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Development of Student Worksheets on Technology Development Theme Based Contextual Teaching and Learning

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Abstract: The researcher describes the development of student worksheets on the theme of technology development based on *contextual teaching* and *learning toward* increasing the literacy skills of elementary school children. The method uses *Research and Development research design* which refers to the theory of Borg and Gall, using ten steps of research implementation namely potentials and problems, data collection, product design, design validation, design revision, product testing, product revision, usage testing, product revision, and mass production. Data collection techniques used were observation, interviews, and questionnaires. The analysis used quantitative and qualitative analysis. Sources of data in this study were teachers and students of class III Public Elementary School No. 1 Gunem and Sendangmulyo. The results got of the needs analysis; it was found that the implementation of learning had not used learning media that were following students' needs for literacy mastery. In the development stage, the researcher designed a *prototype* learning device (*instructional material*). The development of *Worksheet* products based on contextual teaching and learning pays attention to several aspects so that the LKS design can be used by students in learning. Material expert validation obtained 17.75 results with a valid predicate. Media expert validation got a score of 91.6 %, categorized as very feasible. The conclusion of the development of worksheets with the theme of technology development based on *contextual teaching and learning* meets the needs analysis and is appropriate for student learning.

Keywords: Contextual teaching and learning, student worksheets, literacy

1. Introduction

Education is a very important supporting factor for the progress of a country. The more advanced the level of education, the more advanced the country. Law Number 20 of 2003 explains that the purpose of Indonesia's national education is to develop capabilities and form dignified character and national civilization to educate the nation's life, aiming at developing the potential of students to become human beings who believe and fear God Almighty, have good morals noble, healthy, knowledgeable, capable, creative, independent, and become a democratic and responsible citizen (Kemendikbud, 2020).

One of the contents of lessons in schools that are used as a means of achieving these educational goals is Indonesian. Indonesian language subjects are taught from the elementary school level, junior high school, and high school to university. Learning Indonesian has 4 aspects of language skills, namely listening skills, speaking skills, reading skills, and writing skills (Alby et al., 2022). The four skills are a unity that cannot be separated. Indonesian language learning aims to develop Indonesian language skills according to their abilities, needs, and interests, while for teachers it is to develop the potential of students' Indonesian, as well as to be more independent in determining language teaching materials according to the conditions of the school environment and students' abilities (Kanusta et al., 2021).

Learning Indonesian at school is expected to help students get to know themselves, their culture, and the culture of other people, express ideas and feelings and find and use the analytical and imaginative abilities that exist within them (Kamhar & Lestari, 2019) . Indonesian language education is directed at increasing students' abilities to communicate in

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Indonesian properly and correctly, both orally and in writing, as well as fostering an appreciation of the works of Indonesian human literature. Learning Indonesian is one of the main lessons that support increasing the literacy movement. Efforts to create literate learning organizations and foster character for school members through various activities include reading non-learning books for 15 minutes.

The literacy movement which was initiated by the Ministry of Education and Culture as an implementation of Minister of Education and Culture Regulation Number 23 of 2015 concerning the Growth of Character and Character, encourages students to read books first for 15 minutes before school lessons. Reading books for 15 minutes before learning is expected to increase literacy among students, including elementary school children. GLN which has been announced by the government, is implemented through schools called the School Literacy Movement (GLS). The national literacy movement aims to develop a literacy culture in the educational ecosystem starting from families, schools, and communities in the framework of lifelong learning as an effort to improve the quality of life (Kemendikbud, 2021).

The ability to read is the first step in understanding other basic literacy, such as scientific literacy, numeracy literacy, digital literacy, cultural and citizenship literacy, and financial literacy. Based on the fact that Indonesia's literacy level is low, as the results of a 2012 UNESCO survey stated that Indonesia ranks second from the bottom in terms of world literacy, meaning that Indonesian people's interest in reading is very low. According to UNESCO data, the reading interest of the Indonesian people is very concerning, around 0.001%. This means that out of 1.000 Indonesians, only 1 person is an avid reader. This was also found in the *World's Most Literate Nations Ranked research* conducted by *Central Connecticut State University*, which stated that Indonesia was ranked 60th out of 61 countries in terms of reading interest, below Thailand (59) and above Botswana (61) (OECD, 2021).

