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Ethnomathematics E-learning Teaching Material Development: Student-Oriented Problem-Solving Ability

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Abstract

The purpose of this study is to produce e-learning-based ethnomathematical teaching materials and analyze students' problem-solving abilities when students learn to use ethnomathematical-based teaching materials that have been developed. This research is the development of R&D (Research & Development) involving 30 students of SMK Multi Vocational Platform Ars International Bandung by applying the Plomp model. The stages of the Plomp model are initial investigation, design, realization, evaluation and revision, and implementation. So, instruments are material validation sheets, interviews, questionnaires, and problem-solving ability tests. This research's data analysis uses the Chocran, average comparison, and N-gain tests. The results of this research are: (1) linear equation system of two variables teaching materials in e-learning-based Ethnomathematics are classified as feasible on the evaluation of material, and media experts, as well as student responses, (2) Problem-solving abilities used in e-learning, are included in the high category. In this way, linear equation system of two variables teaching materials in e-learning-based ethnomathematics mean that students are more interested in learning and can be a reference for teachers in improving students' mathematical problem-solving abilities.

Keywords: Teaching materials, Ethnomathematics, E-learning, Problem-solving skill, Technology

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INTRODUCTION

Students' mathematical thinking is included in the scope of mathematical thinking abilities. National Council of Teachers of Mathematics (NCTM) (2000) states that in learning mathematics, at least students must have five mathematical skills: problem-solving skills, communication skills, connection abilities, reasoning abilities, and representation abilities. Two of the five mathematical skills that have been described are mathematical problem-solving abilities which are the focal point of this research. Aunurrahman (2016) problem-solving ability must be taught, applied, and accustomed to students solving problems. Where as Wardhani (2008) reveals problem-solving skills, namely the process of applying knowledge that students already have into a problem or new thing that students encounter to solve the issues and produce answers to these problems. This statement is supported by NCTM (2000); Siswoyuono & Susilo (2016), which states that the ability to solve a mathematical problem, students are trained in ways of thinking, discipline, confidence, and curiosity that can help students in solving mathematical problems and other problems. From this statement, it can be

concluded that problem-solving ability is applying old knowledge or knowledge that students already have into new issues that must be familiarized and trained by students.

Mathematical problem-solving ability is essential in learning mathematics, so students must own this ability. The importance of problem-solving skills in mathematics is supported by the opinion of Branca (1980) and Sumartini (2018) because (a) problem solving is a general goal in mathematics teaching, (b) problem solving includes methods, procedures, and strategies that are the core and central system in the mathematics curriculum, and (c) problem solving is an essential ability that students must have in learning mathematics. Students' thinking ability in solving problems is essential to possess and train early (Asigigan & Samur, 2021).

The preliminary study result is in the form of daily test scores on the linear equation system of two variables material for the last three years by containing problems based on problem-solving abilities, namely in 2018 it obtained an average of 56.7 (low), in 2019 it obtained an average of 61.3 (medium) and in 2020 it obtained an average of 64.7 (medium), it can be seen that students' problem-solving skills still need to be improved because they have not yet reached the high category.

Problem-solving ability is the initial bridge for different mathematical abilities. Students' problem-solving ability should be at a high level because it dramatically affects other students' mathematical abilities such as creative abilities, conceptual understanding, and higher abilities such as critical thinking skills and mathematical abstraction abilities. In addition, if students can achieve high problem-solving skills, it will be easier for students to improve other mathematical abilities. However, it is also following the research results Hajar & Sari (2020), Fatima (2016); and Nuryana & Rosyana (2019) in their research stated that 68% of SMK students' problem-solving abilities were still relatively low. In such a way, the researchers want to improve students' mathematical solving abilities because problem-solving is still relatively low and moderate. Sumartini (2018) the results of his research stated that the achievement of vocational students in learning mathematics was still relatively low, especially in the ability to solve mathematical problems. The data obtained states as much as 73% of students still have poor problem-solving skills.

How to hone mathematical problem-solving skills by inviting students to think about mathematical problems because the way students feel in solving problems is not optimal. Knowing that problem-solving skills are still relatively low, especially at the SMK level, the solution given by the author is to hone the mathematical problem-solving skills of SMK students. This statement is supported by Nurmala et al. (2018), stating that students' thinking habits in solving all issues affect problem-solving ability. The accuracy of solving problems depends on how much students are accustomed to solving problems. When students have achieved such a way of thinking, they are unconsciously in the situation-solving process, even though they have not met all indicators. Csikszentmihalyi (1993) states that the human brain can generate introspection awareness, but it seems that not everyone uses it in the same way.

