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Analysis of The Needs for Developing E-LKPD with The Concept of Heat Integrated with Ethnoscience and Joyfull Learning to Facilitate Students' Knowledge and Communication Skills

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ABSTRACT

The development of science and technology (IPTEK) has brought significant changes in the world of education, especially in supporting the achievement of 21st century skills such as critical thinking, creativity, communication, and collaboration (4C). However, the results of the needs analysis at SMA Negeri 1 Enam Lingkung show that the use of technology-based learning devices, such as E-LKPD (Electronic Student Worksheets), is still not optimal. Teachers still predominantly use printed LKPDs that have not been integrated with the ethnoscience approach and joyful learning model, so they do not support the improvement of students' knowledge and communication skills. Students also experience various obstacles, such as difficulty understanding the material on the concept of heat, low learning outcomes, and communication skills that are still relatively low. This study uses a quantitative descriptive method to identify the needs of teachers and students for the development of E-LKPD on the concept of heat that is integrated with ethnoscience and joyful learning. The results of the analysis show the need to develop interactive and contextual E-LKPDs to facilitate the improvement of students' knowledge and communication skills, while supporting the implementation of the independent curriculum and 21st century learning.

Keywords: E-LKPD, Heat Concept, Ethno-Joyfull Learning, Knowledge, Communication

I. INTRODUCTION

Science and technology or information and technology is developing rapidly. As a result of this development, new technologies have emerged. The results of the development of science and technology include the introduction of computers and smartphones in everyday life. Internet access has also become easier along with the development of technology. The development of science and technology affects various aspects of life, including education. The existence of science and technology makes the education process more advanced. This is indicated by the ease of access to information and the availability of various learning resources using science and technology that support the 21st century learning process [3].

Learning in the 21st century requires students to achieve 21st century skills. This achievement can certainly be realized through the process of planning, implementing, and evaluating learning based on these skills [19]. This change aims to bring out student activity in the learning process. Student activity will encourage the birth of quality Human Resources (HR). Learning that is currently centered on students (student centered) can be described from student activities during the learning process, for example, student activities contribute their thoughts in solving problems in organizing their own knowledge concepts [6]. The impact of learning that is only centered on students is seen in the increase in learning outcomes, learning motivation, understanding of concepts, and skills in the 21st century.

21st century skills are basic skills that students must have. Four basic skills are considered the most important in the world of education. These skills are also known as 4C skills. 4C skills consist of critical thinking skills, creative thinking skills, communication skills, and collaboration skills [1]. The existence of 4C skills makes students able to adapt to rapidly changing conditions and can help students achieve success in the future [3]. The

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increasingly tight competition between human resources in the era of globalization makes 21st century skills important for students to have.

Communication skills are included in the important skills for students to have in the 21st century. Having communication skills can help students to convey their thoughts, ideas, ideas, knowledge, and new information to others through speech, writing, symbols, pictures, graphics, or numbers [22]. Students are also required to be able to manage their way of thinking in depth so that their thoughts become more detailed. In addition, communication activities make students use their reasoning or thinking in dealing with something. The knowledge and communication skills possessed by students can create student-centered characters in accordance with the demands of the independent curriculum.

The independent curriculum was developed by the Indonesian government in line with the development of education in the 21st century. This curriculum was created with the aim that schools can participate in the development of the times. One of the main paradigms of curriculum development in Indonesia is compliance with cultural norms and needs. region [16]. This freedom is supported by various educational activities that can be included in the independent curriculum. One of the approaches used in the independent curriculum is Culturally Responsive Teaching (CRT). CRT functions as a tool to improve the quality of life of the general public during the education process [13]. The cultural diversity of society is something that is often reflected in the daily lives of students, so it can be implemented in education in a number of ways, one of which is integration with the curriculum.

Various efforts have been made to improve the quality of education in facing the challenges of 21st century learning. However, the reality in the field is still not in accordance with the expected conditions. Based on the findings of other studies, Communication Skills are still in the low category [9]. Low communication skills of students will affect students' readiness to face 21st century learning. Students with communication skills will have difficulty asking or conveying the difficulties they experience in the learning process [25]. If this problem is not addressed properly, students will have difficulty adapting to 21st century learning. The difficulties experienced by students will hinder students from achieving success in the future [3]. An effort is needed so that the negative impacts caused can be minimized.

