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Development of Learning Model through Video Documentary to Improve Environmental Knowledge of Coastal Community of Palopo City, Indonesia

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ABSTRACT

This study aims to develop the Environmental Learning Model (ELM) by using documentary videos to improve coastal residents of Palopo City's knowledge about mangrove, wastewater, domestic waste, and liveable house. There were two phases used in this research. The first phase examined the concept of the lesson plan, guide book, video material, evaluation tests, and answer sheets that were validated by the experts. In the second phase, two reviewers examined the practicality and the effectivity of the learning implementation.

The validity result of the guide book was in very valid category. The lesson plan was in *very valid* category, and video material was also in the *very valid* category. This validation was carried out by educational expert and multimedia expert. *Practicality*; Two educational reviewers stated the syntax, social system, reactional principle, support system were implemented entirely. *Effectivity*; The learning result of environmental knowledge in the first trial was in the *Medium* category (47,5). And in the second trial, it improved to the *High* category (60,8).

So it can be stated that the development of learning model through documentary videos is valid, practical, and effective to be used in improving environmental knowledge for the coastal resident to avoid bad behaviour.

Keywords: Environmental Learning Model, Fishermen Community, Video documentary

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12 INTRODUCTION

Coastal residents experience health and safety threats every day due to environmental damage. Sembel (2015) noted several causes of health threats due to environmental pollution: (1) water pollution comes from industrial waste, domestic waste, chemicals, and chlorine from sewage disposal; (2) soil pollution comes from seepage of septic tank water into wells or rivers through groundwater. Septic tanks are sources of contaminants such as metals, microbial pathogens, and other compounds; (3) industrial and domestic waste pollution comes from insecticide residues, domestic waste, detergent residues, human waste, cans, plastic, glass and drinking water bottles. Nasrun, (2016) stated that the knowledge level of coastal populations is generally in a moderate and low category. So, it is difficult to improve the condition to be a clean and healthy environment. The health threat has increased every day due to poor environmental conditions in the coastal area of Palopo. These are characterized by frequent residents experiencing health problems in the form of fever, coughing, diarrhea, skin diseases, and other diseases.

Palopo coastal residents choose to live alongside the beach. In general, the condition of the house is very crowded and disorganized, so it seems slum. The condition of the houses around the coastal residents in Palopo is a slum and partly unfit for habitation (Nasrun, 2016; Idaman, 2017; Barrow, 2014). Some houses do not have Water Closet, bedroom, kitchen, and dining room. The coastal residents live in houses that do not comply with health standards for a long time — littering domestic waste directly to the sea damage mangrove forests. Dispose of domestic wastewater increases the proliferation of coliforms containing pathogenic microorganisms that might cause various diseases.

Improving the environmental conditions of the coastal city of Palopo need to be done by educating residents through daily interaction with the environment and the concept of sustainable development. Identification of the current status of pre-service secondary teachers' knowledge, attitude, and practices about the environment is necessary to assess their level of readiness to integrate ESD in their teaching (Boubonari et al., 2013; Esa, 2010). Sustainable development focuses on the quality of human life in utilizing spatial areas, including coastal areas. Improving damaged environments is the responsibility of everyone who every day interacts with it. Therefore, coastal residents are urged to learn about improving the quality of the environment through documentary video as an information media. The aim is to increase knowledge, change

attitudes, and behavior so that environmental conditions remain natural, healthy, and beautiful. Asri et al. (2015) stated the concept of sustainable development in coastal areas requires two ideas of improvement, namely: (1) improvement of living needs must be met, but the average population of coastal life is limited due to low economic levels (poor); (2) improvement of knowledge and skills of coastal residents is still low so that it is challenging to manage natural resources to increase income. One of the best ways to improve the standard of living of coastal residents of Palopo City is to increase knowledge and skills in managing natural resources of mangrove forests as tourist attractions and protect against the wave abrasion. The target of educating the group of fishermen through non-formal education is to obtain information about environmental management using documentary videos as information media.

