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The Development of Problems for Minimum Competency Assessment Based on Ethnomathematics about Farmer Activities in Aceh Besar Regency

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Abstract

Minimum Competency Assessment or Asesmen Kompetensi Minimum (AKM) is used as a national assessment by involving several contexts in Indonesia; one of them is social culture. However, social cultural-based AKM problems, including ethnomathematics, are still limited. Therefore, efforts that can be carried out is designing ethnomathematics-based AKM problems related to farmers' activities. This study aimed to obtain problems for ethnomathematics-based AKM problems about farmer activities in one village, Aceh Besar Regency, Indonesia. This research is developmental research that was carried out through several stages, namely the preliminary, self-evaluation, prototyping, and the field test stages. In this case, the research subjects involved were 33 students of grade 8 at a junior high school in Aceh Besar. The data analysis technique used was the Aiken's V formula and the product moment correlation. The results obtained 10 problems for ethnomathematics-based AKM about farmer activities in Aceh Besar that achieved valid, practice, and had potential effects. The problems can be further used by mathematics teachers to improve the students' numeracy.

Keywords: AKM; Ethnomathematics, Problem Characteristics; Validation

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Abstrak

Asesmen Kompetensi Minimum (AKM) digunakan sebagai asesmen nasional yang melibatkan beberapa konteks, salah satunya sosial budaya. Namun soal AKM berbasis sosial budaya termasuk etnomatematika masih terbatas. Oleh karena itu, upaya yang dapat dilakukan yaitu merancang soal tipe AKM berbasis etnomatematika terkait aktivitas petani. Tujuan penelitian ini yaitu untuk memperoleh soal tipe AKM untuk kelas 8 berbasis etnomatematika terkait kegiatan petani di salah satu, Kabupaten Aceh Besar, Indonesia. Penelitian ini merupakan penelitian pengembangan dengan tahapan yaitu preliminary, self evaluation, prototyping, dan field test. Subjek penelitian ini yakni 33 siswa kelas 8 dari salah satu SMP di Aceh Besar. Teknik analisis data menggunakan formula Aiken's V dan uji korelasi product moment. Hasil penelitian berupa soal tipe AKM berbasis etnomatematika pada kegiatan petani di Aceh Besar sebanyak 10 soal yang valid, praktis, dan memiliki efek potensial. Soal tersebut dapat digunakan oleh guru matematika untuk meningkatkan numerasi siswa.

INTRODUCTION

In 2021, the implementation of the National Examination (NE) was changed to the National Assessment (NA). This is contained in the Regulation of Minister of Education, Culture, Research, and Technology No. 17 of 2021 issued on July 12, *2021,* related to the National Assessment (NA), stating that these activities are constructed to monitor and evaluate the primary and secondary school system. In this case, the skills and achievements of students are assessed by educators and units, not education (Kemdikbud, 2021).

Changes of assessment from National Examination (UN) into Asesmen Kompetensi Minimum (AKM) or Minimum Competency Assessment (MCA) is carried out by the Ministry of Education and Culture (Kemdikbud) as one of the efforts to improve the quality of education. In this case, AKM is the best method to serve the students' needs 1982). AKM tries to determine the minimum level that can be accepted by the learning achievement (Coates, 1994). In addition, AKM also becomes the basic or minimum competency assessment that is needed by the students to develop their self-capacity and positively participate in the society (Kemdikbud, 2020). There are three components in the National Assessments such as AKM Character Survey, and Learning Environment Survey (Pusat Asesmen dan Pembelajaran, 2021).

Reading literacy and numeracy of students are the benchmarks of the students' abilities, which are the objectives of the AKM instrument. AKM participants are all final year students who are respondents to the National Assessment from the fifth-grade elementary school, eighth grade junior high school, and eleventh grade high school classes. Thus, numeracy is one of the main focuses in improving the quality of Indonesian education, especially for better learning outcomes for students.

