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Ethnomathematics Integrated Student Worksheet on Area Measurement Material Improves Elementary School Students' Creative Thinking Ability

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ABSTRAK

Permasalahan pada pembelajaran matematika yaitu rendahnya kemampuan berpikir kreatif. Siswa kurang mampu dalam menghasilkan ide-ide inovatif dalam mengatasi masalah-masalah baru. Tujuan dari penelitian ini adalah untuk mengembangkan lembar kerja peserta didik (LKPD) terintegrasi etnomatematika yang valid dan praktis. Jenis penelitian yang digunakan pada penelitian ini adalah penelitian pengembangan (Development Research). Model penelitian yang digunakan yaitu model Plomp yang membagi tahap pengembangan menjadi tiga fase, yaitu fase investigasi awal, fase pengembangan, dan fase penilaian. Subjek penelitian ini yaitu 1 ahli materi matematika, 1 ahli Bahasa Indonesia, dan 1 ahli seni serta 3 orang guru sebagai uji kepraktisan media. Subjek uji coba penelitian ini terdiri dari uji coba perorangan yang terdiri dari 3 siswa, uji coba kelompok kecil terdiri dari 9 orang siswa. Metode yang digunakan dalam mengumpulkan data yaiti observasi, wawancara, angket, dan tes. Instrumen yang digunakan untuk mengumpulkan data yaitu lembar kuesioner dan tes. Teknik analisis data dilakukan secara kualitatif dan kuantitatif, dan statistik inferensial. Hasil penelitian ini yaitu hasil validasi 3.63 dengan kategori sangat valid. Hasil praktalitas peserta didik 93.05 dengan kategori sangat praktis. Hasil praktikasiltas peserta didik 96.04 dengan kategori sangat praktis. Hasil uji-t menunjukan terdapat pengaruh LKPD Terintegrasi Etnomatematika pada Materi Pengukuran Luas terhadap kemampuan berpikir kreatif pada siswa. Disimpulkan bahwa LKPD terintegrasi etnomatematika pada materi pengukuran luas data sangat valid dan sangat praktis sehingga layak digunakan dalam pembelajaran di kelas IV sekolah dasar.

ABSTRACT

The problem in learning mathematics is the low ability to think creatively. Students are less able to produce innovative ideas to overcome new problems. This research aims to develop a valid and practical integrated ethnomathematics student worksheet. The type of research used in this research is development research. The research model used is the Plomp model, which divides the development stage into three phases: the initial investigation, development, and assessment. The subjects of this research were one mathematics material expert, 1 Indonesian language expert, and one art expert, as well as three teachers as a test of media practicality. The trial subjects for this research consisted of individual trials consisting of 3 students and small group trials consisting of 9 students. The methods used to collect data are observation, interviews, questionnaires, and tests. The instruments used to collect data were questionnaires and tests. Data analysis techniques are carried out qualitatively and quantitatively, as well as inferential statistics. The results of this research are validation results of 3.63 with a very valid category. The students' practicality results were 93.05 in the very practical category. The students' practical results were 96.04 in the very practical category. The t-test results show an influence of the Ethnomathematics Integrated Student Worksheet on Extensive Measurement Material on students' creative thinking abilities. It was concluded that the Student Worksheet integrated Ethnomathematics in data area measurement material was very valid and very practical, so it was suitable for use in learning in the fourth grade of elementary school.

1. INTRODUCTION

Creativity is often considered a natural ability or talent possessed by smart people or people with a high IQ (R. K. Rahmawati, 2017). However, as science increases and modernization develops, many people believe that everyone and education can possess creativity, which has an important role in developing children's creativity, but as science increases. Modernization develops, and many people believe that everyone and education can possess creativity, which is important in developing children's creativity (A. Fatmawati et al., 2019; Putra et al., 2018; Wijayati et al., 2019). As time goes by, students should realize that the ability to think creatively is a characteristic of mathematics lessons. Creative abilities are needed in the 21st century so that students can face rapidly changing and complex developments (Lin & Wu, 2016; Y.

