PrimaryEdu : Journal of Elementary Education
Volume 7, Number 1, February 2023
P-ISSN: 2580-9326
E-ISSN: 2580-7714
PRIMARYEDU

Development of AKM Numeracy Instruments on Numbers, Geometry & Measurement Materials for Grade IV Elementary School Students

Imroatul Mufidah[1], Sentot Kusairi[2], Slamet Arifin[3]

[1]Universitas Negeri Malang, Indonesia
[2]Universitas Negeri Malang, Indonesia
[3]Universitas Negeri Malang, Indonesia
[1]Imroatul.mufidah.2221038@students.um.ac.id , [2] sentot.kusairi.fmipa@um.ac.id,
[3]slamet.arifin.pasca@um.ac.id

Abstract

Based on the results of observations, the implementation of the AKM numeracy in elementary schools has several obstacles. Among other things, the student's ability to understand problems is still low, basic mathematical concepts such as arithmetic operations are generally mastered by students, but the skills to apply these concepts to real-world situations and unstructured problems are sometimes neglected, so research on the development of numeracy instruments in the Minimum Competency Assessment is important. This research uses Research and Development (R&D) development research, using the ADDIE model which has 5 stages namely Analysis, Design, Development, Implementation, and Evaluation. The data collected is data on students' numeracy skills obtained through testing the AKM instrument for arithmetic on numbers, geometry, and specific measurements for 4th-grade elementary school students. Based on the results of the descriptive statistical analysis of the Numerical AKM test, it is known that the average score is 88, the minimum numeracy score is 48, and the maximum score is 100 with a standard deviation of 13.81. The results of the reliability test showed that the value of r count > r table was 0.949 > 0.423. The implications of the results of this study are used as input for teachers and education practitioners to improve themselves in designing the development of similar minimum numeracy competency assessment instruments so that more and more instruments can be used by educators as exercises for students, and can improve the quality of human resources in this country.
Keywords: Instrument Development, Numeracy, Minimun Competency Assesment (AKM)

INTRODUCTION

Numeracy is the ability to apply generalization of numbers and arithmetic operations skills in everyday life. For example at home, working in people's lives, and the ability to explain the information that is around us. Given the importance of these numeracy skills, the actuality of this relationship is expected to describe students' numeracy skills in working on good questions and can be used as the main exploration for further exploration (Ridha Aulia Putri, 2021). Based on the results of observations, the implementation of numeracy AKM in elementary schools has several obstacles. Among other things, students' ability to understand problems is still low, basic mathematical concepts such as arithmetic operations are generally mastered by students, but the skills to apply these concepts to real-world situations and unstructured problems are sometimes neglected. PISA results show that students in Indonesia

generally have numeracy literacy skills that are still relatively low, namely at level 72 out of 79 countries taking the test (Nadhiif et al., 2015).

The low numeracy literacy skills of students are the reason the Ministry of Education and Culture has started planning to use the National Assessment to measure reading, mathematics and science literacy skills which will begin to be used in 2021. The reason for the change is because of the denseness of UN material which causes teachers and students to only test on content mastery, not reasoning competence possessed by students so that it causes weak students' Critical Thinking abilities (D.M. Andikayana et al., 2021). In addition, the National Examination is also a burden for students, teachers, and even parents because it is considered a burden for the success of a student as an individual, not as a measure of the quality of the national education system (Nuzulia & Gafur, 2022).

There are three types of tests conducted in the National Assessment, namely the Minimum Competency Assessment (AKM), character survey, and learning environment survey (Pendidikan, 2019). In essence, the Minimum Competency Assessment (AKM) is an assessment of the fundamental competencies needed by all students in order to be able to develop their own abilities and play an active role in society in activities that have positive value (Kumalasani et al., 2022) . AKM is used to measure students' cognitive abilities in which the aspects that are measured are reading literacy and numeracy literacy as well as critical thinking skills (Rohim, 2021). This AKM can improve the learning process of students. Thus the AKM questions that are developed must be contextual so that they can measure competency through problem-solving , and encourage students to be able to think critically and logically (Ridha Aulia Putri, 2021) .