In learning mathematics, in addition to prioritizing affective and cognitive abilities, other components of learning media must also be considered, one of which is teaching materials. Prastowo (2015) explained that teaching materials are teaching materials that are arranged regularly and structured to form a learning environment or atmosphere. In such a way, the teaching materials in this study can be interpreted as learning instruments in the form of materials that support the realization of teaching and learning activities. Teaching materials are critical dimensions in the educational environment because teaching materials support teaching and learning activities (Khulsum et al., 2018). Suitable teaching materials are interactive teaching materials with two-way learning, and both teaching materials are used in face-to-face classes or online learning. This

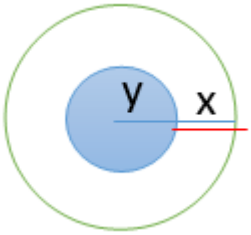
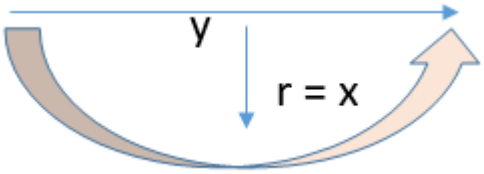
statement is supported by Smaragdina et al. (2020); he said one of the teaching materials could provide the characteristics and techniques of digital native learning. So it is interactive multimedia-based teaching materials that combine several types of media (text, images, audio, animation and video) and authorize the user to interact with the teacher and the material provided.

The author wants to link the linear equation system of two variables material with ethnomathematics in this study. Ethnomathematics offers many opportunities to explore mathematical ideas embedded in unique traditional cultures (Fauzi et al.,2021; Albanese et al., 2016; & Fouze & Amit, 2017). For this study, Ethnomathematics is the practice of mathematics that connects mathematics with culture, especially in Sundanese food in linear equation system of two variables material. Ethnomathematics expresses culture and mathematics (D'Ambrosio, 1985; Burkhardt, 2008; Herron & Barta, 2009). His conceptualization of Ethnomathematics has now known as "Ethno [culture] + mathema [explaining and understanding culture associated with appropriate science] + tics [technique, art]" (D'Ambrosio, 1985). Thus, we can say that Ethnomathematics is the art or practice of explaining, knowing, and understanding diverse cultural contexts and can be applied to scientific and mathematical knowledge (D'Ambrosio, 1990). The link between mathematics and culture can apply to traditional foods, traditional games, and other aspects of culture (Mania & Alam, 2021).

Ethnomathematics in this study is in the form of Sundanese specialties, which will be applied to the linear equation system of two variables material, namely in the form of the shape of the food so that it leads to geometry and its application in the linear equation system of two variables material is related to geometry which is the shape of the traditional food. Several of these statements are supported by (Nisrina et al., 2021) ethnomathematics-oriented teaching materials on the material of two-variable linear equation systems are shown in it in the form of a relationship between culture and problems in the culture itself based on the concept of linear equation system of two variables material. (Nisrina et al., 2021) who stated that the shape of traditional tombs combines the culture with the area of the circumference processed in the linear equation system of two variables material. Traditional food that is seen from its shape or geometry for use in linear equation system of two variables learning is supported by the statement of (Choeriyah et al., 2020) Traditional food if related to school mathematics is related to geometry, with the pattern of the shape of the food in the form of a mathematical field on a very mathematical flat shape.

This study examines the two, and three-dimensional geometric shapes of traditional Sundanese foods applied to mathematical problems in the linear equation system of two variables material. In addition, the things studied were formed teaching materials that students in e-learning used. In this study, typical Sundanese food was taken in geometric form first and then made linear equation system of two variables questions by collaborating Sundanese specialties and geometric shapes into the linear equation system of two variables concept. this can be seen in Table 1:

Table 1. Traditional Sundanese Food in Mathematical Form

Traditional Sundanese Food	Shapes in Mathematics
 Ali Agrem Cake it's like circle	
 Lembang Milk Tofu it's like cube	
 Ice Cream it's like cylinder	
 Surabiit;s like a half of parabola from beside	

Learning that uses teaching materials that will be developed in ethnomathematics will be applied to students based on e-learning. The following are mathematical problems of ethnomathematics teaching materials in system of linear equations in two variables learning:

Surabi Bandung is very popular among young people in Bandung. Even the presentation and toppings are very diverse. Surabi comes from rice flour. In the end, for some people serabi is a kind of snack, and for some it is a substitute for rice. In general, surabi is parabolic. Look at the following picture:

in the shape of surabi, the curved part is similar to the shape of a parabola and there is also a straight line surface above it. If the circumference of the surabi is known to be 18.57 cm, with y being 4 cm longer than x which is the radius of the parabola. Determine the length of x and y.

Through this e-learning media, teachers are expected to manage learning materials, such as compiling syllabus; uploading materials; giving assignments to students; accepting jobs for making quiz tests, giving grades; monitoring activity; managing rates, interacting with others. On the other hand, students can take advantage by accessing assignments, learning materials, discussions with students and teachers, viewing conversations and learning outcomes (Anggoro, 2002; Anugrahana, 2020).

