



Development of Problem Based Learning Student Worksheets on Accounting Computer Subject Class XI SMKN 1 Geger

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Abstract. This research aimed to develop student worksheets accounting computer based on problem and to measure student responses to the developed student worksheets. The type of research used is Research & Development (R&D) by adopting the Four-D model. The research subjects were students of class XI majoring in Accounting and Institutional Finance 2 SMKN 1 Geger, totaling 17 people. Data collection techniques using observation, interviews, and questionnaires. Data were analyzed by qualitative descriptive analysis technique. The development results show that the feasibility of PBL-based student worksheets from the assessment of experts gets an average score of 85.76% with the “Very Good” criteria for use. The average value of the two material experts was 87.27% with the “Very Good” criteria, 80% for the linguist with the “Good” criteria, and for graphic design experts 88.57% with the “Very Good” criteria. Furthermore, the results of the limited trial to students scored 89.78% with the “Very Good” criteria. This means that the PBL-based student worksheets developed are exciting and make it easier to understand the subject matter. Obtaining the results of expert assessments and student responses can be the basis that the PBL-based student worksheets is appropriate to be used as an innovative teaching material for Computer Accounting subjects in an effort to improve students’ knowledge and skills in critical thinking and problem solving, creativity, communication skills, ability to work collaboratively and use of technology.

Keywords: student worksheet · Problem Based Learning (PBL) · accounting computer subject

1 Introduction

In facing competition in the 21st century, students must be equipped with four skills: collaborative cooperation, communication skills, critical thinking and problem solving. In addition, students must also have skills in using technology to win the competition. The traditional learning approach that is teacher-centered and only emphasizes knowledge through rote learning has not developed students’ skills optimally. Learning activities

that must be carried out in the 21st century focus on student centers to provide students with critical thinking skills and problem-solving metacognition, communication, collaboration, innovation and creativity, and literacy information [1]. Through 21st century learning that integrates knowledge and skills, it is hoped to create quality human resources in the field of information technology and the human aspect.

The challenge for teachers in preparing superior and competitive resources in the 21st century is to create innovative, active and creative learning to increase students' knowledge and skills optimally. In the 21st century, education demands changes in teaching materials, learning media, facilities, and learning models provided to students to face increasingly stringent global demands [1]. Teachers must be able to master various skills that can make students have skills in critical thinking, collaboration, communication, creativity and innovation, as well as technology and concepts.

Teachers can apply the PBL learning model and develop teaching materials to be more interesting. PBL is a learning model that is recommended in implementing the 2013 curriculum. PBL learning aims to develop students' mindsets to think more critically in solving real-world or contextual problems [2]. The series of learning activities in the PBL model emphasizes critical and innovative problem-solving processes so that students do not just listen, take notes, then memorize subject matter. However, students will actively think, communicate, search and process data, and finally can make logical and realistic conclusions.

PBL is a contextual learning model that has seven main principles, namely: (1) constructivism, (2) inquiry, (3) questioning, (4) learning community, (5) modeling, (6) reflection, and (7) authentic assessment [3]. The principles in PBL must be applied in the learning process to lead to problem-based learning that is meaningful, independent, applies high-level critical thinking and is integrated with other disciplines. This process encourages students to be more active in discussing learning topics by using strategies to solve the problems presented, share opinions, and formulate or conclude concepts. Students are expected to play an active and independent role in learning while the teacher only acts as a motivator and facilitator.

The PBL is a learning model that focuses more on students, directing students to become independent learners, actively and directly involved in study groups [4]. The results of research indicate that (1) the use of PBL is superior to conventional learning; (2) the application of PBL can improve students' higher-order thinking skills, which are better implemented in problem-solving skills, teamwork, and self-confidence; (3) in the future, higher-order thinking skills will be essential in winning job competition, finding solutions to problems in the workplace and establishing good cooperation with others, so that it will support career success in the future [3].