The design of the documentary video contains material of environmental damage that occurred in the coastal environment in Palopo City. It contains (1) 80% damaged mangrove forest is due to the construction of roads, cafes, food stalls, and expansion of ponds; (2) Domestic wastewater that discharges directly to the ground and sea as a source of pollution; (3) Domestic waste is directly disposed of to the sea or in the house yard; (4) Residence house does not comply with health standards. The coast and sea of the coastal area of Palopo City have changed; namely, the mangrove forests are no longer beautiful so that the habitat of marine life is extinct by itself, the sea is used as place to dispose of small and medium industrial liquid waste, domestic liquid waste, domestic solid waste, and hospital wastewater, modern and traditional markets. Waste is one of the causes of severe environmental damage that can be recycled (Lofrano & Brown, 2010; McKeown et al., 2002). A person will develop environmental awareness if someone understands environmental science, and most of the results of research on environmental education show that the ability to understand environmental knowledge is low among elementary, middle school. College students do not find a significant correlation between knowledge and attitudes—environment on the one hand, and their behavior on the other (Levine & Strube, 2012; Levy et al., 2018; Nugraha et al., 2020; Prasetyo & Trisyanti, 2018; Ramadhan et al., 2019).

Interactive video affect learning result and learner satisfaction in eLearning environment (Zhang, 2005). Learning with documentary videos stimulates memory (cognitive) through images of the phenomenon of environmental damage, and its impact. Iskandar (201) argues that humans interacting with their environment

will form their cognitive mapping; cognitive formation also occurs with development since childhood. With cognitive video mapping, it is planned that students can learn fun by repeating what has happened in the past made in the form of recorded images containing colors, sounds, and movements that can animate personality (Sakchutchawan, 2011; Stufflebeam & Coryn, 2014)

The research statement is whether the development of a learning model with documentary videos can improve environmental knowledge? Then what is measured is the level of validity of the device, the level of practicality, and its effectiveness. The level of validity was assessed by one education expert and one multimedia expert, respectively, the level of practicality and effectiveness was assessed by two education experts using the observation assessment sheet.

The Design of the Environmental Learning Model (ELM) utilizes computer technology to design video documentary software. The device of the Environmental Learning Model is a documentary video that uses the computer. stated that contends, a computer system can provide delivery instruction by allowing them to interact with the lesson programmed into the system; this refers to computer-based instruction.

Instructions can be carried out by computers as learning media, video documentaries as instructional media contain instructions in learning activities.

This study measured the level of validity of the ELM, the level of practicality, and the effectiveness of the model. The level of validity was assessed by two educational model experts and multimedia experts, the level of practicality and effectiveness was assessed by two education experts and learning model experts using observation assessment sheets. Gustafson, 1991 stated that Model design refers to the non-formal education pathway of namely: Plan, Implement and Evaluate (PIE). Practicality and effectiveness about the implementation of learning refer to the theory of Nordyke. Nordyke (2011) stated that there are five essential components of the learning model. They are (1) Syntax, an activity sequences or activity phases; (2) Social Systems, teachers and students each have a role and rules; (3) Principles reaction, rules which must be met by both the teacher and students in the classroom; (4) System support, the conditions required in learning to use tools or media; (5) Impact instructional, the results achieved by students after learning. The effectiveness measured is the completeness of learning outcomes, and the response of fishermen study groups to the implementation of the Model.

METHODS

Kinds of Research: learning development research. It is a development through learning stages to produce a learning model used by coastal residents. This learning model is called the Environmental Learning Model. The quality of this model can be assessed by several criteria, according to Nieveen (1997). The criteria are validity, practicality, and effectiveness. This model's development is followed by learning tools and packaged in the form of a documentary video as a method of information.

Research Instruments: There are several instruments used in the learning model which are packaged in the form of a documentary video as a method of information, namely (1) Assessment Sheet, (2) Observation Sheet, (3) Questionnaire for learning participants' responses, and (4) Validation of each instrument.

Tools and Instruments of Validation: The model has been tested. The learning device is packaged in the form of a documentary video as an information method. The instrument that has met the validity was implemented by 25 residents of the coastal study group of the Palopo City fisherman.