E-LKPD is a worksheet published in digital format, containing text, images that can be read via a computer or other electronic device. The use of technology as a characteristic of E-LKPD makes the learning atmosphere more interesting. Learning resources that were originally print-based have now changed into learning resources that can be accessed online. LKPD used as teaching materials needs to be developed into Electronic LKPD (E-LKPD) by utilizing technological advances [21]. This change is in line with 21st century learning so that students can have the skills required in the 21st century. In addition, E-LKPD has advantages, one of which is that it can be tailored to the needs and characteristics of students.

The use of ICT-based teaching materials can be supported by the integration of joyful learning-based learning models in LKPD. Joyful learning is a learning model that creates teaching and learning activities in a fun, relaxed (not tense), cheers, ice breaking, or brain gym. The application of joyful learning encourages students to learn to minimize tension during the learning process so that students are interested in participating in learning. Joyful learning can also motivate students to be enthusiastic about learning because they do not feel pressured or afraid of their teachers [10].

The initial stage in the process of developing E-LKPD integrated heat concept ethnoscience and joyful learning is needs analysis. At this stage, the focus of the research is to explore information related to the needs of teachers and students for E-LKPD in the learning process. The results obtained from the needs analysis stage will be a reference in the development of E-LKPD [13]. Therefore, a needs analysis is needed to obtain a basis for developing E-LKPD integrated heat concept ethnoscience and joyful learning to facilitate students' knowledge and communication skills.

Based on the problems found, the use of E-LKPD integrated with ethnoscience and joyful learning does not yet exist at SMAN 1 Enam Lingkung. The researcher is interested in developing E-LKPD integrated with ethnoscience and joyful learning at this time. The emergence of this relationship is because the research was conducted by integrating ethnoscience and joyful learning in LKPD packaged digitally through Canva and Liveworksheet software. The material selected in this E-LKPD is the concept of heat in phase F. Because this material presents contextual problems with the real world. The depiction of this real problem will make students play an active role in analyzing and providing solutions to the problem. Therefore, the researcher is interested in raising research entitled "Analysis of the Needs for Developing E-LKPD Integrated Heat Concepts of Ethnoscience and Joyful Learning to Facilitate Students' Knowledge and Communication Skills".

II. METHOD

The method used is quantitative descriptive research. This study describes the data obtained systematically, factually, and accurately without intending to make general conclusions [24]. The purpose of quantitative descriptive research is to provide answers to a problem and obtain broad information about a phenomenon through the stages of a quantitative approach [23]. The data in the form of figures obtained in this study are used as a reference in drawing conclusions about the problems observed [12].

The needs analysis in this study aims to identify problems in learning so that a strong foundation is obtained in developing E-LKPD integrated heat concept ethnoscience and joyful learning. The needs analysis consists of analysis of problems in the use of E-LKPD used by students, analysis of communication skills, analysis of problems in the material of heat concept, and knowledge ability in student learning outcomes. The needs analysis was carried out at SMA Negeri 1 Enam Lingkung. There are two objects studied in this needs analysis. The objects of the study are 2 physics teachers and 32 students of Phase F class XI who choose physics as the subject. From the physics teachers as the objects of the study, information was obtained regarding the problems in the use of E-LKPD integrated heat concept ethnoscience and joyful learning in learning at school. As for students of Phase F class XI, information was obtained regarding student characteristics and seeing the level of knowledge ability and communication skills of students.

The data collection instruments used in this study consisted of questionnaires and tests. There were two types of questionnaires used, namely questionnaires for teachers and questionnaires for students. The teacher questionnaire included questions regarding problems in using E-LKPD on the concept of heat integrated with ethnoscience and the joyful learning model. Meanwhile, the student questionnaire was designed to determine their responses to the use of E-LKPD. In addition to the questionnaire, the researcher also used a test to measure students' communication skills. This test aims to determine the extent of the level of communication skills possessed by students after participating in learning.

The data analysis technique used in this study is descriptive statistical analysis. Descriptive statistics are statistics used to describe the object being studied through data obtained as is [24]. Data from the results of the needs analysis are presented in the form of graphs and tables. The aim is to be able to describe quantitative data more accurately. The data from the results of the needs analysis are then analyzed descriptively to obtain values. The interpretation categories of the values from the results of the needs analysis can be seen in Table 1.