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Rahmawati et al., 2019; Wanelly & Fauzan, 2020). Creative thinking helps hone their ability to see problems from different points of view, create innovative solutions, and connect concepts (Rahmawati et al., 2019; Wahyudi et al., 2022; Widiana et al., 2023). It is what causes the importance of creative thinking skills in students so they can solve problems with creative solutions (Laura et al., 2022; Yang et al., 2018). It also encourages students to be able to find solutions to problems that arise in society because they are trained to think creatively (Nuswowati et al., 2017; Ratna Widianti Utami et al., 2020). The problem often faced in learning mathematics is the need for more ability to think creatively (Fitrianawati et al., 2020; Hagi & Mawardi, 2021). It shows that the ability to think creatively in Indonesia still needs to improve. Previous research stated that inappropriate learning models caused students' low ability to think creatively in the classroom (Suparmi, 2018; R. W. Utami et al., 2020). Other research also states that the lack of creative thinking skills is caused by a lack of learning media or learning resources for students (Almuharomah et al., 2019; Permana, 2018). One of the factors that causes very low mathematical creative thinking abilities is the use of learning tools that need to be more appropriate to the learning material and attract students' attention. Thus, students need more opportunities to convey ideas or express their creative thinking abilities. Students' low creative thinking abilities were also found at SD Negeri 09 Kampung Melayu and SD Negeri 16 Kampung Parit.

The results of interviews conducted with fourth-grade educators showed that elementary school students' creative thinking abilities were still limited. Students are less able to produce innovative ideas needed to overcome new problems. Sometimes, a learning atmosphere that is too structured and assessments that only emphasize the "right" answer can hinder elementary school students from exploring and experimenting with new ideas that may be unconventional. The impact of this learning on students is that students will experience difficulties when faced with existing problems. Learning tools in the form of student worksheets currently available in elementary schools still need to meet students' needs fully. The existing learning tools still need to be contextual and link learning to students' daily lives so that the mathematics learning that is carried out does not involve students.

Based on the problems above, students' creative thinking abilities still need attention. In creating meaningful learning and improving students' creative thinking abilities, a learning resource is needed to make students understand learning concepts better (Dahlan & Permatasari, 2018; Sari et al., 2020; Utami & Zanah, 2021). One teaching resource that can be used to improve students' creative thinking abilities is an Ethnomathematics-integrated student worksheet. Student Worksheets are learning aids that serve as a guide for students in carrying out investigative or problem-solving activities in learning (Aini & Fathoni, 2022; Pane et al., 2022; Pentury et al., 2019; F. A. Putri & Ananda, 2020). Apart from that, Student Worksheets are also teaching materials in the form of sheets that contain a summary of the material and instructions for assignments that refer to the basic competencies that will be achieved by students (Mawardi et al., 2020; Putri et al., 2022; Suryawati et al., 2020). The function of Student Worksheets is, first, as teaching materials that can minimize the role of educators, make it easier for students to understand the material, train students to learn in the form of assignments, and facilitate the implementation of learning (Hernita & Djamas, 2019; Tsani et al., 2019). Student worksheets that integrate Ethnomathematics can make it easier for students to learn.

Ethnomathematics is an approach where this approach can bridge the culture in students' daily environment with education, one of which is mathematics education (Dahlan & Permatasari, 2018; Suhartini & Martyanti, 2017). Ethnomathematics can provide a new nuance. Learning mathematics is not limited to just theory in the classroom. Connecting with the outside world by visiting or interacting with the local culture can be a medium for learning mathematics (Dahlan & Permatasari, 2018; Widiantari & Suparta, 2022). It is because the culture in students' daily environment is also developed from education, including mathematical thinking and ideas. The ethnomathematics approach is an approach to mathematics learning that places greater emphasis on how students can understand and develop mathematical concepts based on the culture that grows and develops in local communities (Ajmain et al., 2020; Diah Purnami Dewi et al., 2022; Widiantari & Suparta, 2022). Ethnomathematics is a learning strategy that links cultural elements in mathematics lessons (Chrissanti, 2019; Fauzi & Lu'luilmaknun, 2019). Ethnomathematics in social culture is related to mathematical concepts, such as the sine rule and cosine rule, the area and perimeter of squares, rectangles, parallelograms, and rhombuses, the surface area of cubes, prisms, pyramids, and cylinders, as well as sets so that they can be integrated into mathematics learning. Ethnomathematics can be integrated into learning adapted to mathematical concepts (Abi, 2016).