Data Analysis Techniques: data is analyzed in two ways, as follows (1) Data analysis for the validity of the model using descriptive analysis (2) Data analysis for model practicality using averaging the observations from each meeting

Calculating the Learning Model assessment sheet's reliability and using the modified formula for the percentage of agreement Grinnell (in Huda et al., 2017; Christensen et al., 2011) as follows:

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

Description :

R = Reliability coefficient
 $\overline{d(A)}$ = Average Degree of Agreement from the assessor
 $\overline{d(D)}$ = Average degree of disagreement of the assessor

- Recapitulate expert assessment results into tables. It includes: (a) aspects (A_i), (b) criteria (K_i), (c) validator assessment results (V_i);
- To find the average of expert ratings for each criterion by the following formula:

$$\overline{X} = \frac{\sum_{i=1}^n \overline{A_i}}{n}$$

\overline{X} = total average
 $\overline{A_i}$ = average aspect K_i
 n = number of aspects

The formula above determines the validity category, according to Salam et al. (2019) as follows:

3.5 < M < 4 is very valid
 2.5 < M < 3.5 are valid
 1.5 < M < 2.5 is quite valid
 M < 1.5 is invalid

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

To determine the model of the practicality, it calculates the reliability of implementation model observations sheets by using the formula of the percentage of agreement (Borich, 2016) as follows:

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

Description:

A = The magnitude of the matching frequency between the two observers' data

D = The frequency of the mismatch between the two observer data

R = Coefficient (degree) reliability instrument

The criterion of the feasibility model observation sheet is said to be reliable if its reliability value $(R) \geq 0.75$ (Borich, 2016).

Determining the category of implementation of each aspect or all aspects of the Model is defined as follows:

$3.5 < M < 4.0$ fully implemented

$2.5 < M < 3.5$ partially implemented

$1.5 < M < 2.5$ is not implemented

$M < 1.5$ is not implemented (Salam et.al, 2019)

Analysis of data on the effectiveness of the environmental learning model: Analysis of mastery of mangrove forest material, environmental sanitation, domestic waste, and livable houses: Describes the results of statistical analysis of the ability to understand the material, mangrove forests, environmental sanitation, domestic waste, livable houses, and determines the categories of learning outcomes based on Snowman & McCown (2011).

RESULTS AND DISCUSSION

Validation Analysis of Environmental Learning Models (ELM)

Analysis of the Learning Environment model's validity: Two experts and practitioners assessed the validity of the Learning Environment (LE) model by providing a simple book guide for the implementation of learning and an assessment sheet to be evaluated and analyzed as follows:

Aspects of Supporting Theory, namely the theory used in the model book in the form of learning theory, learning model theory, learning media theory, and video documentary theory serve as supporting theories for the ELM book. The average score obtained was 3.8. From the data, it can be concluded that the result was "very valid". It can be concluded that the value of 3.8 was included in the category of "Very Valid" so that it was stated that the ELM met the validity criteria in terms of supporting theories.

Syntax Aspect, learning activities using a documentary video beginning with the opening up to the stage of working on the questions done by a group of fishermen. The average score obtained was 3.7. From the data, it can be concluded that the result was "very valid". It was concluded that the value of 3.7 was included in the category of "Very Valid" so that it was stated that the ELM in the syntax aspect met the validity criteria.

Social System Aspect, relationship patterns of interaction of fishermen groups studying documentary video material as a method of information in the form of a one-way relationship pattern. The average score obtained was 3.5. From the data, it can be concluded that the result was "very valid" with validity criteria. It was concluded that the value of 3.5 was included in the category of "Very Valid" so that it was stated that the ELM in the aspect of the social system met the criteria of validity. Aspect of the Reaction Principle. Related to the learning process strategy used in the classroom using documentary videos in the form of noisy activities in the classroom, not being seriously studied, and not responding to responding to questions. The average score obtained was 3.7. From the data, it can be concluded that the result was "very valid". It was concluded that the value of 3.7 was included in the category of "Very Valid" so that the ELM stated in the aspect of the principle of the reaction met the criteria of validity.

Supporting System Aspects. Aspects of supporting learning activities in the form of lesson plans, teaching material, documentary video designs, learning evaluations. The average score obtained was 3.8. From the data, it can be concluded that the result was "very valid". It was concluded that 3.8 was included in the category of "Very Valid" so that it was stated that the ELM in the aspect of the support system met the criteria of validity.