Table 1. Value Interpretation Category

Category	Interval
very less	0-20
not enough	21-40
Enough	41-60
Good	61-80
very enough	81-100

III. RESULTS AND DISCUSSION

RESULTS

Based on the results of the needs analysis of the problems that have been found, the problems of E-LKPD integrated with ethnoscience and joyful learning used by students can be obtained data as shown in table 1. Data from the results of the E-LKPD needs analysis are in table 2, data on the problems of ethnoscience integration and E-LKPD in table 3, problems on the material of the concept of heat in figure 1, knowledge abilities in table 4 and student communication are shown in figure 2.

Results of Teacher Needs Analysis

Based on the results of the needs analysis, teachers revealed several problems in the use of E-LKPD used by students. One of the main problems is that E-LKPD has not been fully integrated with the ethnoscience approach, so that it does not explore local wisdom in the learning process. In addition, the application of the joyful learning model in E-LKPD has not been maximized, so that learning feels less enjoyable for students. Therefore, it is necessary to develop E-LKPD that is more in accordance with learning needs and is able to create a pleasant and meaningful learning atmosphere.

Table 1. Results of the E-LKPD Needs Analysis Questionnaire integrated with Ethnoscience and joyful learning

No	Teacher Needs Analysis
1	The LKPD used is not adequate to support the physics learning process
2	The LKPD used by students is still not interesting and motivating for students
3	One of the LKPDs used by students is still in printed form
4	The LKPD used by students is not yet aimed at improving students' knowledge and communication skills.

5	The LKPD used by students does not yet use electronic LKPD so it cannot be accessed at any time.
6	There are still many shortcomings in the LKPD used by students

Based on the results of the needs analysis, real conditions faced by teachers in the use of E-LKPD integrated with ethnoscience and joyful learning were found. The instrument used to collect this information was a questionnaire distributed to teachers. The results of the questionnaire showed that teachers still use printed LKPD in the learning process. The use of printed LKPD is considered less effective in supporting innovative and interactive learning. In addition, teachers have not implemented an ethnoscience approach in learning, so that local wisdom content has not been properly explored. The joyful learning model has also not been optimally implemented, so that the learning atmosphere tends to be monotonous [5]. These findings indicate the need to develop E-LKPD integrated with ethnoscience and joyful learning in order to improve the quality of learning.

Results of E-LKPD Needs Analysis

Table 2. Results of E-LKPD Needs Analysis

Ideal Conditions for E-LKPD	Real Condition of E-LKPD	Skor					mark
		1	2	3	4	5	
Use of electronic LKPD	Teachers still use printed LKPD in learning		✓				40
Integration of ethnoscience in LKPD	There is no ethnoscience content included in the LKPD	✓					20
Implementation of joyful learning in LKPD	Learning still tends to be conventional and not yet enjoyable		✓				40
Suitability of LKPD content with student characteristics	The contents of the LKPD have not been adapted to the local context and students' needs.		✓				40
Availability of digital-based learning media	Digital facilities and devices have not been used optimally in learning		✓				40

Based on the results of the analysis of teacher needs for the use of E-LKPD, it was found that most teachers still use printed LKPD, with a low score on the aspect of using electronic LKPD. This shows that the use of digital-based learning media is still not optimal. In addition, the integration of ethnoscience in LKPD obtained the lowest score, which indicates that elements of local wisdom have not been included in the learning material. The aspect of implementing the joyful learning model is also still low, indicating that learning has not been designed in a fun and interactive way. The suitability of the contents of LKPD with student characteristics is also considered low, because it has not been adjusted to the local context and student needs. In general, these results indicate the need for the development of more innovative E-LKPD, integrated with ethnoscience, and carrying a joyful learning approach to improve the quality of learning in the classroom [7].

