Research Article

Development Of Environmentally Friendly School Model In Biak Numfor Regency Of Papua Province

Sultan Rasyid[1*] ,Muhammad Ardi[2], Mithen[3]

[1]Student of Population and Environmental Education Study Program, Makassar State University
[2]Lecturer of Population and Environmental Education Study Program, Makassar State University
[3]Lecturer of Population and Environmental Education Study Program, Makassar State University
[1]sultanrasyid.au@gmail.com,[2] ardilpm@gmail.com,[3] mithen.lullulangi@gmail.com

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Abstract
According to Law No. 23 of 1997, theenvironmentis a unitaryspacewithallobjects, forces, conditions, andlivingthings, including human sand their behavior, which affect the continuity of life and the welf are of humans and other living creatures. While the school environmentis the second main educational environment. Students, teachers, administrators, counselor slive to gether and carry out regular and well-planned education(Hasbullah, 2013:36). According toDalyono (2010:131) school environment is one of the factors that contribute to the growth and development of children, especiallyfortheir intelligence. According to Oemar Hamalik (2009:6) school environment is a placetoteachandlearn. So, itcanbesaidthatthe school environment is the state of the school wherelearningtoteachthatalsoaffectsthesuccessrate of students' learning (MuhibbinSyah, 2010:152).

1. Introduction

According to Law No. 23 of 1997, theenvironmentis a unitaryspacewithallobjects, forces, conditions, andlivingthings, including human sand their behavior, which affect the continuity of life and the welf are of humans and other living creatures. While the school environmentis the second main educational environment. Students, teachers, administrators, counselor slive to gether and carry out regular and well-planned education(Hasbullah, 2013:36). According toDalyono (2010:131) school environment is one of the factors that contribute to the growth and development of children, especiallyfortheir intelligence. According to Oemar Hamalik (2009:6) school environment is a placetoteachandlearn. So, itcanbesaidthatthe school environment is the state of the school wherelearningtoteachthatalsoaffectsthesuccessrate of students' learning (MuhibbinSyah, 2010:152).

Environmental education in schools is education that provides understanding to each individual in order to form attitudes and behaviors that are aware of the importance of maintaining the environment as a place where humans live and interact with other living things and the natural potential that exists around them. The implementation of Environmental Education learning is very closely related to the utilization of the environment where students are located, including the utilization of existing local potentials (EnyWinaryati, 2010).

According toZsoka et al. (2013) and Hermon (2014), knowledge of the environment means knowledgeand awareness of environmentalproblemsandsolutions. Educationalinstitutions have a verystrategicrole in realizingexpectationssothattheycanprovidestudentswithknowledge, attitudes, andbehaviorssothatthey have goodinsightsaboutenvironmentalconservationaccompaniedby prevention of environmentaldamage.

Onerealization of this concept is throughthe development of anenvironmentallyfriendly school model thatcreates attitudes, behaviorandprovidesstudents' understanding of theimportance of environmental conservation through savings by modifying the facilities and infrastructureused. Thiseco-friendly school model is an effort toprovide environmental knowledgeamong students. This is based on theassumptionthat if knowledge about the environment increases, thebehavior of caringforthe environment alsoincreasesand will reduce environmental damage in thefuture (Awan, 2013; Juraid et.al, 2019; Hamzah, 2013; Zhang *et al*,2009).

The developmen to fanenvironmentally friendly school model is a conscious effortto create student attitudes and behavior, as an effortto create individuals to wards lifestyle changes and behavior to saveexcessiveuseofresources as a form of concern for the useand conservationof natural resources in a reasonablemanner. This is supported by research Alexandar andPoyyamoli (2014)aboutthe model of school facilities development for sustainabled evelopment which the nencourages students to preserve and protect the natural environment in theschooland in thes urrounding environment.Yue et.al (2020)in his research also states that environment alresponsibility will encourageindividuals to payattentionto environmental problems, motivate

student stotake responsibility initiatives in environmentalprotectioneffortsandpromotepositivepracticesof pro-environmentalbehavior.

As mandatedby Law no. 23 of 1997 concerning Environmental Managementand Law no. 32 of 2009 concerning Environmental ProtectionandManagement, the Minister of EnvironmentRegulation No. 2 of 2009 with the amendment No. 05 of 2013 concerning Guide lines for the Implementation of the Adiwiyata Program. This program will spur school stoach ieveadiwiyatapredicate as a formofschoolsuccess in implementing schoolcare for the environment with out puts that are expectedtoprovideprovisionsforstudents' thinking patterns on the importance of environmental balance, soitmustbepreserved.

Regulation of the Minister of Environment no. 5 of 2013 concerning guidelines for the implementation of adiwiyata program in its description on the integration of environmental education in the curriculum of Adiwiyata school program has become a certification guideline of Adiwiyata schools that have produced many schools with Adiwiyata predicate in Indonesia. However, in the assessment process Adiwiyata school is still more focused on the administrative process so that the physical aspect seems to be ruled out. The assessment model seems to focus only on environmental infrastructure and overrides the assessment of knowledge, attitudes, and behaviors of learners in applying environmental learning as a form of change for individuals who care about environmental sustainability. The absence of detailed technical standards as a reference assessment standard in accordance with the standards of infrastructure and environmental management so as not to cause ambiguous statements in the Adiwiyata assessment process.

One of the regencies in Papua Province is Biak Numfor Regency which is the research area of choice for the government's Adiwiyata program. Lagging behind in access to information, transportation, culture and technology due to its location in the northern part of the island of Irian Jaya (Papua Province) makes logistics distribution difficult. This has an impact on increasing the price of materials and materials including the need for school infrastructure in Biak Numfor Regency. The author wants to look further into the schools that have received the Adiwiyata predicate related to efforts that are suitable to be developed in order to compensate for the backwardness and limitations of facilities, infrastructure, and human resources so that they can still become environmentally friendly schools with local culture.