The components of reading literacy and numeracy contained in the AKM can be seen from three perspectives, namely: content, cognitive processes, and context. The aspects of the context of the numeration assessment in AKM cannot be separated from social and cultural aspects. *Education* is growing and providing many new colours in life. Innovations continue to emerge in the world of education *to* promote creativity and increase students' learning desires. This further affects math topics as well. Ethnomathematics-based mathematics learning is one of the innovations that have been designed to trigger the students' interest in learning mathematics. Ethnomathematics can be a bridge for mastering mathematics in students without leaving the cultural values they have (Lestari, 2019).

One of the relations between mathematics and tradition in an area can be seen in Aceh, which is better known as an area where *most* people work as farmers

and use mathematics in carrying out their routine work as farmers. One of the areas in Aceh where many people work as farmers is Montasik, Aceh Besar Regency.

Many people do not realize that mathematics exists in culture and everyday life, hence learning mathematics can be more meaningful for students by linking contextual problems in learning (Sari et al., 2020). The relationship between contextual problems and culture can be stated in learning problems for students such as the AKM problems.

This study developed an ethnomathematical-based AKM which was used to assess the ability of students to deal with real world math problems related to the local context. This research was also carried out to continue previous research that has been carried out by Yanti (2022).

Various studies on development for junior high school students have been carried out, such as research conducted by Harnita, Johar, Hasbi, and Sulastri (2021) who developed problems with a disaster context, in addition to Wulandari, Hajidin, and Duskri who developed HOTS problems on algebra, and Ina (2020) who developed the PISA model of math problems, and Khofifah (2021) who developed mathematics with the context of Covid-19 for junior high school students.

Ethnomathematics-based development research has also been carried out, by Sutarto, Muzaki, Hastuti, Fujiaturrahman, and Untu (2022) who developed an Ethnomathematics-Based e-Module to Improve Students' Metacognitive Ability in 3D Geometry Topic, and Umbara, Wahyudin, and Prabawanto (2021) who conducted research on ethnomathematics, in which the community practices the dimensions of necessary universal mathematical activities, such as counting, placing, and explaining. Based on ethnomodeling, mathematical ideas and practices carried out are relevant to the concepts of enumeration, integer operations, sets, relations, congruence, and modulo.

Many attempts have been made to construct ethnomathematics-based problems in previous studies, but they have not met the characteristics of problems that are equivalent to AKM problems. This is also because the AKM just has been implemented since 2021 so that the AKM context is still new in education and further exploration is needed to achieve the expected AKM goals.

AKM is carried out to obtain information regarding the competency expected by the students (Kemdikbud, 2020). Teachers can use this competency assessment to develop an effective and qualified learning strategy. In addition, AKM is designed to produce information that can trigger the improvement of learning and teaching quality, that eventually can improve the students' learning achievement (Purnomo, Sa'adijah, Hidayanto, Sisworo, Permadi, & Anwar, 2022). Furthermore, teacher also claimed that ethnomathematical approach supports the students in improving their self-concept, improving their high-order thinking skill, as well as, making the material easier to understand (Fouze & Amit, 2018b; Utami et al., 2019).

Therefore, this study aimed to obtain AKM-based numeration problems for 8th grade on farmer activities in Montasik District, Aceh Besar Regency which meet the characteristics of valid problems and have potential effects. In this case, the research problems raised in this study are: 1) what are the valid characteristics of the AKM numeration problems for the 8th grade based on ethnomathematics in farmer activities in, Aceh Besar Regency? 2) what is the potential effect on numeracy problems of the AKM for 8th grade based on ethnomathematics on farmer activities in Aceh Besar Regency?

METHOD

The research was carried out through a *Research and Development* method, which is a systematic study in designing, developing, and evaluating a process, program, and product of teaching, that meet the criteria of validity, practicality, and effectiveness (van den Akker & Plomp, 1993; Seels & Richey, 1994; van den Akker,1999). The developmental model applied in this research is developmental research proposed by Tessmer (1993) which consists of two stages: the preliminary stage and the formative evaluation stage which consists of self-evaluation, prototyping (expert review, one-to-one, and small group), and field tests. The stages of development of Tessmer (1993) can be seen in the following Figure 1.