Improving national literacy is not only the responsibility of the government but all stakeholders such as the business world, universities, social organizations, literacy activists, teachers, parents, and the community. Of all the stakeholders, schools are educational ecosystems that have a major influence on literacy development with the enactment of the School Literacy Movement. The school literacy movement is the ability to access, understand and use something intelligently through various activities, including reading, viewing, listening, writing, and or speaking.

The reality on the ground is that the literacy level of elementary school children is still low. This is evidenced by data from observations and interviews with students and teachers of class III Public Elementary School No. 1 Gunem conducted by researchers on Saturday, July 17, 2021, which found that: 1) the literacy skills of class III children are very low, this can be seen from the children's ability to understand assignments given and reading assignments, 2) the child's writing is getting worse than in the previous class, 3) a lower reading culture which can be seen from the many complaints from children and parents that the assignments given are very difficult even though the answers to the assignments are in fact in the student books, 4) student enthusiasm is higher when they are given practical assignments than assignments that require reading, writing, and speaking activities.

Based on the presentation of the problem regarding the low level of student literacy, researchers feel the need to develop student worksheets based on *contextual teaching and learning* that can increase student literacy. Student Worksheets (LKS) are guides for students that are used to carry out investigative or problem-solving activities. Student worksheets can be in the form of guides for cognitive development exercises or guidelines for the development of all aspects of learning in the form of experimental or demonstration guides. The worksheet contains a set of basic activities that must be carried out by students to maximize understanding to form basic abilities according to indicators of achievement of learning outcomes that must be taken (Fajrie, 2022).

The worksheets that are made will be more effective because they are associated with the real-life experiences of children. The Student Worksheets that will be made are student worksheets with the theme of technology development based on *contextual teaching and learning*. *Contextual teaching and learning* is a learning concept that can help teachers relate the material they teach to students' real-world situations and encourage students to make connections between the knowledge they have and its application in their lives as members of their families and communities c.

Based on previous studies (Kemendiknas, 2018), the use of student worksheets based on *contextual teaching and learning* can improve student learning outcomes. From previous research, this research is different because the development of student worksheets is used to increase the literacy of elementary school children. The purpose of this study was to obtain a description of the development of student worksheets based on *contextual teaching and learning* toward increasing the literacy skills of elementary school children.

2. Conceptual Framework

This research begins with a problem that occurs, namely the low level of literacy at Public Elementary School No. 1 Gunem. The causes of the low level of student literacy include student worksheets in class III which are less attractive so children are bored, lack of student motivation when participating in learning results in low student literacy skills, the availability of student worksheets based on contextual teaching and learning in learning is still lacking, student worksheets *based* on contextual teaching and learning that should be made by the teacher there are still many teachers who buy student worksheets, the existing *contextual teaching and learning*- based student worksheets are still integrated with student books and there are no separate student worksheets specifically for literacy activities, the worksheets made by the teacher are only in the form of questions that require short answers and are only rote, the teacher has not yet

developed student worksheets based on *contextual teaching and learning* to increase literacy activities for elementary school children.

Based on these problems and needs analysis, researchers want to develop student worksheets with the theme of technology development based on *contextual teaching and learning* for increasing class III literacy at Public Elementary School No. 1 Gunem. Researchers make student worksheets, analyze products, and test student worksheets. After being tested, then applied in learning.

3. Methodology

Research and Development research design consists of 10 steps; Research and Information Collecting, planning, Develop Preliminary Form of Product, Preliminary Field Testing, Main Product Revision, Main Field Testing, Operational Product Revision, Operational Field Testing, Final Product Revision, Dissemination, and Implementation. The population of this study is class III Public Elementary School No. 1 Gunem as the experimental class, and class III Public Elementary School Sendangmulyo as the control class. Sampling technique with purposive sampling. Research instruments are in the form of interviews, observations, questionnaires, tests, and product validation instruments. Quantitative and qualitative data analysis is descriptive.