In Biak Numfor Regency, there are two junior high schools that have implemented Adiwiyata, namely: (1) SMP 2 Biak Kota received the national Adiwiyata award in Jakarta in 2016 and (2) SMP Negeri 3 Biak Kota received the title of National Adiwiyata school in 2014/2015 and several other schools. The success in winning the Adiwiyata award at the national level is a tangible manifestation that the Biak Numfor Regency Government still cares about the management of a clean, healthy and green school environment. With the achievements obtained by the two junior high schools above, researchers are interested in conducting research on the two junior high schools.

However, the initial observations made on June 4, 2020, found the fact that SMP 2 Biak Kota and SMP Negeri 3 Biak Kota, both had not implemented the Adiwiyata program optimally. It is proven by the graffiti on the walls of the school, bathrooms that are still not clean and smelly, sanitation that is not pleasing to the eye, flower plants that are not neatly arranged, and so on. This is not in accordance with the participatory and sustainable components of environmental activities in the Adiwiyata program.

In addition, there are only a few educatorswhointegrateenvironmentaleducationintothe syllabus or lessonplans. In fact, toimplementtheAdiwiyata program, a minimum of 70 percent of educatorsintegrateenvironmentaleducationintothe syllabus or lessonplans. Apart fromthat, thesocializationactivitiescarried out bythe school tostudentsregardingthemeaning, purpose, and benefits of environmentallearning are stilllackingand even ignored. So, fromtheexplanationabove, the researcher aimstofind out thedescription of thelearningmaterial, the steps forits development, the level of validityandpracticality, andalsotheeffectiveness of thematerialdeveloped at theAdiwiyatareceiving school in Biak NumforRegency, Papua Province.

2. Research methodology

A. Types of Research

This research is an educational development research (Educational Research & Development) known as the Four-D device development model which consists of 4 stages of development, namely Definition, Design,

Development, and Dissemination. Development research is defined as a systematic study in the design, development, and evaluation of programs, processes and teaching products that must meet the criteria of validity, practicality, and effectiveness (Akker,1999).

This research was carried out in two junior high schools that have been predicated and implemented Adiwiyata in Biak Numfor Regency, namely SMP 2 Biak Kota and SMP 3 Biak Kota (during December 2020 - January 2021).

B. Variable focus

This research is a research that involves several elements in schools, namely: 1) school infrastructure, 2) students, 3) teachers / teaching staff, and 4) school policies. In addition to these elements, the variables to be considered are:

1. At the survey research stage, description of materials based on the development of environmentally friendly school facilities.
2. Knowledge of the student's environment.
3. Student attitudes.
4. Student behavior.

C. Population and Research Sample

The population in thisstudywereallstudents of SMP 2 Biak Kotaand SMP 3 Biak Kota. Meanwhile, the sample was taken usingtheproportionalstratified random methodbecausethepopulation is nothomogeneousand has a proportional stratum. The sample of this research is class VIII SMP 2 Biak Kota, totaling 25 studentsand class VIII SMP 3 Biak Kotatotaling 25 students.

D. Data collection technique

a. Interviews (toprincipals, teachersandstudents)
b. b. Questionnaire (toprincipals, teachersandstudents)
c. c. Knowledge Scale Test, Attitude Scale, and Student BehaviorScale

E. Data Analysis Techniques

At each stage of research and development, an analysis will be carried out in accordance with the aims and objectives of these stages.

1. Descriptive analysis thatdescribesthematerialthat is ws, deviation, knowledge, attitudes andbehavior of students.
3. Differentialstatistical analysis of the t-test model whichaimstoseetheeffectiveness of increasingstudents' knowledge, attitudes, andbehaviorafterbeinggivenlearning.

Data analysis of non-test instruments in thisstudyuseddescriptive data analysis techniques. The non-test instrument is in the form of a questionnaire using a Likertscale. The Likertscale is usedtomeasure a person's attitudes, opinions, andperceptionsabout a socialphenomenon. In thisstudyusing a scoring scale of 1 to 4 withthehighest score of 4, andthelowest score of 1.

Meanwhile, the data analysis techniqueused in analyzingquantitative data is in the form of questionnaire and test scores. Questionnaire scores are in the form of assessments for media experts andmaterial experts and small groupsbycalculatingthe percentage of answers. The test (post-test) is in the form of an assessment forstudentsbycalculatingthe percentage of learningoutcomes.

Table 1. Feasibility Interpretation Criteria

No	Criteria	Validity Level
1	81,00%-100,00%	Very Valid (can be used without revision)
2	61,00%-80,00%	Valid (can be used with minor revisions)
3	41,00%-60,00%	Less Valid (recommended not to use because it needs revision)
4	21,00%-40,00%	Invalid (should not be used)
5	00,00%-20,00%	Very Invalid (should not be used)

The highertheinterpretationvalue, thehigherthefeasibility of the module.
Calculatingthe percentage rate of increase in learningoutcomes

$$P = \frac{\sum d}{\sum Ni} x\ 100\% \quad (1)$$

Information:
P = Percentage
$\sum d$ = The totalnumber of studentswho do not meet the criteria
$\sum Ni$ = Totalnumber of students
100% = Constant

Aftergettingtheresultsfromthe data managedusingtheaboveformula, theresults are matchedwiththe criteria forthe student successrate as follows:

Table 2. Success Rate Criteria

Number of Students Get Score Above Average Score	**Predicate**
75% - 100%	Successful
50% - 74%	Quite Successful
< 49%	Failed

The module is said to be effective if there is a significant increase in learning outcomes between before using the module and after using the module, and the percentage of students who meet the criteria after using the module increases before using the module. While the module is said to be ineffective if there is no increase in learning outcomes and the percentage of students who meet the criteria, after using the module it does not increase, decrease or be the same as before the use of learning media.