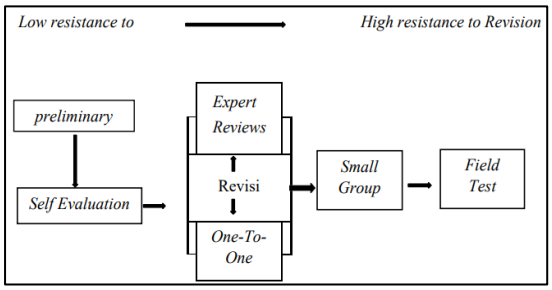

Figure 1 Tessmer Development Stages (1993)

This research was conducted at a junior high school in Montasik, Aceh Besar Regency, Indonesia involving 3 people at the one-to-one stage, 6 people at the small group stage, and 24 people at the field test stage.

The first stage is preliminary by conducting analysis (curriculum and materials) and literature studies on research development of mathematics problems with certain contexts, as well as determining the research schedule and procedures for collaboration with subject teachers at the school.

After carrying out the preliminary stage, the self-evaluation stage was carried out. The self-evaluation stage is the process of developing teaching materials that can be evaluated. At this stage, ethnomathematical-based for AKM-based problems were designed for the 8th grade. Problem development was carried out by paying attention to three main things, namely content, construction, and language. The result of the design is referred to as prototype I.

Furthermore, in the second stage, namely expert review, prototype I was submitted to the validators or experts with the aim of validating the problems. This was done to examine the quality of instrument, which is to ask for experts or validator to conduct an assessment (Sireci, 1998). The validators involved in this study consisted of 3 people who were lecturers and teachers who had experience in developing contextual learning tools and understanding ethnomathematical concepts. The validator provided comments and suggestions on prototype I. After that, revisions were made to prototype I by considering input from the validator. The validator also provided scores and comments/suggestions on the validation sheet that has been provided.

Validity explains the level of goodness of the data collected, covering the real research area (Ghauri & Gronhaug, 2005). In addition, validity refers to assessing whether the element of the instrument is correct, relevant, reasonable, not ambiguous, and clear (Oluwatayo, 2012). The validity of the problems was measured by considering three aspects, namely the content, the construct, and the linguistic aspects. The results of the validator's assessment were analyzed using the Aiken's V formula. The problems are considered valid if the analysis results meet $0.667 \leq Va \leq 1$. The validity test on the ethnomathematics-based AKM problems

Table 1. Characteristics of Problems adapted from Lestari (2019) and Lewy, Zulkardi, & Aisyah (2009)

Content Aspect	Construct Aspect	Linguistic Aspect
Based on the aspect of content, the items developed include: Conformity with K13 basic competence (Revised 2017) Suitability of learning indicators Compatibility with education level Relevant to the ethnomathematics context in accordance with everyday life	Based on the aspect of the construct, the items developed include: Conformity between the construction rules of the problems and the form of the problem Clarity of the material on the problem Consistent font type and size Conformity between text and illustrations (such as pictures, tables, graphs, and diagrams) are presented clearly	Based on the language aspect, each problem developed includes: Good and correct use of Indonesian language Problems that are not convoluted Unambiguous Using spelling and punctuation marks in accordance with PUEBI (General Guidelines for Indonesian Spelling) Using language and terms that can be easily understood by students

that were developed have met the characteristics of the problems shown in Table 1.

The small group stage is to test the practicality of AKM problems involving six students. This stage produced prototype II and III, which were based on the students' feedback and ideas. In addition, prototype III was obtained during the field trial phase. This stage aimed to analyze the empirical validity and potential effect toward AKM problems.

The analysis of the empirical validity of the problems was carried out using the product moment correlation which was adapted from (Widoyoko, 2012). According to Widoyoko (2012), the instrument is considered valid if $r_{count} \geq r_{table}$ with a significant value = 0.05, and conversely the instrument is considered invalid if $r_{count} \leq r_{table}$. The interpretation of the magnitude of the correlation coefficient is presented in Table 2.