Table 3. Results of Ethnoscience Integration Needs Analysis

ideal conditions for ethnoscience integration	Real conditions of ethnoscience integration	Skor					mark
		1	2	3	4	5	
Availability of ethnoscience content in LKPD	There is no material that contains elements of culture or local wisdom	✓					20
The relevance of ethnoscience material to the concept of heat	Ethnoscience material has not been linked to the science concepts being taught	✓					20
Teachers' understanding of the application of ethnoscience	Teachers still do not understand how to integrate ethnoscience into learning		✓				40
Availability of ethnoscience-based learning resources	Local learning resources that support ethnoscience-based learning are still limited.		✓				40

Application of ethnoscience in student activities in LKPD	LKPD does not yet involve activities or practices based on local culture	✓	40

The results of the needs analysis show that the integration of ethnoscience in E-LKPD is still very low. In terms of the availability of ethnoscience content, the E-LKPD used does not yet contain materials containing elements of culture or local wisdom. The relevance between ethnoscience material and the concept of heat is also not yet apparent. Teachers' understanding of the application of ethnoscience in learning is relatively low. Which shows that some teachers still do not have adequate knowledge and skills in integrating ethnoscience. The availability of ethnoscience-based learning resources is also still limited, so teachers have difficulty developing appropriate materials). In addition, student activities in LKPD also do not reflect the application of local culture or ethnoscience-based practices [18].

Results of Student Needs Analysis

Based on the results of the distribution of the problem needs analysis questionnaire instrument, the results of the problems on the heat concept material are shown in Figure 1, knowledge abilities are shown in Table 4 and students' communication skills are shown in Figure 2.

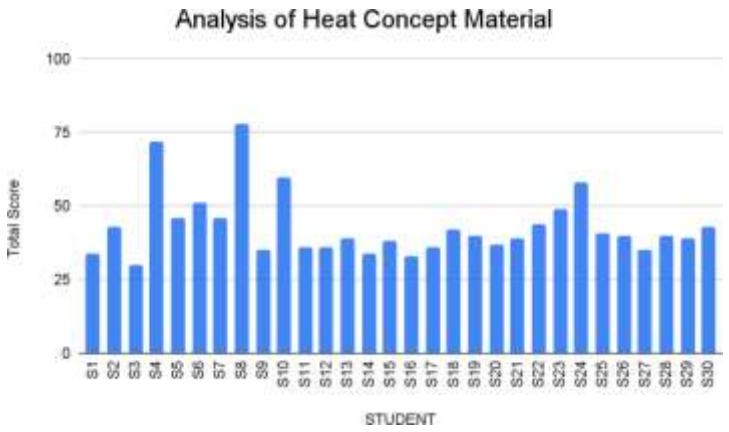

Fig. 1. Results of the analysis of the problem of the material of the concept of heat

Real conditions of students regarding the problem of the concept of heat. Based on the results of the study [14]. regarding difficulties in the material on the concept of heat. The first difficulty, students are unable to interpret the concept of heat properly. Second, students do not provide complete examples and material on the concept of heat. Third, students assume that the material on the concept of heat has many equations, it is difficult to understand the concept of heat and consider the material to be too much, the questionnaire given to students about the material on the concept of heat with a percentage value of 43.13 students still have difficulty in the material on the concept of heat. This requires a more interesting E-LKPD related to the material on the concept of heat, so that students understand the material better and improve student learning outcomes.

Descriptive statistics	mark
Number of Students	30 Students
The highest score	70
Lowest Value	20
Mean	45
Median	45
Modus	50
Range	70-20 = 50

Table 4. Results of knowledge ability analysis from student learning outcomes

The real condition of student learning outcomes in physics learning. The learning outcomes analyzed are students' knowledge scores. These results were obtained from the results of document analysis in the form of students' mid-semester assessment scores (PTS). The percentage of students' mid-semester assessment scores (PTS) is 47.21, which is included in the low category. This shows that students' knowledge scores in physics

learning are still relatively low.

