Jurnal Studi Guru dan Pembelajaran, Vol. 4, No. 2, Mei – Agustus 2021

Environmental Learning Using Interactive Media to Increase Coastal Local Knowledge About Environmental Problems Mitigation in Luwu Raya Sulawesi

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Abstract

This research aims to mitigate environmental problems through learning by using documentary films for fishermen groups whose environmental conditions have been damaged for years. The fishermen group were from Belopa, Harapan, and Munte Village, North Luwu Regency. The method used was action research by creating learning tools validated by two education experts in two learning actions to observe the learning components' feasibility. The validation of the learning plan and documentary film was in the "very valid" category, which means that these two tools are suitable for increasing environmental knowledge. Education experts also assessed that implementation of learning syntax components, social systems, reaction principles, and support systems was also "very valid."The learning outcome of the fishermen groups ware also improved. At the first action in Belopa, the students' levels were in the low and medium categories. Then at the second action, it increased to the medium and high categories. Meanwhile, at the first action in Harapan, the students' levels were in a low category. Furthermore, at the second action, it went up to the medium and high category. In Munte, the first action shows that the students' levels were in the low and medium categories. Then it increased to the medium and high category at the second action. Efforts to mitigate environmental problems through learning documentary films can increase fishermen groups' environmental knowledge in the low, medium, and high categories even it has not impacted the environment directly yet.

Keywords: *Coastal Problem, Documentary Film, Environmental Learning, Fishermen, Mitigation*

Introduction

To mitigate the environmental problems, the groups of fishermen are educated by giving them materials about the environment by using documentary films (Campbell et al., 2020). It is expected to changes the way they think, their behavior, and their awareness. The current condition is very concerning to see mangrove forests are damaged, some of the coastal resident houses are not good for habitation, soil and seawater are polluted due to water disposal from household sanitation, organic, inorganic that waste directly to the land and the sea that causes smell odor (Asri, 2019). Dantje (2015) stated that due to environmental pollution in developing countries, including Indonesia, around 14,000 people die per day from consuming drinking water contaminated by human waste, and in India, about 500 million people do not have eligible toilets. Environmental damage is caused by fishermen's wrong mindset, behaviors, and awareness. Governments worldwide are encouraging attempts to change attitudes and behaviors among citizens to become more environmentally aware and

https://doi.org/10.30605/jsgp.4.2.2021.1267

friendly (Ahnesjö & Danielsson, 2020). Lack of environmental awareness is due to low levels of education, economy, and environmental knowledge that encourages the expansion of environmental damage without improvement (Asri et al., 2015). Today's Westernized societies face many global challenges that are also manifest at local and regional levels, such as dealing with economic crises, climate change, desertification, deforestation, environmental degradation, inequalities, wars and poverty eradication, "United Nations 2012" (Cebrián, 2018).

The results of environmental learning can improve knowledge, skills and attitudes so that it could change behavior that manifested in learning outcomes (Hamzah, 2013). Prasetyo (2018) suggested that the world of education is known as human intelligence, or naturalistic intelligence, which is the individual's ability to understand the environment, flora, and fauna, including managing and caring for the environment

Due to that fact above, it is crucial to create learning material to reduce environmental damage. There are previous studies that concern about Environmental Education Materials (EEM). Viteri et al., (2014) stated that EEM (e.g., video, print, websites) are essential components of educational programs with an aim for the development of environmental knowledge, awareness, skills, attitudes/behaviors. This learning material uses documentary videos to change the fishermen's thinking pattern and their habit of damaging the mangrove forest that might threaten the living creatures due to polluting the land and sea, sanitation, and agricultural waste.

Campbell et al., (2020) stated that student-created videos are digital artifacts that demonstrate learning or perceived knowledge. Documentary films are designed to stimulate cognitive abilities through the memory that reflects images of the environmental damage. It is expected to trigger the fishermen's awareness that this condition can not be ignored anymore.

The learning model refers to Plan, Implement, and Evaluate (PIE) (Smaldino et al., 2011). The learning media, the documentary films contain material about mangrove forests, domestic waste, environmental sanitation, and livable houses that fit the health standards. The learning media descriptions are: (1) The documentary film design contains material validated by experts. (2) For the feasibility usage, the Learning Plan is validated by the expert. Learning implementation refers to the steps of the learning process. According to Joyce et al., (2004) its implementation is assessed by education experts using assessment sheet instruments, namely: (a) Syntax is a stage of the sequence of activities or phases of activity. (b) Social System. In this phase, each fisherman group student has a role and rules to obey. (c) Principles Reaction. Rules must be fully met by all learners in learning. (d) System support is a condition required in learning using tools or media, (e) Impact instructional, the result perceived about knowledge after the learning process. (3) The level of understanding of mangrove forest material, domestic waste, environmental sanitation, habitable houses are measured by test in the form of multiple choice. It is categorized as very low, low, medium, high, very high (Winkel, 2019; Wirawan, 2012).