In improving students' skills, teachers can apply the PBL learning model to explore the potential possessed by students more profoundly. One of them is by integrating the PBL model in teaching materials in student worksheets. Student worksheets are helpful as an alternative teaching material that can activate students in learning to find and develop concepts to facilitate problem-solving abilities [5].

Student worksheets are teaching materials designed by teachers to be given to students in the learning process in the classroom. This student worksheet can facilitate

teachers in the learning process to form effective interactions between teachers and students. Student worksheets based on contextual learning models are highly recommended in the 2013 curriculum.

PBL-based student worksheets can make students much more active in learning activities; they can also train students' independent attitudes and critical thinking in solving problems that the development of proper PBL-based student worksheets can improve students' high-level critical thinking [6]. In addition, it also improves students' creative thinking skills [7].

Student worksheets that are integrated with the stages in the PBL model are considered effective in learning because they are proven to improve students' ability to solve problems, activate students, improve teacher skills in managing to learn, and obtain excellent student responses [5]. PBL-based student worksheets have positively impacted the learning process, including emphasizing process skills, connecting material with everyday life, and inviting students to be active in learning activities [8].

The increase in the skills possessed by students is accompanied by increased learning outcomes. PBL-based student worksheets are proven to be able to improve student learning outcomes. The use of PBL-based student worksheets in learning can increase the acquisition of student scores [8–11].

The education level that focuses on preparing human resources ready to work is SMK or Vocational High School. Vocational students must be equipped with various skills to be better prepared to face the world of work in the 21st century. Skills that must be improved in vocational students include critical thinking and problem solving, creativity, communication skills, the ability to work collaboratively, and technology.

Based on initial observations at SMK Negeri 1 Geger on accounting computer subject for class XI majoring in Accounting and Institutional Finance, students still have difficulty analyzing financial transactions. As a result, the learning objectives of accounting computers have not been achieved optimally. The interviews conducted with students obtained information if the references and teaching materials used in accounting computer learning were still limited. The questions presented in the reference book are less varied, so that students are less interested in learning the material. In addition, student worksheets are still limited to theory; there are no practical questions about analyzing transaction evidence, so that students' understanding is still lacking when asked to analyze evidence of financial transactions for entry in the MYOB application.

Furthermore, the results of observations also show that the learning process in the classroom is still teacher-centered. So the teacher's use of the lecture method still dominates in learning so that students are less active during learning. The use of this learning model is less effective in improving the competence and skills of students in accounting computer subjects. It is feared that it could negatively impact student learning outcomes and not be able to improve skills in critical thinking and problem solving, creativity, communication skills, ability to work collaboratively, and technology. Interviews were also conducted with teachers who teach computer accounting subjects, and information was obtained if teachers still had difficulties preparing student worksheets that we are able to improve students' competencies and skills.

Based on the problems that occurred at SMKN 1 Geger on accounting computer subject class XI majoring in Accounting and Institutional Finance, it can be concluded

that accounting computer learning is still a teacher center and there are limited teaching materials for students to learn. Thus, it is necessary to develop teaching materials in the form of PBL-based student worksheets to make it easier for students to understand the material and be able to improve students' skills, including critical thinking and problem solving, creativity, communication skills, ability to work collaboratively and the use of technology. This study aimed to develop teaching materials in the form of PBL-based student worksheets on accounting computer subjects for class XI SMKN 1 Geger. Next, measure the response of students' interest in the PBL-based student worksheets that have been developed.

2 Methods

The type of research conducted is Research & Development (R&D). The R&D research was developing PBL-based student worksheets on material purchases of materials, equipment, fixed assets, and payment of debts to service companies. The research subjects were students of class XI majoring in Accounting and Institutional Finance 2 SMKN 1 Geger, totaling 17 people. Data collection techniques using observation, interviews, and questionnaires.