Instructional Impact Aspect and Accompaniment Impact. Fishermen groups immediately felt the results of the learning process of mangrove forest material, domestic waste, environmental sanitation. The average score obtained was 3.8. From the data, it can be concluded that the result was "very valid" with validity criteria. It was concluded that the value of 3.8 was included in the category of "Very Valid" so that it was stated that the ELM in the aspect of instructional impact met the validity criteria.

Learning Video Documentary, provide motivational stimulation to more easily understand the material in the form of images according to environmental conditions, the material delivered by mangrove and environmental sanitation experts, and reading of narratives. The average score obtained was 3.8. From the data, it can be concluded that the result was "very valid" with validity criteria. It was concluded that 3.8 was included in the category of "Very Valid" so that it was stated that the ELM in the aspect of documentary video learning met the validity criteria.

The educational experts and media experts gave score 7 for the results of the model book validation. Component aspects are in the "Very Valid" category with an average score of 3.5, 3.7, and 3.8.

The results of the model book validation are presented in Figure 1.

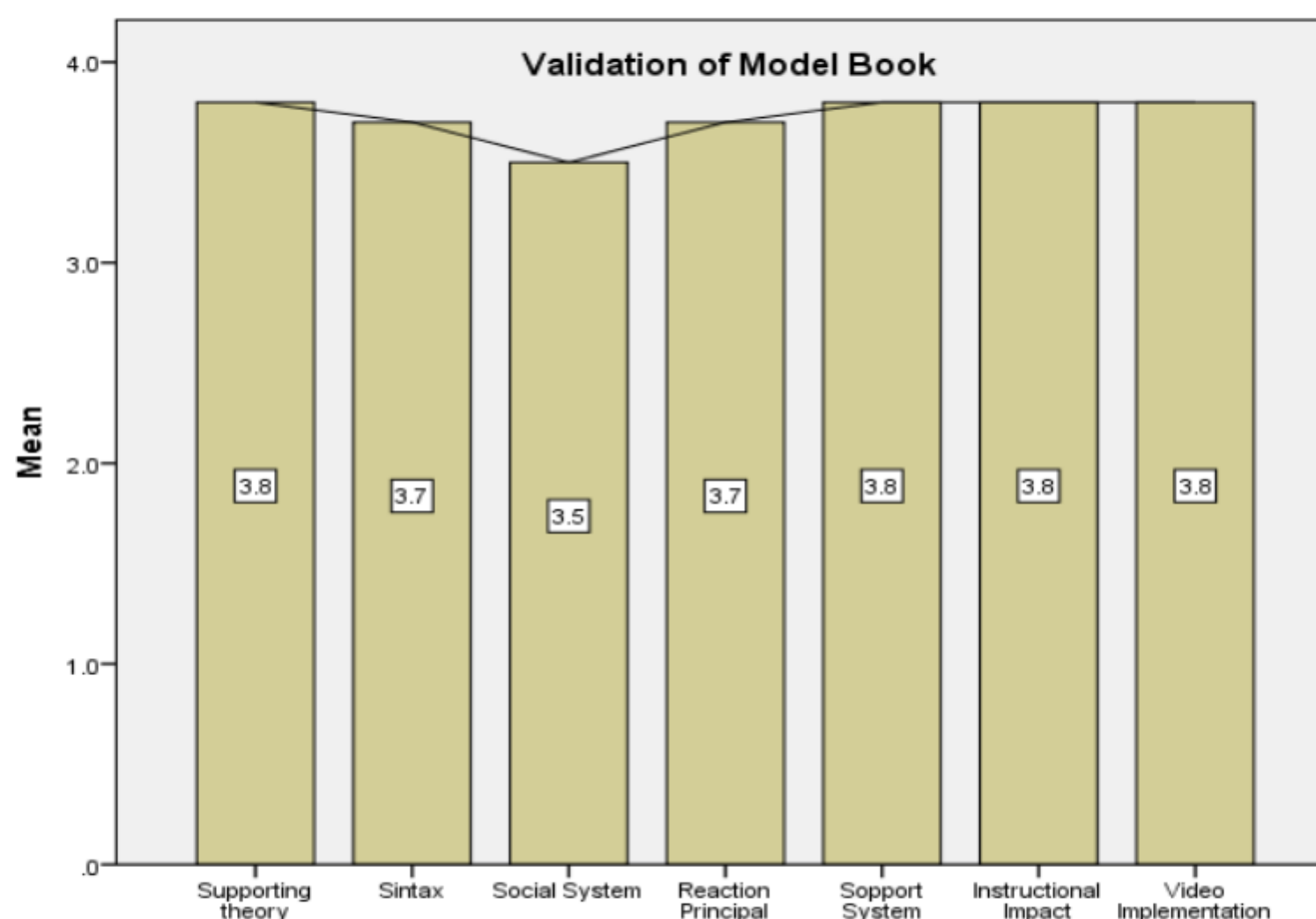


Figure 1. Experts Assessments Results of Model Book Validation.

Validation of Learning Plan

Learning objectives contain indicators of learning objectives for mangrove forests, environmental sanitation, domestic waste, and livable houses. The learning stages using direct learning syntax are modified, namely phase 1 introduction: preparing the learning process for writing instruments, seating, laptop, LCD, and focus on listening to the