METHOD

Educational development research is a suitable approach to address complex problems in educational practice (Akker et al., 2007). This research is an R & D (Research & Development) research, namely research that leads to researching, designing, producing, testing, the validity of products that have been assembled (Sugiyono, 2019). The development model used in this study refers to the general education development model described by Plomp. The Plomp development model is one of the models used in development research. The Plomp model is widely used in the development of educational instruments such as teaching materials, media, and learning approaches. This model consists of five phases, namely: (1) initial investigation phase, (2) design phase, (3) realization phase, (4) test, evaluation, and revision phase, and (5) implementation phase. Furthermore, the procedure must be considered in developing this teaching material. Plomp (Rochmad, 2012) states that the process for teaching materials has at least five steps, which are shown in Figure 1:

Figure 1. Teaching Material Development Procedure

Development is a method of creating products or issuing innovations to products that have been previously assembled that can be designed, developed, utilized, and evaluated according

to the interests of students. As for what will be developed in this study, teaching materials based on E-Learning include mathematical problem-solving abilities and habits of mind in learning for X-grade SMK students. Based on the existing problems, the research method that will be used in this study is a quantitative and qualitative approach with the Embedded Design (Indrawan and Yaniawati, 2014)

RESULTS AND DISCUSSION

Design of Teaching Material

This development study produces linear equation system of two variables teaching materials in e-learning-based Ethnomathematics. This e-learning-based teaching material is one learning media that students can use via Android-based mobile phones, laptops, and computers. The development of e-learning-based teaching materials is carried out based on the development model proposed by Plomp. Namely with the following stages: (1) the investigation phase, (2) the design phase, (3) the realization phase, (4) the trial phase, evaluation and revision, and (5) the implementation phase.

The investigative stage of making this e-learning-based material begins with an analysis of linear equation system of two variables material taken from various sources according to the learning objectives. Then the analysis of Sundanese food is adjusted to the linear equation system of two variables concept. The results of interviews with the school curriculum section of the Multi Vocational Platform Ars International Bandung Vocational School show that the sources of teaching materials in schools, especially mathematics subjects, have followed technological developments. Students and teachers only use printed books, information from the internet, and youtube. Teachers are also required to be more creative in making PPT, PDF, and video teaching materials.

In addition, ethnomathematics in this study is in the form of Sundanese specialties, which are Sundanese specialties that will be applied to the SPLDV material, namely in the form of the shape of the food so that it leads to geometry and its application in the SPLDV material is related to geometry which is the shape of the traditional food. Several of these statements are supported by Nisrina et al. (2021) ethnomathematics-oriented teaching materials on the material of two-variable linear equation systems are shown in it in the form of a relationship between culture and problems in the culture itself based on the concept of SPLDV material. Nisrina et al. (2021) who stated that the shape of traditional tombs combines the culture with the area of the circumference processed in the SPLDV material. Traditional food that is seen from its shape or geometry to be used in SPLDV learning is supported by the statement of Choeriyah et al. (2020) Traditional food if related to school mathematics is related to geometry, with the pattern of the shape of the food in the form of a mathematical field on a very mathematical flat shape, it's like in table 1.

Researchers have studied SPLDV material that is collaborated with ethnomathematics, because researchers want when students buy food, they don't just buy it but know that the food is a typical Sundanese food, then when students want to make typical Sundanese food and eat typical Sundanese food, they don't just do the desired activity but know the shape of the food and also the size of the food, and so that students know that not only contextual activities (not related to culture) can be associated with mathematics but there are also contextual in culture that can

also be associated with culture. This statement is supported by the integration of ethnomathematics as a cultural value that is part of representing real environmental objects in mathematics (Sudirman et al., 2020). The statements that have been supported by several theories have continuity in this researcher. The researcher wants to develop teaching materials for a two-variable linear equation system related to ethnomathematics, the culture of which is Sundanese food.

then after ethnomathematics In this study, namely Sundanese cultural specialties which are collaborated based on their form in the material of two-variable linear equation systems, explanations of the two-variable linear equation material are formed which are formed according to the design and template of the teaching materials developed.

Design Stage done by making a storyboard. Then the teaching materials were consulted with material experts. After that, then start designing linear equation system of two variables teaching materials in e-learning-based Ethnomathematics. The design in PDF and PPT uses a systematic e-learning-based teaching material as follows: a) title and start page; b) basic competencies and concept map of linear equation system of two variables; c) History of linear equation system of two variables; d) Material (per subchapter) which contains; (1) Elimination Method; (2) Substitution Method; (3) Mixed Method; (4) Graphic Method; (5) Contents of material and sample questions; e) Glossary; f) Post-test questions; g) Reference.

The development of linear equation system of two variables teaching materials in Ethnomathematics based on e-learning are printed fabrics and non-printed materials (animations, videos, images), interactive multimedia teaching materials combined with linear equation system of two variables materials with cultural theory, mainly traditional Sundanese food. Then the results of teaching materials in the form of pdf, ppt, and learning videos that can be applied to e-learning learning media are Moodle, and the type used is CBT (Computer-based Tutorials). Researchers use e-learning in CBT because students are familiar and easy to use. The research subjects in the limited trial were students of SMK Class XI Multi Vocational Platform Ars International Bandung; as many as 15 students had received linear equation system of two variables material. Students have a positive attitude towards the use of Moodle in learning mathematics (Lin et al., 2017).