The R&D research model adopts the Four-D model (define, design, develop, and disseminate) [12]. At the define stage, problem analysis and curriculum analysis are carried out as the basis for development research. Design is designing the development of PBL-based student worksheets that are adapted to the applicable curriculum. Develop, namely developing PBL-based student worksheets so that they are suitable for use through two steps, namely expert assessment followed by trials of developing student worksheets. Assessments are carried out by material experts, linguists, and graphic design experts. Material experts focus on assessing the substance of student worksheets, including clarity of work instructions, presentation of material and presentation, and questions. There are two material experts in this study. Linguists focus on choosing the language used so that it is easy to understand, including spelling, legibility, conjunctions, use of sentences, systematic writing, consistency of writing, and use of terms. Graphic design experts focus on displaying student worksheets to attract students' attention, including paper size, cover design, typography, and layout design. Next was the PBL-based student worksheet test conducted on 17 students of class XI majoring in Accounting and Institutional Finance 2 SMKN 1 Geger. The trial was conducted to determine students' interest in student worksheets including design, content, and language.

The disseminate stage has not been carried out because the student worksheets for broad targets have not been carried out optimally. The needs analysis of this research was only carried out in a small scope, namely class XI majoring in Accounting and Institutional Finance 2 SMKN 1 Geger and curriculum analysis was only carried out at basic competencies 3.5, namely analyzing transactions related to the purchase of materials, equipment, fixed assets, and debt payment transactions at service companies.. Research to reach the disseminate stage still has to deepen the analysis of the needs of several schools on accounting computer subject.

Table 1. Eligibility Criteria for Student Worksheets

Value Scale	Criteria	Percentage
1	Very Poor	0%-20%
2	Poor	21%-40%
3	Average	41%-60%
4	Good	61%-80%
5	Very Good	81%-100%

Source: Riduwan (2016)

The data analysis technique in assessing the feasibility of the developed student worksheets and student responses to student worksheets uses a Likert scale with the following assessment criteria (Table 1).

The results of the assessment of the feasibility of student worksheets from experts and student responses are obtained using the following formula:

$$\text{Percentage} = \frac{\text{Score Obtained}}{\text{Total Score}} \times 100\%$$

From the calculation results obtained, the student worksheets with a percentage value of $\geq 61\%$ with the "Good" criteria can be stated that they met the eligibility requirements. Student worksheets that are feasible can be used in the learning process to make it easier for students to understand the subject matter and develop critical thinking and problem solving skills, creativity, communication skills, the ability to work collaboratively and use technology.

3 Results and Discussion

The development of PBL-based student worksheets on accounting computer subject for class XI majoring in Accounting and Institutional Finance 2 SMKN 1 Geger uses the Four-D model (define, design, develop, and disseminate) [12]. The stages that can be carried out are defined, design, and developed, while dissemination has not been carried out because the implementation of student worksheets to broad targets has not been carried out. It is possible to obtain different results if implemented to a broader range of students due to the different characteristics of students. The needs analysis of this research was only carried out in a small scope, namely class XI majoring in Accounting and Institutional Finance 2 SMKN 1 Geger and only at basic competencies 3.5, namely analyzing transactions related to the purchase of materials, equipment, fixed assets, and debt payment transactions at service companies. Until the disseminate stage still have to deepen the analysis of the needs of several schools on accounting computer subjects. The following are the research results conducted through the define, design and development stages in developing PBL-based student worksheets.

3.1 Define Stage

Problem analysis was conducted to obtain information about the problems in learning activities on accounting computer subject for class XI SMKN 1 Geger. Based on the results of initial observations and interviews, the implementation of computer accounting subject went well, but it could not be optimal.

Based on initial observations at SMKN 1 Geger on accounting computer subject class XI, students still have difficulty analyzing financial transactions due to limited references and teaching materials. In addition, teaching materials in student worksheets are still limited to theory, and there are no practical questions to analyze transaction evidence so that students' understanding is still lacking when asked to analyze evidence of financial transactions and enter in the MYOB application.

