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SEGO BORANAN IN BUYING AND SELLING CONTEXT OF MATHEMATICS PROBLEM SOLVING

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Abstract: This study aims to develop problem based learning in ethnomathematics-based textbooks through *Sego Boranan*'s buying and selling activities to improve students' problem-solving abilities in social arithmetic material. Research & development were carried out a procedure of 3D (Define, Design, & Develop). The feasibility assessment was carried out by experts and practitioners using the feasibility sheet, the readability assessment by students who had obtained Social Arithmetic material using readability sheets, and student responses by students who were studying Social Arithmetic material using a student response questionnaire. The textbooks developed were included in the very feasible criteria, was easy to understand, and very feasible to be implemented in learning mathematics. Although it is suggested that using an experimental method can test the effectiveness of using this textbook on learning outcomes and students' problem-solving abilities, this paper presented examples of ethnomathematics problem solving that can be practically implemented in mathematics classrooms.

Keywords: **Social arithmetic, ethnomathematics, problem based learning, problem solving ability, *Sego Boranan*, textbook**

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INTRODUCTION

Mathematics has an important role in supporting the advancement of science and technology today. Mathematics can improve the ability to think and argue, contribute to solving everyday problems in the world, and provide support for the development of science and technology. Furthermore, the focus of developing mathematics is a person who can think and work mathematically (Zevenbergen, Dole & Wright, 2004). Therefore,

mathematics is a subject that must be studied at every level of education, from elementary to high school.

Learning mathematics will be more meaningful when the learning process contains the standard processes of learning mathematics, namely understanding, reasoning, communication, connection, problem-solving, and representation. However, to master higher-order thinking skills such as critical thinking and creative thinking, students must first master problem-solving skills. According to NCTM (2003), problem solving is the most important thing in school mathematics, without the ability to solve problems, the usefulness and power of mathematical ideas, knowledge, and skills are very limited.

However, in reality, students' problem-solving abilities are generally still relatively low. This can be proven from the results of the Trends in International Mathematics and Science Study (TIMSS), where mathematics learning achievement in Indonesia is in the top 6 from the bottom, namely ranking 45 out of 50 countries with a score of 397 (Nugraha & Basuki, 2021). The results of the study indicate that students' problem-solving abilities are still not optimal and are still below standard. For this reason, teachers need to strive for students' mathematical problem-solving abilities to increase and develop. According to Polya (1973), indicators of problem-solving ability are: (1) understanding the problem; (2) develop strategies or settlement plans; (3) solving the problem according to the plan that has been made, and (4) re-checking the answers.

Learning mathematics with the Problem Based Learning model is effective for increasing students' problem-solving abilities (Nasir, 2016). Trianto argues that problem-based learning is a learning model that is based on many problems that require authentic investigation, namely investigations that require real solutions to real problems (Saputro, Sunandar, & Kusumaningsih, 2020). The existence of real problems can increase student motivation to be able to solve these problems. In this case, students not only understand the concepts they learn in the abstract but can also use these concepts to solve real problems around them, so that learning can be more meaningful.

Mathematics is always inseparable from everyday life. Even in the surrounding culture and social phenomena, one can find mathematical concepts. Ethnomathematics is a knowledge that links mathematics with cultural elements (Rosa & Orey, 2011). The form of the relationship between mathematics and culture can be seen in the aspect of applying mathematical concepts in a particular culture as well as ways of teaching mathematics that are adapted to the local culture and students' character so that it is

expected that students can integrate with the mathematical concepts being taught so that students feel that mathematics is part of the culture (Nurmaya, Herawati, & Ratnaningsih, 2021).

An exploratory study related to problem-based learning with ethnomathematics studies has also been carried out by Setyani & Amidi (2022) regarding the study of the PBL-RME model with ethnomathematics nuances in outdoor learning. This research is one of the learning innovations that can be applied at various levels of education to improve students' mathematical problem-solving abilities. This research is expected to be a good first step in developing an ethnomathematics-nuanced textbook with PBL models and outdoor learning strategies to improve students' problem-solving abilities.