The reason for the Ministry of Education and Culture to include numeracy questions in the AKM is to invite students to recognize the role of mathematics, provide the widest possible opportunity for students to express their mathematical ideas, develop critical thinking skills, and provide opportunities to develop the problems given (Winata et al., 2021). Several factors in the field indicate that the reason for the low numeracy skills in low elementary schools, namely the lack of introduction to numeracy-based practice questions given to students to practice their abilities, so that students find it difficult to solve them. In addition, students' ability to solve numeracy-based questions is limited to the questions contained in thematic books and LKS. Students do not have specific experience to practice solving numeracy-based questions. This causes students' creativity to be limited which should be more developed at the elementary school level.

P-ISSN: 2580-9326
E-ISSN: 2580-7714
PRIMARYEDU

Meanwhile, the results of research conducted by Sudianto and Kisno (2020) show that teachers experience difficulties in compiling HOTS questions. The difficulty experienced by the teacher is in compiling the stimulant questions in a cohesive and coherent manner (Sudianto & Kisno, 2021). The results of other studies also found that there are many gaps in elementary schools, namely that the basic numeracy competencies of students still do not reach the minimum standard. Many students find it difficult to answer due to their lack of numeracy competence, so the results are not as expected. Items in the form of descriptions that are arranged also often make it difficult for teachers to carry out assessments. So that this has an impact on the achievements obtained by Indonesian students in the PISA test which shows that the average student has not been able to complete numeration questions at a perfect level.

This is supported by several research results that have been conducted by educational practitioners showing that there are several gaps between the assessment expected by teachers and the assessment used today. The author also found that in similar research some teachers had implemented the Minimum Competency Assessment (AKM) directly in elementary schools, but the use of instruments in AKM was still not appropriate. Not all teachers have good competence in compiling AKM-based questions due to limited mastery of AKM numeration material. 50% of the teacher's design questions have not formulated the question instructions properly, giving rise to students' ambiguity in solving these questions (Indrawati, 2018).

Based on the things that have been stated above, it is necessary to have a settlement solution that can be done by developing numeracy instruments in the minimum competency assessment (AKM). The formulation of the problem in this study is how does a set of numerical AKM instruments on numbers, geometry & measurements of fourth grade elementary school students fulfill content validity, empirical validity, and empirical reliability tests? The purpose of developing and validating arithmetic questions was carried out to find out the students' ability to what extent the level of thinking uses AKM arithmetic procedures and concepts. Students with high-order thinking skills in understanding mathematical concepts can use symbols or numbers according to basic mathematics to help students solve mathematical problems in various situations in everyday life. In addition, the purpose of this study was to produce a set of numerical AKM instruments on numbers, geometry & measurement for fourth grade elementary school students that meet content validity, empirical validity, and empirical reliability.

METHOD

This research uses the Research and Development (R&D) development research method, with the development model used is ADDIE development model (Analyze, Development, Design, Implementation, and Evaluation) (Sensus et al., 2022). The ADDIE stages consist of: (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation. The stages of the research method are presented in the following figure.

