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Journal Homepage: www.ujssh.com

Development of Science Module Based Demak Local Wisdom to Improve Learning Result of Fifth Grade Elementary School Students

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Received 28 May 2022, Revised 11 June 2022, Accepted 23 June 2022, Available online 25 June 2022

To link to this article: https://doi.org/10.53797/ujssh.v1i1.4.2022

Abstract: The objectives in this study are 1) Producing natural science modules based on local wisdom Demak for class V elementary school, 2) Describing the application of natural science modules based on local wisdom Demak in learning in class V elementary school, 3) Analyzing the improvement of learning outcomes of students of class V elementary school after using natural science modules based on local wisdom Demak. The design of this research is Research and Development (R&D) which refers to the opinions of Borg and Gall. The steps consist of 1) Preliminary research and information collection, 2) Planning, 3) Initial product format development, 4) Initial trials, 5) Product revisions, 6) Field trials, 7) Product revisions, 8) Field trials, 9) Final product revisions, 10) Desimination and implementation. The data collection techniques used are observation, interviews, tests, and documentation. Data validity tests use validity tests, rehabilitation tests, different power tests, and difficulty levels. Data analysis techniques use validity test analysis, normality test analysis, homogeneity analysis, T-test, and N-gain score test. The result of this study is a natural science Module developed with the approach of local wisdom of the Demak district area declared valid by two expert validators lecturers of Muria Kudus University with scores of 70 and 75 with valid criteria with little change and can be used in learning. The significance value of 2-tailed on the T Paired test of 0.00. The value of t calculated in experiment 1 is 11.113, and t calculates experiment 2 by 8.198, which is greater than 2.08596 (t-table value). The use of natural science Modules based on Local Wisdom of Demak Regency is categorized as quite effective in increasing the learning outcomes of natural science students of Class V elementary school. The results of the N-Gain score test calculation showed that the average N-gain score for experimental class 1 was 65.9034 or 65.90%. The N-gain score for experimental class 2 was 65.4372 or 65.44%. The conclusion in this research is that this module deserves to be used as material in the learning. In addition, the use of natural science modules based on the local wisdom of Demak Regency is effective enough to improve the learning outcomes of students of grade V elementary school.

Keywords: Learning result students, local wisdom, natural science module

1. Introduction

Local wisdom can be understood as local ideas that are wise, wise, good value, embedded, and followed by members of the community. Local wisdom is a characteristic of a particular region or region that has cultural values, developing in the local sphere from generation to generation (Sartini, 2004).

Local wisdom is something that belongs to a group and is passed down through generations. Aspects of local wisdom are integrated into learning as an effort to cultivate the value of local wisdom to form the character of students (Febriani et al., 2022). Local wisdom referred to here is culture, customs, traditions, and so forth. More specifically local wisdom can be in the form of monuments, special food, regional dances, regional songs, and much more. But if we look at the current state of the Indonesian nation, especially the youth prefer to imitate outside cultures than our own indigenous culture. Local culture began to erode the flow, as a result little by little the cultural heritage and local wisdom began to be abandoned (Dewinta et al., 2021).

Local wisdom is used as a basis in Natural Science learning of them. With the intention that students recognize the area where they live, have their identity, and do not want the culture of the area. Planting a load of local wisdom in students one of them through learning modules.

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According to Setiawan et al. (2017), the module is a book written with the aim that learners can learn independently without or with the guidance of teachers. The Natural Science module is one of the teaching materials used at the elementary level.

Natural Science is a rational and objective knowledge of the universe with all its contents" (Weyl, 2021). The rationale here means acceptable common sense while objective means according to the object.

The results of learning observations show that the Natural Science learning process is still teacher-centered, although the teacher has often participated in training on child-centered learning. At the time of teaching Natural Science learning, teachers use lecture methods, question and answer, and problem training. Based on the results of the interview it is known that the teacher only uses one student handbook, namely the teacher's book and the student's book from the ministry of education.