After designing e-learning-based teaching materials, the realization stage is carried out by collaborating linear equation system of two variables materials with traditional Sundanese food. Displays compiled are images of 2 title pages, Figure of 3 essential competencies and concept maps, Figure of 4 materials, and Figure 5 of Posttest.

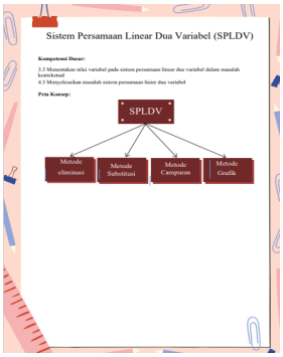


Figure 2. Display Cover

Figure 3. KD Display and Concept Map

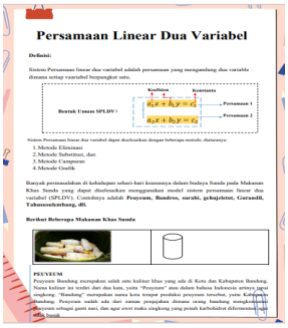


Figure 4. Materials on PDF Teaching Materials

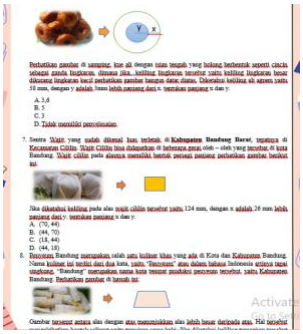


Figure 5. Posttest

The next stage is realizing linear equation system of two variables teaching materials for CBT e-learning media. CBT media has a start page display, dashboard, Site Home, Calendar, meeting room templates, materials, post-tests, pretests, assignments, and grades where these templates are included in learning activities. The teaching materials that have been designed are applied through CBT media so that all students can access them. The following is a display of CBT e-learning media.

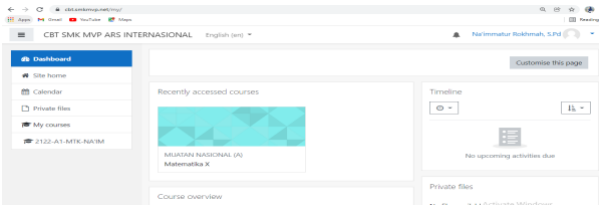


Figure 6. Dashboard

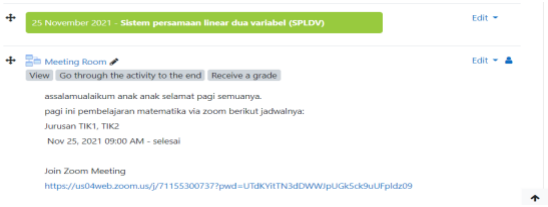


Figure 7. Meeting Room

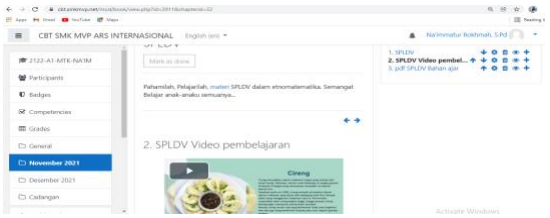


Figure 8. Material

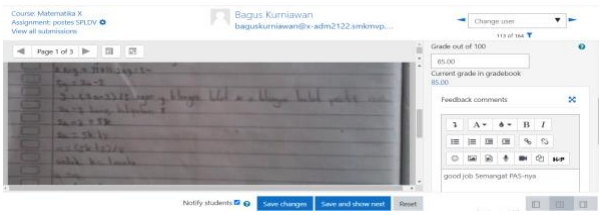


Figure 9. Grade

Validation, trial, and revision stage. Next is the validation stage. The teaching materials were tested for validity by the validator. The test was carried out by researchers using a questionnaire assessment. The assessment indicators are adjusted to the needs in teaching materials and e-learning media. The validation of teaching materials includes the feasibility of content, presentation, language, and problem-solving abilities. Media validation includes aspects of use, utilization, and display. At the time of verification of teaching materials, the teaching materials were still in the form of prototype 1. The results of the validation of material experts and media experts were as follows:

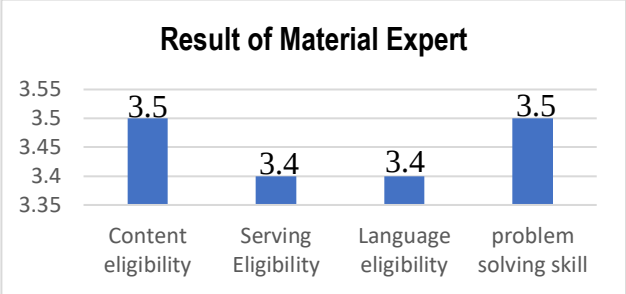


Figure 10. Material Expert Validation

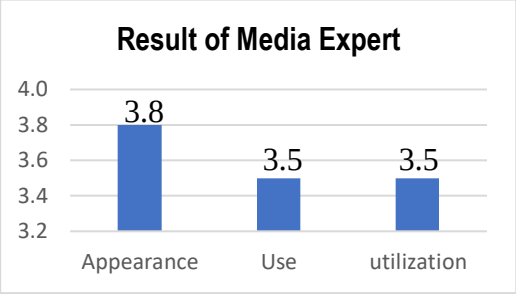
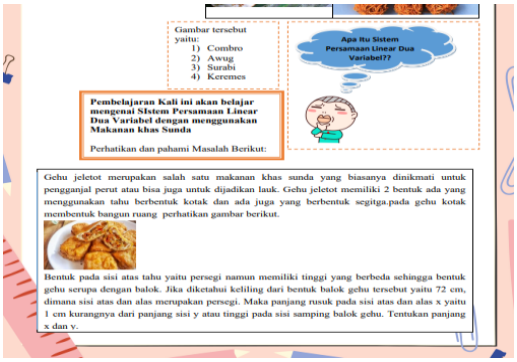


Figure 11. Media Expert Validation

It can be seen the results of the validation of e-learning-based teaching materials carried out by media and material experts, namely. Feasibility of content gets a very decent category in presentation feasibility, namely obtaining a proper type. In the aspect of language feasibility, it gets a worthy class. The mathematical problem-solving ability has a very feasible category in the feasibility aspect. Furthermore, the validation by media experts obtained a very doable type in appearance. In the aspect of use, the class is very feasible. In the aspect of utilization, the category is very likely. Overall, the e-learning-based teaching materials are viable to be applied to students by slightly revising some parts of the e-learning-based teaching materials. The improvements that have been made by the researcher are to revise the learning video with a duration that is not too long, so that learning is not monotonous so that the learning video is divided into two. There are part 1 and part 2. Then the next improvement is about the appearance and use of PowerPoint. These improvements change the appearance of Power point from not automatic to automatic Power point so that it looks more attractive and simple when viewed and studied and used.

After prototype 1 of linear equation system of two variables material in e-learning-based Ethnomathematics was declared feasible by the validator, then linear equation system of two variables's teaching materials in e-learning-based Ethnomathematics were tested in a limited class. The test class is run twice. The first experiment was conducted on November 14, 2021, at 13.00 and was attended by class XI students from SMK Multi Vocational Platform Ars International Bandung. In this survey, students try to practice whether PDF, PPT, and learning videos can be accessed via CBT, can students download PDF, PPT, and learning videos. Then if everything went smoothly, the class XI students were tested by learning to use the teaching materials that had been developed. Researchers did not re-validate teaching materials and media because they only completed some of the missing materials and used the results of Prototype 1.

The problems placed at the beginning of the previous teaching materials in prototype 1 did not exist. The material expert provided a revision to add contextual problems at the beginning of the opening of the material. Contextual problems placed at the beginning of the teaching materials aim to stimulate students to think and prepare to learn. The problems placed at the beginning also aim so that before students enter the core of learning in this teaching material, students are able to collect information with previously obtained learning. So that students are able to use information from old materials that they have learned and relate it to new materials that will be learned in the teaching materials that have been developed.



Figur 12. Repair Results

The results of the revision of the first experiment were to produce prototype 2. Then it was tested again on class XI students of SMK Multi Vocational Platform Ars International Bandung on November 17, 2020, with 15 students. The 15 students were asked to evaluate Prototype 2 of linear equation system of two variables teaching materials in e-learning-based Ethnomathematics. Then students were asked to fill out an evaluation questionnaire for the Prototype 2 material, namely linear equation system of two variables teaching materials in e-learning-based Ethnomathematics. The following shows data from the evaluation of Prototype 2.

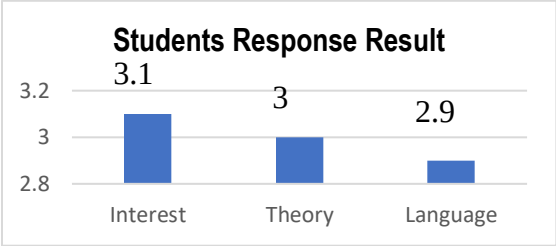


Figure 13. Student Response Results

On the results of the student's response, namely conveying that in the aspect of student interest, an average of 3.1 was obtained, which was in the appropriate category. Then, in the material response, students get an average of 3, which is included in the decent sort. Furthermore, it got a 2.9 with a worthy class in the language aspect. Thus, according to the student's response, teaching materials are feasible to implement.

