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Development of Bupena-Based Test Instruments on the Theme of Care about Living Things

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Abstract

It is still necessary to develop the instruments in the Authentic Assessment Book (BUPENA) used by students because the condition of the questions contained in the current BUPENA are unable to find problems, are not related to everyday life and the questions are very easily accessible. The answer from the internet. This study aims to (1) determine the validity of the development of BUPENA-based test instruments on the theme of Caring for Living Creatures (2) to determine the effectiveness of BUPENA-based test instruments on the theme of Caring for Living Creatures. The development is carried out using the ADDIE model which consists of Analysis, Design, Development, Implementation, and Evaluation. The test instrument developed is in the form of questions related to student life. The validity of the test instrument was carried out by 4th grade elementary school lecturers and teachers. The results showed that the BUPENA-based test instrument on the theme of Caring for Living Creatures was valid and feasible as evidenced by the validation process carried out by the validator on a 10-item questionnaire. The results from the first validator obtained 84.7%, from the second validator the results obtained 87.5%, and from the third validator 94%. Measurement of the effectiveness of the test instrument product obtained a value of 77% in the effective category. The conclusion of the development of the BUPena-based test instrument is declared valid and effective

Keywords
Development; BUPINA; test instrument

I. Introduction

An effective teaching and learning process is influenced by several factors, including factors of teachers, students, curriculum, infrastructure, evaluation, learning resources (books, internet, direct objects, environment, etc.) and so on.

In Law No. 20 of 2003 concerning the National Education System, article 3 states that "Education aims to develop the potential of students to become human beings who believe and fear God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent. and become a democratic and responsible citizen". By referring to this goal, the Indonesian people are actually determined to develop a learning culture which is a prerequisite for the development of science and technology.

Efforts to develop a learning culture are carried out with policies in the implementation of the 2013 Curriculum with the consequence of a fundamental change in classroom learning activities and the assessment process. The 2013 curriculum demands: 1. The learning process in elementary schools is carried out with integrated thematic learning, namely studying all subjects in an integrated manner through the themes of life that students encounter in everyday life. 2. Active student learning process to develop aspects

of attitudes, knowledge and skills. 3. Assessment using a multi-aspect and multi-way approach. Assessment is carried out not only at the end of the learning process, but also throughout the learning process, which is called authentic assessment to assess students' attitudes, knowledge and skills.

In addition to using authentic assessments, the assessments carried out so far have also included tests (including written tests, oral tests and assignments), Mid-Semester Examinations (UTS) and Final Semester Examinations (UAS).

The Authentic Assessment Book (BUPENA) which has been used so far to meet the demands of the 2013 Curriculum still requires development. BUPENA contains material, experimental activities and exercises. In terms of the material in BUPENA, the learning materials and reading content in the textbooks seem monotonous, and the questions in BUPENA seem to be questions that are unable to find problems, are not related to everyday life, and the answers to the tests given are very easily accessible on the internet. Internet.

Based on this background, it is necessary to develop a BUPENA-Based test instrument on the theme of Caring for Living Creatures. The following are some of the problem formulations that can be put forward, namely: How is the validity and effectiveness of the Development of BUPENA-Based Test Instruments in the fourth grade of SD?

Based on the formulation of this question, it can be stated that the research objective is to determine the validity and effectiveness of the Development of BUPENA-Based Test Instruments in the fourth grade of SD.

II. Review of Literature

Development of Test Instruments. Development is an effort to improve technical, theoretical, conceptual, and moral abilities according to needs through education and training. Materially, it means from the aspect of teaching materials that are adapted to the development of knowledge, while methodologically and its substance is related to the development of learning strategies both theoretically and practically.