Previous research findings stated that the use of Student Worksheets can make it easier for students to learn so that they can improve student learning outcomes (Effendi et al., 2021; Gustin et al., 2020; Vivi Puspita & Dewi, 2021; Septian et al., 2019). Other research explains that the Ethnomathematics approach makes it easier for students to understand learning material and increases their learning motivation (Hayu et al., 2023; Mahendra, 2017; Ratriana et al., 2021). Using student worksheets that

integrate Ethnomathematics can make learning easier for students. However, there has yet to be a study regarding using student worksheets that integrate Ethnomathematics in mathematics learning for fourth-grade elementary school students. The advantage of the Ethnomathematics integrated student worksheet that will be developed is that it is a series of questions and information designed to understand complex ideas that guide students to carry out learning activities systematically. Student Worksheets can also guide students to discover their concepts by observing their environment, such as culture, because culture is very close to students and can be connected to mathematics learning, especially area measurement material. Based on this, this research aims to develop a valid and practical integrated ethnomathematics student worksheet.

2. METHOD

The type of research used in this research is development research. This research will develop a product in the form of a teaching module and student worksheet integrated with the Ethnomathematics of the traditional tete game. The research model used is the Plomp model, which divides the development stage into three phases: the initial investigation phase, the development or prototyping phase, and the assessment phase (Plomp & Nieveen, 2013). The research was conducted at SDN 02 Pasar Batukambing, SDN 16 Kampung Parit, and SDN 09 Kampung Melayu, Agam Regency. In the initial investigation phase (preliminary research), the activities carried out were collecting and analyzing information and reviewing the literature available in the field as a basis for developing learning tools in the form of Student Worksheets. This phase consists of several stages: needs analysis, curriculum analysis, concept analysis, and student analysis. In the development or prototyping phase, the activity carried out is creating a design for a Student Worksheet integrated with the Ethnomathematics of the traditional tete game based on the analysis carried out in the initial investigation phase with details of the activities in this phase, namely creating a Student Worksheet design, self-evaluation, expert assessment using a validation sheet. In the assessment phase, the activities determine whether the product made is practically in line with expectations in a real classroom setting.

The subjects of this research were two mathematics material experts, one Indonesian language expert, and one teacher. The trial subjects for this research consisted of individual trials consisting of three students and small group trials consisting of nine students. The methods used to collect data are observation, interviews, questionnaires, and tests. Observation and interview methods are used to discover problems in the field related to learning. The questionnaire method is used to collect data through assessment results given by experts, teachers, and students. The test method measures the effectiveness of students' integrated ethnomathematics worksheets. The instruments used to collect data were questionnaires and tests. The instrument grid is presented in Table 1 and Table 2.

Table 1. Grid of Teaching Module Aspects Validated by Experts

Rated aspect	Objective
Teaching module components Traditional game ethnomathematics integrated learning activities. Language and writing	To determine the content validity and construct validity of the designed traditional game ethnomathematics integrated teaching module

Table 2. One-to-One Evaluation Aspect Grid

No	Rated aspect	Objective
1 2 3	Material Learning Design Implementation	Looking at possible errors in the material, learning design, implementation, and technical quality or practicality of traditional game ethnomathematics integrated learning tools

Data analysis techniques are carried out qualitatively and quantitatively, as well as inferential statistics. This data analysis technique includes analysis at the preliminary or initial investigation phase, validity data analysis from experts, and practicality analysis through observation sheets and questionnaires. The activities carried out in this data analysis are reducing the data, presenting the data, and drawing conclusions. Inferential statistics are used to analyze product effectiveness. The effectiveness of a product is measured to see whether or not there is an effect or influence on students of the device being developed. The effectiveness test was conducted to determine whether the Student Worksheets could be used to achieve effective learning objectives in improving the quality of learning.

