA N 5 Kupang City. Research data were collected through interviews and distribution of questionnaires. The research data were analysed in a qualitative descriptive way. The results of the study obtained teacher and student responses, including students need LKPD based on local wisdom on biotechnology material to make it easier to understand the material, In addition, in learning, teachers provide examples of the results of biotechnology based on local wisdom in the form of pictures and videos, and are presented in the form of virtual laboratories with animations to attract more student attention, so that students are more motivated to learn, which will affect learning outcomes. The biology material for class X semester that is most difficult for students to understand is the innovation material of biotechnology, so teachers need LKPD based on local wisdom in biotechnology material that can help students introduce local wisdom in their respective regions so that students can easily apply it in everyday life and support learning, which has a positive impact on improving students' learning outcomes.

Keywords: *Based on local wisdom, Biotechnology material, LKPD, Needs analysis*

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INTRODUCTION

Needs analysis is the process of identifying the specific requirements and preferences of learners in order to design effective educational programmes or materials. It is important because it helps educators understand learners' needs, interests, and goals so that they can tailor instruction to meet those needs and promote successful learning outcomes (Amalia & Albiansyah, 2023). Needs analysis can be done through a variety of methods such as questionnaires, interviews, and document analysis and conducting needs analysis, educators can identify topics, skills, and materials that are most relevant and meaningful to learners, ensuring that instruction is engaging and applicable to everyday life (Mulyana & Sumarmin, 2019). Needs analysis is an important first step to identify the weaknesses and needs of students and teachers in understanding and applying biotechnology concepts. Through this analysis, knowledge and skill gaps can be found that need to be revised, so that the development of learning materials can be adjusted to concrete needs at the senior high school level. (Wu, 2023).

Optimizing biotechnology learning in high school is an important step in facing the development of science and technology in the era of globalization. Biotechnology is one of the fields of science that has great potential in providing solutions to various challenges in the fields of health, agriculture, and the environment. Therefore, improving the quality of biotechnology learning in high school is an urgent need (Harms, 2002). One approach that can be used to achieve this is to develop LKPD based on local wisdom.

Local wisdom is an important element in the development of LKPD biotechnology. Combining the concept of biotechnology with local values will make it easier for students to understand the material, while increasing the relevance of learning to the context of students' daily lives. Thus, students not only acquire biotechnology knowledge, but also develop a love for culture and the surrounding environment (Suratno et al., 2020). By integrating life-based learning with local wisdom, innovative biotechnology learning models can be developed and applied in schools, universities, and communities (Buntting & Jones, 2020).

Optimization of biotechnology learning needs to pay attention to the development of information and communication technology (ICT). The use of digital media, simulations, and online learning platforms can be an effective means to facilitate the teaching-learning process. The integration of this technology will provide a more interactive learning experience and support a thorough understanding of biotechnology concepts (Josué et al., 2023). Education must prepare and develop quality human resources and character in accordance with moral values upheld in Indonesia. therefore, the government always strives to improve the quality of Indonesian education through curriculum innovation through the Merdeka curriculum.

The implementation of an independent curriculum provides an opportunity for students to have more autonomy and flexibility in learnin (Mauliddina & Irianto, 2023). Students can choose subjects or fields of study that align with students' interests and abilities (Anisa, 2022). The independent curriculum also aims to prepare students for the challenges of working life and make them globally competitive (Usanto, 2022). Collaboration between curriculum and industry needs, providing learning facilities, and developing learning tools. By implementing differentiated learning, the independent

curriculum caters to the diverse needs and interests of students, leading to improved learning outcomes. In addition, increasing teacher competence is also a key factor in optimizing biotechnology learning. Through training and skills development, teachers can be better prepared to teach biotechnology concepts thoroughly and adapt teaching strategies to student needs. Improving teacher quality will have a positive impact on student motivation and understanding of learning materials.