One example of culture in Indonesia that can be applied to ethnomathematics-based mathematics learning is the phenomenon of local culture in Lamongan district, East Java. In Lamongan, there is a special food that is only traded in that area, namely what is called *Sego Boranan*. In this food, there are sales activities that can be related to the subject of learning mathematics, especially in the discussion of social arithmetic for the 7^{th} grade of junior high school. In selling the food, there are examples of the application of social arithmetic learning materials, namely those related to calculating the selling price, purchase price, losses, profits, discounts, gross, net, tare, simple interest, and taxes.

In accordance with the previous explanation, learning mathematics using textbooks based on ethnomathematics is considered effective. A professional teacher must be able to design textbooks that are interesting and effective to use so that students can easily understand the material. Textbooks are learning devices that contain information to achieve learning objectives. Textbooks will be good if they are designed to take the mindset of students into account so that they can help teachers and students during learning by paying attention to the curriculum used. Based on the discussion above, it will be carried out on the development of problem-based learning ethnomathematics textbooks on *Sego Boranan's* buying and selling activities to improve students' problem-solving abilities on social arithmetic material. The focus of this research is to develop textbooks that are appropriate, easy to understand, and get a good response from students.

Several studies have been carried out with a focus on developing textbooks with ethnomathematics. Teaching materials characterized by ethnomathematics from the *Suku Komering* have also been developed by Nelawati *et al.* (2018). The content of traditional or iconic buildings is a study for developing textbooks using ethnomathematics as

developed by Unodiaku (2013) at Enugu State, Ayuningtyas & Setiana (2019) at the Yogyakarta Palace Building, Ardiansyah *et al.* (2023) at the Al Mahdi Mosque in Magelang. Furthermore, Setiyadi (2021) has developed teaching materials with ethnomathematics nuances with traditional games from Banyumas. Other studies related to the development of teaching materials with ethnomathematics integrated with problem-based learning have been carried out by several researchers such as Suryawan & Sariyasa (2018); Dama, Bhoke, & Natalia (2021); Syarifuddin & Anshari (2022); Aisyah *et al.* (2023). In this research, the focus of the research is to develop teaching materials with ethnomathematics nuances with traditional food objects called *Sego Boranan* which are integrated with Problem-Based Learning.

METHOD

The research method used in this study is Research and Development (R&D), which produces or improves products and then examines the effectiveness and feasibility of these products (Ardiansyah & Pratama, 2021). In this study, the product produced was a problem-based learning ethnomathematics textbook on *Sego Boranan*'s buying and selling activities in Lamongan district to develop students' problem-solving abilities. The development procedure used in this study is a modification of the 4D model, which consists of (a) define stage; (b) the design stage; and (c) the development stage (develop), as presented in Figure 1.