4. Results and Discussions

4.1 Analysis of Needs for Developing Student Worksheets (LKS) Based on *Contextual Teaching and Learning*

The results of the research need analysis for the development of *Contextual Teaching and Learning* -Based Student Worksheets (LKS) were seen based on the results of interviews and observations of children's learning. The results of interviews with 10 children showed that the children were interested in LKS teaching materials, the teacher used LKS when teaching, the LKS used was from a publisher not made by the teacher, the language and materials used by the teacher were less understandable, students were happier if learning explanations were carried out with activities and varied (7 people) and the use of LKS so far is not fun. Interviews were conducted with class teachers who were used to obtain a direct description of the implementation of learning carried out by the teacher so far. The results of interviews with teachers show that so far the teacher in learning to improve literacy uses LKS, this LKS is not made by the teacher but uses LKS from the publisher, the language used is difficult to understand, the material is also difficult for students to understand, all teachers agree that in learning to use LKS based on *contextual teaching and learning.*

The results of the interview clearly show that learning has not used the right media, so it is difficult to stimulate students' literacy skills. The results of this interview indicate the need to develop student worksheets based on *contextual teaching and learning* on the literacy abilities of elementary school children. Previous research found that the analysis of the needs of LKS learning media was indicated by an initial test to obtain an overview of the problems in learning. Learning is less effective for learning, so it is necessary to develop worksheets based on *Contextual Teaching and Learning*. Student worksheets (LKPD) based on *Contextual Teaching and Learning* (CTL) are presented as a form of initiation to train students' skills in the learning process.

Previous research found that the early stages of development showed that the LKS developed by the teacher was still not attractive. This can be seen from the cover and contents. The cover display does not contain interesting pictures but only LKS writing, and the contents presented are only student activities that are simple in shape. Students are only required to answer the questions that have been presented without any understanding of the concept of the material being taught correctly. The questions presented in LKS Natural Science tend to be monotonous so that the appearance is less attractive. This is what causes boring learning for students (Brahmantara Insan & Hidayat, 2018) . Other research found that the early stages of this research were carried out based on interviews and observations which showed that students were disinterested in the learning process because LKS was less attractive, and learning was boring.

The problems encountered by most students, namely students are still minimal to be able to work on problem-solving problems due to inappropriate learning models and lack of innovation in learning making students not fully able to understand and work on problem-solving questions. The research stated that it is necessary to carry out innovations in learning, innovation, or movement in its implementation. One learning. Learning so far is less innovative, learning is centered on the teacher so that it does not develop the potential that exists within students.

In the early stages of research, context and needs analysis, literature review, concept or framework development was carried out. In this study, a needs analysis was carried out by reviewing the literature regarding PISA results and students' mathematical literacy in Indonesia as well as observing the learning resources that students used the most. Context analysis was carried out by interviewing teachers and students regarding the use of worksheets in class. The literature review is focused on the topic of LKS preparation and the characteristics of the questions. This stage resulted in the conclusion that it is necessary to develop literacy-based worksheets to familiarize students with literacy problems (Wildani et al., 2020) . Improving students' literacy skills requires systematic teaching materials. The teaching material used in this research is in the form of student worksheets (LKS). The results of the researcher's analysis of several worksheets show that in presenting worksheets, the teacher is still dominated by the process of associating/reasoning. In

learning mathematics, teachers have not designed worksheets with a scientific approach, especially in the questioning process.

Needs analysis is also supported by observation results, namely teachers using lecture and conventional methods (3 people), 2 teachers not using instructional media according to guidelines, 2 teachers not reviewing material, all children are less interested, and children are less active in learning, lack of clarity of purpose did not provide follow-up, storybooks did not match basic competencies and the learning flow was not clear. The results of this observation indicate that in the learning carried out by the teacher through lectures and learning activities using the same book from the previous year, the learning carried out so far makes students less interested, students pay less attention to the teacher because the media used by the teacher is less attractive, the child pays less attention teacher explanation. Learning activities like this do not provide a stimulus for the development of literacy for children. Observation of students found that they were less active in learning, and not enthusiastic about learning so only a small number of students worked on evaluations. Teacher observations found that learning was not associated with relevant knowledge, was less related to the realities of life, learning was less context-based, and did not prioritize student involvement.

Learning students are required to be more active in the learning process and active in finding learning resources, emphasizing the achievement of student competencies both classically and individually, process-oriented learning outcomes, and learning resources not only from teachers but also from other learning sources that fulfill educational elements. Learning professional abilities that must be possessed by a teacher include the ability to master the subject matter/material, the ability to plan teaching and learning processes, the ability to manage teaching and learning programs, the ability in implementing teaching and learning processes, the ability to use media and learning resources, and ability to carry out evaluation and assessment student learning outcomes (Rostika & Junita, 2018). In addition, these abilities must be supported by various learning resources. Less varied and monotonous learning processes are one of the problems faced by the world of education. The way to create an effective and varied learning process is that teachers can use worksheets as teaching materials (Rizki et al., 2021).