3. RESULT AND DISCUSSION

Result

This research aims to develop a valid and practical integrated ethnomathematics student worksheet. The research model used is the Plomp model, which divides the development stage into three phases: the initial investigation, development or prototyping, and assessment. First is the initial investigation phase (preliminary research). In this initial investigation phase, researchers analyzed three schools in Ampek Nagari District, Agam Regency: SD Negeri 09 Kampung Melayu, SD Negeri 16 Kampung Parit, and SD Negeri 02 Pasar Batukambing. The activities carried out are needs analysis, curriculum analysis, concept analysis, student analysis, and ethnomathematics analysis of the traditional tete game. The results of the needs analysis are that the teaching module has not stimulated students to be motivated in learning, the teaching module has steps that are still generally arranged and sometimes abstract, and the approach or method used is not by the steps contained in the teaching module, and has not The stages of students' creative thinking can be seen from the indicators and problems created by educators in the teaching module.

The mathematics student worksheets used in elementary schools are taken from textbooks, which only consist of questions, so they do not enable students to discover the concepts of mathematics being studied. They are less interested in the student worksheets used. Based on the results of interviews in the field with elementary school teachers in Ampek Nagari District, Agam Regency, it was concluded that mathematics learning was carried out by providing material by the teacher explaining it in front of the class and the students listening to the teacher explaining. The results of the curriculum analysis are that the curriculum objectives include four competencies, namely (1) spiritual attitude competency, (2) social attitude competency, (3) knowledge, and (4) skills. These competencies are achieved through intracurricular, co-curricular, and extracurricular learning processes. The analysis of student characteristics, namely class fourth grade students, in learning area measurements, showed that learning was carried out by the teacher explaining in front of the class and then giving assignments. This way of learning is not by the stages of cognitive development of students, where fourth-grade students are at the learning stage, which must start from concrete situations that are connected to the world that is close to students so that it influences the learning outcomes obtained by students. Apart from that, in teaching mathematics regarding area measurement material, teachers have never tried to connect this mathematical material with the culture close to students' daily lives, such as traditional games in West Sumatra.

Second, the development or prototyping phase. At this stage, a prototype of an integrated teaching module for the Ethnomathematics of the traditional tete game was designed. The integrated teaching module on Ethnomathematics of the traditional tete game is prepared in as much detail as possible and systematically so that it is easy for teachers to understand and implement at school. The researchers compiled this teaching module referring to the Minister of Education and Culture of the Republic of Indonesia Regulation number 16 of 2022. The following are the characteristics of an integrated teaching module on the Ethnomathematics of the traditional game tete. First, module identity. This module's identity includes the author's name, educational unit, year of preparation, school level, subject, class/semester phase/class, main material, and time allocation. Second, initial competence. Developing an integrated teaching module for tete games on broad measurement material requires a deep understanding of the initial competencies required by students. Before understanding the concept of measuring area, students need to have basic knowledge of measuring length, a basic understanding of rectangles, and mastery of basic calculation skills. This teaching module is designed to ensure that students have a solid foundation before entering the study of area measurement. Third, facilities and infrastructure. Determining the facilities and infrastructure for developing an integrated teaching module on the Ethnomathematics of the traditional tete game is a crucial step in ensuring the success of the learning process. Accessibility of facilities and infrastructure is important to ensure that all students, including those with special needs, can access teaching modules easily. The suitability of facilities and infrastructure with teaching materials, interactivity capabilities, availability of supporting materials, and evaluation and monitoring must also be considered in selecting and determining teaching module facilities and infrastructure. The results of the ethnomathematics-integrated student worksheet design are presented in Figure 1.