The results of the analysis that has been conducted on curriculum teaching materials in 2013, there are some weaknesses in teacher books and student books, among others: 1) material in the theme teaching book 5 classes V is less complete only limited to fundamental knowledge, 2) in the teaching book theme 5 class V there is no material about the local wisdom of Demak Regency, 3) the content of the material in the teaching book theme 5 class V is presented in general and less contextual to the daily life of students, and 4) in the theme teaching book 5 class V there is no question of evaluation at the end of learning.

Based on the results of observations, interviews, and analysis of the teaching book, the researchers identified several problems that must be solved, namely: 1) Natural Science learning has not been optimal, 2) Natural Science learning has not contained local wisdom in the Demak area, and 3) modules have not been able to facilitate students' needs in improving learning outcomes in Natural Science learning.

Based on the identification of these problems, researchers offer solutions that can be used to overcome the problem, among others: (1) to optimize teacher Natural Science learning must be able to transform teacher-centered learning into student-centered learning, (2) incorporate the content of local wisdom of the Demak area into Natural Science learning by linking the material taught with the conditions of the student's immediate environment, and (3) there must be the development of Modules that have a load of local wisdom Demak and can facilitate the learning needs of Natural Science.

1.1 Conceptual Framework

According to Walter Dick and Cary in Anwar, Ruminiati, & Suharjo. (2017), the module is interpreted as a printed learning unit that is reviewed from the physical form of printed learning materials, its function as a medium of self-study, and its contents in the form of a unit of learning material. According to Houston & Howson, learning modules include a set of activities aimed at making it easier for students to achieve a set of learning goals. Meanwhile, according to Setiawan et al. (2017), the module is a book written with the aim that learners can learn independently without or with the guidance of the teacher so that the module contains at least all the basic components of teaching materials.

According to Jerrold E, Kemp in (Anwar et.al., 2017) module is interpreted as a self-learning package containing one topic or unit of learning material and requires learning time several years for one week.

Based on the above understandings, it can be concluded that the module is one form of print media that contains a learning unit designed by the teacher or others to facilitate the learning process that allows learners who use it can achieve their goals independently with a little help from the teacher.

Trianto (2010: 136). Natural Sciences is part of Science or Science which all comes from the English "science". The word science itself comes from the Latin word "Scientia" which means I know.

Sulistyorini, (2007: 39) argues that Natural Science is related to how to find out about nature systematically so that Natural Science is not only the mastery of systematic collection and Natural Science is not only the mastery of knowledge collection in the form of facts, concepts, or principles but also a process of discovery.

Based on the above understanding it can be concluded that Natural Science is a science that studies the symptoms of nature obtained through systematic observation and experimentation and explained with the help of rules, laws, principles, theories, and hypotheses.

According to Mack et al. (2021) stated some of the purposes of Natural Science education for elementary school learners. There are objectives: 1) Understanding the surrounding nature, including natural and man-made objects and the concepts of Natural Science contained therein; 2) Have the skills to gain knowledge, especially Natural Science in the form of "process skills" or simple scientific methods; 3) Have a scientific attitude in knowing the surrounding nature and solving the problems it faces, and realizing the greatness of its creator; 4) Have the basic knowledge necessary to continue their education to higher education.

Based on the above objectives, it can be concluded that Natural Science learning in elementary school requires a teaching and learning process that is not too academic and verbalizes but emphasizes logical application.

Zamroni (2021) in Khusniati (2014) reveals that local wisdom is the wisdom of original knowledge of a society derived from the noble value of cultural traditions to regulate the order of people's lives. The local wisdom is the community's wisdom or local genius deriving from the lofty value of cultural tradition to manage the community's social order or social life. Local wisdom is a local cultural value that can be used to regulate the order of people's lives wisely

or wisely. The local wisdom is the value of local culture having been applied to wisely manage the community's social order and social life.

Understanding local wisdom according to Mungmachon (2012), it is the attitude, outlook, and ability of a community to manage the spiritual and physical environment that gives it resilience and growing power within the territory in which it belongs. Local wisdom can also be called creative answers to local geographical-geopolitical, historical, and situational situations (Wibowo, Wasino, & Setyawati, 2012).