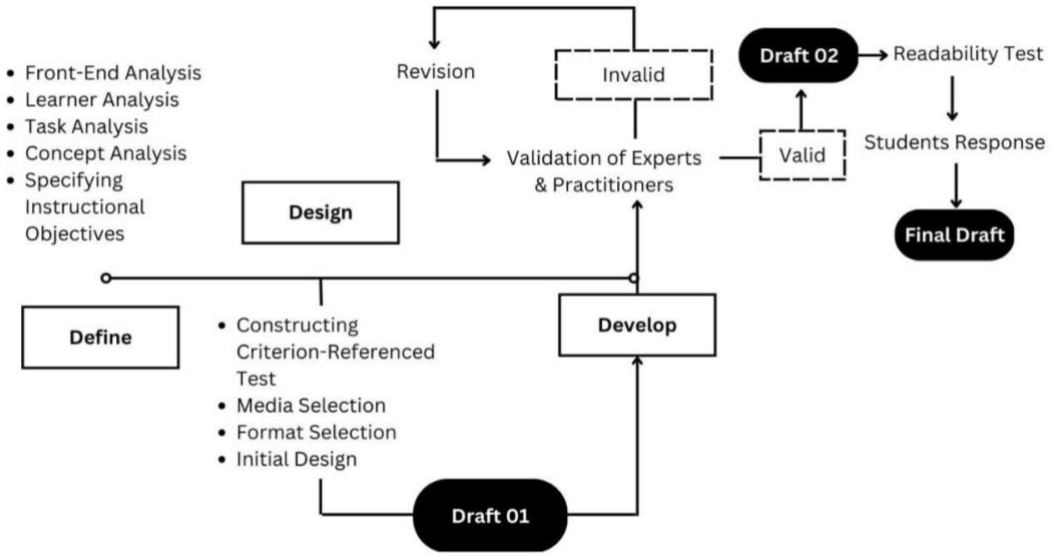

Figure 1. Textbook development scheme

The process of developing teaching materials begins with defining several things through front-end analysis activities, learner analysis, task analysis, concept analysis, and specifying instructional objectives. The results of the Define stage will be developed into product designs through constructing criterion-referenced tests, media selection, and format selection to obtain an initial design, namely a textbook prototype. Furthermore, several assessments will be carried out related to feasibility, readability, to limited trials to obtain student responses. The whole process is integrated and continuous to obtain quality textbooks that are ready to be implemented in class.

The data collection technique used in this study was to use a questionnaire to obtain levels of feasibility, readability, and student responses. The feasibility test was carried out by 3 experts/lecturers and 3 practitioners/teachers respectively. The readability test was carried out by 5 students in the 8^{th} grade with the assumption that these students had obtained social arithmetic material. Student responses were made by 5 students in the 7^{th} grade who were taking social arithmetic material. The feasibility test questionnaire was developed by taking into account several aspects of the assessment, which consisted of aspects of content feasibility, presentation feasibility, and language adaptation to the book analysis format published by the Kemendikbud (2018). The readability test questionnaire was developed by taking several aspects of the appropriate assessment into account. It is a modification of the questionnaire that was developed by Ardiansyah, Ferianto, & Dinasari (2021). Furthermore, a student response questionnaire was developed openly to find out how students responded to textbooks.

Then, to obtain a product that can be said to be of high quality, the textbooks developed must meet the criteria for the level of eligibility, the level of readability, and the student's response to the textbook. The minimum score that needs to be met is 70%. If the results of the student's assessment or response are less than 70%, it is necessary to make improvements. Table 1 show the scoring criteria for the feasibility test, Table 2 show the scoring criteria for the readability test, and Table 3 show the scoring criteria for the students' responses to textbooks.

Table 1. Criteria for the feasibility level of textbooks

Score	Criteria
$1\% < skor \leq 50\%$	Not Feasible
$50\% < skor \leq 70\%$	Less Feasible
$70\% < skor \leq 85\%$	Feasible
$85\% < skor \leq 100\%$	Very Feasible

Source: Ardiansyah, Sari, & Hamidah (2021)

Table 2. Criteria for the readability level of textbooks

Score	Criteria
$1\% < skor \leq 50\%$	Elusive
$50\% < skor \leq 70\%$	Less understand
$70\% < skor \leq 85\%$	Acceptable
$85\% < skor \leq 100\%$	Easy to understand

Source: Ardiansyah *et al.* (2021)

Table 3. Criteria for student response to textbooks

Score	Criteria
$1\% < skor \leq 50\%$	Not Good
$50\% < skor \leq 70\%$	Less Good
$70\% < skor \leq 85\%$	Good
$85\% < skor \leq 100\%$	Very Good

Source: Ardiansyah *et al.* (2021)

RESULTS AND DISCUSSION

This development research is a textbook that is ready to be used in class in the 7th grade. The developed textbook is expected to be a reference for teachers in delivering social arithmetic material. This textbook was developed by taking into account the 4D model, which consists of (a) the define stage; (b) the design stage; and (c) the develop stage. The following are the results of research from each of these stages.

Define Stage

The define stage aims to establish and define learning requirements (Noto, 2014). At this stage, an analysis is also carried out to determine the learning objectives and the limits of the material being developed. According to Thiagarajan, Semmel, & Semmel (1974) this stage consists of initial analysis, student analysis, concept analysis, task analysis, and the formulation of learning objectives.

A front-end analysis was carried out to determine the fundamental problems faced by educators in the process of learning mathematics so that it underlies the need for developing textbooks (Ardiansyah & Pratama, 2021). This research was conducted to develop students' problem-solving abilities through the development of ethnomathematics-based textbooks for *Sego Boranan*'s buying and selling activities on social arithmetic material. With the development of this textbook, it is hoped that the problem of low student problem-solving abilities can be further developed.