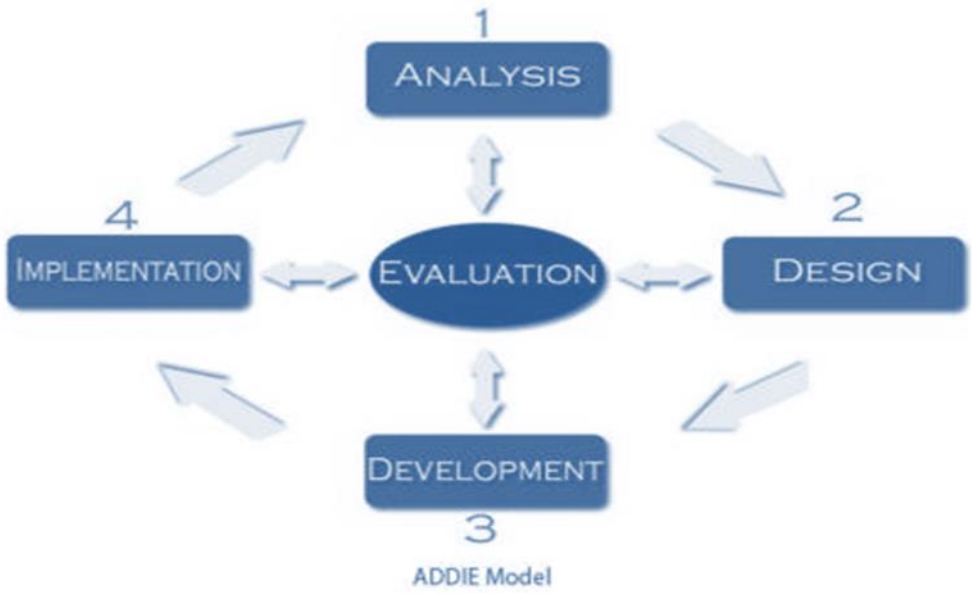

Figure 1. ADDIE Development Model

The ADDIE research model is used because the product is developed is in the form of a set of minimum numeracy competency assessment instruments used in mathematics learning not software engineering, so that the ADDIE method is suitable for the product development process. The analysis phase includes analysis of core competencies, analysis of basic competencies, and determining indicators of number, geometry, and measurement materials.

The design stage, namely compiling a grid of numeracy AKM questions that will be developed into a test instrument. The grid was developed taking into account and emphasizing the preparation of numerical AKM questions. The development stage, namely the activity of developing questions or statements sourced from the grid. The implementation stage, namely the implementation of the tryout AKM numeracy test instrument in class IV students as many as 34 people. The evaluation stage, which measures whether the stages passed previously were appropriate and provided valid and reliable results. Evaluation is carried out by looking at the results of developing the questions that have been carried out and if valid results have not been

P-ISSN: 2580-9326
E-ISSN: 2580-7714
PRIMARYEDU

obtained, the questions will be revised. Validity, namely the activity of making comparisons on the value of r for each item statement and calculating the product moment r, reliability is determined by applying Cronbach's Alpha formula (Studi et al., 2022). The data collection method uses a question relevance scale questionnaire and a numeracy test. There are 10 questions with the following criteria or grid:

Table 1. Lattices / Criteria for Developing Numarcy Minimum Competency Assessment Questions (AKM)

Competence	Domain	Context	Question Form	Cognitive Level	Question Numbers
Expresses a number as the sum, difference, product, or quotient of two whole numbers	number	culture	Multiple choice	Analyze (C4)	1
Explain the value and equivalence of currency fractions	number	social	Multiple choice	Deployments (C3)	2
Expresses a number as the sum, difference, product, or quotient of two whole numbers	number	social	TrueFalse	Deployments (C3)	3
Expresses a number as the sum, difference, product, or quotient of two whole numbers	number	scientific	Complex multiple choice	Analyze (C4)	4
Explain the value and equivalence of currency fractions	number	personal	TrueFalse	Reasoning (C5)	5
Relate the perimeter and area formulas for different types of quadrilaterals (square, rectangle, rhombus, parallelogram, trapezoid, and kite) and triangles.	Geometry and measures	personal	TrueFalse	Reasoning (C5)	6

Explain the value and equivalence of currency fractions	number	personal	Complex multiple choice	Deployments (C3)	7
Describe the circumference of a circle	Geometry and measurements	personal	Complex multiple choice	Reasoning (C5)	8
Explain the value and equivalence of currency fractions	number	personal	matchmaking	Deployments (C3)	9
Explain the value and equivalence of currency fractions	number	social	Description	Reasoning (C5)	10

Table 2. Numerical Minimum Competency Assessment Questionnaire (AKM)

Rating Items	Rating Score			
	1	**2**	**3**	**4**
The suitability of the questions with the material.				
The suitability of the questions with the competencies that students must achieve.				
Conformity of the question sentences with good and correct Indonesian language rules.				
The use of sentences in the questions does not contain SARA elements.				
Illustrations, pictures and photos are appropriate for the topic and can help students.				
The language used does not have a double meaning. Interesting test questions design.				

The data analysis method in this study is divided into 3. The first analysis is to measure the content validation (CV) value of the instrument which was developed using the Gregory formula formula based on the assessment of 2 experts. The formula used by Gregory to calculate the CV value is as follows.