material. Phase 2 Core activity: Explain learning strategies using videos, listening to the material for each subject duration of 30 minutes. Phase 3 works on the multiple-choice test. The expert judgment results obtained an average of = 4.0 if this figure was confirmed on the validity criteria and analysis techniques as a determinant of the validity criteria ($3.5 \leq \bar{X} \leq 4.0$). It can be concluded that 4.0 is in the "Very Valid" category

Presented Materials include material sourced from mangrove experts, environmental sanitation materials, domestic waste materials, and livable housing materials sourced from public health experts. The average score obtained was 3.8. From the data, it can be concluded that the

result was "very valid" with validity criteria ($3.5 \leq \bar{X} \leq 4.0$).

Learning Aids. The process of learning activities required aids in the form of video documentaries, SD-ROM, Computers, and Liquid Crystal Display (LCD). The average score obtained was 4.0. From the data, it can be concluded that the result was "very valid" with validity criteria ($3.5 \leq \bar{X} \leq 4.0$).

Aspect of the Reaction Principle contains a learning activity phase consisting of a preliminary phase preparing fishermen study groups and instructional information, a core activity phase of learning strategies and listening to material through a documentary video, and a final activity phase giving questions verbally and working on multiple-choice form questions. The average score obtained was 4.0. From the data, it can be concluded that the result was "very valid" with validity criteria ($3.5 \leq \bar{X} \leq 4.0$).

The validation results of the Learning Plan from the education experts gave score four (4). The component aspects are in the "Very Valid" category with an average score of 3.5, and 4.0.

