The Development of Minimum Competency Assessment Test Instruments (AKM) for Elementary Schools Contain Reading Literacy Based on the PISA Framework

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ABSTRACT

This research was conducted based on the results of observations and interviews on the lack of teacher involvement in the process of preparing the minimum ability assessment test instrument (AKM) and many teachers and prospective teachers do not know what components are measured in the AKM. This study aims to develop a minimum ability assessment test instrument (AKM) for reading literacy and numeracy in the thematic learning of fifth grade elementary school based on the Program International Student Assessment (PISA) framework. The research method used is a research and development (R&D) method with a 4D development model (Define, Design, Develop, and Disseminate). This research was carried out with a small-scale test at SDIT AkmalaSabila with 19 students and a large-scale test at SDN 6 Arjawinangun, Cirebon Regency with 47 students. In addition to developing the AKM test instrument based on the PISA framework, this research is also to assess the Eligibility and quality aspects of the AKM test instrument based on the PISA framework that was developed. Data and collection techniques in this study include questionnaires, tests, and documentation. The data were analyzed using several formulas of validity, reliability, and level of difficulty. Based on the results of the study, the average percentage of Eligibility of the AKM test instrument based on the PISA framework obtained from the validation of material, language and construction experts is 93.75% in the very valid category. The results of the quality of the AKM test instrument based on the PISA framework shown that there were 26 or 83.87% items categorized valid, 5 or 17% items categorized as invalid. The result of Cronbach's Alpha coefficient value of 0.941 so that the question has a very high reliable value. The results of the difficulty level index were 23 or 88.46% questions in the medium category and 3 or 11.54% questions in the easy category.

Keywords: Test Instrument, AKM, literacy and numeracy, *framework* PISA.

INTRODUCTION

The competency standards of graduates through the implementation of the 2013 curriculum shows that the quality of education is still low, so the Minister of

Education and Culture Nadiem issued many new policies including the abolition of the National Examination (UN) because for more than 10 years it has not had a good impact on the results of the Program International Student Assessment (PISA) as one of the benchmarks for the quality of education. a country. In 2021 the government officially implements the National Assessment (AN) which aims to change the paradigm of education evaluation in Indonesia as an effort to evaluate and map the education system in the form of inputs, processes, and results instead of evaluating the achievements of students previously used in the National Examination (Rokhim *et al.*, 2021). The AN consists of several main instruments, one of which is the Minimum Ability Assessment (AKM).

AKM is carried out as an effort to improve the quality of education in Indonesia which is currently still low (Rukoyah *et al.*, 2020). AKM can measure reading and numeracy literacy skills (Aisah *et al.*, 2021). In line with the objectives of integrated science learning listed in the 2013 Curriculum, there are to form students with high scientific literacy (Purwani *et al.*, 2018).

Further, the results of the 2018 PISA survey published by the OECD in 2019, Indonesia ranks 72 out of 78 countries that took part in the PISA survey (Govorova *et al.*, 2020). The results of the Indonesia National Assessment Program score which measured reading, math, and science skills for elementary school children shown that the students' reading ability is 46.83% in the low category (Atmazaki, 2018). The data shows that Indonesia's literacy level is still far from what the government expects. Teachers as the main actors in education are required to improve students' reading literacy and numeracy through AKM

activities (Matondang *et al.*, 2021). Reading literacy skills are very important to be applied in the 21st century then it is hoped that the existence of AKM can prepare students to be able to compete with the international world in welcoming 21st century skills (Shara *et al.*, 2020).

Novita *et al.*, (2021) stated that there were still many teachers and prospective teachers who do not know about the AKM concept used to measure students' cognitive abilities. The results of interviews with several elementary school teachers in the city of cirebon obtained the fact that most of the teachers had not tried to make AKM-based questions. This fact shows that the readiness and involvement of teachers in the process of preparing the AKM instrument has not been seen because there is no plan to develop and assess reading literacy and numerical literacy skills (Nurhikmah *et al.*, 2021). The literacy and numeracy abilities of students are classified as low because they are not used to working on questions with minimum ability assessment standards where students must carry out learning by continuing to train high-level abilities or reasoning on the questions given to students (Ahmad *et al.*, 2021).