Furthermore, the results of observations also show that the learning process in the classroom is still teacher-centered so that students are less active during learning. Teachers' use of the lecture method still dominates in learning so that students are less active during learning. The use of this learning model is less effective in improving the competence and skills of students in accounting computer subjects. It is feared that it could have a negative impact on student learning outcomes and not be able to improve skills in critical thinking and problem solving, creativity, communication skills, ability to work collaboratively and technology. Preliminary interviews were also conducted with subject teachers and information was obtained if teachers still had difficulties in preparing student worksheets that we're able to improve student competencies and skills.

The next analysis, conducted interviews with students to find out the characteristics of students in-depth. Students revealed that they still had difficulty understanding accounting computer material due to the limited reference books provided by the school, and the practice questions on the student worksheets so far are still in the form of theory, there are not many practice questions for practice with the MYOB application. Students also revealed that in analyzing questions, they needed discussion with friends. By discussing, it is easier for students to complete the practice questions.

After analyzing the problem, then conducting a curriculum analysis to determine the focus of developing student worksheets. In curriculum analysis, learning objectives are prepared by adjusting core competencies, basic competencies, indicators of competency achievement contained in the learning implementation plan and syllabus.

The research focuses on developing basic competencies 3.5 which discusses related to analyzing transactions related to the purchase of materials, equipment, fixed assets and debit payment transactions at service companies. So far, the questions presented in student worksheets still focus on measuring cognitive abilities to the realm of application. In the 2013 curriculum currently in effect, it demands that the material includes questions that are able to measure the ability of students to think critically, analytically, interpret, and evaluate. In addition, the content of the questions presented must also be relevant to the real conditions experienced by students. The questions presented should have appropriateness and usefulness in the real-life activities of students.

Based on needs analysis in the form of problem analysis and curriculum, the product developed is in the form of PBL-based student worksheets to be applied in accounting computer learning for class XI. Student worksheets are based on PBL steps, namely practice questions presented related to daily life -days and in the work in groups with the guidance of the teacher. Through PBL-based student worksheets, it is hoped that students will be more active and able to master the material easily and be able to develop critical thinking and problem solving skills, creativity, communication skills, ability to work collaboratively and use technology.

3.2 Design Stage

The next stage is the design stage. Design activities for the PBL-based student worksheet format include the layout design display, the substance of the material, and the substance of the practice questions. The purpose of designing student worksheets is to produce products that are in accordance with the needs of students, and in accordance with curriculum developments. The development of student worksheets is carried out in a systematic manner that is adjusted to the quality standards of preparing good student worksheets. Student worksheets compiled in accordance with the provisions of the BSNP (Badan Standar Nasional Pendidikan) writing standard consisting of covers, introductions, table of contents, group identity, core competencies, basic competencies, indicators of competency achievement, learning objectives, instructions for using participant worksheets students, material summaries, practice questions, worksheets, answer keys, and bibliography.

Submission of core competencies, basic competencies, and indicators of competency achievement at the beginning before entering the material with the aim that students know the material being discussed. Learning objectives and instructions for using student worksheets are aimed at providing students with an overview of the outline of learning achievements and knowing instructions for using student worksheets which later are expected students to have no difficulty in using student worksheets.

Presentation of material summary regarding the purchase of materials, equipment, property, plant and equipment and payment of debts of service companies, explaining the meaning and steps for entering transactions for purchasing materials, equipment, fixed assets in cash, credit and returns and debit payment transactions correctly. Time, maturity and discount. It is hoped that by presenting a summary of the material, students are able to master the material well and learn to think critically and actively in the learning process.

Practice questions are presented like real notes with an attractive appearance and contain all the commands in the MYOB program. Transaction evidence in the form of notes was chosen to be relevant to the real conditions of students in everyday life and the world of work. When students work in a company, in making financial reports, they will enter data in the form of evidence of financial transactions, including notes, invoices, and receipts. The practice questions in the PBL-based student worksheets are presented in the form of transaction evidence of 16 transactions.