The implementation stage of linear equation system of two variables materials in e-learning-based ethnomathematics in class X SMK Multi Vocational Platform Ars International Bandung was declared eligible by the validator. Learning is done online using Zoom Meeting, provided in the meeting room template on CBT (e-learning learning media). To test the teaching materials' effectiveness, the researchers first obtained the pretest and post-test results and then conducted a normality test. The acquired significance of Shapiro-Wilk (sample), the pretest value is 0.010, and the post-test value is 0.249, so for the pretest results$\geq 30 < 0.05$, which means the data is not standard and *post-test* significant > 0.05, which means the information is expected. Learning with e-learning-based teaching materials can effectively improve mathematical problem-solving abilities from this description. It can be seen in Table 3 that the significant value is 0.000, which means that H0 is accepted. So, it can be concluded that there is a difference between student learning outcomes in learning mathematics using e-learning-based teaching materials on pretest and post-test data.

Problem Solving Ability Results

It identifies elements that are known, asked, and the adequacy of the components needed, organizing mathematical problem solving, applying strategies to solve various problems in mathematics and outside it. To determine the achievement of student problem solving abilities, researchers used the gain test to determine the improvement in problem-solving skills. The achievement of students' mathematical problem-solving skills was analyzed based on the answer rubric and scoring guidelines which included four indicators of mathematical problem-solving skills. And using the achievement value of each hand adjusted to the categorization of problem-solving skills., evaluate and interpret the results of the settlement.

Improvement of mathematical problem-solving ability in analyzing data using the gain test method. In order to conduct a gain test, several data are needed, namely pretest data and posttest data. To find out the increase and classification of the increase, a gain index test is needed. The results of the gain index are classified according to the following table (Meltzer, 2002).

Tabel 2. Gain Index Classification

Gain Index	Criteria
$gain > 0{,}70$	Tall
$0{,}30 < gain \leq 0{,}070$	Currently
$gain \leq 0.30$	Low

The N gain test is carried out on students who use linear equation system of two variables teaching materials in e-learning-based Ethnomathematics. The subject will receive treatment I before using the teaching materials developed, then treatment II on learning outcomes after using teaching materials developed at the International Vocational School. The average value of the pretest is 34.3, and the average value of the post-test is 63.7. The following are the results of the N gain test:

$$\frac{\text{Posttest Score - Pretest Score}}{\text{Ideal Score- Pretest Score}} = \frac{63.7\text{-}34.3}{100\text{-}34.3} = \frac{29.4}{65.7} = 0.4$$

The results of the N gain test are 0.4, with a medium category. It states that there is an increase in students' problem-solving abilities when they learn to use teaching materials developed, namely linear equation system of two variables teaching materials in e-learning-based Ethnomathematics. Mathematical problem-solving can help students improve their analytical power and can help them apply that power to a variety of situations (Sari et.al, 2019).

From the students' answers, the assessment is adjusted to the rubric. Each indicator has an evaluation in each question. The value obtained by students will be converted into percentage form. After finding the percentage value, it will be adjusted according to the problem-solving ability criteria in Table 3.

Table 3. Achievement of Problem-Solving Ability of Each Indicator

Indicator	No Question	Achievement Score (%)	Criteria
Identify elements that are known, asked, and the adequacy of the components needed	1	88.33	Very high
Organizing mathematical problem solving	2	81.67	Very high
Applying strategies to solve various problems in mathematics and outside it	3	50.56	Low
Evaluating and interpreting the results of the settlement	4	57.22	Currently
Total average (%)		69.31	Tall

Identify elements that are known, asked, and the adequacy of the components needed

The first indicator scored 88.33%, with the category of students' problem-solving abilities very high. However, it was still not optimal because some students were not maximal in answering. The following is the documentation of student answers:

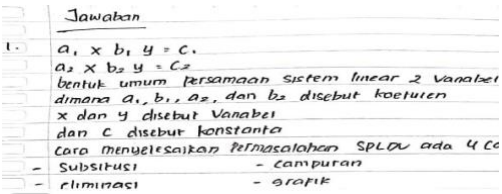


Figure 14. Student Answers Correct

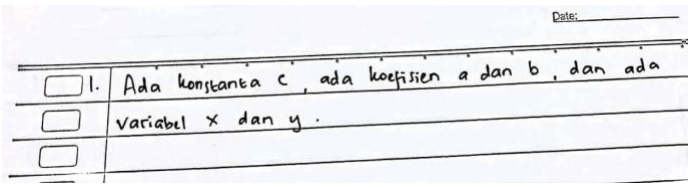


Figure 15. Students' Answers Are Not Exactly

Many students have high problem-solving abilities after being given learning using teaching materials developed. The difference in the picture above can be seen, namely in identifying the concepts in the linear equation system of two variables material. It can be seen in Figure 14, namely the answers of students who answered according to the linear equation system of two variables concept completed with the settlement method used in satisfying the linear equation system of two variables, namely S7's answer. In Figure 15, the students' answers are good but incomplete with the concept of meeting the linear equation system of two variables, namely the methods belonging to S15. This fact shows that not all students have identified the idea well because a few have not been optimal in identifying certain elements.

Organizing mathematical problem solving

In the second indicator, the score is 81.67%, with the category of students' problem-solving ability being very high. However, it is still not optimal because some students are not optimal in answering the given mathematical problems. The following documentation compares students who answered not maximally and those who responded optimally.