Based on the results of the study, students were more interested in using worksheets than textbooks, this was because, in the textbooks used by students, there were too many theoretical explanations, so students were less motivated and confused while studying. The worksheets used so far do not necessarily guide students to actively build their understanding besides that the worksheets used are also less attractive, the paper is blurry and still confuses students because the work instructions are difficult to understand and unclear. The teaching materials needed are teaching materials that have principles when teaching material must be presented from contextual things, students understand the material better so that students will not have difficulty understanding abstract material. Besides that, the availability of appropriate teaching materials is also needed to facilitate learning in improving students' mathematical reasoning abilities such as Student Worksheets (LKS). These teaching materials are fun because they use contextual problems so that they can increase students' reasoning abilities and students' interest in learning (Nurazhaar, 2019).

4.2 Development Design

The results of the study found that based on the needs analysis it was found that the implementation of learning had not used learning media that matched the needs of students to develop mathematical reasoning. Therefore, it is necessary to develop Student Worksheets (LKS) Based on *Contextual Teaching and Learning* on the Literacy Ability of Elementary School Children. The development of this LKS is adapted to the analysis of core competencies and basic competencies of elementary school students in learning. In the next development stage, the researcher designed *a prototype* learning device (*instructional material).* The selection of media and formats for materials and the production of initial versions underlie the major aspects of the design stage. Previous research stated that the results of the needs analysis, LKS products were designed. In designing the initial product, an analysis of the material concept is carried out, determines a prototype that is adapted to the eligibility requirements of the worksheet (didactic, construction, and technique) and includes aspects of a problem-based approach and trains students to solve problems through the stages of the literacy process.

The learning tools in this study were limited to Learning Implementation Plans (RPP) and Student Activity Sheets (LKS). The development of learning tools is adapted to the stages of the literacy-based learning model, namely format selection, determining themes, and objectives, making initial designs, covers, content designs, and final parts. The next stage is compiling research instruments learning devices, student response questionnaires, observation sheets of learning implementation, and mathematical reasoning ability test questions. The development of LKS was also tested for validity by media and material experts and an assessment was made of the responses of teachers and students. The development stage is the stage of product design and development with improvements. Parts of the LKS are repaired (revised) repeatedly based on the evaluation results of the product draft (Olujuwon et al., 2021; Wildani et al., 2020).

The development design is described by a hypothetical model as follows:

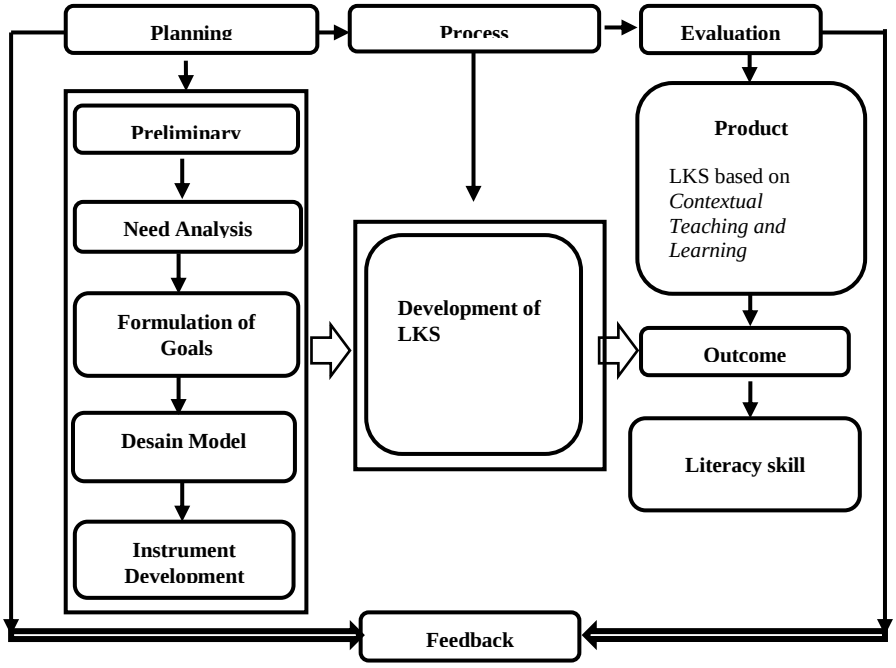

Figure 1. The hypothetical model of student worksheets based on *contextual teaching and learning* on the literacy ability of elementary school children