Through needs analysis in the development of LKPD based on local wisdom, optimizing biotechnology learning in high school can create a more effective, relevant, and fun learning environment for students. With this approach, it is expected that students can develop a deep understanding of biotechnology and be able to apply the concept in solving real-world problems. LKPD which uses local wisdom in biotechnology learning is one of the innovations in learning. This research is the initial stage of a series of subsequent research in the process of developing LKPD based on local wisdom. Analysis of student and teacher needs will be the initial focus in designing and developing LKPD. This research is important to do to make it easier for researchers to develop LKPD. The resulting formulation will be used to compile and develop LKPD based on local wisdom of biotechnology materials.. This study aims to obtain an overview of the formulation of LKPD based on local wisdom that needs to be developed in learning biology of conventional biotechnology materials at SMA N 5 Kupang City which is adjusted to the learning achievements and objectives. The results of the research obtained are expected to be a reference in developing LKPD based on local wisdom

METHOD

The method used in this study is a qualitative method that focuses on analyzing the needs of LKPD based on local wisdom on Biotechnology material in high school biology learning. The subjects in this study were 3 teachers who taught in class X of SMAN 5 Kupang City, and 175 students were randomly drawn from all grade X students of science interest at SMA N 5 Kupang City. Research data were collected by interviews, and questionnaire dissemination. Teacher interview instruments are used to obtain information about teaching materials and methods used in learning. The research data were analyzed in a qualitative descriptive manner. The instrument used in this study is in the form of questionnaires on the needs of students and teachers containing questions related to Biotechnology learning. These questions are used to reveal gaps felt by students and the needs of students in Biotechnology learning related to the development of LKPD based on local wisdom.

RESULTS AND DISCUSSION

The research conducted an analysis of LKPD needs based on local wisdom of class X biotechnology material at SMA N 5 Kupang city through data collection with questionnaires to teachers and students obtained the results of responses or answers presented in tables 1 and 2.

Table 1. Results of teacher answers about LKPD needs analysis based on local wisdom of biotechnology material

Question	Answer	Persentage
A. Student characteristics in biology learning		
1. Do you think students like learning Biology?	very fond	100%
2. How enthusiastic do you think students are during the Biology learning process?	Quite enthusiastic very enthusiastic	33, 33 % 66.66%
3. Based on the experience of the teacher, how is the completion of learning Biology so far?	Always done Just done	66.66% 33.33%
B. **Model, and Biology learning process**		
1. Do teachers use learning models that are able to face the demands of 21st century vocational work career fields?	sometimes always	33.3 3 % 66.66%
2. The learning model that teachers often use in learning is?	PBL, Discovering learning, inquiry , PjBL	
3. The learning method that you often use is?	Discussion , simulation , experiment	
4. According to the teacher, which biology learning is practical and effective to apply in high school biology learning	- Learning that emphasizes factual and conceptual and procedural materials so that students are able to develop a number of process skills and apply them in life - Learning that emphasizes providing direct experience so that students need to be helped to develop a number of process skills so that students are able to explore and understand the environment .	-
C. **Characteristics of matter (Biotechnology)**		
1. According to the teacher, what is the most difficult material for class X biology in the third semester to teach students?	Biological technology innovation material	100%
2. According to the teacher, what is the most difficult for students to understand in class X biology material	Biological technology innovation material	100%
3. Have you taught biotechnology material?	Ever	100%
4. How do teachers teach this material (related to models, and methods)	- The model used is discovering learning with	-