Next is learner analysis. This activity was carried out to identify the characteristics of students in accordance with the design and development of learning (Noto, 2014). In this study, student analysis was carried out through interviews with one of the students regarding cultural studies regarding *Sego Boranan*. It can be obtained that these students do not know the connection between *Sego Boranan* buying and selling activities in learning mathematics, besides that, these students also do not have mathematics textbooks that are oriented to the surrounding culture, and there are still textbooks that are less attractive. Therefore, the development of this textbook is a solution to students' lack of knowledge regarding the surrounding culture, which can be linked to learning mathematics, as well as a solution to the absence of mathematics textbooks that are oriented towards the surrounding culture. Through the creation of ethnomathematics-based textbooks through *Sego Boranan*'s buying and selling activities on this social arithmetic material, it is hoped that students will more easily understand the interrelationships of surrounding culture with learning mathematics and also have interesting teaching materials.

Concept analysis is carried out to identify the main concepts to be taught, arrange them in a hierarchical form, and sort individual concepts into critical terms (Noto, 2014). In this study, concept analysis was carried out by determining the material and curriculum used in the development of this textbook. The curriculum used is an independent curriculum, so the learning outcomes in this textbook are that students can apply arithmetic operations to real numbers and provide estimates in solving problems (including those related to financial literacy). Based on these learning outcomes, the materials used in the development of this textbook were determined, namely selling prices, purchase prices, profits, losses, discounts, gross, net, tare, simple interest, and taxes.

Task analysis is carried out to identify the main skills needed and analyze them for additional skills that may be needed (Noto, 2014). Task analysis activities in this study were carried out by analyzing the tasks that must be done and mastered by students in order to achieve the expected learning objectives, namely by solving problems on the core issues and questions on the competency test at the end of each sub-material. Problems on the core issues and questions on the competency test were developed by taking into account the learning objectives integrated by ethnomathematics through *Sego Boranan's* buying and selling activities and adapting them to indicators of problem-solving abilities.

Specifying instructional objectives is carried out to convert the results obtained in the task analysis and concept analysis steps into specific goals (Noto, 2014). In this study, the formulation of learning objectives was carried out by determining the learning outcomes to be developed and the learning objectives for students. From this activity, the results are obtained in Table 4 as follows.

Table 4. Description of learning objectives

Learning Outcome	Learning Objectives
Students can apply arithmetic operations to real numbers, and provide estimates/ approximations in solving problems (including those related to financial literacy).	By using the PBL model, students are expected to be able to: 1. provide estimates of selling prices, buying prices, profits and losses correctly; 2. provide estimates related to discounts correctly; 3. provide estimates related to gross, net, and tare correctly; and 4. provide estimates related to single tax and interest correctly.

Design Stage

The design stage is the stage for designing the development of learning devices. The design stage consists of four stages, namely constructing criterion-referenced tests, media selection, format selection, and initial design. The development of ethnomathematics-based textbooks through *Sego Boranan's* buying and selling activities to develop students' problem-solving abilities is focused on learning outcomes regarding financial literacy in social arithmetic material.

The preparation of the test description is the stage that connects the define stage with the design stage. The description of the test is arranged based on the learning objectives and student analysis, which is then arranged into a learning outcomes grid. The several tests that have been developed are presented in Table 5.

Table 5. Results of test development

Learning Objectives	Learning Objectives
1. By using the PBL model, students are expected to be able to provide estimates of selling prices, buying prices, profits, and losses correctly.	Mrs. Lia bought 10 servings of *Sego Boranan* for IDR 100,000.00. Then Mrs. Lia resold her *Sego Boranan* at a price of IDR 12,000 for one portion. What is the estimated percentage of profit earned by Mrs. Lia?
2. By using the PBL model, students are expected to be able to provide estimates related to discounts correctly.	One day Vina went to the Lamongan market, she bought 10 portions of *Sego Boranan* for a total price of IDR 100,000.00. Arriving at the location, it turns out that if you buy more than 10 *Sego Boranan*, you will get a 20% discount. What is the estimated amount of money paid by Vina?
3. By using the PBL model, students are expected to be able to provide estimates related to gross, net, and tare correctly.	Mrs. Dewi is a seller of *Sego Boranan*. She bought as many as 6 sacks of rice flour as the raw material for making peanut brittle with a total weight of 120 kg and a rate of 2%. If the price of rice flour is IDR 3,000.00/kg, then how much does Mrs. Dewi have to pay to buy 6 sacks of rice flour?