Wagiran (2012) argues that local wisdom is a contextual culture. Wisdom always comes from human life. When life changes, local wisdom will change. Furthermore, some characteristics of local wisdom, among others: 1) local wisdom appears to be simple, but often is elaborate, comprehensive, diverse; 2) It is adapted to local, cultural, and environmental conditions; 3) It is dynamic and flexible; 4) It is tuned to needs of local people; 5) It corresponds with quality and quantity of available resources; and 6) It copes well with changes.

According to Wagiran (2012) in the cultural sphere, the physical dimensions of local wisdom include aspects: 1) traditional ceremonies, 2) cultural heritage, 3) tourism, 4) traditional transportation, 5) traditional games, 6) cultural infrastructure, 7) traditional clothing, 8) cultural heritage, 9) museums, 10) cultural institutions, 11) arts, 12) cultural villages, 13) arts and crafts, 14) folklore, 15) children's playing, and 16) puppets.

Kennedy (2006) state that learning outcomes are behavioral changes that learners get after experiencing learning activities. The acquisition of these aspects of behavior change depends on what the learner learns. Therefore, if the learner learns the knowledge of the concept, then the change in behavior obtained is in the form of mastery of the concept.

Development research conducted by Handayani, et al. (2015) uses Borg and Gall steps consisting of three main stages, namely introduction, development, and validation. The results of the development of effective learning tools to improve the learning outcomes of learners in class VII of Public Secondary School 2 Jepara, as evidenced by a marked improvement in the results of the paired t-test sample with a significance value of 0.000 <0.05, and a high increase (gain > 0.7), as well as learning results achieved differed significantly from the control group.

1.2 Research Objectives

The researchers developed the Natural Science Module Based on Local Wisdom Demak. With the development of this module, it is expected that Natural Science learning can be optimized so that it can improve students' learning outcomes and be able to understand the meaning of cultural diversity, especially Demak Regency, and can apply it in everyday life.

2. Methodology

2.1 Research Design

This research approach is Research and Development (R&D) or Research and Development which refers to the opinion of Borg and Gall. The procedures in this study consist of 1) Research & Initial Information Collection, 2) Planning, 3) Develop a preliminary form of the product, 4) Preliminary field testing, 5) Main product revision, 6) Main field testing, 7) Operational product revision, 8) Operational field testing, 9) Final product revision, 10) Dissemination and implementation.

The hypothesis in this study is H0) there was no significant difference in the learning outcomes of grade V elementary students before and after using the Natural Science Module based on local wisdom Demak. H1) there is a significant difference in the learning outcomes of students of grade V elementary school before and after using the Natural Science Module based on local wisdom Demak

2.2 Data Source

The data source comes from the product trial of the Natural Science Module based on local wisdom Demak consists of 1) Module Expert, namely lecturer of Muria Kudus University, 2) Teacher of class V of Krajnbogo Public Elementary School, Teacher of Class V of Pamongan Public Elementary School 2, and as a teacher of Class V Jatimulyo Public Elementary School, 3) Students of class V of Krajanbogo Public Elementary School Bonang Subdistrict, students of class V Pamongan Public Elementary School 2 Guntur District, and students of class V Jatimulyo Public Elementary School.

The subjects of this development research are students of class V of Krajanbogo Public Elementary School with the number of students as many as 20 students as experimental class 1, students of class V of Pamongan Public Elementary School 2 with the number of 20 students as Experiment class 2, and students of class V Jatimulyo Public Elementary school as many as 20 students as control classes. This development research will be carried out in the 1st semester of the 2020/2021 school year.

2.3 Data Collection Techniques

Interviews are used as data collection techniques if researchers want to conduct preliminary studies to find problems that must be studied, and also if researchers want to know things from respondents more in-depth (Sugiyono, 2016). The interview that the researcher used was a structured interview with instruments as guidelines for interviews conducted

with teachers of class V of Krajanbogo Public Elementary School, and teachers of class V of Pamongan Public Elementary School 2 to find out the obstacles faced when teaching Natural Science learning.