		discussion methods, and working on LKPD. - Using PBL by watching videos or doing lab work depends on the needs of the tools and materials needed.	
5.	Are students enthusiastic during the biotechnology learning process?	enthusiastic	100%
6.	Do you relate this material to everyday life or based on local wisdom?	always sometimes	66.66%
		On tempeh making material, tape making and nata de coco	33.33%
7.	How do students understand biotechnology material after being given an explanation by relating daily life or based on local wisdom?	understand	100%
8.	Do you do practicum for biotechnology materials?	always sometimes	66.66% 33.33%
9.	How is the completeness of student learning outcomes in learning biology biotechnology materials?	Thoroughly, there are remedial students	100%
D.	**Biology teaching materials**		
1.	The teaching materials that you usually use in learning biology biotechnology materials are?	LKPD, Modules, Handouts, teacher books and student books	
2.	Are the teaching materials that you use homemade?	Yes No	66.66% 33, 33%
3.	Which teaching materials have you ever made yourself?	LKPD	
4.	Do teachers need LKPD based on local wisdom in Biotechnology material?	Yes	100%
5.	The reason for needing LKPD based on local wisdom in Biotechnology material?	- It is very helpful because students can get to know the local wisdom of their respective regions - So that students can easily apply in everyday life - It is very necessary to support learning, because familiar things will have a more positive impact in improving student learning outcomes	-

Table 2. Answer results analysis need towards based LKPD local ingredient wisdom Biotechnology

Question	Answer	Persentage
1. What teaching materials other than books from school help you understand biotechnology materials?	video/ animation practicum	73.1 % 52%
2. Do you need alternative teaching materials that can be used to learn biotechnology concepts more easily and interestingly?	very needy enough need	65.1 % 36.6%
3. What teaching materials or books do you use in biotechnology learning? (may select more than one option)	Book package LKPD YouTube	72.6 % 68 % 56 .6 %
4. Is LKPD used in biotechnology materials based on local wisdom?	Yes No	36.5 % 63.4 %
5. Do you need LKPD based on local wisdom on biotechnology material to make it easier to understand the material?	very needy enough need	60 % 38.8 %
6. Your advice for learning biology, especially biotechnology material, becomes easier to understand if.....	- More interesting learning with LKPD - Direct biotechnology practicum - Provide real-life examples of how biotechnology is used in everyday life - Teaching materials vary such as in the form of animations, videos, articles to make it easier to understand the material - Presented in the form of a virtual laboratory with animation to better attract students' attention. - Learning using a contextual approach - Learning using interesting and interactive media - Provide examples of the results of biotechnology based on local wisdom in	

	the form of pictures and videos

DISCUSSION

A needs analysis or assessment of the needs of teachers and students on biological material is necessary to identify the specific requirements and preferences of the target audience to develop effective teaching materials. Analysis helps in understanding the types and characteristics of teaching materials needed for biology education, such as the use of simple language, sequential materials, and feedback (Saifuddin & Puspitasari, 2021). It also helps in identifying the development of teaching materials based on a cooperative approach, which can facilitate students' understanding of the topic (Setiawan et al., 2020). Furthermore, the analysis highlights the shortcomings of existing teaching materials, such as difficult language, unsuitable topics, and unattractive designs, and the need for character-based biology modules with concept maps (Dwiyanti & Sumarmin, 2020). In addition, the analysis revealed a lack of suitable teaching materials for biology learning, the need for project-based learning modules, and the importance of problem-solving-based teaching materials (Susanti, 2019).

Needs analysis aims to analyze the needs of students and teachers related to the material and learning media needed to achieve learning objectives in the curriculum. The results of this analysis are used as a basis for the design of learning media development. Analysis of student and teacher needs is carried out by providing questions in the form of student questionnaires and teacher questionnaires related to the needs of students and teachers for learning media, especially on Biotechnology material. Based on the results of the questionnaire answers, it is known that teaching materials other than books from schools that help students understand biotechnology materials in the form of practicums and animated videos, students really need alternative teaching materials that can be used to learn biotechnology concepts more easily and interestingly. The results of student questionnaires on biology learning, especially biotechnology materials, become easier for students to understand if learning with LKPD is more interesting, biotechnology practicum directly, provides real examples of how biotechnology is used in everyday life, teaching materials vary such as in the form of animations, videos, articles to make it easier to understand the material, presented in the form of virtual laboratories with animations to attract more students' attention, learning using interesting and interactive media, providing examples of the results of biotechnology based on loKal wisdom in the form of images and videos.