Learning Objectives	Learning Objectives
By using the PBL model, students are expected to be able to provide estimates related to single tax and interest correctly.	Mrs. Nia is a seller of *Sego Boranan*. In a day, Mrs. Nia can sell as many as 60 portions of *Sego Boranan*, with the price of one portion being IDR 12,000.00. If Mrs. Nia is subject to a tax of 1% from the sale of *Sego Boranan*, then what is the estimated tax that must be paid by Mrs. Nia for one month?

Develop Stage

The development stage is the stage for producing a development product, which is carried out through two stages, namely expert assessment with revisions and development trials (Ardiansyah & Pratama, 2021). In the development stage, a feasibility test was carried out by 3 experts consisting of one lecturer in the field of ethnomathematics studies, one lecturer majoring in mathematics, and one other person who is a postgraduate student majoring in mathematics. The due diligence was also carried out by 3 practitioners/teachers consisting of junior high school mathematics teachers.

Expert assessment produces suggestions for improvement in the development of textbooks. After the textbook has been assessed by experts and practitioners, it can be revised according to the suggestions and comments given. Assessment of experts and practitioners is carried out by providing a feasibility assessment sheet consisting of three aspects, namely the content feasibility aspect with 26 assessment points, the presentation feasibility aspect with 15 assessment points, and the linguistic aspect with 14 assessment points. The rating score is given on a Likert scale, where a score of 4 means very good, a score of 3 means good, a score of 2 means not good, and a score of 1 means very bad. The due diligence data results are presented in Table 6 and Table 7 below.

Table 6. Expert validation data

Aspect	Max Score	A1	A2	A2
Content feasability	104	88	104	98
Presentation feasability	60	48	60	59
Language	56	44	55	54
Score	100%	81.81%	99,55%	95%
Mean		92.12%		
Criteria		Very Feasible		

Table 7. Practitioner validation data

Aspect	Max Score	P1	P2	P2
Content feasability	104	96	95	94
Presentation feasability	60	55	54	55
Language	56	46	49	50
Score	100%	89.54%	90%	90.45%
Mean		89.997%		
Criteria		Very Feasible		

Based on the results of the validation above, an average final score of 92.12% was obtained from the expert validation. These results are included in the very feasible criteria. Then the average final practitioner validation score was 89.997%. These results are included in the very feasible criteria. If the average final score of expert and practitioner validation is carried out, a score of 91.06 is obtained. This score is included in the very feasible criteria. These results indicate that ethnomathematics-based textbooks through *Sego Boranan's* buying and selling activities to develop students' problem-solving abilities on social arithmetic material are feasible to implement in mathematics learning at the end of expert and practitioner validation, obtaining a score of 91.06%. This score is included in the very feasible criteria. These results indicate that ethnomathematics-based textbooks through *Sego Boranan's* buying and selling activities to develop students' problem-solving abilities in social arithmetic material are feasible to implement in learning mathematics.

Before textbooks can be implemented in mathematics learning, it is necessary to carry out development trials. Development trials are carried out to obtain input in the form of responses and comments so that an effective textbook can be obtained. This development trial was aimed at 5 students in the 8^{th} grade as targets for using textbooks. However, before carrying out the development trial, 5 students in the 7^{th} grade conducted a readability test first. The readability test was carried out with the aim of testing whether the textbooks were easy to understand or not. The readability test was carried out by giving an assessment sheet consisting of 10 assessment items and an assessment score given on a Likert scale, where a score of 4 means very good, a score of 3 means good, a score of 2 means not good, and a score of 1 means very bad. The results of the readability test are presented in Table 8, while the student response data is presented in Table 9 below.