One alternative effort to overcome these problems is to design a test instrument in the form of a test instrument, such as using a minimum competency assessment test evaluation tool based on the PISA framework. Minimum Competency Assessment (AKM). AKM is an assessment of basic competencies needed by students with the main goal of being able to map reading and numeracy literacy (Sani, 2021). The choice of these two literacys is due to two basic and conditional areas where all subjects have a real understanding. In addition, these two abilities are closely related to developments in the 21st century

contained in 4C, so it is hoped that the implementation of AKM in the 21st century can prepare students to be able to compete internationally in the future (Aisah *et al*., 2021).

Based on the description above, this research is to develop a reading and numeracy literacy test instrument in preparation for the preparation of the AKM. The form of the test instrument that is arranged in the form of multiple choice, true false choice, and matchmaking in the thematic learning of class V Elementary School to analyze the ability of learning outcomes in working on the AKM test instrument of students.

MATERIALS & METHODS

This research used development research method with 4D design (Define, Design, Develop, and Disseminate). Thiagarajan, S. *et al.,* (1974) the first stage is defined, collecting data relating to the initial conditions of students and assessment instruments that have been used by teachers in the targeted school. The second stage is design, after obtaining information about the initial conditions of the school that is used as the object of research, then the preparation of the AKM test instrument based on the PISA Framework is based on the needs and conditions of the research object. The stages of instrument preparation were validated by experts which aimed to determine the Eligibility of the instruments that have been prepared. The third stage is the develop stage, by conducting trials of the products that have been produced aiming to get feedback or feedback and can be used as material for product evaluation in order to achieve the final product. The last stage is dissemination or publication of the final product.

Data collection techniques in this study included test techniques, questionnaires and documentation. The test technique is the AKM test instrument based on the PISA Framework which consists of 3 different forms of questions, there were multiple choice, true false choice, and matching according to AKM recommendations which are used to measure the ability of students' learning outcomes in thematic learning. The questionnaire technique was to analyze the Expert Validation sheet questionnaire. Expert validation in this study aimed to determine the Eligibility of the instrument developed by conducting content validity tests conducted by expert validators who have expertise in the field of elementary school education, that is lecturers of the Postgraduate Study Program, State University of Semarang. Documentation techniques are carried out as a source of supporting data to complement the data obtained from problem identification activities, photos of student activities and data from the test results of the AKM test instrument based on the PISA framework for the sixth grade students of SDIT Akmala Sabila, Cirebon Regency.

Data analysis techniques that researcher used: (1) Instrument Eligibility, including content validity test. Content validation tests were carried out by expert validators, there are material and language expert lecturers. The validation sheet used is a questionnaire with a Likert scale in the form of a checklist. Giving a score according to the rubric, score 4 = very valid, score 3 = valid, score 2 = not valid, score 1 = very invalid; (2) Instrument quality includes the validity of the instrument to determine whether an instrument is valid or not. The scores on the items are correlated with the total score, then compared at the 5% significance level, the items are declared valid if $r_{xy} > r_{table}$.

Reliability test is used to test the consistency of the instrument. The results of the reliability calculation are then related to the r product moment value with $dk = N - 1$ 5% significance and the decision-making rule, if $r_{11} > r_{table}$ means reliable and $r_{11} > r_{table}$ not reliable. The item difficulty level test is needed to find out whether the item is easy, medium, or difficult. The items on the test can be expressed as good item items, if the item items are not too difficult and not too easy, in other words, the degree of difficulty of the item is moderate or sufficient.

RESULT&DISCUSSION

The Eligibility of the AKM test instrument based on the PISA framework in thematic learning of class V Elementary School.

This research was conducted to analyze the Eligibility of developing the AKM Literacy and Numeracy test instrument based on the PISA framework for elementary school students in Thematic learning held at SDN 6 Arjawinangun, Cirebon Regency, in the 2022/2023 Academic Year in the Odd Semester.

Prior to conducting trials in the field or on a large scale, the AKM test instrument that was developed was first tested for content validity to produce the right test to measure the desired abilities. Sugiyono (2013) states Validity is the level of reliability and validity of the measuring instrument used. The instrument can be said to be valid, it meant that the measuring instrument used to obtain the data is valid or can be used to measure what should be measured, while Zakaria *et al*., (2020) stated that learning tools or materials need to be tested for validity to ensure Eligibility.

The content validity test for assessing the AKM test instrument was carried out by 2

experts to see the suitability of the material, construction, and language of the developed test instrument, in line with Hendryadi (2017) which done validity describes the extent to which the measuring tool (test) measures what to be measured. The test instrument validators developed are academics which can be seen from Table 1.