Content validity = $\frac{D}{(A+B+C+D)}$

P-ISSN: 2580-9326
E-ISSN: 2580-7714
PRIMARYEDU

Information:
CV : Content Validity (content validity).
D : Content that demonstrates a valid agreement between the two experts.
AC : Content that shows different views between the two experts.
D : A cell showing agreement between the four experts

Table 3. Data tabulation in matrix tables

2x2 matrices		**Appraiser 1**	
		Less Relevant (Scores 1-2)	**Very relevant (3-4 scores)**
Appraiser 2	Less relevant (Scores 1-2)	(A)	(B)
	Very relevant (3-4 scores)	(C)	(d)

Information:
A = The number of items with an irrelevant assessment by both examiners
B = Number of items with an irrelevant assessment by examiner 2
C = Number of items with an irrelevant assessment by examiner 1
D = Number of items with relevant judgments by both examiners

The table is used to calculate the content validity of the assessment results of two experts. From these results, it will be known whether the valid criteria for the numeracy instrument in the AKM are valid or not by using the following Gregory formula

Table 4. Content Validity Criteria (Gregory)

Coefficient	**Validity Criteria**
0.8 – 1	Very high validity
0.6 – 0.79	High validity
0.4 – 0.59	Moderate validity
0.2–0.39	Low validity
0.00 – 0.19	Very low validity

The second analysis is the analysis of empirical validity which is measured using the product moment calculation formula assisted by using SPSS 26 for windows software. The criterion of whether each item is valid is determined from the acquisition of person correlation (r) if the value of r count > r is critical. The process of calculating empirical validity was divided into two types of trials that were carried out, namely trials with 34 students from several grades IV subjects and the results of students' daily mathematics tests. While the third analysis is the reliability analysis used to measure the AKM questions. The researcher uses Alpha Cronbach

formula. The researcher uses criteria based on Guilford's criteria (Koyan, 2012), that is, if the questions developed obtain a minimum high reliability value or are in the interval criteria 0.60 < X ≤ 0.80 (D.M. Andikayana et al., 2021).

Table 5. Realiability Criteria

Coefficient	Validity Criteria
< 0.20	Reliability almost non-existent
0.21 0.40	Low reliability
0.41 – 0.70	Moderate reliability
0.71 – 0.90	High reliability
>0.90	Very high reliability

RESULTS AND DISCUSSION

Results

The results of this study are in the form of a Numeracy Minimum Competency Assessment (AKM) instrument product using a rating scale assessment form for each score. The product for the development of this AKM instrument numeracy has gone through two stages of assessment, namely the results of validation and testing. The validation of this instrument involved two mathematicians/experts, namely a mathematics lecturer at Malang State University, and a math teacher at the Elementary School. While the trial involved 34 fourth grade students at the Elementary School.

This numeracy AKM instrument was developed by adapting The ADDIE model stages consisting of (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation. The analysis phase includes analysis of core competencies, analysis of basic competencies, and determining indicators of number, geometry, and measurement materials.

At the design stage, the researcher begins by compiling the test specifications to be developed. The test developed is the AKM numeracy test which consists of multiple choice, complex multiple choice, true-false, matching, and description tests. In this case, the researcher first determines the purpose of the test according to the material for fourth grade elementary school students, determines the content, context, and cognitive level, determines the question indicators, then arranges the test grid, chooses the form of the questions, and determines the length of the test. Next, the researcher compiles items on the numeracy Minimum Competency Assessment (AKM), the items are arranged according to the measured numeracy ability indicators, the questions consist of 10 items, the material chosen is numbers, geometry and

P-ISSN: 2580-9326
E-ISSN: 2580-7714
PRIMARYEDU

measurements that are adapted to the material studied by students in theme I in class IV. Each item is equipped with a scoring rubric.

1. Content Validity

The next step is for the researcher to examine the items carried out by experts using the panel technique. Before the questions are validated, the questions that have been reviewed and modified are examined by researchers and supervisors first for a feasibility test, whether the questions are in accordance with the indicators to be measured. The validation stage is to obtain content validity from mathematicians/experts and prove the content validity of the AKM numeracy test questions concerning numbers, geometry and measurement. The purpose of doing this content validation is to find out and measure whether the AKM numeracy questions used are in accordance with the competencies and indicators of critical thinking and the cognitive level achieved. During the validation process, researchers got a lot of suggestions and input on the preparation of the AKM numeracy test questions, so that the test questions tested were good and valid. The validation results by two validators from a team of mathematicians can be seen in the following table.