The results of research by Ersoy et al., (2022) that virtual laboratories with animation can be used to attract students' attention and make learning more interesting and interactive. Using a contextual approach, students can learn in a more meaningful way and relate their knowledge to real-life situations (Durkaya, 2022). In addition, the use of engaging and interactive media, such as simulation and modeling, in virtual labs can enhance the learning experience. Providing examples of outcomes from local science-based biotechnology in the form of images and videos can better engage students and make learning content more relevant (Khorasani et al., 2022).

The results of teacher questionnaires about practical and effective biology learning are applied in high school biology learning that learning emphasizes fact and conceptual

and procedural materials so that students are able to develop a number of process skills and apply them in life. The result of the teacher's response that the reason for needing LKPD based on local wisdom in Biotechnology material is very helpful because students can get to know the local wisdom of their respective regions, so that students can easily apply it in everyday life. It is very necessary to support learning, because familiar things will have a more positive impact in improving student learning outcomes. LKPD based on local wisdom on science material in secondary schools is important for several reasons. First, it increases the validity of science modules by integrating local wisdom, making content more relevant and meaningful to students (Nabila et al., 2023). Secondly, it increases the practicality of the module, as shown by the high efficiency criterion (Fahmi & Nurwahyunani, 2022). Third, it has been found effective in improving learning outcomes, with high criteria for n-gain (Krisnayanti & Sujana, 2022). In addition, local wisdom-based LKPD is considered suitable for use and effective in improving mathematical problem solving skills (Ladona et al., 2022). Moreover, it helps in developing critical thinking skills and improving learning outcomes in science (Fauzi et al., 2022). The development of LKPD based on critical thinking on class IX Junior High School Biotechnology material obtained the results of the effectiveness test of the average Pre-test and Post-test scores of students obtained an N-Gain score of 0.6 in the medium category and student questionnaires obtained an average result of 82% with the very effective category (Sinaga & Anas, 2022). Overall, the integration of local wisdom in LKPD for science materials in secondary schools is useful for increasing the validity, practicality, effectiveness, and relevance of learning materials.

The results of the needs assessment needs analysis research on LKPD biology show that there is a need to develop biology learning media modules based on Project-Based Learning, as identified by lecturers and students (Susanti, 2019). In addition, the management of Biological Laboratories in certain schools has been assessed, with some laboratories managed separately while others are co-managed with other science laboratories (Salabi, 2016). Furthermore, a study has been conducted to develop a valid and practical guided inquiry-based Biology LKS, which has been found to be very practical for the learning process (Nengsih & Afriani, 2019). Understanding student needs and the context of local wisdom has a significant impact on the development of LKPD biotechnology at SMA N 5 Kupang. Research conducted by Yurnetti et al. developed and analyzed the validity and practicality of E-LKPD biotechnology integrated with local wisdom based on a scientific approach. The results show very high validity and practicality, showing that LKPD is suitable to help the learning process (Wahyuni & Yurnetti, 2023). Similarly, Setianingrum et al. (2022) developed LKPD with a contextual approach based on flipbooks, which turned out to be very feasible and received excellent student responses. This also increases students' motivation to learn science Ladona et al. (2022) developed LKPD based on Realistic Mathematics Education (RME) with local wisdom, which is declared feasible and practical to use, effectively improving students' mathematical problem solving abilities. Therefore, understanding students' needs and the local context is essential in developing appropriate, engaging, and effective LKPD for learning.

CONCLUSION

Students need LKPD based on local wisdom on biotechnology material to make it easier to understand the material, besides that in learning teachers provide examples of the results of biotechnology based on local wisdom in the form of pictures and videos, and presented in the form of virtual laboratories with animations to attract more students' attention, so that students are more motivated to learn which will affect learning outcomes.

The biology material for class X semester that is most difficult for students to understand is biological technology innovation material, so teachers need LKPD based on local wisdom in Biotechnology material, which can help students introduce local wisdom in their respective regions so that students can easily apply it in everyday life, and to support learning, which has a positive impact on improving student learning outcomes.

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