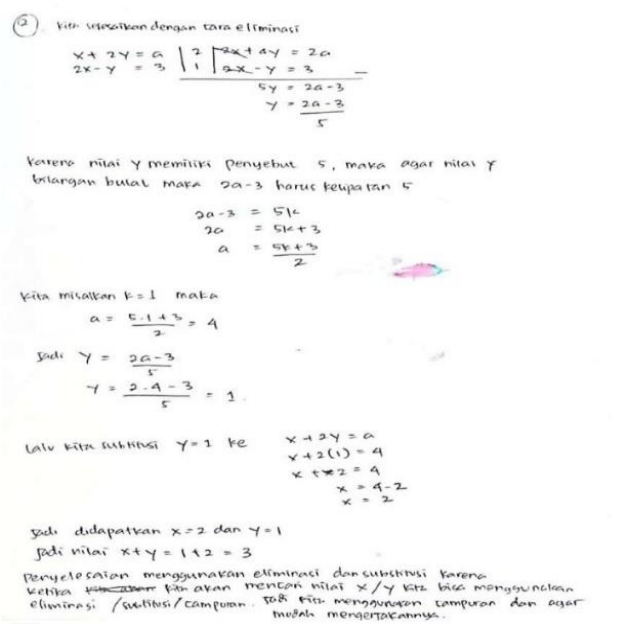


Figure 16. Student Answers Correct

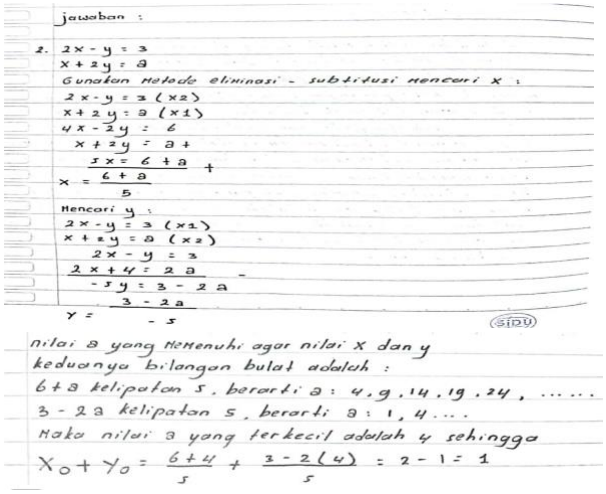


Figure 17. Students' Answers Are Not Exactly

In Figure 16, it can be seen that the systematics in organizing the sequence of answers has a good and proper organization, and the students also give reasons why students choose the solution method. The answer belongs to S9 students. It is different from Figure 17 in that finding the value of x and y is good, finding the matter, and getting the deal of a. However, students are not suitable for finding x + y because students are not careful in adding up x and y. Besides that, students also do not explain why students take the solution method. The answer belongs to S13, so the work is good but not quite right because of the lack of student accuracy.

Applying strategies to solve various problems in mathematics and outside it

The third indicator scores 50.56% in the category of familiar student problem-solving abilities because most students are not optimal in applying the LINEAR EQUATION SYSTEM OF TWO VARIABLES concept when solving problems related to contextual problems, especially Sundanese food and mathematical problems given. So that in this indicator, students are not optimal in formulating strategies to solve problems.

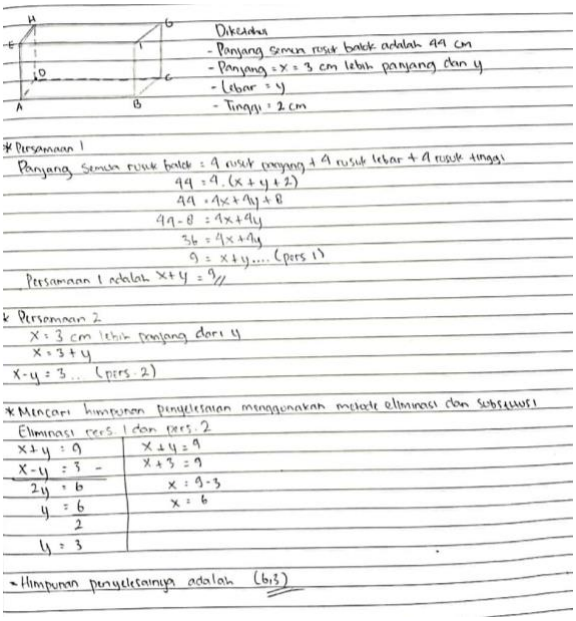


Figure 18. Student Answers Correct No. 3

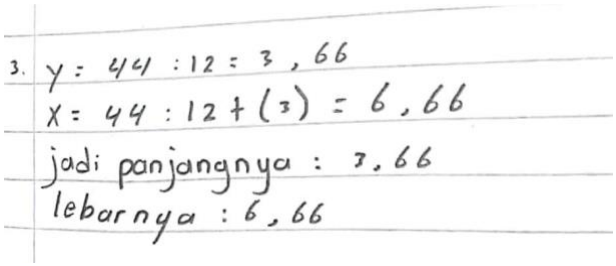


Figure 19. Incorrect Student Answers No. 3

Figure 18 shows the application of the linear equation system of two variables concept in solving mathematical problems related to Sundanese food. In addition, students answer systematically and provide conclusions at the end of the answer. The answer belongs to S6 students. Unlike the case with Figure 19, some students answer not using the linear equation system of two variables concept with students who are less careful in reading the questions. The answers belong to S5 students. Because the questions given have stated that there is a typical Sundanese food, namely cake blocks, which have the shape of a partnership, not a rectangle. This statement shows that students still have common problem-solving skills on indicators regarding the application of concepts and problem solving given.