Research development is a step or steps to develop a new product or improve an existing product, which can be accounted for. The purpose of this research is to develop an existing product. In terms of test development,Arifin (2012:85) suggests that in general a test can be developed through the following stages: 1) determining the purpose of the assessment, 2) compiling a grid, 3) developing an instrument draft, 4) testing and analyzing questions, and 5) revising and assembling question (new instrument). Mardapi in Mawardi (2008:42) explains that instrument development is carried out in a number of steps: compiling specifications for measuring instruments, writing statements or questions, reviewing questions or statements, conducting trials, analyzing instrument items, assembling instruments, taking measurements and interpreting measurement results. According to Sugiyono (2010:298) research and development steps include: 1) problem identification, 2) information collection, 3) product design, 4) design validation, 5) design improvement, 6) product testing, 7) product revision. , 8) trial use, Meanwhile, according to Suryabrata in Mawardi (2008:43), instrument development is carried out in a number of steps, namely developing test specifications, writing questions, reviewing questions, testing items empirically, and administering final forms of tests for standardization purposes. According to Suryabrata in Mawardi (2008:43). The development of test instrument specifications is carried out by determining the general objectives and test requirements, compiling test grids, selecting the type of questions, determining the level of

difficulty of the questions, determining the number of questions, determining how to compile the questions in their final form, and preparing for writing questions and reviewing questions.

The test instrument according to Sugiyono (2010:95) is a tool used to measure the observed natural and social phenomena. Setyosari (2012:152) defines the instrument is a tool used during the implementation of treatment, and according to Riduwan (2012:78) instrument is a tool to measure the value of the variable will be researched.

Problem solving ability is seen as a fundamental part of science learning. According to Gok & Silay in Tutut Nurita (2010:102), problem solving is a process of applying previously acquired knowledge into new, unfamiliar situations so that students are more challenged and motivated to learn it.

Each student has different abilities in solving a problem. This is because problem solving skills require special skills and abilities that each student has.Problem solving ability refers to the effort required by students in determining solutions to problems faced by Selcuk et al in Tutut Nurita (2008:102)

According to Polya Wardaniin Tutut Nurita (2010:103) the strategy in problem solving consists of four steps, namely understanding the problem, making a problem-solving plan, implementing a problem-solving plan and making a review of the implementation of the problem-solving plan.

Problem solving skills should be taught to students from an early age.Problem solving is a series of learning activities centered on procedures for solving problems scientifically faced by Komariah in Merry Dwi Prastiwi (2011: 102).

III. Research Method

The products produced in this research and development areBUPNA-based test instrument on the theme of caring for living things.The development model used in this research is the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model. This research was carried out at SD NEGERI 091390 Panribuan, Dolok Silau District, Simalungun Regency. The research was carried out on April 28-29 2021, the Academic Year 2020/2021. The population of this study were all fourth grade students at SDN 091390 Panribuan, Dolok Silau District. This research sample is limited in number due to the Covid-19 constraint, which is only 10 people

The development model used in the development of this instrument is the ADDIE model. In terms of the ADDIE development research procedure, it is revealed that the ADDIE cycle is composed of several research steps as follows: 1. Analysis, 2. Design, 3. Development, 4. Implementation, and 5. Evaluation. According to the product development steps, this research and development model is more rational and more complete, Endang Mulyatiningsih (2014:194-195). More details can be seen in the image below:

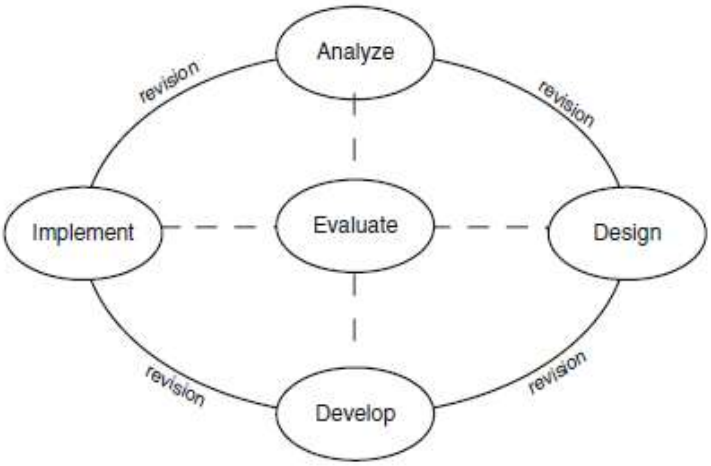

Figure 1. *ADDIE development stage(in Angko, 2013:5) Research Instruments*

The instruments that will be used in the research include:

3.1 Expert/Validator Assessment Sheet

The instrument validation sheet is used to determine the validity of the instrument along with questionnaires and supporting learning tools that were developed by obtaining input, suggestions, or criticism about the expert's assessment of the instrument. The learning device validation sheet consists of: a) The test instrument validation sheet.