3.3 Develop Stage

After doing the define and design stages, the next step is to do the develop stage. The development stage is carried out by assessing the feasibility of student worksheets, namely validation tests carried out by experts consisting of material experts, linguists, and graphic design experts. Material experts in this study used two people. Each material expert evaluates the PBL-based student worksheets to the point that they state that the student worksheets are “usable”. Furthermore, conducting a limited trial to determine the response of students’ interest in student worksheets.

The first material expert is a lecturer in the Accounting Education Study Program, Universitas PGRI Madiun who teaches computer accounting courses and has been certified by CAP (Certified Accurate Professional). The final result of the first material expert’s assessment of the feasibility of student worksheets was 89.09% and entered the “Good” criteria. Aspects of the assessment of material experts include working instructions, presentation of material and presentation of questions. The first material expert stated that the PBL-based student worksheet “can be used without revision”. PBL-based student worksheets that are made are in accordance with basic competencies, indicators of competency achievement and computer accounting learning objectives. The scope of the material and questions presented in the student worksheets is also in accordance with the objectives of learning accounting computers.

The second material expert is a productive accounting teacher who teaches computer accounting subjects at SMKN 1 Geger. The final result of the second material expert’s assessment of the feasibility of student worksheets was 85.45% and entered the “Very Good” criteria. Aspects of the assessment of material experts include working instructions, presentation of material and presentation of questions. The second material expert stated that the PBL-based student worksheet “can be used with minor revisions”. There are several notes from the second material expert, namely for proof of credit purchase transactions, purchase invoices are written instead of sales invoices, and there are several proofs of transactions that should be written as debit notes instead of credit notes. PBL-based student worksheets are in accordance with learning objectives, work instructions are clearly presented, material is presented systematically, and practice questions are by competency achievement indicators. Improvements made before the trial were limited to students, namely correcting evidence of transactions that were not by the instructions for processing and re-checking all evidence of transactions presented in the practice questions so that there were no more writing or presentation errors.

Assessment of PBL-based student worksheets from the two material experts who respectively gave a value of 89.09% and 85.45% with an average value of 87.27% can be concluded if the student worksheets fall into the criteria “Very Good” and “can be used”. In developing student worksheets for accounting material, when it gets a score of 86.86% from material experts, it is declared “Very Appropriate” for use in learning [14]. In developing PBL-based student worksheets in accounting material obtained 85% results and stated that student worksheets were very suitable for teaching materials [15].

The linguist is a lecturer in the Indonesian Language and Literature Education study program, Universitas PGRI Madiun, and is in charge of the BSI Teaching Material Preparation course. The final result of the linguist's assessment of the feasibility of the student worksheets was 80% and entered the "Good" criteria. Aspects of the linguist's assessment include the use of spelling, legibility, use of conjunctions, use of sentences, systematic writing, consistency of writing, and use of terms. Linguists state that PBL-based student worksheets "can be used with minor revisions". There are several notes from linguists, which are completed for page numbers and table of contents. The sentences and language used in the PBL-based student worksheets have been effective. Improvements made before the trial were limited to students, namely completing page numbers and tables of contents to make it clearer and more accessible for students to use PBL-based student worksheets in accounting computer learning. In developing student worksheets for accounting material, when it gets a score of 81% from linguists, it is declared "Very Appropriate" for use in learning [14]. In developing PBL-based student worksheets, obtained higher results, namely 96%, and stated that the language in student worksheets was very suitable for accounting learning [15].