The Ethnomathematics Integrated Student Worksheet that has been designed then goes through the development stage. The cover design of this Student Worksheet reflects the integration of ethnomathematics concepts with the traditional game of tete as the main focus point. Through creative design touches, the illustrations depict the excitement and cultural values of the game, creating initial enthusiasm for students. The color imagery and design elements were carefully chosen to create a friendly, inviting atmosphere that simultaneously reflects the essence of mathematics learning that is fun and related to local wisdom. Student worksheet covers are designed using the Canva for Education application by containing various attractive colors identical to the animations students like. The type of writing used on

the cover of the Student Worksheet is dominated by Times New Roman and combined with Comic Sans MS. The student worksheet design consists of five student worksheets; one student worksheet is used at each meeting. Each Student Worksheet contains a meeting title designed using Arial letters with sizes 18 and 14 in brownish red and bold and contains illustrative images regarding area measurements so that the writing looks clear and attractive. The main aim of the student worksheet is to integrate Ethnomathematics with the traditional tete game while remaining focused on understanding mathematical concepts and cultural values and developing students' creative thinking abilities.

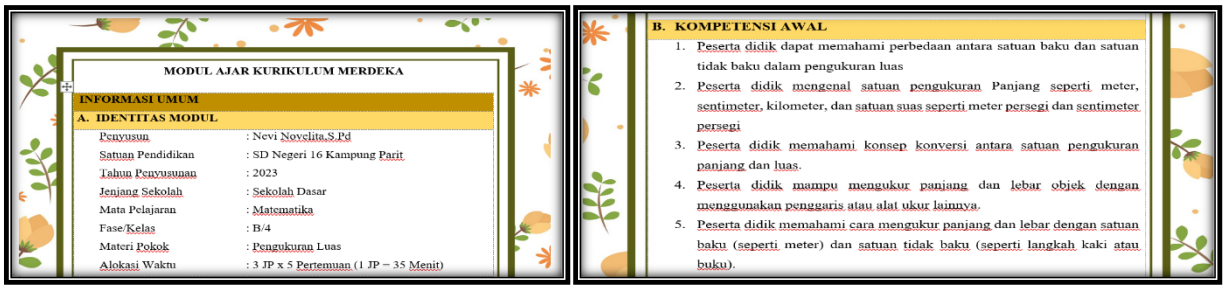

Figure 1. Design Results of the Ethnomathematics Integrated Student Worksheet

In creating student worksheets that integrate Ethnomathematics through the traditional tete game, this research emphasizes selecting tools and materials that make it easier to achieve learning objectives. The tools and materials selected are carefully designed to foster a holistic and immersive learning experience. Primarily, this research applies Tete game tools that are in harmony with the culture of the students' environment. This equipment serves as a mathematics teaching tool and a vehicle for understanding the cultural meaning embedded in the game. Learner Worksheet Instructions provide a step-by-step guide on how to play Tete, including game rules and applicable strategies. These instructions are prepared in clear and simple language, making it easier for students to understand and carry out learning activities. Apart from that, the Student Worksheet instructions are written using Arial font with size 12. The subtitles for the Student Worksheet instructions are written in size 16.

Instructions for Student Worksheets are useful for students in working on Student Worksheets, and students can find out the purpose of working on Student Worksheets. After understanding Ethnomathematics is emphasized, the next step in this Student Worksheet is to guide students through the steps of playing tete. Clear instructions are presented to explain the game's rules, strategic tactics, and how to measure the area associated with the game. This activity includes practical demonstrations, game simulations, and exercises that allow students to interact directly with the mathematical concepts contained in this traditional game. Furthermore, the activity steps in the Student Worksheet are designed to involve students in actively measuring areas. This activity involves using standard and non-standard unit measuring instruments, applying area measurement formulas, and analyzing measurement results. Students are also invited to reflect on how Ethnomathematics is reflected in each step of their area measurement. Finally, the activity steps include making joint conclusions, where students are asked to share their understanding of the mathematical concepts and cultural values integrated into the title game. This activity aims to strengthen students' understanding, encourage group discussions, and stimulate creative thinking skills regarding the relationship between traditional games, mathematics, and culture. The development of an integrated ethnomathematics student worksheet is presented in Figure 2