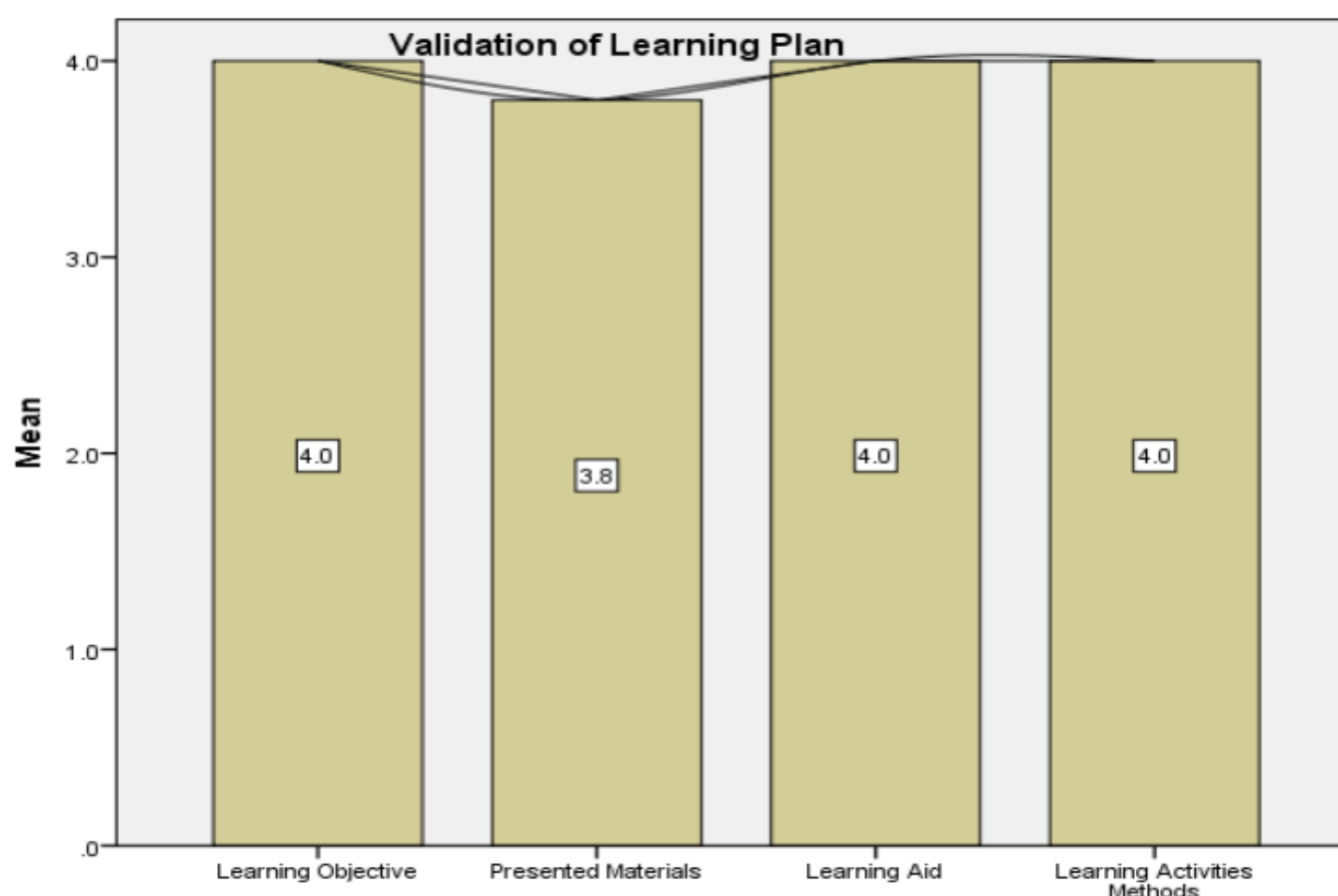


Figure 2. Educational Experts Assessment Results of Learning Plan Validation

Validation of Video Documentary Material

Home (Initial display) includes the design of the main menu display, the display of the title menu, the display of the subject matter material, the display of the narrative of the documentary video learning objectives, the narrative display of the learning achievements of the ELM using a documentary video. The average score obtained was 3.75. From the data, it can conclude that the result was "very valid".

Video Documentary Display includes colour quality display design, text quality display, image quality display, audio quality display. The average score obtained was 3.62. From the data, it can be concluded that the result was "very valid".

Material View includes the duration of time used in presenting the material, the display of mangrove forest material, the display of environmental sanitation material, the display of domestic waste material, the display of material for livable homes. The average score obtained was 3.8.

From the data, it can be concluded that the result was "very valid".

Display of evaluation questions used simple and easy sentences to understand, multiple-choice question forms, time duration, and the number of questions, and answers to questions. The average score obtained was 3.66. From the data, it can be concluded that the result was "very valid".

The End View segment (closing) shows the acknowledgment display of funding sources, researcher names, video editors, and narrative voice actors. The average score obtained was 3.75. From the data, it can be concluded that the result was "very valid" with validity criteria.

The validation results of the documentary video material from learning media experts obtained score five (5). Aspects of the component are in the "Very Valid" category with average scores of 3.62, 3.66, 3.75, and 3.8.

The results of the documentary video validation are presented in Figure 3.