Development of student worksheets (LKS) based on *Contextual teaching* (CTL) that can be used in learning as teaching materials for teachers in learning physics. The results of each stage of this development research procedure include product, product design, design revision validation, product trials, and product revisions (Olaniyan-Shobowale et al., 2021; Aryati et al., 2018). Research states that the initial product design of the LKS consists of an LKS identity page (Title of LKS, student, and school identity columns, subject identity, and core competencies/basic competencies/indicators), student activity pages present material with contextual problems that lead students to the discovery of concepts material. Product design by determining the SK, KD, and indicators presented, looking for reference materials and questions for preparing LKS, making LKS display designs, and the process of making your cover with CorelDraw X7 Software *which* is printed on *Ivory* 230 paper type A4 size. This aims to get a perfect image design in terms of images and colors because using *CorelDraw* X7 Software is the right step in designing covers (Adeyemi, 2019; Brahmantara Insan & Hidayat 2018).

LKS contains a set of basic activities that must be carried out by students to maximize understanding to form basic abilities according to indicators of achievement of learning outcomes that must be taken. LKS consists of six components, namely titles, study instructions (student instructions), competencies to be achieved, supporting information, assignments and work steps, and assessment. Designing the systematics and structure of LKS (Nengsih & Septia, 2017). LKS that is good in learning should have eligibility requirements in terms of three aspects, namely didactics, construction, and not technique. Didactic terms mean referring to the principles of effective learning, including paying attention to individual differences, emphasizing the process of discovering concepts, having a variety of stimuli, and developing children's social, moral, and aesthetic communication. In addition, construction requirements are conditions related to the use of language, sentence structure, vocabulary, level of difficulty, and clarity which in essence must be effective in the sense that they can be understood by the user or student. Technical requirements include writing arrangements, providing pictures, and attractive packaging/appearance (Akinyemi et al., 2021; Afriansyah, 2019).

4.3 Design Feasibility

The main result of this development is Student Worksheets (LKS) Based on *Contextual Teaching and Learning* on the Literacy Ability of Elementary School Children. This development was carried out by validating media experts who received a score of 91.6%, so based on the table of media expert validation scores it was categorized as very feasible (valid). Material expert validation obtained a score of 17 .75 with a valid predicate. In addition to this development, field tests were carried out to get teacher and student responses. The child's response showed a positive response result obtained by a total score of 42 out of 50 so the percentage of positive responses was 84% with the very like category. The teacher's response obtained a positive response of 41 out of 50 points, which means the percentage is 82% with a very decent category. Based on the results of these calculations, it can be seen that the Development of Student Worksheets (LKS)

Based on *Contextual Teaching and Learning* on the Literacy Ability of Elementary School Children has a very good effect and is needed by teachers in student learning.

Previous research stated that the development stage evaluated the validity and practicality of the LKS. The validity evaluation was carried out by experts using the LKS validity assessment sheet. The validity assessment sheet determines three aspects of the assessment, namely: content, construction, and language. LKS is said to be valid if the experts (validators) state that all criteria (indicators) of validity are met. After the LKS was declared valid by the experts, the LKS was tested on six students with two students each having high and medium mathematical abilities. The validator stated that all LKS had met all the assessment criteria and the LKS was declared valid by both validators. The next stage is testing the LKS and FGD. Students are appointed based on suggestions from math teachers (Wildani et al., 2020). Aryati in her research stated that development was carried out through evaluation through assessments from each expert, teacher responses, and product trials on students (Annisa et al., 2021; Aryati et al., 2018;).

Brahmantara Insan & Hidayat (2018) in their research stated that the media products developed were validated by media experts, material validation, and learning validation. In addition, the assessment is based on student response questionnaires and teacher assessment sheets for LKS teaching materials based on *Contextual Teaching and Learning*. Small-group product trials and large-group use trials in the form of qualitative and quantitative data. The material expert's validation assessment of the product quality of LKS teaching materials based on *Contextual Teaching and Learning* got a score of 49 with a percentage of 81.67% which has the Eligible criteria. The results of the validation of the three experts can be concluded as follows, media experts 93.3%, material experts 81.67%, 80%, if the sum is 254.97% then the average is 84.99%, if converted into qualitative data the overall results of the three validators are in the very decent category.