Table 8. Readability assessment data

Aspect	Max Score	S1	S2	S3	S4	S5
Score	40	40	38	40	39	39
Final Score	100%	100%	95%	100%	97.5%	97.5%
Mean	98%					
Criteria	Easy to Understand					

Based on the results form Table 8, the average readability test result by 5 students in the 8^{th} grade was 98%. These results are included in the easy-to-understand criteria, thus indicating that ethnomathematics-based textbooks through *Sego Boranan's* buying and selling activities to develop students' problem-solving abilities on social arithmetic material are easy to understand in terms of readability.

Based on the results form Table 9, an average final score of 97% was obtained. Furthermore, students' responses qualitatively are used as improvements to maximize the quality of ethnomathematics-based textbooks through *Sego Boranan's* buying and selling activities to develop students' problem-solving abilities on social arithmetic material. Figure 2 presents several views of the products that have been developed

Table 9. Student response data

Aspect	Score	Final Score	Responses
S1	20	100%	The language used is easy to understand and attractive in appearance.
S2	20	100%	The textbook is interesting because there are pictures.
S3	18	90%	The textbook is easy to understand and the questions are interesting.
S4	19	95%	The questions in the textbook are easy to understand and the language used is also easy to understand.
S5	20	100	The textbook is interesting because there are pictures related to the material.
Mean	19.4	97%	
Criteria		Very Good	

Figure 2. Display of teaching materials

The development of problem-based learning ethnomathematics-based textbooks through *Sego Boranan's* buying and selling activities to develop students' problem-solving abilities in social arithmetic material is a solution to making mathematics learning more meaningful by integrating the surrounding culture in mathematics learning. As it is known, meaningful learning is associating new information with concepts that are relevant to students' lives in their cognitive structure (Ausubel, 1963). Thus, Ethnomathematics can be used as an effort to integrate the context of everyday life into learning mathematics (Prahmana & D'Ambrosio, 2020). This provides the possibility to improve student learning outcomes through meaningful mathematics learning, in another sense linking mathematics in the classroom with aspects of student culture (Risdiyanti & Prahmana, 2014).

The process of developing this textbook goes through several steps starting with the define stage, then the design stage, and finally the develop stage. Thus, textbooks will be obtained that are feasible to implement. The define stage starts with the initial analysis, student analysis, concept analysis, task analysis, and specifying instructional objectives that will provide certainty about the needs of students integrated with the quality of the national education content standards, which are presented in learning outcomes for assessment and learning objectives for the learning process. The design stage includes several activities, namely the constructing criterion-referenced tests, media selection, format selection, and initial design, which is a follow-up to the define stage. So, the prototype of problem-based learning ethnomathematics-based textbooks through *Sego Boranan's* buying and selling activities on social arithmetic material is ready to be tested and implemented in school. The final stage of this research is the develop stage, which includes expert appraisal activities with revisions and developmental testing.

The ethnomathematics-based textbook that we have developed has passed validation tests by several experts and practitioners. So, it can be concluded that the problem-based learning ethnomathematics-based textbook related to *Sego Boranan's* buying and selling activities on social arithmetic material is in accordance with the learning outcomes used. The feasibility test provides certainty about the quality of the textbooks that have been developed. The assessment aspects that are assessed in this textbook are aspects of content feasibility, presentation feasibility, and linguistic feasibility. From the results of the feasibility test above, it can be concluded that the textbooks we have developed are very feasible to implement in mathematics learning in classes related to arithmetic material for 7^{th} grade.

Readability validation studies are carried out to obtain teaching materials that are ready to be used in class when learning mathematics. This aspect of assessing readability includes several aspects consisting of (1) the use of language that is easy to understand; (2) the use of the form and size of the writing used to make it easier to understand the material; (3) determining the width of the spacing used to facilitate reading; (4) mistakes in writing books; (5) use of graphs/tables in books; (6) presentation of books that are interesting and appropriate to the material and age of the readers; (7) the writing style used; (8) density of ideas and information in books; (9) the use of standard Indonesian grammar; and (10) systematic presentation of material so as to facilitate understanding of mathematical material. From the results of the readability test, it can be concluded that this textbook is easy for students to understand and also gets a positive response from students. With this textbook, it is hoped that it can help students understand social arithmetic material in *Sego Boranan's* buying and selling activities so that it can improve students' problem-solving abilities.