Table 1. Validator Expert Data

Expert	Competency	Remark
Expert 1	Academics	Expert Lecture
Expert 2	Academics	Expert Lecture

Expert validators are asked to provide an assessment of the instruments that have been made by researchers. The expert validator assessed the Eligibility of the AKM test instrument containing literacy and numeracy that has been developed and made according to the context, content, and process of thematic learning materials. The expert's assessment of the test instrument was then analyzed using Microsoft Excel. The results of validation by experts on the assessment of the AKM test instrument can be shown in Table 2.

Table 2. Reading Literacy Test Instrument Eligibility Criteria

Scoring Aspect	Total Score	Maximum Score
Presentation	22	24
Content/content	31	32
Construct	28	32
Grammar	39	40
Use	15	16
Grand Total Score	135	144
Percentage	93,75%	
Criteria	Very Valid	

Both experts were asked to provide an assessment of the test instruments that have been carried out by the researchers. In addition to the quantitative data analyzed, qualitative data were also obtained from the expert validators. Qualitative data in the form of suggestions for attention and improvement in the development of the

AKM test instrument. Items that have been tested on expert validators are then revised by considering the suggestions given by experts so that they become items that can measure the ability of students' learning outcomes.

Suggestions and inputs from expert validators are found in the improvement of several items to be adapted to the material, construct, and language used in the items. The suggestions given by the 2 validators on the AKM test instrument developed are as follows.

In developing the test instrument, there are several questions that must be revised according to expert advice. After validation by experts, the test instrument was revised bellow:

5. in the field ecosystem there are corn, grasshoppers, frogs, snakes, and owls. If snakes are reduced due to poaching, what will happen is….
a. The grasshoppers decreased and the owls increased
b. The grasshoppers increased and the frogs decreased
c. Fewer frogs and fewer owls
d. The frogs increased and the owls decreased

Question number 5 contained indicators of competency achievement. Analyzing relationships in an ecosystem (community). This question contained content in everyday life. Competence in the question is in the form of analyzing the relationship between ecosystem components and food webs in the surrounding environment. This question was revised, there was in the question section on the word "ecosystem" which was replaced by "community" this was caused by an inaccurate alignment in the use of the term. The definition of ecosystem itself is the interaction between living things and their environment. While the problem did not show the relationship, but only mentions the components contained in an association. After evaluation based on expert opinion, question number 5 is corrected below:

5. In the farming community there are corn, grasshoppers, frogs, snakes and owls. If snakes are reduced due to poaching, what will happen is….
a. The grasshoppers decreased and the owls increased
b. The grasshoppers increased and the frogs decreased
c. Fewer frogs and fewer owls
d. The frogs increased and the owls decreased

7. A factory in the upstream area of the river is suspected of dumping waste carelessly. The influence of these activities on the water cycle is….
a. Inhibition of condensation in the area around the factory
b. Reduced evaporation of river water in the area
c. Polluted River water which is then carried to the sea
d. River water that seeps into the ground becomes less

Question number 7 is a question that contained indicators of competency achievement. Presenting interrelated concepts in non-fiction texts. This question contained content in everyday life. Competence Analyzing the relationship between ecosystem components and food webs in the surrounding environment. This question was revised, that was in the part of the question that was still not appropriate, that was "disposing of waste carelessly" still raises a question mark about what waste is meant. While we know that factory waste is not only in liquid form. Based on the answer options offered, it leads to liquid waste. Students are asked to determine the impact of liquid waste disposal on the water

cycle. After evaluation based on expert opinion, question number 7 is corrected as follows:

7. A factory in the upstream area of the river is suspected of disposing of liquid waste carelessly. The influence of these activities on the water cycle is….

a. Inhibition of condensation in the area around the factory
b. Reduced evaporation of river water in the area
c. Polluted River water which is then carried to the sea
d. River water that seeps into the ground becomes less

11. The physical characteristics of a creature determine its place of life. In desert areas, water is hard to come by. It is very cold at night and very hot at night. Among the following living things, which one is suitable to live in the desert?

a. Banana tree
b. Teak tree
c. Cactus
d. lotus

Question number 11 contained indicators of competency achievement, that is Presenting the relationship between interrelated concepts. Contained content adaptation of living things to their environment. This question has been revised in the use of the word "physical characteristics of living things". While adapting is one of the characteristics of living things, other than that it is sufficient to "characterize living things" without the need for physical characteristics or mental characteristics, etc., because the characteristics of living things were not classified. The statement "it's very hot at night" is also not quite right. In addition, there are still some typo words. After evaluation based on expert opinion, question number 11 can be seen as follows:

11. one of the characteristics of living things is to adapt their place of life. In desert areas, water is hard to come by. It is very cold at night and very hot during the day. Among the following living things, which one is suitable to live in the desert?

a. Banana tree
b. Teak tree
c. Cactus
d. lotus

The AKM test instrument with literacy and numeracy is a form of question whose answers can be selected from several possible answers that have been provided and have one correct answer while the other acts as a distractor to measure broad knowledge with varying domain levels, while the development of this multiple-choice test is done by analysis of items qualitatively and quantitatively.