Table 2. Category of Empirical Validity

Coefficient	Category
0.800 ≥ 1.00	Very High
0.600 ≥ 0.800	High
0.400 ≥ 0.600	Medium
0.200 ≥ 0.400	Low
0.00 ≥ 0.200	Very Low

(Arikunto, 2019)

Potencial effect was analysed based on students' response rtoward AKM problems using questionnaire. According to Khabibah (2006) and Kiswanto (2012), students' responses are positive if 70 percent or more of each indication is in the happy, new, and interested categories. The detail categories as shown in Table 3.

Table 3. Students' Response Criteria

Interval	Category
$85\% \leq RS_{media}$	Very Positive
$70\% \leq RS_{media} < 85\%$	Positive
$50\% \leq RS_{media} < 70\%$	Less Positive
$RS_{media} < 50\%$	Not Positive

(Khabibah in Kiswanto, 2012)

Table 2 shown most of students' response was positive. It concluded that the AKM problems have a potential effect.

RESULTS AND DICUSSION

The results of this study were AKM problems for the 8th grade based on ethnomathematics on farmer activities in Montasik District, Aceh Besar Regency. The design of problem was conducted to see the conformity between problems indicator with ethnomatematical context and the cognitive level on AKM, including *knowing*, *applying*, and *reasoning*.

The development of the problems was conducted through stages in accordance with Tessmer (1993) namely the preliminary and formative evaluation stages. The set of problems that have been developed consists of ten problems that have potential effects and met the characteristics of valid problems in accordance with the expected valid criteria.

Some of the development of ethnomathematics-based problems that have been carried out by previous researchers where there were no problems developed for the implementation of AKM. This is also because the AKM just has been implemented since 2021 so the AKM context is still new in education and further exploration of problems is needed to achieve the expected AKM goals. Thus, in this study the researchers concluded that it was necessary to develop ethnomathematics-based AKM problems for junior high school students to see the characteristics of valid problems that refer to students' mathematical reasoning abilities.

In the preliminary stage, the curriculum was analyzed to determine that the socio-cultural context, especially ethnomathematics is an important element that must be integrated optimally. Students' cultural values that are related to education must be integrated into learning process and established as a basic in developing the learning because social cultural is not only important for the humanity, but also for mathematics and science subjects (Simamora, Saragih & Siratuddin, 2019). Besides that, the socio-cultural context has not been fully included in the curriculum other than the content given by the teacher personally. In addition, material analysis was also carried out so that at this stage it was decided to take the material on numbers, geometry and measurements, algebra, data, and uncertainty which became the material domain in AKM numeration. The conclusion obtained at the preliminary stage is that it is necessary to develop an ethnomathematics-based AKM numeration problems. In addition, further exploration of problems related to the socio-cultural context is necessary.

The self-evaluation stage produced a set of numeration problems of the AKM for the 8th grade and the answer key with an ethnomathematical-based socio-cultural context on farmer activities in Montasik District, Aceh Besar Regency (prototype I) obtained ten problems. These problems consist of 5 problems on algebraic material (ratio & proportion and pattern numbers), 3 problems on geometry and measurement (flat shape and space), 1 problem on data and uncertainty (data and their representations), and 1 problem on a mixture of numbers with geometry and measurements (number operations and measurements).

The problems developed have been validated by the validator at the expert review stage and were declared valid entirely in terms of content, construct, and linguistic aspects. The validity of a problem can be seen based on the theoretical validity that must be met, such as content validity and construct validity (Arikunto, 2019). The results at the expert review stage are in line with research by Khofifah (2021), namely problems that are valid and feasible to use are problems that meet the content and construct aspects carried out by experts. This is in line with other research conducted by Harnita et al (2021) which stated that valid items are items that cover both content and construct aspects. At this stage, prototype I underwent revision on problems number 1 to number 7 as well as the stimulus problems to produce prototype II. Problems number 8, number 9, and number 10 did not undergo revision because according to the validator the three problems were

Table 4. The stimulus revision process for problems number 1 and 2 and problem number 1

Validator Comments	Revision Decision
In the Stimulus problem and problem number 1, the sentence "normal prices (before discounts) and discounts at shops in several villages" should be replaced with "normal prices (before discounts) and discounts in several villages" because the table does not contain information related to shop. In addition, the writing of Rp must not have a dot.	The researcher deleted the word shop and changed the sentence on Stimulus problem and problem number 1 to "normal price (before discount) and discount in several villages". The researcher also revised the correct writing of Rp according to PUEBI.

included in the very good category from the content aspect, the construct aspect, and the linguistic aspect. The process and results of the validation of several problems are as follows.