The graphic design expert is a lecturer in the Information Systems study program, Universitas PGRI Madiun, and a Graphic Design subject. The final result of the graphic design expert's assessment of the feasibility of student worksheets was 88.57% and entered the "Very Good" criteria. Aspects of graphic design expert assessment include paper size, cover design, typography, and layout design. Graphic design experts state that PBL-based student worksheets "can be used without revision". The graphic design of the PBL-based student worksheets is in accordance with national and ISO standards and has an appeal to learn because it has a harmonious color combination. In developing student worksheets for accounting materials scored higher, namely 92% of graphic design experts, and were declared "Very Appropriate" for use in learning [14]. While in developing PBL-based student worksheets, obtained lower results, namely 80.8%, but it can be stated that graphic design in student worksheets is very suitable for accounting learning [15].

The results of assessing the feasibility of the PBL-based student worksheets from the experts were then added together to obtain the average score. The average score is 85.76% and is included in the "Very Good" criteria. The following is a recapitulation of the results obtained from the expert's assessment of the feasibility of PBL-based student worksheets (Table 2).

Table 2. Recapitulation of Expert Assessment

Validator	Score	Criteria
First Material Expert	89.09%	Very Good
Second Material Expert	85.45%	Very Good
Linguist	80%	Good
Graphic Design Expert	88.57%	Very Good
Average	85.76%	Very Good

After obtaining the assessment results, corrective notes and approval from the experts, the student worksheets have been deemed to meet the eligibility requirements as teaching materials and are ready to be tested on students. Furthermore, a trial activity of the student worksheet product was limited to 17 students grouped into 4 groups. The learning process is carried out referring to the learning implementation plan that has been designed by implementing the PBL model.

The trial activity was carried out to know the response of students' interest in PBL-based student worksheets. The student responses to PBL-based student worksheets were 89.78% and were in the "Very Good" category. This means that the PBL-based student worksheets developed are exciting and make it easier to understand the subject matter. Student responses to PBL-based student worksheets include the attractiveness of design, content, and language. Students stated that the design and layout of the material in the student worksheets were very interesting and different from the previous student worksheets so that students were more enthusiastic in studying the material and completing the available practice questions.

PBL-based student worksheets can be implemented in computer accounting subjects. Students through discussion forums can be active, and a good cooperative process can be seen between group members. Students can communicate well when presenting the results of group work. With critical and creative thinking, students can complete the practice of student worksheets according to the instructions because the language used in the student worksheets is clear and easy to understand. Practice questions presented with pictures of notes increase students' interest in learning and encourage students to think critically in analyzing. A summary of the material accompanied by an illustration of transaction evidence in the form of a receipt can increase the reasoning power of students [16]. Skills in using technology are also seen when students enter proof of transactions in the MYOB application. Although they have not yet fully mastered the Myob application, the students seemed enthusiastic in completing the practice questions in the MYOB application.

4 Conclusion

The development of student worksheets using the PBL approach showed excellent results. Based on the assessments of two material experts, linguists and graphic design experts, the average percentage was 85.57% and entered the "Very Good" criteria. The average value of the two material experts was 87.27% with the "Very Good" criteria, 80% for the linguist with the "Good" criteria, and the graphic design expert 88.57% with the "Very Good" criteria. This means that the PBL-based student worksheets are very suitable for use in accounting computer subjects. In addition, based on the student interest response questionnaire from the results of a limited trial of PBL-based student worksheet products, 17 students showed an average score of 89.78% and entered the "Very Good" criteria. This means that the PBL-based student worksheets developed are exciting and make it easier to understand the subject matter. Obtaining the results of expert assessments and student responses can be the basis that PBL-based student worksheets are

appropriate to be used as teaching material innovations for accounting computer subjects for class XI majoring in Accounting and Institutional Finance 2 SMKN 1 Geger to improve students' knowledge and skills in critical thinking and problem-solving, creativity, communication skills, ability to work collaboratively, and technology. The research carried out is still limited, namely only until the development stage, because the needs analysis is still in a small scope. Suggestions that can be given are that further research in developing PBL-based student worksheets in accounting computer subjects can be carried out to the disseminate stage to determine the effectiveness of PBL-based student worksheets.

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