Table 6. Expert Validation Results with the Gregory Test using a Likert scale

Question Item Number	Validators 1	Validators 2	tabulations	Information
1	3	3	D	High Validity
2	3	3	D	High Validity
3	3	4	D	High Validity
4	3	2	B	High Validity
5	3	3	D	High Validity
6	3	3	D	High Validity
7	3	2	B	High Validity
8	3	2	B	High Validity
9	3	3	D	High Validity
10	3	3	D	High Validity

Table 7. Data Tabulation in Matrix Tables

2x2 matrices		Validators 1	
		Less Relevant (Scores 1-2)	Very relevant (3-4 scores)
Validators 2	Less relevant (Scores 1-2)	(0)	(3)
	Very relevant (3-4 scores)	(0)	(4)

Content validity = = 0.7$\frac{7}{(0+3+0+7)}$

Based on the results of the assessment of the two validators, the numerical AKM instrument is categorized as having a high validity of 0.70. Gregory (2000) states that an instrument product can be declared to have a "high validity" level if it obtains a content validity calculation value > 60 or a value range between 0.60 - 0.79.

2. Empirical Validity

The next data analysis activity, namely empirical validity. This empirical validity was carried out by comparing the results of the numeracy test and the average value of the Mathematics Daily Test on 34 students at Elementary School.

3. Numerical Test Value

The results of the numeracy test based on the instrument developed by the researcher can be seen in the following figure.

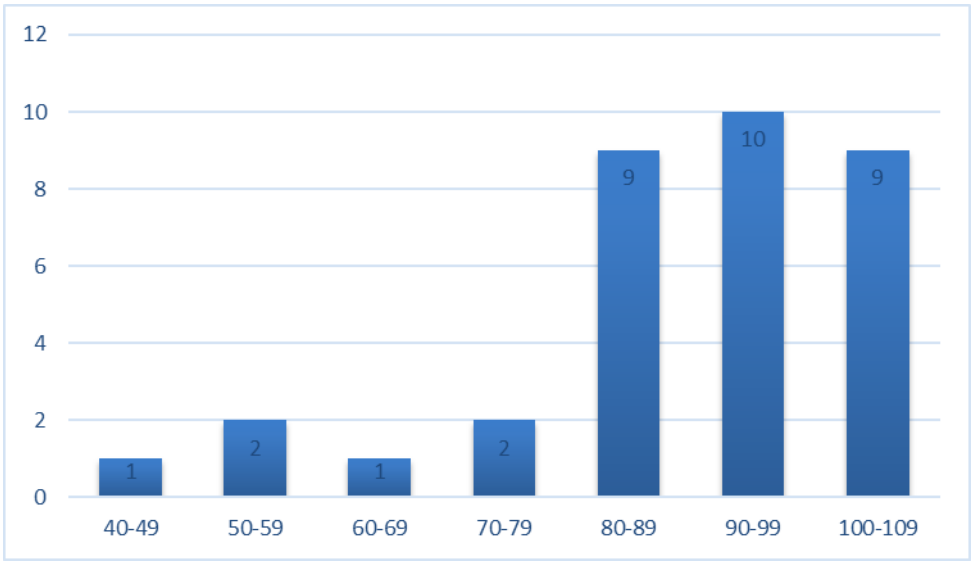

Figure 2. Student Numerical Test Results

Based on the results of the numeracy tests that have been obtained, the researcher then conducted an analysis using descriptive statistics using the SPSS for Windows version 26 software. The results of the descriptive statistical analysis of the AKM numeracy test can be seen in table 8 below.

P-ISSN: 2580-9326
E-ISSN: 2580-7714
PRIMARYEDU

Table 8 . Student Numeracy Test Results

Statistics	Scores
Means	88
std. Deviation	13.81
Minimum	48
Maximum	100

The results of the descriptive statistical analysis of the numerical AKM test show that the mean value is 88, while the minimum score for the numerical AKM test is 48, and the maximum score is 100 with a standard deviation of 13,81.

4. Daily Repeat Average Value

The results of the average student daily test can be seen in the following figure.