Observation is done through direct observation of the conditions in the classroom at the time of the learning process. This method is carried out at the beginning of the study aims to find out the initial condition of students and is carried out during the implementation of learning using Natural Science modules based on local wisdom of Demak Regency. In addition, observations of products in this study. The product in this research is an Natural Science Module for the learning of grade V elementary students. In the observation of this product, the one who acts as an observer is an expert. The results of the expert observations are then used as data on improvements to the products made.

The test used in this study was a written test. Tests are developed by learning competency indicators. Tests are conducted before and after testing to determine the effectiveness level of the module developed. The test method used is a test to measure the effectiveness of modules, namely the pretest and posttest tests to find out the large improvement in student learning outcomes after using the Natural Science module based on local wisdom (local wisdom).

Documentation methods are used to get data about the initial abilities of students who are sampled by the study. This method is done by collecting a list of student names and repeat values which are then analyzed and determine the homogeneity of the population.

The instruments used in research and development are divided into 3 stages. The first stage of potential and problem instruments used the interview guidelines for needs analysis. The second stage is the Validity of the design of the instrument that the expert validation sheet provides. The stage of thinking, the effectiveness of the instrument products used cognitive tests of class V students.

2.4 Data Validity Test

The validity used in this study is the validity test, instrument reliability test, difficulty level test, and another power test with the help of the SPSS for Windows Version 23 program.

2.5 Data Analysis Techniques

Data analysis techniques using validation test results analysis, normality test analysis, homogeneity test analysis, product effectiveness test analysis, and hypothesis test analysis are performed to determine the difference in average learning outcomes between experimental classes and control classes. The significance of the gain is determined through the t-test (independent sample t-test) using the significance level ($\alpha = 5\%$).

3. Findings and Discussion

3.1 Design Development of Natural Science Module Based on Local Wisdom of Demak Regency

The product in this research and development is the Natural Science Module with local wisdom of Demak Regency. Then the module is validated by lecturer experts. Validation results are in Table 1.

Table 1. Recap of expert validation results

Validator Name	Score	Conclusion	Information
Validator 1	75	Valid and can be used with minor revisions	Revision in the writing procedure section must be consistent, include basic competencies at the beginning of the module
Validator 2	72	Valid and can be used with minor revisions	Local content is highlighted again in each sub-topic. try the source of the photo comes from the researcher / include the source

Based on Table 1, the module is declared valid with a score of 70 and 75 with the criteria that the module is valid and can be used for research and can be used as learning material in grade V elementary students.

This is in line with research conducted by Pratama & Fikriyah (2021) on the Development of E-Modules on Thematic Learning in Class V Public Elementary School No. 2 Waruroyom. The results showed that the feasibility value by material experts with a value of 93.5%, while eligibility by media experts with a value of 62.5% and thus obtained the final result for the feasibility of the thematic e-module class V which is 78%. This suggests that e-modules using Sigil software generated in the study are considered feasible for use in the thematic learning of local wisdom.

3.2 Application of Natural Science Module Based on Local Wisdom Demak in Learning in Class V Elementary School

The results of the T-test from the research data analyst are in Table 2.

Table 2. T Paired sample test results

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pretest Experiment 1 – Posttest experiment 1	-33.08250	13.31369	2.97703	-39.31350	-26.85150	-11.113	19	.000
Pair 2	Pretest Experiment 2 – Posttest experiment 2	-30.83350	16.81971	3.76100	-38.70537	-22.96163	-8.198	19	.000

Based on the average Natural Science learning outcomes of class V students in experimental classes 1 and 2, then to prove a significant difference it is necessary to look at the value of its 2-tailled significance. In the T paired test this test sample values its significance of 2-tailled of 0.000. Thus H1 is accepted and H0 is rejected. Why so, if the 2-tailled significance value is less than 0.05 then H1 is accepted, and H0 is rejected. Because the 2-tailled significance value in the study was 0.000, where the value was less than 0.05, H1 was accepted and H0 was rejected. The value of t calculated in experiment 1 is 11.113, and t calculates experiment 2 by 8.198, which is greater than 2.08596 (t-table value). Based on the exposure, the modules that researchers use are proven to support the learning outcomes of grade V elementary students well.