F. Development Procedure

The research that will be done is a type of development research. The development research model to be used in this study adapts the stages of the ADDIE development research model which is an acronym of Analyze, Design, Develop, Implement, and Evaluate (Branch, 2009) and Four-D device development model consisting of 4 stages of development, define, design, develop, and disseminate or adapted into 4-D models, namely definition, design, development, and dissemination that can be described as follows:

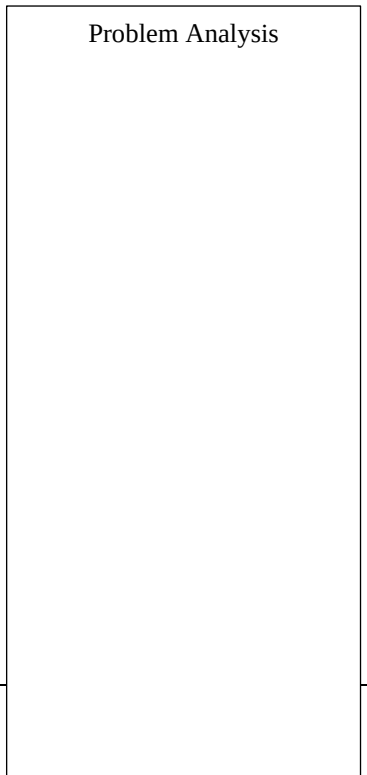

Figure 1.4-D development model

The procedure for developing learning materials based on environmentally friendly school facilities at Adiwiyata schools is as follows:

1. Defining Stage (define)

This stage establishes and defines the needs faced in learning. The things that need to be considered include student development, curriculum, school conditions and problems faced in learning related to the learning materials developed. In this stage there are 5 activities, namely:

a. Analysis of the problem
b. Student analysis
c. Task Analysis
d. Concept Analysis
e. Analysis of Learning Objectives

2. Design stage

This stage aims to find a more effective and efficient way to develop an initial product design (draft) based on the data obtained at the definition stage. The stages that must be carried out at this design stage are:

a. Arrangement of Instruments
b. Material Selection
c.Format Selection
d. Initial Design

3. Development Stage

The development stage is the implementation stage of the product planning that has been carried out in the previous stage. The purpose of this stage is to produce a final product that is suitable for use. The steps taken are as follows:

a. Revised Supervisor
b. Validation of expert lecturers and teachers
c. Development Trial

4. Stage of Dissemination (Disseminate)

This stage is the final stage of the research. This stage is the stage of using the tools that have been developed on a wider scale, for example in all junior high schools taken in the study. The distribution is only done in a limited way, namely providing learning material products based on environmentally friendly school facilities at Adiwiyata schools.

RESULT AND DISCUSSION

A. Research Result

1. Description of learning materials based on environmentally friendly school facilities at the Adiwiyata Junior High School in BiakNumfor Regency

a. Needs Analysis

Based on initial observations made on June 4, 2020, it was found that SMP 2 Biak Kota and SMP Negeri 3 Biak Kota had not implemented the Adiwiyata program optimally. It is proven by the graffiti on the walls of the school, bathrooms that are still not clean and smelly, sanitation that is not pleasing to the eye, flower plants that are not neatly arranged and so on.

An environmentally friendly school module is needed in learning activities, because it can improve students' knowledge, attitudes and behavior which in the module aims so that students can understand and explain environmental problems, resource management, environmental education and environmental pollution, and environmentally friendly infrastructure and facilities and ecosystem.

b. Module Design

The module is designed to support the achievement of environmental education learning objectives in junior high school. Module on Environmentally Friendly Schools In junior high schools has been designed in accordance

with the basic competencies that have been established in the curriculum of environmental education, ranging from environmental issues, resource management, environmental education and environmental pollution, and environmentally friendly infrastructure and ecosystems.

In this book is also given cases / problems that must be solved by students so that it will train to behave and behave positively towards the environment. The material in this module can develop students' knowledge, attitudes and skills so that they are able to apply the knowledge gained in their daily lives. The following are the main components of the module book.

Table 3. Module BookComponents

Component	Description
Chapter I	Environmental problems
Chapter II	Resource management
Chapter III	Environmental education and environmental pollution
Chapter IV	Environmentally friendly infrastructure
Chapter V	Ecosystem

2. Steps to develop learning materials based on environmentally friendly school facilities at Adiwiyata school in Biak Numfor Regency.

The steps for developing an environmentally friendly school module are teaching materials that are used independently containing environmentally friendly schools in Biak Numfor Regency including: environmental issues, resource management, environmental education and environmental pollution, and environmentally friendly infrastructure and ecosystems.

The initial design was produced from the draft of the environmentally friendly school-based learning material/module product at the Adiwiyata school, which was then consulted with the supervisor. The initial design includes: 1) cover design, title, material, 2) learning instructions, 3) basic competencies, 4) learning activities, 5) pictures and so on.

This module book is designed to consist of five parts containing the following materials:

Table 4. Module Materials

Chapter	Content
Chapter I Environmental problems	A. Basic Competence B. Material 1. Understanding Environment 2. The Purpose of Environmental Education 3. Scope of Environmental Education 4. Adiwiyata-Based Eco-Friendly School Concept 5. Environmental Pollution C. Assignment D. References
Chapter II Resource management	A. Basic Competence B. Material 1. Understanding Resources 2. Natural Resources 3. Artificial Data Source 4. Human Resources C. Assignment D. References
ChapterIII Environmentaleducationandenvironmentalpollution	A. Basic competencies B. Material 1. Understanding Resources 2. Natural Resources 3. Artificial Data Source 4. Human Resources C. Assignment D. References
Chapter IV Environmentally friendly infrastructure	A. Basic Competence B. Material 1. Understanding Resources 2. Natural Resources 3. Artificial Data Source 4. Human Resources

Chapter	Content
	C. Assignment D. Bibliography
Chapter V Ecosystem	A. Basic Competence B. Material 1. Understanding Resources 2. Natural Resources 3. Artificial Data Source 4. Human Resources C. Assignment D. Bibliography

3. Materials that have been developed for Adiwiyata Middle School students in Biak Numfor Regency are valid and practical to use.

a. Module Validation Results

The modules developed in this study were designed according to the conditions of the research subjects. The material summarized in the module is described in systematic pictures so that it is easily understood by students. The module also includes an evaluation instrument to measure student success.