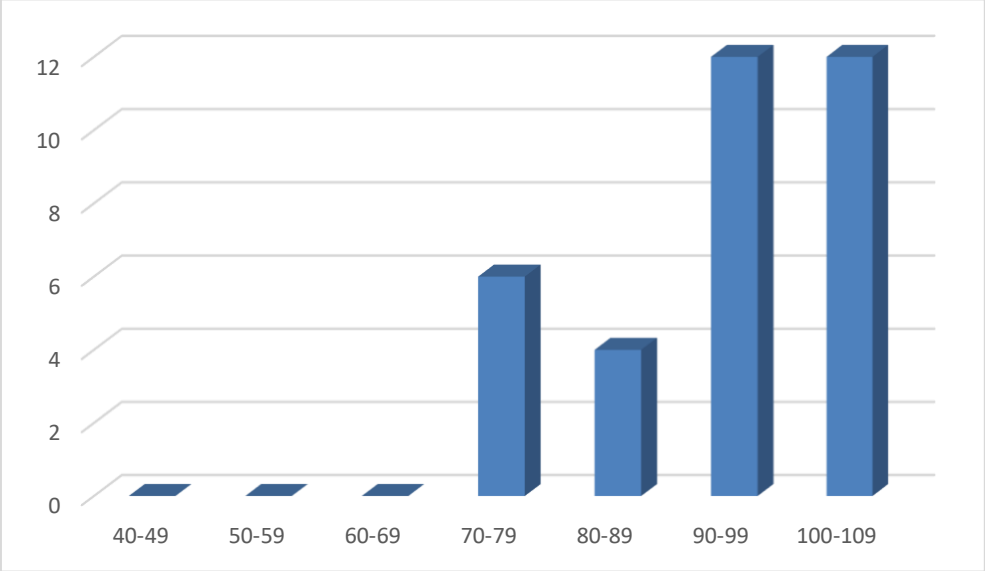

Figure 3. The Average Results of Students' Daily Tests

Based on the results of the average daily test scores that have been obtained, the researcher then conducted an analysis using descriptive statistics using the SPSS software for windows version 26. The results of the descriptive statistical analysis of the numeracy AKM test can be seen in the table 9 below.

Table 9. Results of the Average Daily Student Deuteronomy

Statistics	Scores
Means	93
std. Deviation	8,28
Minimum	70
Maximum	100

The results of the descriptive statistical analysis of the Average Daily Student Test found that the mean value was 93, while the minimum score for students' daily test scores was 70, and the maximum score was 100 with a standard deviation of 8.28.

5. Reliability Test Analysis

Instruments that have been analyzed from the aspect of content and empirical validity then need to know how much the reliability value is by using the validity of the appeal. Calculations were performed using SPSS software version 26 to obtain reliability values using the Alpha Cronbach formula shown in the table below.

6. Appeal Validity Results

Table 10. Correlation Results

Person correlation coefficient	Instrument Validity Coefficient	R Critical Pearson	Criteria
0.949	0.949	0.423	Valid

The results of the reliability test using the comparative validity of the AKM numeracy test instrument are shown in table 10, indicating that the value r count _ > r table, namely 0.949 > 0.423. Thus, it can be concluded that the developed numeracy test instrument is valid or has high reliability and can be used to collect research data related to student numeracy. Judging from the results of the instrument analysis performed, the development of this research resulted in a valid and reliable AKM numeracy instrument.

Discussion

The results of the analysis show that the developed AKM numeracy instrument is the right instrument to be used as a numeracy assessment and has good quality in terms of readability. The instrument is a valid and reliable instrument. Based on the results of the assessment of the two validators, the numerical AKM instrument is categorized as having a high validity of 0.70. Based on the results of the descriptive statistical analysis of the numerical AKM test, it is known that the mean value is 88, while the minimum score for the numerical AKM test is 48, and the maximum score is 100 with a standard deviation of 13.81. While the results of the descriptive statistical analysis of the Average Daily Student Deuteronomy found that the mean value was 93, while the minimum score for the student's daily test score was 70, and a maximum score of 100 with a standard deviation of 8.28. The results of the reliability

P-ISSN: 2580-9326
E-ISSN: 2580-7714
PRIMARYEDU

test using the comparative validity of the AKM numeracy test instrument are shown in table 9, indicating that the value r count _ > r table, namely 0.949 > 0.423.