This validation sheet provides information about the quality of developing learning instruments based on the assessment of experts/validators. Where the validator is asked to provide a general assessment of the learning device by stating that:

a) Devices can be categorized: very valid (score 4), valid (score 3), moderately valid (score 2), less valid (score 1).
b) Devices can be categorized as: (1) not feasible, (2) eligible with revisions, (3) eligible without revisions.

The instrument grid of the validation sheet used by the validator is shown in the table below:

Table 1. Instrument Grid for Test Instrument Validators

No	Aspect	Indicator	Item	No. Items
1	Material compatibility with KI and KD	Completeness of the test according to the material	1	1
		The flexibility of the test according to the material	1	2
		Depth of test according to material	1	3
2	Material Accuracy	Accuracy of concepts and questions	1	4
		Principle accuracy	1	5
		Accuracy of facts and data	1	6
		Sample question accuracy	1	7
		Accuracy of notation, symbols and icons	1	8
3	Supporting Learning	Reasoning (reasoning)	1	9
		Linkages	1	10

.	Materials .	Communication (write ad talk)	1	11
		Application	1	12
		The attractiveness of the test according to the material	1	13
		Encourage seeking further information and conclusions	1	14
4	Material Update	The suitability of the test with the development of science	1	15
		The image presented is actual	1	16
		Using case examples that are close to students	1	17
		Library updates	1	18

Source: Romi Sastria Wahono in Masri Kusumawardhana (2014)

The data collection techniques used for the development of this test instrument are as follows: questionnaire data validation of the test instrument, data on the effectiveness of the test instrument. Data analysis techniques using Descriptive Statistics and Validity Data Analysis were carried out on the development of test instruments. The validator consists of 3 science lecturers and 1 elementary science teacher.

IV. Results and Discussion

This study uses the type of Research and Development (R&D) with the product developed in the form of a test instrument in science learning with the theme Caring for the Environment in Sub-Theme Three, Let's Love the Environment, with a total of ten questions developed.

The development model used in this research is ADDIE, with the stages of Analysis, Design, Develop, Implementation, and Evaluation. Based on the development and research conducted, the following research results were obtained:

1. Analysis Results (Analysis)

The first stage in this research is analysis (analysis). At this stage, what is done is Needs Analysis, Curriculum Analysis and Analysis of Student Characteristics.

a. Needs Analysis Results

Through interviews with class 4 elementary school teachers, the following results were obtained: teachers still had difficulties in using it. The questions given in BUPENA are not able to find problems, and the questions presented are also not related to everyday life. In addition, test questions are also easily accessible on the internet, so students often look for an easy way by looking at answers from the internet.

b. Curriculum Analysis Results

The presentation of the indicator formulation based on the basic competencies contained in the 2013 Curriculum is as follows:

Table 2. Formulation of Indicators

Basic Competence (KD)	Indicator
a. Understand the importance of balancing and preserving natural resources in the environment	a. Identify environmental balance problems
b. Make efforts to conserve natural resources in the environment	b. Identify balance problems

2. Design Results

At this stage the researcher begins to design the test instrument that will be developed starting from the cover, where to fill in the student's name, basic competencies, indicators and contents of the developed test instrument.