The results of the development of the learning module were validated by two experts. The aspects of the assessment of the validation of teaching materials (modules) are: (1) the suitability of the objectives of the material, (2) the determination of the order of the material, (3) the truth of theories and concepts, (4) the ease of learning the material, (5) the ease of learning flow, (6) contextuality, (7) clarity of the material to be understood, and (8) examples are given for clarity of concept. These eight aspects of teaching materials (modules) have been validated by two experts with the following assessment results:

Table 5. Teaching Material Validation Test Results (Module)

No	Instructional Aspect	Validation		∑	%	Info.
		V1	V2			
1.	Suitability of material purposes	4	5	4.5	90	Very Valid
2.	Material order determination	4	5	4.5	90	Very Valid
3.	Truth theory and concept	5	4	4.5	90	Very Valid
4.	Ease of learning materials	4	5	4.5	90	Very Valid
5.	Ease of learning flow	5	4	4.5	90	Very Valid
6.	Contextuality	4	5	4.5	90	Very Valid
7.	Clarity of material to understand	4	4	4	80	Valid
8.	Examples are given for concept clarity	4	4	4	80	Valid
Average aspects assessed		4.25	4.5	4.375	87.5	Valid

Based on the validation results in table 5, several suggestions for improvement were obtained from 2 experts, namely:

1)Illustration images must match the material

2) Use lighter language

3)Add image

4)Module cover is made more attractive

Based on the suggestions from the validator, improvements were made to the teaching material products (modules).

b. Instrument Validation Results

Table 6. Knowledge Instrument Validation Test Results

No	Instructional Aspect	Validation		∑	%	Info
		V1	V2			
1.	Question Material	4.3	4.5	4.4	88	Very Valid
2.	Question construction	4.3	4.8	4.6	91	Very Valid
3.	Language and writing	4.4	4.6	4.5	90	Very Valid
Average aspects assessed		4.3	4.6	4.5	90	Very Valid

Table 7. Attitude Instrument Validation Test Results

No	Instructional Aspect	Validation		∑	%	Info
		V1	V2			
1.	Question Material	4.2	3.8	4.0	80	Valid
2.	Question construction	3.5	3.8	3.7	73	Valid
3.	Language and writing	4.6	4.0	4.3	86	Very Valid
Average aspects assessed		4.1	3.9	4.0	80	Valid

Table 8. Behavioral Instrument Validation Test Results

No	Instructional Aspect	Validation		∑	%	Info
		V1	V2			
1.	Question Material	4.2	4.2	4.2	84	Very Valid
2.	Question construction	4.8	4.3	4.6	91	Very Valid
3.	Language and writing	4.6	4.2	4.4	88	Very Valid
Average aspects assessed		4.53	4.2	4.4	88	Very Valid

c. Practicality Test

The analysis of the practicality of the Eco-Friendly School module is based on the results of the percentage assessment of responses from validators and students as users. Based on the analysis of validators and student responses or benefit tests, the percentage for validators on average is 82% and the percentage of student responses for benefit tests is an average of 87.5%. From the percentage of expert validation questionnaires and benefit test questionnaires for students, the percentage of practicality of the Eco-Friendly School module was obtained with an average of 82%. This shows that the Eco-Friendly School module developed meets the criteria of practicality with a high interpretation (84.8% - very practical).

4. The material that has been developed is effective in increasing the knowledge, attitudes and behavior of students in Adiwiyata Junior High School in Biak Numfor Regency.

a. Results of Inferential Statistical Test Analysis

1) The effectiveness of the eco-friendly school model on the knowledge of Adiwiyata Junior High School students in Biak Numfor Regency

To find out the effectiveness of the environmentally friendly school model on the knowledge of Adiwiyata Junior High School students in Biak Numfor Regency, it was done by comparing the students' knowledge before and after using the environmentally friendly school module. Thus the researcher builds the research hypothesis as follows:

Ha = There is a difference between students' knowledge before and after using the environmentally friendly school module at the Adiwiyata Junior High School in Biak Numfor Regency.

Ho = There is no difference between students' knowledge before and after the use of environmentally friendly school modules in Adiwiyata school SMP Biak Numfor

The results of the hypothesis analysis can be described as follows:

Tabel 9. Paired Sample Test

	Paired Differences						
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	t	df	Sig. (2-tailed)

				Lower	Upper			
Pair 1	before - after	-1.02000	.95810	.13550	-1.29229	-.74771	-7.528	49	.000

Based on the output in table 9 above, it shows that the results of hypothesis testing with the paired sample test with the results of the analysis show the value of Sig. (2-tailed) of 0.000 which means that there is a difference between students' knowledge before and after the use of environmentally friendly school modules at Adiwiyata Junior High School in Biak Numfor Regency, this is evidenced by the value of Sig. (2-tailed) 0.000<0.05

2) The effectiveness of the eco-friendly school model on the attitudes of Adiwiyata junior high school students in Biak Numfor Regency

To find out the effectiveness of the environmentally friendly school model on the attitudes of Adiwiyata junior high school students in Biak Numfor Regency, it was done by comparing the attitudes of students before and after using the environmentally friendly school module. Thus the researcher builds the research hypothesis as follows:

Ha = There is a difference between students' attitudes before and after using the environmentally friendly school module at the Adiwiyata Junior High School in Biak Numfor Regency.

Ho = There is no difference between students' attitudes before and after using the environmentally friendly school module at the Adiwiyata Middle School in Biak Numfor Regency.

The results of the hypothesis analysis can be described as follows:t:

Table 10. Paired Sample Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	before - after	-1.64000	4.10455	.58047	-2.80650	-.47350	-2.825	49	.007

Based on the output in table 10 above, it shows that the results of hypothesis testing with the paired sample test with the results of the analysis show the value of Sig. (2-tailed) of 0.007 which means that there is a difference between students' attitudes before and after using the environmentally friendly school module at the Adiwiyata Junior High School in Biak Numfor Regency, this is evidenced by the value of Sig. (2-tailed) 0.007<0.05.