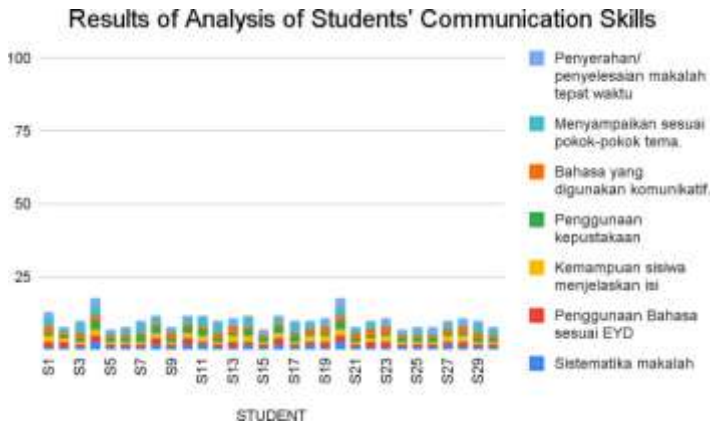

Fig. 2. Hasil Analisis Keterampilan Berkomunikasi Siswa

This result was obtained from the results of making a paper given to students of class XI F SMAN 1 Enam Lingkung consisting of 30 people. Based on the results of the observation, students' communication skills are still low, this can be seen from the results of the paper assessment which is assessed from several aspects including the systematics of the paper, the use of language according to PUBEI, the ability of students to explain the contents of the paper, Use of literature, Submission/completion of the paper on time.

Based on the results of the analysis, namely the analysis of the problems of E-LKPD integrated with Etnosains and Joyfull Learning, problems in the material of the concept of heat, knowledge abilities seen from student learning outcomes, and student communication skills [25]. There are several problems faced by students in learning physics. Some of these problems include difficulty in understanding learning materials, lack of interest in learning subjects, difficulty in solving problems, lack of motivation, inadequate learning methods and the LKPD used has not implemented electronic LKPD because teachers do not understand the various supporting software for making E-LKPD [16]. Therefore, researchers developed E-LKPD with the concept of heat integrated with Etnosains and Joyfull Learning to facilitate students' knowledge and communication skills.

DISCUSSION

The results of the needs analysis show that the implementation of E-LKPD integrated with the ethnoscience approach and joyful learning model in schools is still very limited. Based on the questionnaire data obtained from teachers (Tables 1 and 2), it is known that most teachers still use printed LKPD and have not integrated ethnoscience elements or a joyful learning approach. This causes the learning process to be less interactive and unable to facilitate students' learning needs optimally. The available LKPD has not been able to increase students' learning motivation or understanding of the material, especially in the concept of heat which is the focus of the study [17].

The integration of ethnoscience in E-LKPD, as shown in Table 3, is also still at a low level. Ethnoscience as a contextual approach that should connect scientific knowledge with local culture, has not been utilized optimally by teachers in developing LKPD [4]. The availability of ethnoscience content, relevance to the material on the concept of heat, and its application in student activities have not been reflected in the LKPD currently used. In addition, the limited understanding of teachers towards ethnoscience and the lack of supporting local learning resources also become obstacles in its development.

The results of the analysis of students' problems with the heat concept material (Figure 1) strengthen previous findings. Most students have difficulty understanding the heat concept, especially in interpreting the concept, presenting examples, and solving problems related to the many formulas and concepts that are considered complex. This is in line with the results of a study [14]. Which stated that heat material is one of the materials considered difficult by students. This condition shows that learning with a conventional approach has not been able to bridge students' conceptual understanding of heat material.

Furthermore, the results of the analysis of students' knowledge abilities based on PTS scores (Table 4) show that the average student achievement score is only 47.21, which is relatively low. This value illustrates that students have not understood the material in depth. In the context of communication skills in (Figure 2), the results of observations on paper making show that students still have difficulty in conveying their ideas and concepts systematically, using appropriate scientific language, and presenting accurate information based on relevant library sources. These low communication skills are an indicator that the learning process has not provided enough space for students to develop critical thinking skills and convey information effectively [20].

Based on these findings, it can be concluded that there are various interrelated problems in physics learning, especially in the material of the concept of heat. These problems include the limitations of the learning media used, the lack of integration of local values and contextual approaches, low cognitive abilities of students, and the lack of reinforcement of communication skills. Therefore, it is necessary to develop E-LKPD that is able to integrate ethnoscience and joyful learning approaches as a solution to overcome these obstacles. The developed E-LKPD is expected to increase learning motivation, facilitate understanding of concepts, and train students' thinking and communication skills through interactive and contextual digital media [7].

IV. CONCLUSION

The results of the analysis that have been presented can be concluded from the description of the problems that have been analyzed, namely developing E-LKPD integrated heat concept of Etnosains and Joyfull Learning to facilitate students' knowledge and communication skills. the use of E-LKPD in learning, students can help teachers in carrying out learning activities in the classroom. Teachers can choose the appropriate LKPD to be used during the teaching and learning process to help students understand the learning material and achieve the expected goals. LKPD must be in accordance with the curriculum used, because teachers must continue to learn to improve their services to students.

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