Method

Type of research: Action research aims to raise awareness of coastal residents managing their residential environment through learning documentary film. Sukardi (2016) stated that there are four important steps in action research, namely: (1) Designing Learning Plan as references for learning steps. Documentary film material contains images of the damaged environment, material from mangrove experts and public health experts. The documentary

film was designed using computer software to make animated images. (2) Action steps. The results of the Learning Plan design were validated by education experts, and the documentary film is validated by multimedia experts using assessment sheets for their feasibility. (3) Observation Step. Two education experts observed the implementation of the learning component using validated devices that were feasible to use. Action 1 was tried out on 18 people in Belopa Village, Luwu Regency, 18 people in Harapan Village, East Luwu Regency, and 18 people in Munte Village, North Luwu Regency. Total Participants from fishermen groups were 54.

(4) Reflection. The observer provided inputs to improve the learning components that were not implemented correctly in action 1. These inputs were then used in action 2 in the same participants from the same villages and the same number of learning participants. The assessment results, learning outcomes evaluation were used to measure whether there is an improvement in learning outcomes on mangrove forest material, environmental sanitation, domestic waste, and livable houses. The implementation of the documentary film method learning environment refers to the Elliot model. The stages are stated as follows (Sukardi, 2016).

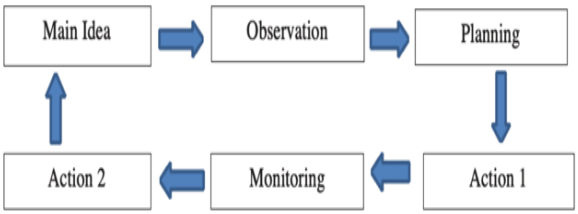


Figure 1. Elliot's Cycle Model

Data Analysis Techniques: Data is analyzed in two ways, as follows: The validity of the Learning Plan and Documentary Film used descriptive analysis. Meanwhile, categorization of the validity of the Learning Plan (Salam et al., 2019) are mentioned below:

3,5 < M < 4 Very Valid

2,5 < M < 3,5 Valid

1,5 < M < 2,5 Valid Enough

M < 1,5 Not Valid

Description:

M = $\overline{K_i}$ to find the validity of each criterion

M = $\overline{A_i}$ to find the validity of each criterion

M = $\overline{X}$ to find the validity of all aspects

Data analysis for the implementation of the learning component used the average observations from each meeting. Calculating the reliability of the learning stages assessment sheet and using the modified results of the formula, percentage of agreement by Grinnell (Christensen et al., 2014; Huda et al., 2017) as follows:

$$R = \frac{\overline{d(A)}}{d(A) + \overline{d(D)}}$$

Description

R = Reliability coefficient

$\overline{(d(A))}$ = Average degree of agreement from the assessors

$\overline{d(D)}$ = Average degree of disagreement from the assessors

Recapitulate the results of the expert's assessment into a table which includes: (a) aspects (Ai), (b) criteria (Ki), (c) validator assessment results (Vji);

To find out the average result of the experts' assessment for each criterion with the formula:

$\overline{X} = \frac{\sum_{i=1}^{n} \overline{A_1}}{n}$, with:

$\overline{X}$ = total mean

$\overline{A_i}$ = aspect average ke-i

n = number of aspects

To determine the percentage of agreement of learning through documentary videos is by calculating the reliability of the learning implementation observation sheet (Borich, 2016) as follows:

$$Percentage\ of\ agreement\ (R) = \frac{Agreements}{Disagreements + Agreement} x\ 100\%$$

Description

A = the amount of match frequency between the two observers' data

D = the amount of mismatch frequency between the two data observers

R = coefficient (degree) of instrument reliability

The model implementation observation sheet criteria are reliable if the reliability value (R) ≥ 0.75 (Borich, 2016).

Determining the implementation category for each aspect or all aspects of the learning stages are defined as follows:

3,5 < M < 4,0 : Completely Implemented

2,5 < M < 3,5 : Partially Implemented

1,5 < M < 2,5 : Less Implemented

M < 1,5 : Not Implemented,

(Salam et al., 2019).