3) The effectiveness of the eco-friendly school model on the behavior of Adiwiyata junior high school students in Biak Numfor Regency.

To determine the effectiveness of the environmentally friendly school model on the behavior of Adiwiyata junior high school students in Biak Numfor Regency, it was done by comparing the attitudes of students before and after using the environmentally friendly school module. Thus the researcher builds the research hypothesis as follows:

Ha = There is a difference between student behavior before and after using the environmentally friendly school module at the Adiwiyata Junior High School in Biak Numfor Regency.

Ho = There is no difference between the behavior of students before and after the use of environmentally friendly school modules in Adiwiyata Middle School, Biak Numfor Regency.

The results of the hypothesis analysis can be described as follows:

Table 11. Paired Sample Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	before - after	-1.18000	2.66259	.37655	-1.93670	-.42330	-3.134	49	.003

Based on the output in table 11 above, it shows that the results of the hypothesis test with the paired sample test with the results of the analysis show the value of Sig. (2-tailed) of 0.003 which means that there is a difference

between student behavior before and after the use of environmentally friendly school modules in Adiwiyata Junior High School in Biak Numfor Regency, this is evidenced by the value of Sig. (2-tailed) 0.003<0.05.

B. Discussion

1. **Description of learning materials based on environmentally friendly school facilities at the Adiwiyata Junior High School in Biak Numfor Regency.**

The module is designed to support the achievement of environmental education learning objectives in Junior High School. Module on Environmentally Friendly Schools In junior high schools has been designed in accordance with the basic competencies that have been established in the curriculum of environmental education, ranging from environmental issues, resource management, environmental education and environmental pollution, and environmentally friendly infrastructure and ecosystems.

Ramli *etal* (2012) revealed that the design elements of the school towards a green and sustainable school are characterized by the presence of indoor air quality, temperature comfort, sound, daylight, water efficiency and energy efficiency. Tasci (2015) suggeststhatthephysicalityofschoolbuildingsincludessignificantinfrastructure in educationandisanadditional material forlearningsothatschoolbuildingsshouldbedesigned in such a way as tosupportsustainableenvironmentaleducation.

In theimplementationoftheAdiwiyataschool program, there are things in themanagementoffacilitiesandinfrastructurethatmustbeachieved. Thisachievementcanmakeschoolsenvironmentallyfriendly, andmakestudentshavebroadinsightsabouttheenvironmentthatcanbeapplied in everydaylife. The EnvironmentAgencyandtheMinisterofEducationandCultureNumber 05 of 2013 concerningGuidelinesfortheImplementationoftheAdiwiyata Program set severalindicatorsofachievingthemanagementofenvironmentallyfriendlysupportingfacilitiesandinfrastructurethatmustbeownedandimplementedbyAdiwiyataschools.

2. **Steps todeveloplearningmaterialsbased on environmentallyfriendly school facilities at Adiwiyata schools in Biak NumforRegency**

The steps fordevelopinganenvironmentallyfriendly school module are teaching materialsthat are usedindependentlycontainingenvironmentallyfriendly schools in Biak NumforRegencyincluding: environmental issues, resource management, environmentaleducationandenvironmentalpollution, andenvironmentallyfriendlyinfrastructureandecosystems. The modules developed in thisstudyweredesignedaccordingtotheconditions of the research subjects. The materialsummarized in the module is described in systematic pictures sothatit is easilyunderstoodbystudents. The module alsoincludesanevaluation instrument tomeasure student success.

The results of the development of the learning module were validated by two experts. As for the aspects of the assessment of the validation of teaching materials (modules), namely: The suitability of the objectives of the material, the determination of the order of the material, the truth of theories and concepts, the ease of learning the material, the ease of the learning flow, contextuality, clarity of the material to be understood and understood, examples are given for clarity concept.

The results of the module validation assessment from two experts are seen from aspect 1 of the suitability of the objectives of the material by 4.5 or 90% (very valid), aspect 2 of the determination of the order of the material by 4.5 or 90% (very valid), aspect 3 of the truth of theories and concepts 4.5 or 90% (very valid), aspect 4 of the ease of learning the material is 4.5 or 90% (very valid), aspect 5 of the ease of learning flow is 4.5 or 90% (very valid), aspect 6 of contextuality is 4.5 or 90% (very valid), aspect of contextuality is 4.5 or 90% (very valid), 7 clarity of material to be understood and understood by 4 or 80% (valid), aspect 8 examples are given for clarity of concept by 4 or 80% (valid).

The results of the knowledge instrument test conducted by two experts showed that aspect 1 of the question material was 4.4 or 88% (very valid), aspect 2 of question construction was 4.6 or 91% (very valid), aspect 3 of language and writing was 4.6 or 90% (very valid). This is accordance toSeptian (2016)saidthatknowledge is theresult of knowing. Knowingwillexistaftertheindividual has sensedthe object. Sensing is doneusingthesensesconsisting of theeyes, ears, nose, tongue and skin. Of the five senses, eyesandearscontributethe most knowledgetohumans.

The results of the attitude instrument test conducted by two experts showed that aspects 1 of the question material by 4 or 80% (valid), aspect 2 of question construction by 3.7 or 73% (valid), aspect 3 language and writing by 4.3 or 86% (very valid). This is accordance to Purwanto (2003) states that attitude is a way of reacting to a stimulus. A tendency to react in a certain way to a stimulus or situation at hand. According to Bukhori (1999) in Nurhidayah (2013) Attitude is a tendency to think or feel in a certain way or in certain channels. In its development attitude is influenced by factors; prestige, authoritarian or expert opinion or the opinion of the majority and from painful experiences. This of course can affect the development of the attitude of a person or a group of people about an object or problem related to the environment.