Problem Prototype I

One of the farming activities in Montasik District, Aceh Besar Regency carried out by the community is the provision of fertilizer. The following table shows a list of normal prices (before discount) and in-store discounts in several villages. All villages sell the same type of fertilizer.

Village	Discount			Unit Price (*sak*)		
	Urea Fertilizer	ZA Fertilizer	NPK-subsidi Fertilizer	Urea Fertilizer	ZA Fertilizer	NPK-subsidi Fertilizer
Weu Krueng	25%	10%	15%	IDR 150,000	IDR 120,000	IDR 160,000
Alue	20%	15%	10%	IDR 150,000	IDR 120,000	IDR 160,000
Warabo	15%	20%	25%	IDR 150,000	IDR 120,000	IDR 160,000
Seumet	10%	25%	20%	IDR 150,000	IDR 120,000	IDR 160,000

Source: Yanti (2022)

Pak Umar wants to buy each type of fertilizer per 1 *sak* at a shop in the same village. In order to get the cheapest price, the village that Pak Umar must visit to shop is...

a. Weu Krueng
b. Alue
c. Warabo
d. Seumet

Problem Prototype I after revision

One of the farming activities in Montasik District, Aceh Besar Regency carried out by the community is the provision of fertilizer. The following table shows a list of normal (before discount) and discount prices in several villages. All villages sell the same type of fertilizer.

Village	Discount			Unit Price (*sak*)		
	Urea Fertilizer	ZA Fertilizer	NPK-subsidized Fertilizer	Urea Fertilizer	ZA Fertilizer	NPK-subsidized Fertilizer
Weu Krueng	25%	10%	15%	IDR150.000,00	IDR120.000,00	IDR160.000,00
Alue	20%	15%	10%	IDR150.000,00	IDR120.000,00	IDR160.000,00
Warabo	15%	20%	25%	IDR150.000,00	IDR120.000,00	IDR160.000,00
Seumet	10%	25%	20%	IDR150.000,00	IDR120.000,00	IDR160.000,00

Source: Yanti (2022)

Pak Umar wants to buy each type of fertilizer per 1 *sak* in the same village. In order to get the cheapest price, the village that Pak Umar must visit to shop is...

a. Weu Krueng
b. Alue
c. Warabo
d. Seumet

Table 5. Revision process for problem number 2

Validator Comments	Revision Decision
In problem number 2, the sentence "the price of 1 *sak* of urea after the discount is the cheapest in Weu Krueng village" should be replaced with "the cheapest price of 1 sak of urea after the discount is in the village of Weu Krueng".	The researcher replaces the sentences according to what is suggested by the validator.

Problem Prototype I

The following statements relate to the purchase of fertilizer in Weu Krueng village. Put a tick (√) on each correct statement!

- ☐ Buying 3 *saks* of urea fertilizer in Weu Krueng village at a normal price is the same as buying 4 *saks* of urea fertilizer at a discount.
- ☐ The price of 1 *sak* of urea fertilizer after the discount in Weu Krueng village is the cheapest, as well as the price of 1 *sak* of ZA fertilizer and 1 bag of subsidized NPK fertilizer after the discount.
- ☐ The discount on the purchase of 2 *saks* of urea fertilizer in Weu Krueng village and 2 *saks* of ZA fertilizer is the same as the price of 1 bag of urea after the discount in the same village.

Problem Prototype I after revision

The following statements are related to the purchase of fertilizer in Weu Krueng village. Put a tick (√) on each correct statement!