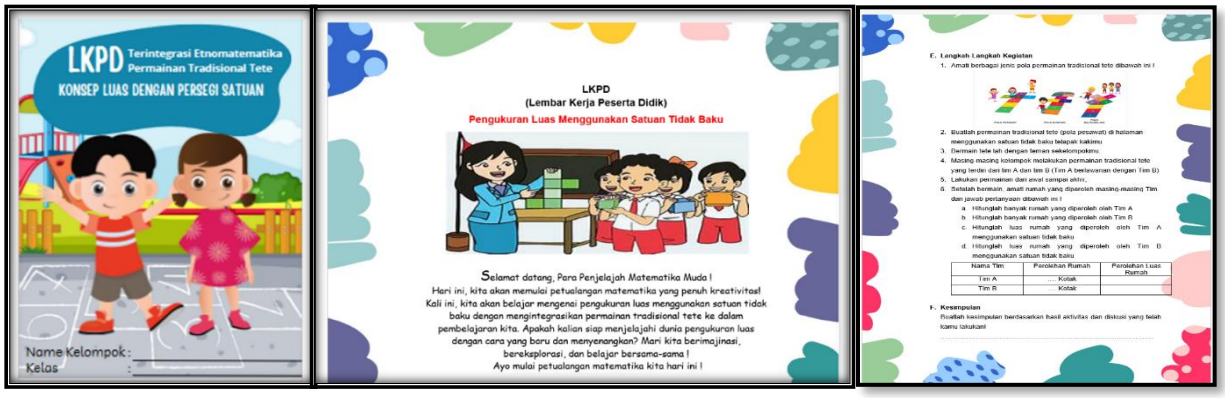

Figure 2. Results of the Development of an Integrated Ethnomathematics Student Worksheet

Third is the assessment phase. The Ethnomathematics Integrated Student Worksheet developed by experts, teachers, and students is validated in this phase. Based on the results of the development of the Student Worksheet, it integrates the Ethnomathematics of the traditional tete game into broad measurement material starting from creating the design of the Student Worksheet, validating the presentation and appropriateness of the content of the Student Worksheet, the language of the Student Worksheet, and the graphics of the Student Worksheet to subject matter expert in mathematics, Indonesian and arts. The assessment results are presented in Table 3.

Table 3. Validation Results From Experts and Students

Experts	Average Score	Description
First Mathematician	3.85	Very Valid
Second Mathematician	3.60	Very Valid
Indonesian Language Expert	3.52	Very Valid
Elementary school teacher	4.00	Very Valid
Individual Trial	94.06	
Small Group Trials	93.05	

The assessment result given by the first mathematician was 3.85, so the qualification was very valid. The assessment result given by the second mathematician was 3.60, so the qualification was very valid. The assessment results given by the Indonesian language expert were 3.52, so the qualification was very valid. The assessment results from elementary school teachers were 4.00, so the qualifications were very valid. Based on the validation results from experts, the Integrated Ethnomathematics Student Worksheet on Area Measurement Material is very valid and, therefore, suitable for learning. Next, the Ethnomathematics Integrated Student Worksheet will be tested for its practicality by students. The results of the individual trials obtained a score of 94.06, so you get a very practical qualification. The results of the small group trial were 93.05, so getting a very practical qualification. It was concluded that the Integrated Ethnomathematics Student Worksheet on Area Measurement Material is very practical. The Ethnomathematics Integrated Student Worksheet on Area Measurement Material was then tested for effectiveness using the T-test. The results of the data normality test obtained a value of 0.93 > 0.05, so the data was normally distributed. The homogeneity test result is 0.073, so 0.073 > 0.05, the data is homogeneous. Next, a t-test was carried out. The results of data analysis obtained a significance value of 0.000 so that 0.000 < 0.05. Based on these results, there is an influence of Ethnomathematics Integrated LKPD on Area Measurement Material on students' creative thinking abilities.