The results of the behavioral instrument test conducted by two experts showed that aspect 1 of the question material was 4.2 or 84% (very valid), aspect 2 of question construction was 4.6 or 91% (very valid), aspect 3 of language and writing was 4.4 or 88% (very valid).Mulyadi (2011) andVeithzal& Mulyadi (2011), statesthat human behavior is essentially goal-oriented, in otherwords a person'sbehavior is stimulatedbythedesiretoachievesome goal. Furthermore, thedefinition of behavior is a result of someone's actions that are carried out continuouslyand have a continuoustendencytobecarried out in situationsandconditionsfaced.

3. **The materials that have been developed for Adiwiyata Junior High School students in Biak Numfor Regency are valid and practical to use.**

The overall validity test of the eco-friendly school model was shown to have met the validity requirements. The assessment that has been carried out by the experts is stated to be valid based on the results of the assessment of the results of the components as outlined in the environmentally friendly school module. The validity of the research modules and instruments were validated by 2 experts. The suggestions from the validation results are: 1) Adding a chapter on ecosystems, 2) Illustration of pictures according to the material, 3) Using easy language, 4) Adding pictures, 5) More attractive module covers.

Practicalitycanbemeasuredbased on theresults of theobserver's assessment of theimplementation of the model. The analysis of thepracticality of theEco-Friendly School module is based on theresults of the percentage assessment of responses fromvalidatorsandstudents as users. Based on the analysis of validatorsand student responses or benefit tests, the percentage forvalidators on average is 82% andthe percentage of student responses for benefit tests is anaverage of 87.5%. Fromthe percentage of expert validation questionnaires and benefit test questionnaires forstudents, the percentage of practicality of theEco-Friendly School module was obtainedwithanaverage of 82%. This shows thattheenvironmentallyfriendly school module developedmeetsthe criteria of practicalitywith high interpretation.

4. **The materialthat has been developed is effective in increasingtheknowledge, attitudes andbehavior of theAdiwiyata Junior High School students in Biak NumforRegency.**

Effectiveness was measuredbased on thecomparison of theresults of the pre test and post test bothdescriptivelyandstatistically. Descriptive analysis of student knowledge shows thatthe minimum pre-test score is 12 in thevery high category (range 7.6-10), namelythe percentage of 84%. Meanwhile, the minimum post test score is 14 in thevery high category (range 7.6-10), which is a percentage of 100%. Thisindicatesthatthere is a significant increase in student knowledgeafterbeingtreatedwiththeuse of environmentallyfriendly school modules. Furtherstatistical analysis shows thatthevalue of Sig. (2-tailed) of 0.000, which means thatthere is a differencebetweenstudents' knowledgebeforeandafterusingtheenvironmentallyfriendly school module at theAdiwiyata Junior High School in Biak NumforRegency. This is evidencedbythevalue of Sig. (2-tailed) 0.000<0.05. These resultsstrengthentheprevious analysis thattheuse of environmentallyfriendly school modules is effective in increasingstudents' knowledge.

The results of thisstudy are in accordancewith Hoffmann andMutarak (2019) In his research on the factors thatinfluenceenvironmentaleducation, there are threemechanismsthat have thepotentialtoexplaintheeffects of environmentaleducation, namely: differentialknowledgeaboutclimate change, risk perception, andawareness.Mulianaet.al, (2018) arguesthatenvironmentalknowledge is a process of recognizingvaluesandconcepts in developing skills, as well as a necessary medium forunderstandingandappreciatingtheinterrelationshipsbetweenhumansandtheir culture andbiophysical environment.

Likewiseaccordingto Chen (2013), whichstatesthatenvironmentalknowledge is a series of ecologicalknowledgepossessedbyindividualsaboutthe environment. Educationaboutthe environment does not stop at knowledge, but must go to a deeper level. Knowledge itself is notenoughbecause as expressedPrabawaniet al(2017), whenthe level ofeducationishigher, students' understandingofgreeneducationis not better. Thisresearch has alsorevealedthatschoolaccreditationis not significant in influencingstudents' understandingofenvironmentallyfriendlyissues.

Effectivenesswasmeasuredbasedonthecomparisonoftheresultsofthepretestandposttestbothdescriptivelyandstatistically. Descriptiveanalysisofstudentattitudesshowedthatthe minimum pre-testscorewas 12 in theveryhighcategory (range 19-24), namelythepercentageof 74%. Meanwhile, the minimum post-testscoreis 14 in theveryhighcategory (range 19-24), whichisthepercentageof 80%. Thisindicatesthatthereis a significantincrease in studentattitudesafterbeingtreatedwiththeuseofenvironmentallyfriendlyschoolmodules.
Furtherstatisticalanalysisshowsthatthevalueof Sig. (2-tailed) of 0.007, whichmeansthatthereis a differencebetweenstudents' attitudesbeforeandafterusingtheenvironmentallyfriendlyschoolmoduleattheAdiwiyata Junior HighSchool in Biak Numfor Regency. ThisisevidencedbythevalueofSig. (2-tailed) 0.007<0.05. Theseresultsstrengthentheprevious analysisthattheuseofenvironmentallyfriendlyschoolmodulesiseffective in improvingstudentattitude.

This is accordance toGibsonand Ivancevich (1994), states that attitude is an essential part of a person's personality because people in looking for a match between beliefs and feelings towards the object they face during the process of changing one's attitude will depend on one of the feelings or belief. Attitudes or responses to something received by someone is different -different, it is caused by factors that exist in each individual such as differences in talents, interests, knowledge, experience, intensity of feelings and also environmental situations. Furthermore, as statedby Buchori (1999) in Nurhidayah (2013) saidthatattitudeis a tendencytothinkorfeel in a certainwayor in certainchannels. In itsdevelopmentattitudeisinfluencedbyfactors; prestige, authoritarianorexpertopinionortheopinionofthemajorityandfrompainfulexperiences. Thisofcoursecanaffectthedevelopmentoftheattitudeof a person or a groupofpeopleaboutanobjector problem relatedtotheenvironment.