This is in line with research conducted by Sasmita & Fajriyah (2018: 168-2) with the title of Development of Quantum Learning Modules Ecosystem Theme for Grade V Elementary School. The results of his research showed that the average learning value of class V students amounted to 81.5. The value is obtained from the post-test given after the use of modules based on quantum learning ecosystem themes. Thus, the modules developed are proven to support the achievement of learning outcomes on the theme of the ecosystem well.

3.3 Effectiveness of Natural Science Module Based on Local Wisdom Demak to Student Learning Outcomes Class V Elementary School

Improvement of Natural Science learning outcomes of grade V elementary students is obtained from pretest grades before learning using Demak local wisdom-based Natural Science Modules and posttest grades after students use Demak local wisdom-based Natural Science Modules. The effectiveness of students' learning outcomes is first tested using a normalized gain test. The N-gain test is performed to determine the increase between the pretest and posttest values. The results of the N-gain test can be seen in the following Table 3.

Based on the results of the N-gain score test calculation, it shows that the average value of the N-gain score for experimental class 1 is 65.9034 or 65.90%. The N-gain score for experimental class 2 was 65.4372 or 65.44%. Meanwhile, the average N-gain score for the control class (book issued by the Ministry of Education) is 53.2227 or 53.22%. By looking at the table of N-gain score test results, data was obtained that the average N-gain score of the 1st experimental class by 65.90% and the experimental class 2 by 65.44% using the Natural Science Module based on Local Wisdom of Demak Regency was categorized as effective enough to improve the learning outcomes of grade V elementary students.

This is in line with research conducted by Nilasari, Djatmika, & Santoso (2016) which states that there are differences in student learning outcomes in control classes and experiments using contextual learning modules, namely final test results in experimental classes higher than control classes.

Table 3. N-gain score test results

Class				Statistic	Std. Error
N-Gain	Experiment I	Mean		65.9034	4.13925
		95% Confidence Interval for Mean	Lower Bound	57.2399	
			Upper Bound	74.5670	
		5% Trimmed Mean		66.6510	
		Median		67.7009	
		Variance		342.668	
		Std. Deviation		18.51129	
		Minimum		25.01	
		Maximum		93.34	
		Range		68.33	
		Interquartile Range		28.88	
		Skewness		-.649	-.512
		Kurtosis		-.113	-.992
	Experiment II	Mean		65.4372	4.70808
		95% Confidence Interval for Mean	Lower Bound	55.5831	
			Upper Bound	75.2914	
		5% Trimmed Mean		65.8121	
		Media		70.3323	
		Variance		443.320	
		Std. Deviation		21.05517	
		Minimum		30.00	
		Maximum		94.12	
		Range		64.12	
		Interquartile Range		32.84	
		Skewness		-.540	-.512

4. Conclusions and Recommendations

Based on the results of research and discussion, the conclusions in this research and development are as follows:

a. The Natural Science module developed with the local wisdom approach of the Demak district area was declared valid by two expert validators of lecturers of Muria Kudus University with scores of 70 and 75 with valid criteria with little change and can be used in learning.
b. Development of Natural Science modules based on local wisdom (local wisdom) Demak Regency can improve the learning outcomes of students' Natural Science in grade V elementary school
c. According the table of N-gain score test results, data is obtained that the average N-gain score means the use of local wisdom-based science modules in Demak Regency in learning is quite effective in improving science learning outcomes for fifth grade elementary school students.

The advice that can be given by this study is 1) Natural Science module based on local wisdom (local wisdom) Demak Regency only contains local wisdom of Demak Regency. Teachers who want to teach the cultural diversity of the area other than those in teaching materials can take material from the internet or other sourcebooks. 2) The development of Natural Science modules based on local wisdom (local wisdom) Demak Regency can improve the learning outcomes of Natural Science students of grade V elementary school so that teachers can develop Natural Science Modules with a local kaerifan approach to be used in the learning process in other subjects. 3) In this research several

research opportunity be done for advanced research, for example, it is necessary to develop a learning approach and local wisdom in addition to Demak Regency.

Acknowledgement

The authors would like to express their gratitude to the Universitas Muria Kudus for their support in providing both facilities and financial assistance for this research.

Conflict of Interest

The authors declare no conflicts of interest.

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