Qualitative item analysis in this study was carried out by judgment or asking for opinions from 2 experts, that is expert lecturers to find out whether a question was functioning and whether a question was tested on students. After conducting a qualitative analysis of 31 test questions containing multiple choice, true-false choices, and matching, all questions were worthy of being tested on students by making several revisions. In line with this, Zein *et al*., (2013) products of relevant test instruments were validated using 2 experts, there were material experts and language experts in their fields. The AKM test instrument that has been validated by an expert validator and has been analyzed and revised, will then be tested in a small-scale trial to then be analyzed and seen for the validity, reliability, and level of difficulty of the questions so that the test instrument has a good quality score so that it can be used to

determine the ability of student learning outcomes.

The quality of the AKM test instrument based on the PISA framework in the Thematic learning of class V Elementary School.

This study was conducted to analyze the quality of the development of the AKM Reading Literacy and Numeration test instrument based on the PISA framework for elementary school students in thematic learning carried out at SDN 6 Arjawinangun, Cirebon Regency, 2022/2023 Academic Year in Odd Semesters.

The product validity test of the thematic AKM test instrument consists of media validation, material, and readability. Meanwhile, the validity of the instruments in the research developed was also carried out to determine whether the test items were valid. The validity of the test questions is an index of grouping students with high abilities and students with low abilities (Sugiyono, 2012). Validity is an important aspect that is measured on the test instrument (Depdiknas, 2016). In line with the opinion of Andikayana *et al.*, (2021) test instruments that have gone through the analysis stage of empirical validity and reliability will proceed to the analysis stage of interpreting test results. At this stage, if the results of the items are invalid, then the items are declared invalid and unfit for use.

The calculation of the validity of the questions was carried out on a small-scale trial. The validity analysis of the small-scale test was carried out using the Microsoft Excel 2019 program. The data from the validity test items that were declared valid and invalid are shown in Table 3.

Table 3. Valid and Not Valid Question Item Results

Items	Total	Criteria	Remark
1,2,3,5,6,7,8,9,10,11,12 13,15,16,17,18,19,21,22,23, 25,26,27,29,30,31	26	Valid	Used
4, 14, 20, 24, 28	5	Not Valid	Not Used

In the small-scale trial there were 5 questions that were declared invalid, which had a validity of less than 2.11. Questions that are declared invalid are questions number 4, 14, 20, 24, 28. Question number 4 does not meet the validity criteria, this is because the validity coefficient of question number 4 is low, that is 0.82. Although many answered questions correctly, this question was declared invalid because question number 4 was made only to focus on memorizing concepts, so it had not been trained in reading literacy skills based on the PISA framework.

Question number 14 was declared invalid, with a validity coefficient of 0.12. After doing the analysis, it was found that there was still some content in question number 14 which was considered inappropriate so that there were still many students who had difficulty in answering question number 14.

Question number 20 was declared invalid, because it does not meet the validity criteria. The coefficient of validity on question number 20 was low, which is 0.90. In question number 20, it is known that many students have not answered correctly and are still having difficulty understanding the questions and have not been able to interpret the meaning of the questions, thus making students confused.

Question number 24 was declared invalid, with a coefficient value of 0.82. Although many answered the questions correctly, there were still many students who still had difficulty understanding the meaning of the questions presented. For other items that are not valid, that is question number 28.

The question is said to be invalid because the coefficient value was low, that is 0.39. The language used in the questions still makes it difficult for students to understand the meaning of the questions presented. In line with the Ministry of National Education, (2016) where one component that needs to be considered in making multiple choice items is language.

There are several factors that affect the validity of the questions in line with research from Rusilowati *et al*., (2016) including (1) the objectivity of the teacher in the assessment (2) the condition of the students (3) the ability of the students to be sufficient. These factors are in line with the validity factor according to Yusup (2018), that is the condition of the students themselves. The condition of the students greatly affects the results of the test instrument work which in turn can affect the value of the validity of the AKM test instrument.