Discussion

The results of the data analysis show that the students' worksheets integrated with Ethnomathematics are valid and practical. It is caused by several factors, as follows. First, integrated with Ethnomathematics in broad measurement material, student worksheets can improve creative thinking abilities. Creative thinking is a cognitive ability to solve problems that allows someone to use (Rahmawati, 2017; Ratna Widianti Utami et al., 2020). This creative mathematical ability is one of the abilities that students must have because this ability has an important role in mathematical problems (Dewi et al., 2018; Khasanah et al., 2021; Purwasi & Fitriyana, 2020). In the learning process, students must have the ability to think creatively mathematically because students must be able to find solutions to existing problems to be solved with creative solutions (Khaerunnnisa & Pamungkas, 2019; Yanuarto & Setyaningsih, 2017). Ethnomathematics integrated student worksheets can improve students' creative thinking abilities. One of the higher-order thinking skills is the ability to think creatively, and Ethnomathematics has been proven to foster critical thinking skills through the culture around students (Chrissanti, 2019; Dahlan & Permatasari, 2018). Apart from that, the developed ethnomathematics-based student worksheet meets the criteria of being valid and practical, so it is suitable for use. Therefore, integrating ethnomathematics student worksheets can help improve students' creative thinking abilities in mathematics.

Second, the Ethnomathematics Integrated Student Worksheet on Area Measurement Material can improve students' understanding. One of the functions of teaching modules is to reduce the burden on educators in presenting content so that educators can have more time to become tutors and help students in the learning process (Kinanti et al., 2021; Purwasi & Fitriyana, 2020). Student understanding increases when students are provided with learning facilities such as teaching materials (Aini & Fathoni, 2022; Kudsiah et al., 2022; Sugiyanto et al., 2018). Previous research findings also state that using Student Worksheets can improve students' understanding of learning (Purwasi & Fitriyana, 2020; V. Puspita & Dewi, 2021; Rewatus et al., 2020). Student Worksheets integrated with Ethnomathematics in area measurement

material can improve students' understanding. One study shows that ethnomathematics-based student worksheets improve students' mathematical representation abilities. Therefore, using integrated ethnomathematics student worksheets in area measurement material can help improve students' understanding of these mathematical concepts.

Third, the Ethnomathematics Integrated Student Worksheet can increase students' enthusiasm for learning. Ethnomathematics integrated student worksheets can increase students' enthusiasm for learning. Valid Student Worksheets effectively increase student learning motivation (Andani & Maris, 2021; Pane et al., 2022; Pratama & Saregar, 2019). One of the functions of teaching modules is to reduce the burden on educators in presenting content so that educators can have more time to become tutors and help students in the learning process (Arianty et al., 2021; F. A. Putri & Ananda, 2020; Suryaningsih & Nurlita, 2021). Developing ethnomathematics-based student worksheets helps students understand and consider their needs and the characteristics of targets in learning. Therefore, integrated ethnomathematics student worksheets can increase students' enthusiasm for learning mathematics. Using Student Worksheets is important in learning because it can provide significant benefits (L. Fatmawati et al., 2021; Kudsiah et al., 2022).

Previous findings also confirm that the use of Student Worksheets can make it easier for students to learn so that they can improve student learning outcomes (Arianty et al., 2021; Wardani & Suniasih, 2022). Educators often use student worksheets, which are an important part of supporting learning (Purwasi & Fitriyana, 2020; V. Puspita & Dewi, 2021; Rewatus et al., 2020). Student Worksheets contain practice questions that aim to maximize students' abilities so that they can help in the learning process (Makhrus et al., 2018; Utomo, 2018). Therefore, using Student Worksheets in learning supports the teaching and learning process. The limitation of this research is that the Ethnomathematics Integrated Student Worksheet developed can only be used by fourth-grade elementary school students. The advantage of the developed Ethnomathematics Integrated Student Worksheet is that students are invited to solve problems and answer questions in their way actively. Using Student Worksheets makes students feel happy because they can express opinions and share information with their friends. This research implies that applying a Student Worksheet integrated with traditional game ethnomathematics on broad measurement increases students' learning activities and also influences students' creative thinking abilities.

4. CONCLUSION

The results of data analysis show that the students' worksheets integrated with Ethnomathematics are valid and practical as assessed by experts, teachers, and students. It was concluded that the Ethnomathematics integrated student worksheet was suitable for learning. Apart from that, the results of data analysis show that the integrated ethnomathematics student worksheet effectively improves students' creative thinking abilities. Using Student Worksheets makes students feel happy because they can express opinions and share information with their friends. This research implies that applying a Student Worksheet integrated with traditional game ethnomathematics on broad measurement increases students' learning activities and also influences students' creative thinking abilities.

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