According to (Rohim, 2021) in a similar study, that the suitability criteria of the item must have elements in the description of test development and any measurement aspects that can affect the score results (for example, test format). Meanwhile, (Apriatni et al., n.d.) in his research on the development of AKM Numeration questions also argues that the meaning of test scores or learning outcomes scores obtained by students is a description of students' abilities towards subject competencies. (Rijoly & Patty, 2021) in her research added that a test instrument must have certain criteria and have parallels between the measurement results and the desired criteria. Thus, it can be concluded that the developed numeracy test instrument is valid or has high reliability and can be used to collect research data related to student numeracy. Judging from the results of the instrument analysis performed, the development of this research resulted in a valid and reliable AKM numeracy instrument. According to (Ridha Aulia Putri, 2021) the question grid needs to be added to basic competencies. Besides being valid, the characteristics of a good instrument must be relevant. Relevance means that the instrument used must be in accordance with the material, learning context, and assessment of learning outcomes. According to (Setiyowati et al., 2022) relevance relates to the learning content that is being studied with the knowledge that students already have.

The development of this numeracy AKM needs to be carried out, so that it can be used by teachers in learning and as an alternative example of numeracy questions (Ridha Aulia Putri, 2021) . Numeracy is a skill that can equip students to use mathematics as a way to solve everyday problems. People who have numeracy skills will be able to understand and identify various kinds of mathematical ideas used in solving everyday problems (Apriatni et al., nd) . Numerical ability also has a close relationship with student learning achievement, because if students have good numeracy skills, mathematics learning outcomes will automatically increase. (Study et al., 2022).

CONCLUSION

Based on the results of the analysis and discussion, it can be concluded that the developed AKM numeration instrument is an appropriate instrument for use as a numeration assessment and has good quality in terms of readability. The instrument is a valid and reliable instrument. Based on the results of the assessment of the two validators, the numerical AKM instrument is categorized as having a high validity of 0.70. Based on the results of the

descriptive statistical analysis of the numerical AKM test, it is known that the mean value is 88, while the minimum score for the numerical AKM test is 48, and the maximum score is 100 with a standard deviation of 13.81. While the results of the descriptive statistical analysis of the Average Daily Student Deuteronomy found that the mean value was 93, while the minimum score for the student's daily test score was 70, and a maximum score of 100 with a standard deviation of 8.28.

The results of the reliability test using the comparative validity of the AKM numeration test instrument are shown in table 9, indicating that the value r count > r table, namely 0.949 > 0.423. Thus, it can be concluded that the developed numeracy test instrument is valid or has high reliability and can be used to collect research data related to student numeracy. Judging from the results of the instrument analysis performed, the development of this research resulted in a valid and reliable AKM numeration instrument.

Some of the AKM numeracy questions that have been made by the teacher have different instrument components at each grade level. All numeric AKM instrument components are in the questions, but not all of them appear in every question. In addition, the forms of questions that have been made have different types of questions. There are multiple choice questions, short answers, true/false, complex multiple choice, essay questions and so on. The questions made by the teachers showed that with different types of text, the form of the questions which also had an AKM instrument component aimed at training students' numeracy skills, in addition to increasing critical thinking and HOTS thinking. Future researchers should analyze more deeply regarding students' numeracy AKM abilities at each different grade level, so that it can be used as evaluation material for teachers to provide appropriate actions to improve students' numeracy literacy.

ACKNOWLEDGMENTS

The author's thanks go to Prof. Dr. Sentot Kusairi, S.Pd., M.Si, and Dr. Slamet Arifin, M.Pd. Who is full of sincerity and patience in guiding, so that the writing of this article can be completed properly and on time. Hopefully this article can provide benefits, especially for educational practitioners to be able to use in learning and as an alternative example of numeracy problems.

P-ISSN: 2580-9326
E-ISSN: 2580-7714
PRIMARYEDU

REFERENCES

Apriatni, S., Yuhana, Y., Matematika, S. P., Sultan, U., & Tirtayasa, A. (n.d.). Pengembangan Instrumen Literasi Numerasi Materi Trigonometri. 2759, 185–198. https://doi.org/10.20527/edumat.v10i2.13720.

D.M. Andikayana, N. Dantes, & I.W. Kertih. (2021). Pengembangan Instrumen Asesmen Kompetensi Minimum (Akm) Literasi Membaca Level 2 Untuk Siswa Kelas 4 Sd. Jurnal Penelitian Dan Evaluasi Pendidikan Indonesia, 11(2), 81–92. https://doi.org/10.23887/jpepi.v11i2.622.