Withregardtoperceptionsoftheenvironment, experience has a lot todowith a person organizingjudgmentsandbeliefsabouttheenvironmentandchanging his behavioraboutttheenvironment. Thustheformationofattitudescaninvolvelearningabouttheenvironmentsothatthiscanbesupportedbyconditioningtheoryaboutattitudestowardstheenvironment, instrumental conditioningtheoryaboutattitudesandsociallearningtheoryaboutattitudestowardstheenvironment.

Effectivenesswasmeasuredbasedonthecomparisonoftheresultsofthepretestandposttestbothdescriptivelyandstatistically. Descriptiveanalysisofstudentbehaviorshowsthatthe minimum pre-testscoreis 12 in thehighcategory (range 13-18), namelythepercentageof 60%. Meanwhile, the minimum post-testscoreis 17 in theveryhighcategory (range 19-24), whichis 76%. Thisindicatesthatthereis a significantincrease in studentattitudesafterbeingtreatedwiththeuseofenvironmentallyfriendlyschoolmodules. Furtherstatisticalanalysisshowsthatthevalueof Sig. (2-tailed) of 0.003 whichmeansthatthereis a differencebetweenstudentbehaviorbeforeandafterusingtheenvironmentallyfriendlyschoolmoduleattheAdiwiyata Junior HighSchool in Biak Numfor Regency. thisisevidencedbythevalueofSig. (2-tailed) 0.003<0.05. Theseresultsstrengthenthepreviousanalysisthattheuseofenvironmentallyfriendlyschoolmodulesiseffective in improvingstudentbehavior.

The resultsofthis study are in accordancewith Robert Y. Kwick., (1972), statesthatbehaviorisanactionoractionofanorganismthatcanbeobservedandevenstudied. Then Benjamin Bloom., (1981), aneducationalpsychologistdistinguishesthreekindofbehavior, namelycognitive, affective, andpsychomotor.

Likewise, accordingto Mulyadi (2011), statesthat human behaviorisessentiallygoal-oriented, in otherwords a person'sbehaviorisstimulatedbythedesiretoachievesomegoal. Furthermore, thedefinitionofbehavioris a resultofsomeone'sactionsthat are carriedoutcontinuouslyandhave a continuoustendencytobecarriedout in thesituationsandconditionsencountered. Itfurtherexplainsthatthere are threeformsofbehavior, namely: (1) behavior as a formofknowledge in relationtosituationsorexternalstimuli, (2) behavior as a formofattitudetowardsexternalstimuli, and (3) behavior as a formofconcreteaction in theformofactionstosituationsorstimulifromoutside.

C. Novelty

The findings of this study introduce learning materials packaged in environmentally friendly school modules, the implementation of which refers to the Minister of Environment Regulation number 5 of 2013 concerning guidelines for implementing the Adiwiyata program in its elaboration on the integration of environmental education in the Adiwiyata school program curriculum. This study found a model for assessing students' knowledge, attitudes, and behavior in applying environmental learning as a form of individual change who cares about environmental sustainability. The findings of this study strengthen the results of the study fromRamli, Syarina, *et.al* (2019) in his research entitled "*The Importance of Green Skills - from the Perspective of TVET Lecturers and Teacher Trainees"*, his research showed that Education improves sustainable development and increases human capacity to handle environmental, social and economic problems. Eco-friendly behaviour will help Malaysia stay ahead of environmental challenges and opportunities in a rapidly changing political and global landscape. There are fourteen implementations of green behavior for TVET teacher training participants that need some consideration. They should be integrated into TVET curricula, learning content, teaching and learning processes, and reflected in the policies and practices of educational institutions.

Furthermore, the findings of this study are also supported by research results ofArdoin, Nicole M. *et.al* (2019) in his research entitled "*Environmental education outcomes for conservation: A systematic review*". His research shows that environmental education programs documenting direct impacts include: a focus on local problems or the relevant local dimensions of a wider problem; collaboration with scientists, resource managers, and/or community organizations; integrated action elements; and intentional measurement/reporting structures.

CONCLUSIONS AND SUGGESTIONS

A. Conclusion

Based on theresults of thestudy, itcanbeconcludedthat:

1. The description of learningmaterialsbased on environmentallyfriendly school facilities at theAdiwiyata Junior High School in Biak NumforRegency is designedto support theachievement of thelearningobjectives of environmentaleducation in Junior High Schools. The module on EnvironmentallyFriendly Schools at this junior high school has been designed in accordancewiththe basic competencies set out in theenvironmentaleducation curriculum, rangingfromenvironmental issues, resource management, environmentaleducationandenvironmentalpollution, andenvironmentallyfriendlyinfrastructureandecosystems.

2. The steps fordevelopinglearningmaterialsbased on environmentallyfriendly school facilities at theAdiwiyata school in Biak NumforRegencyweredeveloped in thisstudydesignedaccordingtotheconditions of the research subjects. The materialsummarized in the module is described in systematic pictures sothatit is easilyunderstoodbystudents. The module alsoincludesanevaluation instrument tomeasure student achievement. The development steps include: 1) cover design, title, andmaterial, 2) learninginstructions, 3) basic competencies, 4) learningactivities, 5) pictures andso on.

3. The material that has been developed for Adiwiyata junior high school students in Biak Numfor Regency based on the results of the validity test of the eco-friendly school model as a whole is shown to have met the validity requirements. Practicality based on the results of the observer's assessment of the implementation of the developed model meets the criteria of practicality with high interpretation.

4. The material that has been developed is effective in increasing the knowledge, attitudes and behavior of the Adiwiyata Junior High School students in Biak Numfor Regency, as evidenced by the value of Sig. (2-tailed) < 0.05. Thus, the use of environmentally friendly school modules is effective, increasing the knowledge, attitudes and behavior of Adiwiyata Junior High School students in Biak Numfor Regency..

B. Suggestion

The suggestionsthatcanbe put forward fromtheresults of thisstudyinclude:

1. The results of thisstudycanbeused as a reference in the development of environmentallyfriendly schools, toachievetheAdiwiyatapredicate.