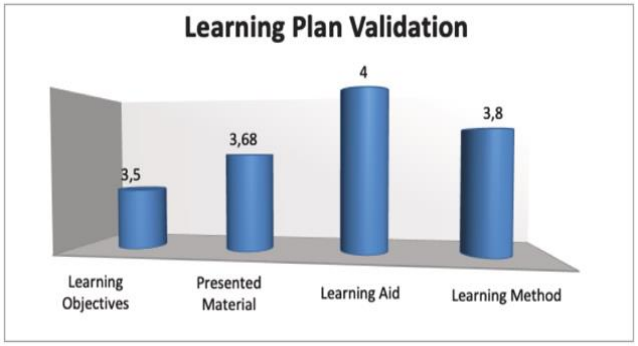
Analysis of material mastery about mangrove forests, environmental sanitation, domestic waste, and livable houses were analyzed using SPSS software. The results of descriptive statistical analysis are categorized as "very low, low, medium, high, very high" (Winkel, 2019).

Results

Findings Validation of the Learning Plan

The learning plan's validation results from education experts are components needed in the environmental learning process using documentary films for fishermen groups. And the results are:

1. Learning Objectives. This component contains indicators of learning objectives for mangrove forests, environmental sanitation, domestic waste, and livable houses. Experts provided an assessment of the components of learning objectives, which are arranged in 3 phases. Phase 1 Introduction: preparing for stationery, seating set, laptop, LCD, and fishermen's attention for the material explanation. Phase 2 Main Activity: explaining the learning strategies using documentary film and listening to each subject for 30 minutes. Phase 3 worked on the multiple-choice as the learning evaluation. The education experts' results of Learning Objectives components, which contain 3 phases, show an average score at = 3.5. According to the validity criteria or the analysis technique (3.5 ≤ $\overline{X}$ ≤ 4.0), It can be concluded that the component of learning objectives that contained 3 phases of learning activities was in the "Very Valid" category.
2. Material component. The experts of mangrove forests, public health, environmental sanitation, domestic waste, and livable houses provided the assessment result at an average score of 3.68. According to the validity criteria or the analysis technique (3.5 ≤ $\overline{X}$ ≤ 4.0), It can be concluded that the material component included in the learning plan was in the "Very Valid" category.
3. Component of learning aids. Educational experts assessed the learning aids used in the learning process, such as documentary films, CD-ROM, computers, and Liquid Crystal Display (LCD). The result shows an average score of 4.0. According to the validity criteria or the analysis technique (3.5 ≤ $\overline{X}$ ≤ 4.0), It is concluded that the learning aids used for learning activities are in the "Very Valid" category.
4. Methods and learning activities. Education experts assessed the methods used, namely: the preliminary phase. In this phase, the fishermen group was given directions for readiness to learn and provide information on learning instructions. Then in the main activity, fishermen were directed to listen to material through documentary films. And the final activity phase. The fishermen group was given verbal questions to answer and work on multiple-choice tests. The expert gave an average score of 3.8. According to the validity criteria or the analysis technique (3.5 ≤ $\overline{X}$ ≤ 4.0), it is concluded that the method used in learning activities is in the "Very Valid" category. The results of the expert validation assessment are presented in graph 1.



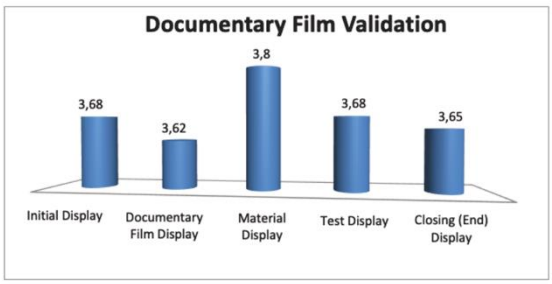
Graph 1. Validation of Learning Plan

Validation of Documentary Film

Multimedia learning experts provide an assessment of documentary films as a tool for delivering learning material to fishermen study groups. The components assessed by the documentary film are as follows:

1. Home (Initial display). The experts assessed the design display of the main menu, title menu, learning material, multiple-choice test, and display menu for documentary film manual instruction. The result shows an average score of 3,68. According to the validity criteria or the analysis technique (3.5 ≤ $\overline{X}$ ≤ 4.0), it can be concluded that Home as the initial display of documentary films used in the learning process was in the "Very Valid" category.
2. Documentary film display. Experts assessed the color, text, image, and audio quality display with an average score of = 3.62. According to the validity criteria or the analysis technique (3.5 ≤ $\overline{X}$ ≤ 4.0), It can be concluded that the display quality of documentary films used in the learning process is in the "Very Valid" category.
3. Material Display. Experts assessed the duration of time used for presenting the material, display of mangrove forest material, display of environmental sanitation material, display of domestic waste material, display of habitable house material with an average score of = 3.8. According to the validity criteria or the analysis technique (3.5 ≤ $\overline{X}$ ≤ 4.0), it is concluded that the material display quality of the documentary film material used in the learning activities is in the "Very Valid" category.
4. Display of Evaluation Test. The expert assessed the sentences, their simplicity.
5. Beasiness to understand, displays of the multiple-choice questions, answers, and working time duration of the test. It shows an average score of 3.62. According to the validity criteria or the analysis technique (3.5 ≤ $\overline{X}$ ≤ 4.0), it can be concluded that the quality of the test display used as a learning evaluation tool is in the "Very Valid" category
6. The End Display. The expert gave an assessment of the end display that shows gratitude to the funding source, researcher names, film editor, and the voice over. It shows an average score of 3.65. According to the validity criteria or the analysis technique (3.5 ≤ $\overline{X}$ ≤ 4.0), It can be concluded that the end display of the documentary film segment is in the "Very Valid" category.

The results of the assessment of multimedia experts' validation are shown in graphic 2



Graph 2. Validation of Documentary Film

Implementation Analysis of Environmental Learning Components

Two educational experts observed the implementation of the learning environment component two times in action 1 and 2 by using assessment sheets. The result of the component implementation was assessed by using the Percentage of Agreement formula. The components assessed were the learning component and its aspects, namely the syntax component, social systems, reaction principles, and support systems (Joyce et al., 2004). The results of the assessment of each component of the learning environment are described as follows:

Syntax Components

The expert assessed the documentary film's main points of the subject, activities in the learning process, material presentation individually, and the strengthening of material comprehension. The results show that two experts have agreed that the syntax component Reliability of Percentage of Agreement R (PA) was 95.6%, and the average implementation of the syntax component in the first action was 3.5, and the second action was 3.6. It means that the syntax components' implementation at the first and second action is in the Completely Implemented category.

Social System Components.

Experts assessed the social components of the documentary film as one-way communication. The experts also assessed the fishermen's activeness in the learning process, listening to the material explanation, underlining, taking notes of important material, working on multiple-choice tests, and rewarding the active participants. The results show that two experts have agreed that the Social System Component Reliability Percentage of agreement R (PA) = 100% and the average implementation of the social system components for the first action was 3.7, and the second action was 3.6. It means that the social system component's implementation at the first and second action is in the Completely Implemented category.

Reaction Principles Component.

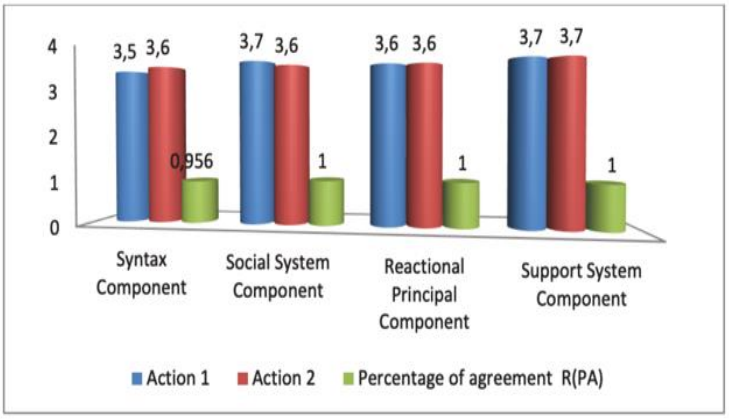
Experts assessed a few items in this component, namely creating a conducive atmosphere in listening to the material, giving positive responses to exciting material, and supporting the learning process to run well.

The study group listened to material from mangrove experts and public health experts properly, setting seat position in orderly, well-manner and easy to direct and arrange. The results show that two experts have agreed that Reaction Principle Component Reliability Percentage of Agreement R (PA) = 100%, and the average implementation of the component of the first action was 3.6, and the second was 3.6. It means that the principle of reaction component at the first and second action is in the Completely Implemented category.

Support System Components.

In this component, the experts assessed the room conditions, learning atmosphere, the quality of documentary film quality like its sound, image, and color. The experts also assessed the sentence structure of the multiple-choice test, its easiness to understand, and the quality of learning equipment such as computers and LCDs. The results show that two experts have agreed that the Support System Components Reliability Percentage of Agreement R (PA) = 100%, and the average implementation of the support system components for the first action was 3.7, and for the second action was 3.7. It means that the support system components at the first action and the second action are in the Completely Implemented category.

The results of the assessment of two education experts are presented in graph 3.



Graph 3. Implementation Analysis of Environmental Learning Components in Action 1 & 2

Analysis of Learning Outcomes through Documentary Film.