Indrawati, M. D. (2018). Pengembangan Instrumen Penilaian Literasi Sains Fisika Peserta Didik Pada Bahasan Gelombang Bunyi Di Sma Negeri 1 Gedangan Sidoarjo. Jurnal Inovasi Pendidikan Fisika (JIPF), 07(01), 14–20.

Kumalasani, M. P., Fitri, D., Aini, N., & Kusumaningtyas, D. I. (2022). Komponen Instrumen AKM Pada Proses Kognitif Soal AKM Literasi Membaca. JIKAP PGSD: Jurnal Ilmiah Ilmu Kependidikan, 6(2), 289–293.

Nadhiif, M. A., Diantoro, M., & Sutopo. (2015). Tes Isomorfik Berbasis Komputer untuk Diagnostik Miskonsepsi Diri pada Materi Gaya dan Hukum Newton. Jurnal Pendidikan Sains, 3(2), 58–67.

Nuzulia, N., & Gafur, A. (2022). Development of Minimum Competency Assessment (AKM)-Based Exercise Books to Improve Students' Literacy and Numeracy Ability at Sdn Janti 02 Sidoarjo. Madrosatuna: Journal of Islamic, 6(1), 1–14. https://doi.org/10.21070/madrosatuna.v6i1.1564.

Pendidikan, M. (2019). Program pasca sarjana pendidikan guru madrasah ibtidaiyah iain salatiga 2019.

Ridha Aulia Putri, S. L. H. (2021). Jurnal basicedu. Jurnal Basicedu, 5(4), 2541–2549. https://doi.org/10.31004/basicedu.v5i4.1230.

Rijoly, H. M., & Patty, J. (2021). Pemahaman Penerapan Akm (Asesmen Kompetensi Minimal) Bagi Guru-Guru Di Kec. Salahutu Kab. Maluku Tengah. Gaba-Gaba : Jurnal Pengabdian Kepada Masyarakat Dalam Bidang Pendidikan Bahasa Dan Seni, 2(1), 49–55. https://doi.org/10.30598/gabagabavol2iss1pp49-55.

Rohim, D. C. (2021). Konsep Asesmen Kompetensi Minimum untuk Meningkatkan Kemampuan Literasi Numerasi Siswa Sekolah Dasar. Jurnal VARIDIKA, 33(1), 54–62. https://doi.org/10.23917/varidika.v33i1.14993.

Sensus, M., Arifin, K., & Munir, A. (2022). Validitas Soal pada Asesmen Kompetensi Minimum Materi Ekologi SMA Kelas X. Jurnal Biologi Dan Pembelajarannya, 14(1), 1–10.

Setiyowati, H., Suryati, E., & Rina, R. (2022). Analisis Pelaksanaan Asesmen Nasional Berbasis Komputer (ANBK) Di Madrasah Ibtidayah Negeri 9 Hulu Sungai Utara. Al-

Madrasah: Jurnal Pendidikan Madrasah Ibtidaiyah, 6(3), 803. https://doi.org/10.35931/am.v6i3.1086.

Studi, P., Guru, P., Dasar, S., Pendidikan, J. I., Keguruan, F., Ilmu, D. A. N., & Dharma, U. S. (2022). Pengembangan Soal Asesmen Kompetensi Minimum (Akm) Numerasi Untuk Siswa Kelas V Sekolah Pengembangan Soal Asesmen Kompetensi Minimum (Akm) Numerasi Untuk Siswa Kelas V Sekolah.

Sudianto, S., & Kisno, K. (2021). Potret kesiapan guru sekolah dasar dan manajemen sekolah dalam menghadapi asesmen nasional. Jurnal Akuntabilitas Manajemen Pendidikan, 9(1), 85–97. https://doi.org/10.21831/jamp.v9i1.39260.

Winata, A., Widiyanti, I. S. R., & Cacik, S. (2021). Analisis Kemampuan Numerasi dan Literasi Membaca Peserta Didik Kelas XI MA Islamiyah Senori Tuban. Prosiding SNasPPM VI Universitas PGRI Ronggolawe, 6(1), 659–666. http://prosiding.unirow.ac.id/index.php/SNasPPM%0Ameningkatkan.