2. The results of thisstudyshouldbeused as materialforthe development of studies regardingthe model fordevelopingenvironmentallyfriendly schools, forgeneralenvironmental research.

REFERENCES

1. Alexandar, R dan G. Poyyamoli (2014) "The effectiveness of environmental education for sustainable development based on active teaching and learning at high school level-a case study from Puducherry and Cuddalore regions, India", *Journal of Sustainability Education,* Vol. 7
2. Akker, J. Van Den. (1999). *Principles and Method of Development Research. London.*Dlm. van den Akker, J., Branch, R.M., Gustafson, K., Nieveen, N., & Plomp, T. (pnyt.)". Design approaches and tools in educational and training .Dordrecht: Kluwer Academic Publisher.
3. Ardoin, Nicole M., Alison W. Bowers, Estelle Gaillard (2019) "Environmental education outcomes for conservation: A systematic review" Biological Conservation.214. 2020. https://doi.org/10.1016/j.biocon.2019.108224
4. Awan, A. G. (2013). Relationship Between Environment and Sustainable Economic Development: a Theoretical Approach To Environmental Problems. International Journal of Asian Social Science.
5. Bloom, Benjamin S. 1981. *Taxonomi Of Educational Objectives Book 1 Cognitive Domain*. New York: Longman.
6. Chen, L. 2013. A Study of Green Purchase Intention Comparing with Collectivistic (Chinese) and Individualistic (American) Consumers in Shanghai, China. *Information Management and Business Review*. 5 (7): 342-346.
7. Dalyono, M. 2010. *PsikologiPendidikan.* Jakarta: Rinekacipta
8. Gibson, James L dan John M. Ivancevich, 1994. *Organisasi dan Manajemen,*.Edisi 4, Jakarta :Erlangga
9. HamzahSyukri. 2013. *PendidikanLingkungan*. Bandung: RefikaAditama.
10. Hasbullah. 2013. *Dasar-dasarIlmuPendidikan*.Jakarta :Rajawali Pers
11. Hermon, D. (2014). *Climate Change Mitigation*. Jakarta: Radjawali Press
12. Hoffmann, R. and Muttarak, R. 2019, Greening through schooling: understanding the link between education and pro-environmental behavior in the Philippines, *Environ. Res. Lett*. 15
13. Juraid, Baharuddin Hamzah, AsepMahpudz, RiadyIbnu Khaldun, 2019, Implementation And Development Of Adiwiyata Schools To Realize Character Of Students Care For Environment, *International Journal Of Scientific & Technology Research*, Volume 8, Issue 10
14. Kwick, Robert (1974) dalamNotoatmodjo, Soekidjo. 2003. *Pendidikan Dan PerilakuKesehatan*. Jakarta: RinekaCipta.
15. Muhibbin Syah.2010.*Psikologi Pendidikan denganpendekatanbaru*.Bandung:PT. RemajaRosdakarya
16. Muliana, R., Hamama, S.F, Zamzami. 2018. HubunganPengetahuanLingkunganTerhadapSikapSiswa pada PengelolaanKebersihan di Sekolah. *JurnalDedikasi Pendidikan*. 2 (1): 8-13.

17. Mulyadi. (*2011*), Auditing, Jakarta: SalembaEmpat
18. Nurhidayah, S. 2013. PeningkatanMinatBelajarSiswaDalam Mata Pelajaran IpaMateri Indra DenganMenggunakan Media Audio Visual Pada Siswa Kelas Iv Mi KlumpitKecamatanKaranggedeKabupatenBoyolaliTahunAjaran 2013/2014.
19. OemarHamalik (2009), *ProsesBelajarMengajar*, Jakarta: PT bumiAksara
20. Prabawani, B, ItaMusfirowatiHanika, Ari Pradhanawati& Agung Budiatmo (2017), Primary Schools Eco-Friendly Education in the Frame ofEducation for Sustainable Development. International JournalOfEnvironmental&ScienceEducation, Vol. 12, No. 4, 607-616.
21. Purwanto, N. (2003). *Psikologi Pendidikan.*Bandung : PT. RemajaRosdakarya.
22. Ramli, N.H., Mawar Haji Masri, Mohd. Zafrullah Haji Mohd. Taib&Norhazarina Abd Hamid.(2012). A Comparative Study of Green School Guidelines, Procedia - SocialandBehavioralSciences50 (2012) 462 – 471
23. Ramli, Syarina, Mohamad Sattar Rasulb, HaryantiMohdAffandi, 2019. The Importance of Green Skills - from the Perspective of TVET Lecturers and Teacher Trainees, International Journal of Innovation, Creativity and Change. www.ijicc.net Volume 7, Issue 6
24. Septian, Y. 2016. Perilaku Ramah LingkunganPesertaDidik SMA. *Sosial Science Education Juornal*. 2 (2): 193-201.
25. Tasci, B.G. (2015), "Sustainability" Education by Sustainable School Design, *Procedia - SocialandBehavioralSciences186 (2015) 868 – 873*
26. Veithzal, R & Deddy Mulyadi. 2011. *Kepemimpinan dan Perilaku Organisasi Edisi Ketiga*. Jakarta : PT. Rajagrafindo Persada.
27. Yue, Beibei, Guanghua Sheng, Shengxiang She and Jiaqi Xu, 2020. Impact of Consumer Environmental Responsibility on Green Consumption Behavior in China: The Role of Environmental Concern and Price Sensitivity, *Sustainability*, Vol 1. No. 12
28. Zhang, J., Zhang, Z. &Zheng, Y., 2009, An Introduction of Building Green Schools, *JournalofSustainableDevelopment,*Vol. 2, No. 1, Maret 200-203
29. Zsoka, A., Szerenyi, Z. M., Szechy, A., & Kocsis, T. (2013). Greening Due to Environmental Education Environmental Knowledge, Attitudes, Consumer Behavior and Everyday Pro Environmental Activities of Hungarian High School and University Students, Journal of Cleaner Production.