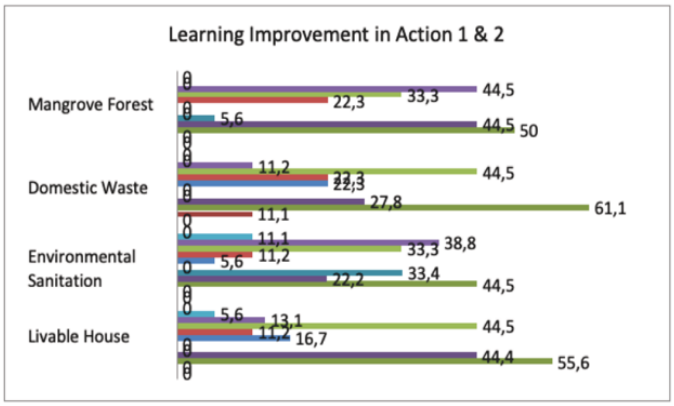
Understanding the material using documentary films through Action 1 and Action 2 containing material mangrove forests, domestic waste, environmental sanitation, and livable houses were descriptively analyzed using the SPSS 22.0. The score analysis results are classified into five categories: very high, high, medium, low, and very low (Winkel, 2019). The results of the learning analysis in action 1 and 2 at Belopa Village are presented in Table 1:

Table 1. Frequency Distribution of Learning Outcomes of the Belopa Village Fishermen Group

Action 1						Action 2				
Category (%, Frequency)						Category (%, Frequency)				
	Very High	High	Medium	Low	Very Low	Very High	High	Medium	Low	Very Low
Mangrove Forest	0	8	6	4	0	1	8	9	0	0
Domestic Waste	0	2	8	4	4	0	5	11	2	0
Environmental Sanitation	2	7	6	2	1	6	4	8	0	0
Livable House	1	4	8	2	3	0	8	10	0	0

The explanation of the descriptive analysis in action 1 and action 2 in Table 1. 1. shows the number of participants that improve their knowledge. (1) Mangrove Forest. In action 1, there were 8 people (44.5%) in the high category. In action two, there was no improvement. For the medium category in action 1, there were 6 people (33.3%). Then, it increased to 9 people (50%) in action 2. (2) Domestic Waste. It shows an increase in the medium category. In action 1, there were 8 people (44.5%). In action 2, it increased to 11 people (61%). (3) Environmental Sanitation. In action 1, there were 6 people (33.3%), then it increased to 8 people (44%) in action 2. (4) Livable Houses material also experienced an increase. There were 4 people (13%) in the high category. Then in action two, it increased to 8 people (44%.).

The improvement percentage of learning outcomes from actions 1 & 2 at Belopa Village is presented in graph 4



Graph 4. The Percentage of Improvement in Learning Outcomes in Belopa Village

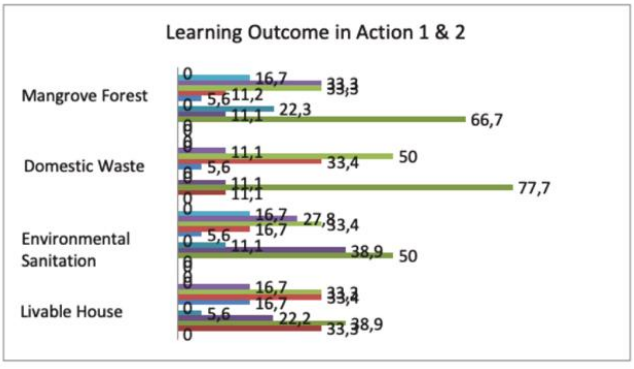
The analysis results of learning in action 1 & 2 at Harapan Village are presented in tabele 2

Table 2. Frequency Distribution of Learning Outcomes for Fishermen Group in Harapan Village

Action 1						Action 2				
Category (%, frequency)						Category (%, frequency)				
	Very High	High	Medium	Low	Very Low	Very High	High	Medium	Low	Very Low
Mangrove Forest	3	6	6	2	1	4	2	12	0	0
Domestic Waste	0	2	9	6	1	0	2	14	2	0
Environmental Sanitation	3	5	6	3	1	2	7	9	0	0
Livable House	0	3	6	6	3	1	4	7	6	0

Data in Table 2 shows that: (1) Mangrove forest material experiences an increase in the medium category. There were 6 people (33.3%) in action 1. Furthermore, in action 2, it increased to 12 people (66%). (2) Domestic Waste material also improves. In the medium category, action 1, there were 9 people (50%). Then in action 2, it increased to 14 people (77%). (3) Environmental Sanitation shows improvement in the medium category. In action 1, there were 6 (33.4%). Furthermore, in Action 2, it increased to 9 people (50%). (4) Livable House Material. It experiences an improvement in the medium category. In action 1, there were 6 people (33.4%). Moreover, it increased to 7 people (38.9%) in action 2.