3. Development Results (Development)

The third stage of the ADDIE development model is the development stage. At this stage the validator sees the feasibility of the designed test instrument. After getting a feasibility assessment, the test instrument was revised according to the validator's criticisms and suggestions. The validator consists of two lecturers, namely Nuri Ramadhan, M.Pd (North Sumatran Nahdatul Ulama University Lecturer) and Emy Hariati Lecturer, S.Pd., M.Pd (North Sumatra Nahdatul Ulama University Lecturer) and one 4th grade teacher at SD 091390 Panribuan Dolok Silau District, Simalungun Regency, namely Lustriaty Damanik, S.Pd.

a. Validation result

1. Assessment of the test instrument by the validator
   a. Feedback, suggestions and criticism from validator one

Table 3. Results of Revised Validator One

Lecturer Name	Suggestions, critiques and feedback
Nuri Ramadhan, M.Pd	• We recommend that you include the author's name • Loading the name of the supervisor on the cover • Loading the student name sheet halaman • It's better to include instructions for filling out questions • The image in the test instrument should be real • The source of the image must be clear • Interesting color combination • The writing must be clear, for example from plastic being changed to plastic • Standard language used • Paper size

Table 4. Revision of Validator Two

Lecturer Name	Response
Emy Hariati, S.Pd.,M.Pd	Writing corrected If you can, the source of the image doesn't have to be too long If possible, include the back cover

c. Responses, suggestions and criticisms from the three validators, namely elementary school teachers

Table 5. Revision of Validator Three

Lecturer Name	Response
Lustriaty Damanik S.Pd	It is better if the author's biodata is made (profile) It's better if the question instructions are more clear Appropriate test instrument

4. Results of implementation

The fourth stage of the ADDIE development model is the implementation stage. After being declared eligible by the validator, the test instrument was applied in class IV at this implementation stage followed by 10 students.

5. Evaluation (evaluation)

Evaluation is the last stage of the ADDIE development stage. Evaluation can be carried out at each stage of development and an overall evaluation is carried out at the end of development activities. This stage is carried out by evaluating the results of the assessment by the validator.

4.1 Discussion of the results of the development of test instruments

a. Test Instrument Validity Analysis

Data analysis of the test instrument validation results was based on the average validation results of 2 lecturers and 1 teacher for fourth grade elementary school. The results of the validity of the given value validator are one to four. Interval data were analyzed by calculating the average answer based on the respondents' scores.

Table 6. Overall Assessment Data on Each Aspect of the Validator

No	Aspect	Validator			Average	Category
		Lecturer 1	Lecturer 2	Elementary School teacher		
1	Pages and covers	3.5	3	3.7	3.4	good
2	The suitability of the material	3	3.5	4	3.5	good

	with KD					
3	Material accuracy	3.2	3.2	3.5	3.3	good
4	Supporting learning materials	3.5	3.7	4	3.7	good
5	Material updates	3.5	4	3.7	3.7	good