The calculation of the reliability of the questions aims to determine the consistency of the items made. The instrument is said to be able to measure something that is measured if it is consistent. The purpose of being consistent is that the reliability of an instrument can be tested by analyzing the consistency of instrument items using certain techniques (Sugiyono, 2019). Same with validity, where reliability is one of the important aspects measured on the test instrument. Reliable test instruments are needed in learning to be able to correctly measure the abilities and skills of students (Putri *et al*., 2020). So, the test instrument is said to be reliable if it shows the same results even though the test is repeated. Reliability is expressed in numbers and is known as the reliability coefficient. The higher the reliability coefficient of a test instrument, the higher the reliability of the test instrument.

Measuring the reliability of the items was carried out on a small-scale trial. At the time of the small-scale trial, there were 26 items tested which would then be measured for reliability using the Cronbach alpha formula. This adjusts to the type of test instrument that is made, namely multiple choice. The problem is declared reliable if it is larger $r_{11} > r_{table}$. The reliability analysis of the small-scale test was carried out using the Microsoft Excel 2019 program. Before calculating the reliability of the item items, a difficulty index calculation will be carried out for each question. The small-scale test was declared reliable with a reliability coefficient value of 0.941.

The factors that lead to differences in the reliability of small-scale trials are the readiness of students in pursuing questions. Small-scale trials are carried out directly, in addition to small-scale trials there are still many errors that are found. Factors that affect the reliability of the AKM test instrument are in line with Fadhilah & Sri, (2021), that is the gap of an instrument is influenced by the number of questions, the condition of students, the distance from the first test to the second test, the obstacles experienced in the process of implementing the test, and readiness of each student. The results of the reliability analysis of the AKM test instrument described above, the AKM reading literacy test instrument based on the PISA framework in Thematic learning is declared reliable.

The quality of the items that are sought in addition to the validity and reliability tests is the level of difficulty test, which aims to find out which questions are classified as difficult, easy, and moderate. The items of the test items can be stated as good items, if the items are not too difficult and not too

easy, in other words the degree of difficulty of the item is moderate or sufficient. The level of difficulty of the questions shows that students' test abilities can be netted through questions that can be answered correctly by students. A good question is a question that is classified as moderate means that it does not fall into the category of being too difficult or too easy (Arikunto, 2009). Learning outcomes are said to be good if the coefficient of difficulty level reaches a minimum in the medium category. The results of the analysis of the calculation of the multiple-choice questions of learning outcomes are presented in Table 4.

Table 4. Results of Analysis of the Level of Difficulty of Problem Student Learning Outcomes

Items	Total	Criteria
1,2,3,5,6,7,8,9,10,11,12 13,14,15,17,19,20,21,22,23,24, 25,26.	23	Medium
4,16,18	3	Easy

Table 4 shown that of the 26 multiple-choice questions, the level of difficulty was tested with the results that all items had criteria of moderate difficulty and 3 other multiple-choice questions had easy difficulty so that they could be used properly. Analysis of the difficulty level on the item questions means examining the test items from the level of difficulty so that it is obtained which items are included in the easy, medium, and difficult categories. Items in the good category are questions that are not too easy and not too difficult. The level of difficulty of the items is seen from the students' ability to answer, not from the point of view of the teacher as a question maker (Susanto *et al*., 2015). In line with Valen & Satria (2021) the level of difficulty of the items is the opportunity to answer correctly from the items according to a certain level of ability. Items are categorized as good if they have a moderate

level of difficulty, which means that they are not too difficult and not too easy. Problems with categories that are too easy have the meaning that they cannot stimulate students in solving problems. Conversely, if the items in the category are too difficult, it will cause students not to have the motivation to work on the items because it is beyond the ability of students.

CONCLUSION

Based on the findings of the data and discussion, it can be concluded that.

1. The Eligibility of the AKM test instrument based on the PISA framework in the developed thematic learning is declared eligible to be tested on a small scale. The Eligibility of the AKM test instrument based on the PISA framework obtained from the validation of material, language, and construction experts with a value of 93.75% in the very valid category.

2. The quality of the AKM test instrument based on the PISA framework in thematic learning developed in a small-scale trial obtained 26 or 83.87% items categorized as valid from a total of 31 items. The reliability of the AKM test instrument based on the PISA framework with the results of the Cronbach Alpha coefficient value of 0.941 so that the AKM test questions based on the PISA framework have a reliability value in the very high category.

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