The improvement of the learning outcomes from the action 1 & 2 at Harapan Villages is presented in graph 5.



Graphic. 5. Learning Outcome Percentage at Harapan Village

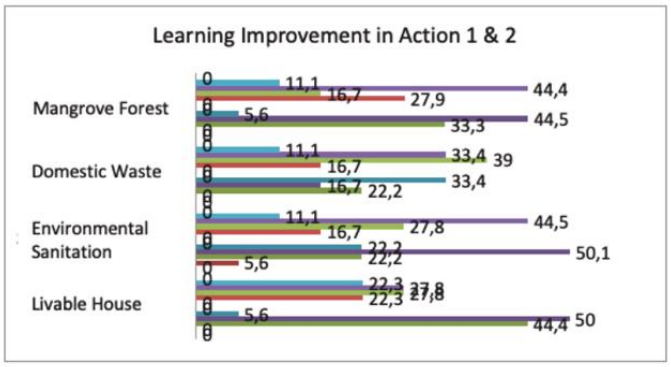
The learning analysis results in action 1 and 2 at Munte Village are described in Table 3

Table 3. Frequency Distribution of Learning Outcomes of Fishermen Group in Munte Village

Action 1						Action 2				
Category (%, frequency)						Category (%, frequency)				
	Very High	High	Medium	Low	Very Low	Very High	High	Medium	Low	Very Low
Mangrove Forest	2	8	3	5	0	1	8	6	3	0
Domestic Waste	2	6	7	3	0	6	5	3	4	0
Environmental Sanitation	2	8	5	3	0	4	9	4	1	0
Livable House	4	5	5	4	0	1	9	8	0	0

The result of the learning outcome in action 1 is descriptively analyzed as follows: (1) Mangrove Forest. Data shows that there were 2 people (11.1%) in the very high category, 8 people (44.4%) in the high category. Meanwhile, there were 3 people (16.7%) in the medium category, 5 people (27.9%) in the low category. (2) Domestic Waste Material. Data shows there were 2 people (11.1%) in the very high category, 6 in the high category (33.4%). Meanwhile, there were 7 people (39%) in the medium category, 3 people (16,7%) in the low category. (3) Environmental Sanitation. Data shows from this material that there were 2 people (11.1%) in the high category and 8 people (44.5%) in the high category. Meanwhile, there were 5 people (27.8%) in the medium category, 3 people 16.7% in the low category. (4) Livable House. Data shows that 4 people (22.3%) were in the very high category 5 people (27.8%) in the high category. Meanwhile, there were 5 people (27.8%) in the medium category, 4 people (22.3%) in the low category.

The Learning outcome in action 2 shows improvement as well in understanding environmental sanitation material and livable houses. The descriptive analysis is described as follows: (1) Mangrove Forest Material. Data shows that 1 person (5.6%) was in the very high category, and 8 people (44.5%) were in the high category. Meanwhile, there were 6 people (33.3%) in the medium category. (2) Domestic Waste Material. Data shows that there were 6 people (33.4%) in the very high category and 5 people (16.7%) in the high category. Meanwhile, there were 4 people (22.2%) in the low category. (3) Environmental Sanitation Material. Data shows 4 (22.2%) people were in the very high category and 9 people (50.1%) in the high category. Meanwhile, there were 4 people (22.2) in the medium category and 1 person is the low category with a percentage of 5.6%. (4) The material for livable houses obtained data that show 1 person (5.6%) was in the very high category, and 9 people were in the high category with a percentage of 50%. Meanwhile, there were 8 people in the medium category with a percentage of 44.4%. The recapitulation of this improvement is described in the graph below.



Graphic 6. Results of Learning Improvement in action 1 & 2 at Munte Village

Discussion

Learning Tool Validation

Educational experts and multimedia experts provide a conceptual assessment of Learning Plans, which have short-term learning plan objectives, namely: (1) projecting the learning activities of fishermen groups; (2) assessing the aspects of activities carried out by students in learning, the studied material, way to study it, and aspects of students evaluation or mastery of the material. The two expert assessment results show that the Learning Plan validation was in the "Very Valid" category, which means that the Learning Plan Tool is suitable for environmental learning. The design of the learning plan used in learning activities has met the feasibility elements (Rusman, 2012).