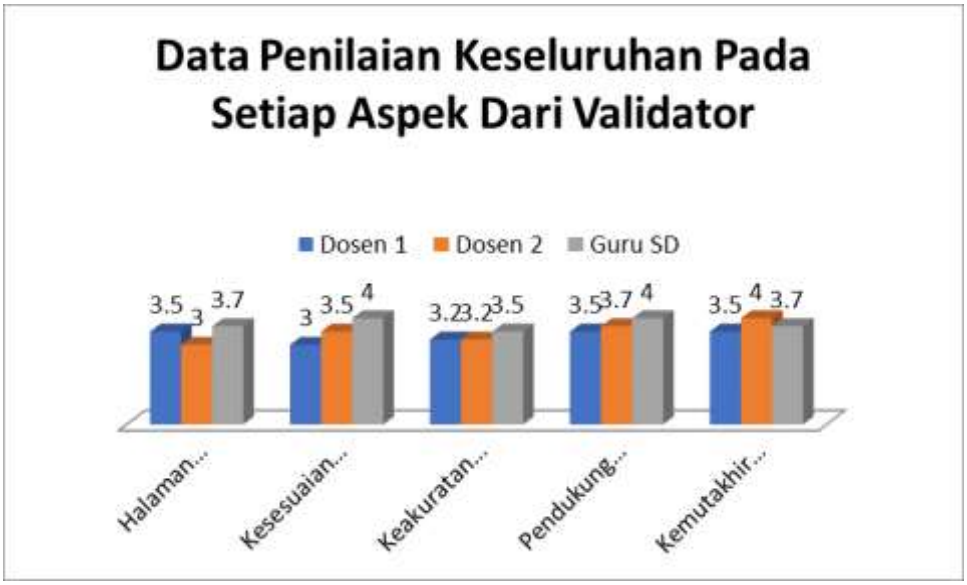

Figure 2. *Validator Assessment Data on Each Aspect*

Based on the results of the validation from validator one, it can be concluded that the test instrument in science learning with the theme of Caring for Living Creatures in the sub-theme of Ayok Loves the Environment on criteria 81 – 100% is declared valid. The following is data from all aspects of the validator.

Validator One:

$$persentase\ kevalidan = \frac{jumlah\ skor\ yang\ diperoleh}{jumlah\ item} x100\%$$

$$= \frac{61}{72} x100\%$$

= 84.7%

Validator Two

$$persentase\ kevalidan = \frac{jumlah\ skor\ yang\ diperoleh}{jumlah\ item} x100\%$$

$$= \frac{63}{72} x100\%$$

$$= 87{,}5\%\%$$

Three Validators

$$persentase\ kevalidan = \frac{jumlah\ skor\ yang\ diperoleh}{jumlah\ item} x100\%$$

$$= \frac{68}{72} x100\%$$

= 94.4%

b. Test Instrument Effectiveness Analysis

The results of the effectiveness analysis are formulated in the answer scores obtained by students. The learning outcomes test is carried out after the students have studied the sub-themes of the developed test instrument. Student test results data are presented in the following table:

Table 7. Student learning outcomes test

No	Student's name	Mark
1	Diga Santos Tarigan	80
2	risk	80
3	Joi Peranata Ginting	70
4	Iin Katerina Tarigan	70
5	Lona Yunita Ginting	80
6	Talita Gracia Ginting	60
7	Yana Sahmetia Barus	90
8	Angga Adi Tarigan	70
9	Aditya Tarigan	90
10	Sasya Oktariani	80
Amount		770

KKM = 70

$$\text{Kefektifan audience} = \frac{Tse}{Tsh} x100\% = \cdots .\%$$

$$\text{Kefektifan audience} = \frac{77}{100} x100\% = 77.\%$$

From the results of the calculation of the effectiveness of students obtained 77% it isin the range of 61.00% - 80.00% the criteria are already quite effective.

$$\text{Kefektifan audience} = \frac{Tse}{Tsh} x100\% = \cdots .\%$$

$$\text{Kefektifan audience} = \frac{68}{100} x100\% = 68\%$$

From the results of the calculation of student effectiveness, it was found that 68% it was in the range of 61.00% - 80.00%, the criteria were quite effective.

$$\text{N Gain} = \frac{H\ bupena\ lama - H\ bupena\ baru}{H\ bupena\ lama} x100\%$$

$$\text{N Gain} = \frac{68-77}{68} x100\%$$

= -0.1

The product developed is carried out according to the ADDIE model with five stages, namely analysis, design, development, implementation and evaluation. Then after the product has been developed, product validation is carried out to the validator after being declared valid and effective, testing is carried out on students. The products developed are finally related to the daily lives of students. Based on this, the development of test instruments is very helpful for teachers in measuring students' abilities by presenting covers, attractive colors and questions that are close to students' lives, it can be concluded that 75% of students achieve scores in the range of 61% -80% which are considered quite effective.

V. Conclusion

Based on the results of research and discussion regarding the development of a BEPENA-based test instrument, it can be concluded as follows:

1. The Development of BUPENA-Based Test Instruments on the Theme of Caring for Living Creatures was declared valid.
2. The BUPENA-Based Test Instrument on the Theme of Caring for Living Creatures was declared effective.

Based on the results of the study and the conclusions above, it can be suggested as follows:

1. For teachers: The test instrument that has been developed by researchers can be an alternative to measure students' abilities to measure students' abilities in the theme of Caring for Living Creatures.
2. For researchers: For the preparation of the development of test instruments on other themes

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