Exploration studies related to social arithmetic material with ethnomathematics studies have also been carried out by several researchers. One of them is research conducted by Asnawi & Susanti (2020) related to Solving Mathematical Problems (Social Arithmetic) Using the Marosok Tradition. The findings from this study are related to the Marosok tradition carried out by sellers and buyers using sarongs, hats, or towels. This buying and selling uses symbols that have meaning with the sale and purchase agreement through nods and greetings indicating an agreement. From the activity of solving questions that contain knowledge of how to carry out the Marosok tradition, students can at least get to know the existing traditions and can practice them in the world of education, especially problem solving in social arithmetic learning such as selling prices, buying prices, profit and loss, and others using an ethnomathematics approach. By implementing culture in learning mathematics, students can understand mathematics easily and become aware of the relationship between culture and learning mathematics.

Ethnomathematics itself provides its own nuances for solving student problems. The nuances of ethnomathematics, which are the implementation of contextual learning, provide opportunities for students to be able to process and use mathematical ideas and concepts related to student experiences to solve problems independently (Masruroh *et al.*, 2022). Students feel directly involved in the learning process, considering the integration of culture in the classroom (Cahyadi *et al.*, 2020). Astuningtyas, Wulandari, & Farahsanti (2017) stated that the ethnomathematics approach provides a higher problem-solving

ability score than lectures with a direct approach. Nur *et al.* (2020) added that ethnomathematics has an influence on problem-solving abilities. Furthermore, several studies mention the effectiveness of ethnomathematics on problem-solving abilities (Febrinasti, Rochmad, & Isnarto, 2021; Purwanti, Zaenuri, & Asikin, 2019). This success is none other than because Ethnomathematics provides meaningful learning for students, considering that student learning resources come from familiar environments (Saniyah & Ardiansyah, 2023).

Further studies related to the development of integrated Ethnomathematics teaching materials have been carried out by several researchers. Utami *et al.* (2018) in their research have developed an ethnomathematics-based e-module that is valid and has readability values that are easy to understand to improve students' problem-solving abilities. Another innovation was carried out by Suryawan & Sariyasa (2018) who integrated open-ended problem-based teaching materials with ethnomathematics. The results of its implementation show effectiveness in improving student achievement. Further innovation through an ethnomathematics-based digital flipbook module has been carried out by Fitrianawati & Setiyawati (2021). The results of this development show a very good category, both in the assessments of experts, teachers, and students. The development of other teaching materials integrated with ethnomathematics was carried out by Hidayah, Winarno, & Istiqlal (2022) through mathematical comics on the Instragram application. The results of this development state that the product is valid, practical, and effective for student learning outcomes. Several other researchers have integrated Ethnomathematics with the Problem-Based Learning model in their teaching materials. Karuna, Sari, & Ardiansyah (2023) have developed teaching materials integrated with problem-based learning and ethnomathematics nuances through the culinary exploration of salted eggs. The results state that the teaching material is ready to be implemented in class because it has good results of the due diligence, readability tests, and student responses. Another innovation was carried out by Ardiansyah, Safitri, & Oktaviani (2023) by developing social arithmetic teaching materials through Dumbeg buying and selling activities. The results of the development stated that the feasibility assessment by experts and teachers, the readability assessment, and very good student responses were achieved, so that the product could be implemented in the classroom. This innovation confirms that the integration of ethnomathematics in teaching materials, either directly with learning models and based on ICT, has a positive impact on achieving students' problem-solving abilities.

CONCLUSION

The development of ethnomathematics-based textbooks through *Sego Boranan's* buying and selling activities to develop students' problem-solving abilities on social arithmetic material sounds feasible to be implemented in class. The application of ethnomathematics-based textbooks through *Sego Boranan's* buying and selling activities to develop students' problem-solving abilities in social arithmetic material provides opportunities for students to study and travel through the use of textbooks in class. A follow up research is needed to test the effectiveness of using the textbook on learning outcomes and students' problem-solving abilities in a much deeper understanding which element is the most critical to point when designing a textbook.

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