Documentary films validated by multimedia experts are used to improve knowledge to mitigate environmental problems in mangrove forests, environmental sanitation, domestic waste, and livable houses. Components assessed by multimedia experts are: (1) Environmental documentary material is made according to the real conditions the fishermen are experiencing, such as mangrove forest damage, organic and inorganic household waste scattered under houses, sanitation liquid waste that immediately disposed of to the ground or the sea, and the layout of the house is disorganized and unfit for habitation. (2) The material explanation from mangrove experts and public health experts is supported with pictures and music. (3) The display of a documentary, such as animation, color, and lighting, has good quality. The multimedia experts' assessment results show that the documentary display is in the "very valid" category that indicates that it is suitable for environmental learning. However, there is still little note that needs to be improved. Since the materials

made are permanent, the material and evaluation questions cannot be updated. These things should be made updatable. Asri et al., (2015) suggested that the implementation of Environmental Education in Vocational High Schools uses online computer media, materials, and evaluation questions that can be updated. It enables teachers to change, delete and add material according to the subject to be taught.

Education experts observe the implementation process of learning using documentary films to increase environmental knowledge. Skills often use “successful later-year tertiary students to facilitate peer-learning sessions,” which may involve “discussion around course content and related study skills (Bester et al., 2017)

The implementations of the learning components observed by reviewers are syntax, social systems, reaction principles, and support systems as learning models so that fishermen groups can easily comprehend the learning material (Joyce et al., 2004). Eggen & Kauchak (2012) suggested that models of teachers are models of learning as we help students acquire information, ideas, skills, values, ways of thinking, and means of expressing themselves and teaching them how to learn. The teacher applies the learning model stages to help students obtain information, knowledge, ideas, or skills.

The results of observations of the implementation of learning show that not all learning stages are carried out well, even though professional development and training programs are necessary to increase academics' understanding and awareness of sustainability (Asri et al., 2020; Cebrián, 2018). Averagely, the assessment results of the learning components implementation are in the "Very Good" category. (1) the syntax component obtained an average score of 3.57 in three villages. The social system obtained a score of 3.81, the

principle of reaction obtained 3.76, and the supporting system obtained an average score of 3.89. (2) The impact of efforts to mitigate the damage by learning environment using documentary films can increase knowledge individually. Personal influences reference the individual motivations and personal interests that were recognized to play a critical role in their engagement in Education for Sustainable (EFS) (Cebrián, 2018)

The positive effects that arise after the learning process are: (a) the learning participants give positive responses toward the environmental learning documentary film as a mitigation effort to increase environmental knowledge. (b) The fishermen group stated that what they have done so far has damaged the environment verbally. (c) the fishermen group realizes that environmental conditions have been damaged for years, through documentary film, it will change their mindset, behavior towards the environment in more positive ways. The observation results of the environmental conditions indeed show that fishermen groups live are bad and left dirty. Coastal residents may be exposed to the threat of extreme seasons from the waves, and of course, their health might get affected by fever, coughs, diarrhea, skin diseases, and etc (Chandra, 2012).

Fishermen Group Learning Result

Efforts to mitigate environmental problems by fishermen groups were carried out by learning and measuring the multiple-choice test results on the material of mangrove forests, environmental sanitation, domestic waste, and livable houses. The results are as follows: (1) Learning actions in Belopa Village:

(a) on the domestic waste material, there were students get improvement after the learning. In action 1, there were two people (14.5%), and in the second act, it increased to 11 people (61.1%) who were in the medium category. It means that most coastal residents have understood the health threat if domestic waste is not managed correctly. Unfortunately, that is only understood theoretically. It appears that there is no action to prepare the trash. Indonesian organic and inorganic household waste might cause severe consequences for the environment, disrupts human health, reduces soil quality, and threatens wildlife (Prasetyo, 2018).

(b) Livable house materials. A few students slightly increased in this material. In action one, there were eight people (44.5%), followed by action two rose to 10 people (55.6%) classified in the medium category. It means that most of the coastal population already has a good understanding of the house according to health standards. It means that some groups of fishermen have understood how the livable house is according to health standards. However, the fact shows that fishermen still have houses that do not meet health standards due to low income. Their income is enough to use for eating with family daily. Slum settlements are a source of disease carried by flies, cockroaches, and rats (Chandra, 2012; Prasetyo, 2018).

(c) mangrove forest material. In this material, the number of students has increased slightly. In action 1, there were about eight people (44.5%), then in action two increased to nine people (50%) classified in the medium category. It means that some of the fishermen already know about mangrove forests. Unfortunately, the mangrove forests' condition is damaged along Belopa Village's coastline, turning its function into ponds and roads. The wood from mangrove forest is intentionally taken for household use or charcoal (Manik, 2018).