- ☐ Buying 3 *saks* of urea fertilizer in Weu Krueng village at normal price is the same as buying 4 *saks* of urea fertilizer at a discount.
- ☐ The cheapest price for 1 *sak* of urea after the discount is in Weu Krueng village, as well as the price of 1 *sak* of ZA fertilizer and 1 bag of subsidized NPK fertilizer after the discount.
- ☐ The discount on the purchase of 2 *saks* of urea fertilizer in Weu Krueng village and 2 *saks* of ZA fertilizer is the same as the price of 1 bag of urea after the discount in the same village.

Changes on sentences were also carried out in the problems revision so that the sentence became more communicative and were not ambiguous. Ambiguous sentence has more than one meaning, hence causing unclearity. In order that the sentences constructed can be accpeted well, the sentence must use Indonesian language that are good, correct, standard, and in accordance with the PUEBI (Riswati, 2015).

Table 6. Revision process for problem number 5

Validator Comments	Revision Decision
In problem number 5, some punctuation marks should be paid more attention, such as the sentence "to fence the land is too long" should be given a period (.) and then followed by the following sentence, and so on.	The researcher revised some punctuation marks that were considered inappropriate in sentences.

Problem Prototype I

A farmer will fence his nursery in the form of a square with an area of p^2 m^2, but the net available to fence the land is too long so the farmer changes the shape and size of his nursery. If the length of the nursery is extended by 8 m and the width of the nursery is reduced by 3 m. What is the area of the new nursery area?

Problem Prototype I after revision

A farmer will fence his nursery in the form of a square with an area of p^2 m^2, but the net available to fence the land is too long. So, farmers change the shape and size of their nursery. If the length of the nursery is extended by 8 m and the width of the nursery is reduced by 3 m, what is the area of the new nursery?

The results of the validity score of the problems from experts is shown on Table 7.

Table 7. The Score of Validation from Validators or Experts

Assessment Aspect	Score			Analysis Process						
	Va-1	Va-2	Va-3	S1	S2	S3	ΣS	n(c-1)	CV1	Criteria
S (1)	5	5	4	4	4	3	11	12	0.9167	Valid
S (2)	5	5	4	4	4	3	11	12	0.9167	Valid
S (3)	4	5	5	3	4	4	11	12	0.9167	Valid
S (4)	5	5	4	4	4	3	11	12	0.9167	Valid
S (5)	4	5	4	3	4	3	10	12	0.8333	Valid
S (6)	4	5	3	3	4	2	9	12	0.75	Valid
S (7)	5	5	4	4	4	3	11	12	0.9167	Valid
S (8)	4	5	4	3	4	3	10	12	0.8333	Valid
S (9)	5	5	4	4	4	3	11	12	0.9167	Valid
S (10)	5	5	5	4	4	4	12	12	1	Valid
S (11)	4	5	4	3	4	3	10	12	0.8333	Valid
S (12)	5	4	4	4	3	3	10	12	0.8333	Valid
S (13)	4	4	5	3	3	4	10	12	0.8333	Valid
S (14)	4	5	5	3	4	4	11	12	0.9167	Valid
S (15)	4	5	4	3	4	3	10	12	0.8333	Valid
S (16)	5	5	5	4	4	4	12	12	1	Valid
S (17)	4	5	4	3	4	3	10	12	0.8333	Valid
S (18)	5	5	5	4	4	4	12	12	1	Valid

(Description: S = statement)

Furthermore, based on the results of student answers and student comments at the one-to-one stage and the small group stage (prototype III), it was stated that students had understood the problems developed. Thus, the problems have been read and can be understood by students. In line with the research conducted by Kamid et al, (2021) which measured the practicality of the problems through the ability of students to understand the problems, it was easy to read and understand, and the context used was recognized by students. In one-to-one and small group, students solve the problems completely as seen on Figure 2.

Prototype III was tested on 24 students in grade 8 in a junior high school in Montasik. The field test was conducted on the grounds of analyzing the empirical validity and potential effect of the problems through the results of the students' scores. The empirical validity (r_{xy}) of the developed problems resulted in an average value of $r_{xy} > r_{table}$ with a significant level of 5%, where r_{table} is 0.404. The results of the empirical validity of the problems can be seen in Table 8.