Evaluating and interpreting the results of the settlement

The fourth indicator scored 57.22% in the category of moderate problem-solving abilities because there were still some students who were not maximal in evaluating the results of their completion, especially in Sundanese food and in the mathematics problems given. The following is the documentation of student answers:

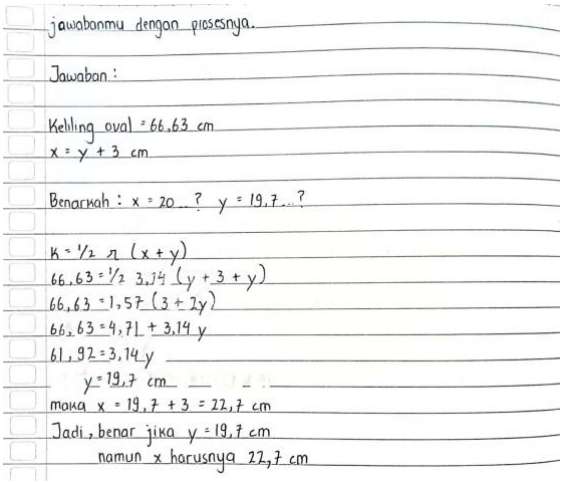


Figure 20. Student Answers Correct

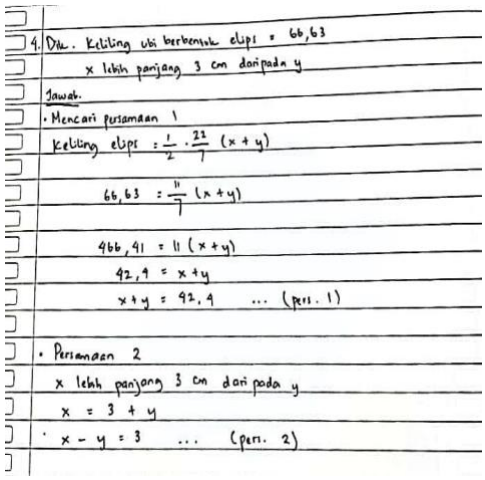


Figure 21. Incorrect Student Answers

In Figure 20, student work results with the substitution method are carried out systematically and precisely. The answer belongs to S16. However, not all students answered the problems correctly and well because most of the students had just completed the stage of stating equations one and two (see Figure 21), the answer from S15. In such a way, it has not solved the problems given correctly and adequately. This argument is actual if students' problem-solving abilities are still not optimal even though they have now reached the moderate category. However, this implementation of e-learning has not achieved optimal results. Some students, deficient achiever students, have not utilized this e-learning well (Yaniawati et.al, 2018).

CONCLUSIONS

Teaching materials developed are used to improve mathematical connection skills in the learning process and are used to create innovative learning. linear equation system of two variables teaching materials in Ethnomathematics based on e-learning were developed using Plomp theory which includes initial investigation, design, evaluation, trial and revision, and implementation. The development of teaching materials this time also involves ethno-mathematics of the ethno-ethnicity of Sundanese cultural specialties and mathematics seen from the form of Sundanese specialties linked to mathematics and linked again to learning about two-variable linear equation systems that have never existed in previous research. Based on the results of the evaluation of appropriate teaching materials, so that teaching materials can be implemented to students. The mathematical problem-solving ability of students of SMK Multi Vocational Platform Ars International Bandung who utilize linear equation system of two variables teaching materials in Ethnomathematics based on e-learning is included in the high criteria. Of the four indicators, there are two in the high category, namely identifying the adequacy of the elements needed and organizing mathematical problem-solving. While in the low class, the indicator applies strategies to solve various problems in mathematics and outside it, while those who get the medium type are indicators of evaluating and interpreting the completion results. Students can explain what they know to answer questions, relate the questions well to the problems they face, and draw the correct conclusions well. For future research, various cultures other than Sundanese food can be adapted into a mathematical context, such as traditional games, traditional musical instruments,

traditional dances, traditional houses and so on.However, this study also acknowledges certain limitations, such as the limited sample size and the focus on a single specific context, namely the Siger Tower. Consequently, it is recommended that future research involve a larger sample size and incorporate a broader range of contexts in the development of PISA-type mathematics problems. Expanding the variety of contexts could provide a more comprehensive evaluation of the problem set's effectiveness across different scenarios.

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