(2) Desa Harapan (a) in the mangrove forest material, some students improved their knowledge. In action one, there were six people (33.4%), followed by action two, which

increased to 12 people (66.7%) classified in the medium category. It means that the level of mangrove forests understanding for some fishermen is good enough. However, it is only understood without any action to conserve mangrove forests. It can be seen along the coast of Harapan Village. The mangrove forest has been heavily damaged. Mangrove forest wood is converted into firewood for cooking needs or turned into charcoal (Manik, 2018).

(b) domestic waste material. The number of students who experienced an increase in action one was 9 (50%), then in Action 2, it increased to 14 people (77.7%) categorized in the medium category. It means that the level of understanding of domestic waste material is quite good (medium category). Unfortunately, the trash can is still not provided. Children, adolescents, youths, well-educated and not educated adults still litter on the streets, such as littering food packages, bottles, mineral glasses, plastic bags, food scraps, and fruit skins (Dantje, 2015).

(c) Environmental sanitation materials. There were six students (33.4%) who experienced an improvement in action 1, then in the second action, nine people (50%) were included in the medium category. It means that their environmental sanitation is in the medium category. However, it has no impact on the environment. Their settlements do not yet have bathrooms/toilets, kitchen wastewater channels.

Domestic wastewater is divided into two, toilet and non-toilet wastewater. Toilet wastewater consists of feces, urine, and rinses. On average, each person excretes 1.2 liters of feces. Meanwhile, Non-toilet wastewater such as bath, kitchen, and sink wastewater (Asri, 2019; Said, 2017).

(3) Munte Village learning action. (a) mangrove forest material, the number of students did not increase at action one and two. There were eight people (44.5%) in Action 1, and Action 2 remain the same eight people (44.5%) categorized in the high category. It means that students' understanding of the material is in the high category. It also indicates that almost 50 percent of the fishermen group understand mangrove forests' management and function very well. Unfortunately, the mangrove forest in Munte Village has changed its role to become a pond, and yet not regulated. The utilization of the coastal area must be controlled so that the damage and its impacts can be minimized as much as possible (Asri et al., 2020; Manik, 2018).

(b) domestic waste material. In this material, the number of students does not show an increase in knowledge. In action one, there were seven people (39%), followed by action two down to 3 people (16.7%) classified in the medium category. It means that fishermen did not learn the material seriously, so the result declined. They think that this material is not crucial because they are used to live with domestic waste, which is reflected in how they dispose of the trash anywhere. Human behavior towards domestic waste has become a habit, such as throwing garbage into sewers, rivers, lakes, or into the sea in the form of used plastics, animal waste, even human waste (Dantje, 2015).

(c) Environmental sanitation materials. the number of students has increased in this material. In action one, there were eight people (44.5%), followed by action two increased to 9 people (50.1%) classified as the "High" category. It means that participants' level of understanding of the material is high. But the impact of fishermen's daily sanitation is dirty that pollutes groundwater. Contaminated water generally comes from domestic wastewater, namely wastewater from household activities (Said, 2017).

(d) Livable house materials. the number of students has increased in this material. In action one, there were five people (27.8%), and action 2 increased to 9 people (50%). It is classified in the high category. It means that the understanding level of this material is in the high category. However, their knowledge has not been well implemented. Most of the fishermen's houses still have semi-permanent houses made of bamboo and wood that do not have windows where air circulation will impact health (Chandra, 2012)

Conclusion

Learning Tool Validation

The validation of educational experts on the Learning Plan as an instrument for implementing the learning process is in the "very valid" category. It indicates that the learning design is suitable for the fishermen group's use as environmental media learning. The multimedia experts also found that documentary films were in the "Very Valid" category, which means that the documentary film displays environmental learning material that is feasible to use.

Environmental Learning Implementation

Two education experts observed the feasibility of the learning component in two meetings. The learning stages that are assessed are syntax, social systems, reaction principles, and support systems. The average score obtained is 3.6, which is in the "very good" category, and the reliability of the percentage of agreement R (PA) = 100%. It indicates that the implementation of the components of the learning stages is completely implemented.

Learning Outcomes Using Documentary Films

After learning through documentary films, student learning outcomes have increased. (1) In the village of Belopa, the fishermen's environmental knowledge increases. In action one, the level is in the low & medium category; then it increases to medium & high category in action 2. (2) Meanwhile, in Harapan Village, knowledge improvement also occurred. In action one, the average level is in the low & moderate category, then increases to the medium & high category in action two. (3) In Munte Village, there is an increase in knowledge about the environment as well. In action one, the average score is in the low & medium category, followed by action two increases to medium & high categories.

Acknowledgment

N/A

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