Previous research stated that expert validation uses indicators of the level of readability, attractiveness, and practicality of worksheets. LKS is attractive for students. The practicality of LKS was seen from the student response questionnaire of 70.83% (good) and 100% of the student response categories were good so it was concluded that student responses to LKS were positive. The purpose of LKS validation is to see the eligibility level of LKS in terms of didactic, technical, and construction requirements. To test the ability of mathematical literacy content validation is carried out. The mathematical literacy ability test is classified as valid and reliable with an alpha value of 0.72 in the high category. Bahri (2021) in his research stated that the worksheets developed contained a CTL component consisting of experimental and observational activities (2) CTL-based worksheets were valid based on validation from material experts, media, and teachers. Percentage and content eligibility criteria 86.5 % (very feasible), presentation eligibility 75% (adequate), CTL assessment 81.25% (decent), graphic feasibility 79.2% (decent), and linguistic assessment 85% (decent).

LKS as a medium used in learning must be able to make students acquire the knowledge they want to achieve. Therefore, an LKS that has been made needs to be assessed to find out whether it is suitable or not for use in learning. Student responses to LKS can be obtained using a questionnaire containing statements regarding the appropriateness of the content, language, graphics, presentation, and concept of CTL. The results of the student response questionnaire analysis obtained an overall average aspect of 97.91, so it can be concluded that the CTL-based worksheets tested were included in the very good category (Sayekti et al., 2022; Brahmantara Ihsan & Hidayat 2019). Other research has found that learning designs that are packaged properly will make student learning take place systematically and become meaningful so that it will take place in a directed and organized manner (Nikmah et al., 2021; Suryani et al. 2016). In terms of educational technology, Pratama obtained CTL-based LKS which was stated to be very valid with a validity percentage of 93.33%. The results of the practicality trial obtained a percentage of 91.38% (Pratama, 2021).

Contextual Teaching and Learning (CTL) learning is a learning approach that emphasizes the process of involving students to be able to find the material being studied, then relate it and can apply it in their lives (Baran, 2018). Humans in their research found that product trials in small groups consisted of 6 students, it was known that the total score was 328 so the percentage was 91.1% with Very Eligible criteria. The results of the teacher's assessment show a score of 59 so the percentage is 98.3%, with Very Eligible criteria (Prabowo et al., 2021; Brahmantara Insan & Hidayat, 2011). Fiyani found that the trial of teaching materials in the form of LKS obtained teaching materials with very good criteria covering aspects of content feasibility of 99.16%; aspect of the presentation component of 97.5%; language aspect of 97.91%; graphic aspect of 98.33%; and the contextual approach aspect of 99.7% (Fiyani, 2019).

5. Conclusions and Recommendations

Needs analysis by way of interviews and observations shows that students need the development of Student Worksheets (LKS) Based on *Contextual Teaching and Learning* on the Literacy Ability of Elementary School Children. The development of this LKS is adapted to the analysis of core competencies and basic competencies of elementary school students in learning. In the next development stage, the researcher designed *a prototype* learning device (*instructional material).* The selection of media and formats for materials and the production of initial versions underlie the major aspects of the design stage. The learning tools in this study were limited to Learning Implementation Plans (RPP) and Student Activity Sheets (LKS). The development of learning tools is adapted to the stages of the literacy-based learning model, namely format selection, determining themes, and objectives, making initial designs, covers, content designs, and final parts. The results of the validation of media experts get a score of 91,6% so if it is based on the table of validation scores of media experts it is categorized as very feasible (valid). Material expert validation obtained a score of 17 .75 with a valid predicate. In addition to this development, field tests were carried out to get teacher and student responses.

The child's response showed a positive response result obtained by a total score of 42 out of 50 so the percentage of positive responses was 84% with the very like category. The teacher's response obtained a positive response of 41 out of 50 points, which means the percentage is 82% with a very decent category.

This research recommends that worksheets can be developed for other materials and must be adapted to the learning design and the content of the subjects. LKS developed *by design* will be more following the context and characteristics of students so that the learning process can take place effectively and efficiently.

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