Table 8. The Empirical Validity of Problems

No.	r_{xy}	$r_{tabel} = 0{,}404$	Conclusion
1.	0.667	$r_{xy} > r_{tabel}$	Valid
2.	0.417	$r_{xy} > r_{tabel}$	Valid
3.	0.662	$r_{xy} > r_{tabel}$	Valid
4.	0.492	$r_{xy} > r_{tabel}$	Valid
5.	0.825	$r_{xy} > r_{tabel}$	Valid
6.	0.503	$r_{xy} > r_{tabel}$	Valid
7.	0.435	$r_{xy} > r_{tabel}$	Valid
8.	0.466	$r_{xy} > r_{tabel}$	Valid
9.	0.566	$r_{xy} > r_{tabel}$	Valid
10.	0.695	$r_{xy} > r_{tabel}$	Valid

Based on Table 8, it is concluded that, all problems have met the valid criteria. This is in line with research conducted by Khofifah (2021) who developed problems and each item was declared valid, that ethnomatematics-based questions are important to be developed. There is a change on the students' perspectives concerning the mathematical relationship with the real and cultural situation around

RICE NURSERY

Look at the picture of the land for rice nurseries. Landforms can be square as well rectangles. A farmer will fence off his square-shaped nursery with an area of p^2 m^2, however nets are available to fence the land is too long. Therefore, the farmer changed the shape and size of the land his nursery. If the length of the nursery is extended by 8 m and the width of the nursery minus 3 m, what is the area of the land new nursery?

Students' Answer:

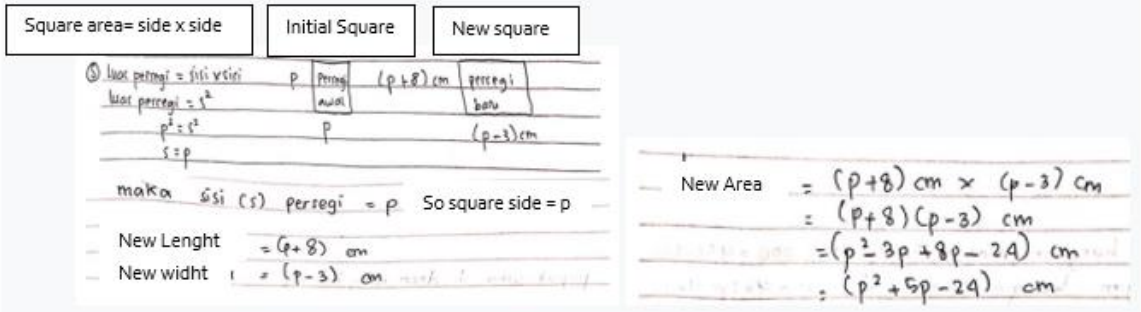

Figure 2. Problem 5 about rice nursery problem and students' answer

the students after learning mathematics using ethnomathematics exploration. This can further improve the students' comprehension and cause the students to think that the mathematics subject they learnt is meaningful (Prahmana & D'Ambrosio, 2020). Furthermore, students are also happier because they can solve the mathematics problems closer to their real world (Purwanti, 2012).

This study also analyzed the students' response questionnaires given at the field test stage as additional information about the potential effect on student interest in using the developed AKM problems. Questionnaire is a tool used to collect data by asking respondents to provide written answers to statements that have been given by users (Widoyoko, 2012). The results of students' response to questionnaire can be seen in Table 9.

Table 9. Students' Response to Questionnaire Results

No	Aspects	Responses		Category
1.	What do you think of the components:	New	Not New	
	a. The AKM has a socio-cultural context in farmer activities in Montasik District, Aceh Besar Regency given	100%	-	Very Positive
	b. The material presented in the AKM has a socio-cultural context in farmer activities in Montasik District, Aceh Besar Regency	75%	25%	Positive

No	Aspects	Responses		Category
	c. The socio-cultural context presented in the AKM problems is the activities of farmers in Montasik District, Aceh Besar Regency	70.83%	29.17%	Positive
	d. The form of the problems presented in the AKM has a socio-cultural context in farmer activities in Montasik District, Aceh Besar Regency	75%	25%	Positive
	e. The contextual problem presented in the AKM has a socio-cultural context in farmer activities in Montasik District, Aceh Besar Regency	70.83%	29.17%	Positive
2.	What do you think about the problems?	Yes	No	
	a. Is the socio-cultural context presented relevant to your previous knowledge?	70.83%	29.1%	Positive
	b. Are the problems related to everyday life?	87.5%	12.5%	Very Positive
	c. Is the supporting information in the problems, such as pictures, graphs, tables, diagrams, presented clearly?	87.5%	12.5%	Very Positive
	d. Is the writing of the type and size of the letters in the problem consistent?	95.8%	4.2%	Very Positive
	e. Are the instructions on how to answer the problems clearly written?	87.5%	12.5%	Very Positive
	f. Can you understand the use of language in each sentence in the problem well?	95.8%	2.2%	Very Positive
	g. Does the socio-cultural context make learning and taking tests such as the AKM less boring?	75%	25%	Positive
	h. Does socio-cultural context encourage you to explore more about the culture in your area	75%	25%	Positive
	i. Do you like the idea of a Minimum Competency Assessment that is being implemented in education in Indonesia today?	87.5%	12.5%	Very Positive
3	Are you interested in participating in other AKM activities with a socio-cultural context?	Interested	Not Interested	
		87.5%	12.5%	Very Positive

Based on the results of the questionnaire analysis presented in the Table, 8 aspects of the assessment measured in the questionnaire are in the very positive category ($85\% \leq RS_{media}$) and 7 other aspects of the assessment are in the positive category ($70\% < RS_{media} < 85\%$). The quality of product is determined by the students, where the students appreciated the product and have willingness to use them (Nieveen, 1999).

The results of the questionnaire showed that the ethnomathematics-based AKM problems on farmer activities in Montasik District, Aceh Besar Regency are considered to have a potential effect which refers to the interest of students in the problems because more than 70% of students respond with new, happy, and interested larger than the problem being developed. In this case, High school students like to study through props that connect geometry and culture (Verner, Massarwe & Bshouty, 2019).

Based on the results of ethnomatematics-based AKM problems development on farmers' activities in Aceh Besar Regency, it obtained 10 problems that have met the valid criteria. In addition, based on the students' answers and comments on the one-to-one and small group discussion stages, the problems have met

the practical criteria and to have a potential effect which refers to the students' response toward the problems. In this case, the results of the quality of learning development product must met the criteria of validity, practicality, and effectiveness (Nieveen, 1999).

Furthermore, the limitation of the current research was on the *field test* stage where several students did not answer the problems that have been developed so that these students were not involved in the analysis. In addition, students also share their comment during *one-to-one* and small group discussion stages that several problems developed were too long, so the researcher tried to minimize them by making a shorter stimulus for the two problems. However, not all stimulus of problems can be shortened since all the information is needed.

CONCLUSSION

This study results in a package of numeration problems of AKM for the 8th grade based on ethnomathematics on farmer activities in Montasik District, Aceh Besar Regency which have met the valid criteria in terms of content, construct, and language aspects according to experts. In addition, **this problem** also met empirical validity based on the test carried out to students. The problems developed have various problems namely 2 multiple choice problems, 3 complex **multiple-choice** problems, 2 long answer problems, 2 short answer problems, and 1 matching problem. Based on student response to problem, it can be concluded that AKM problems based on ethnomathematics about farmer activities have a potential effect which refers to the interest of students to the problems raised. In this case, the problems can be used further by the mathematics teacher as an instrument to improve the junior high school students' numeration skill.

This research wasconducted on the validity, practicality and have potential effect. Future researcher is expected to continue the research to test the effectiveness of AKM problem. Meanwhile, the implication of this research is in the forms of valid problems that have potential effects to be used by teachers in teaching and learning process in the classroom.

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