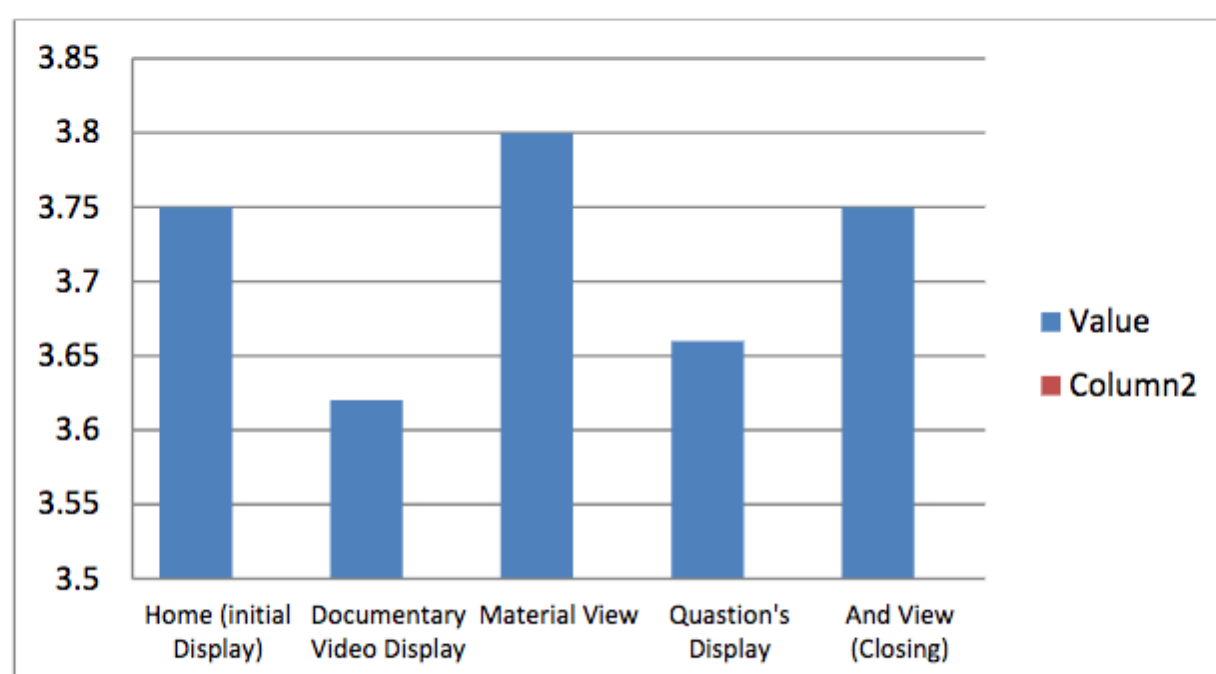


Figure 3. Multimedia Experts Assessment Result of Documentary Video Material Validation

ELM Practicality Analysis

The practicality of the ELM measured was the feasibility of the learning component according to Nordyke, (2011), namely the syntax component, social system, reaction principle, and support system. Observation of the learning component was carried out by two observers in the trial of two meetings. The results of the analysis of the feasibility of learning components of the ELM can be stated as follows:

The Syntax Component was concerned about the main subject of video documentary, the carried-out activities in the learning process, individual presentation of the learning process, and strengthening of the material. Two observers have agreed that the Syntax Component of the ELM reliability percentage of agreement R (PA) is 100%. The average observation of the implementation in the first meeting syntax component was 3.5, and the average observation of the implementation of the syntax component of the second meeting was 3.6. It means that the syntax component in the learning of the first meeting and the meeting of two groups of fishermen was carried out well entirely.

Social System Components were concerned about documentary videos as one-way interaction information media, activeness of fishermen groups following the presentation of the material, activeness of fishermen groups listening to expert explanations, underlining, making essential notes, activeness working on multiple-choice questions, and giving rewards to the active learning participant. Two observers have agreed that the Social System Component ELM reliability percentage of agreement R (PA) is 100%. The average result of observation of the social system components of the first meeting was 3.7, and the average result of observations of the implementation of components social system in meeting two was 3.6. It means that the social system component in the learning of the first meeting and the second meeting of the fishermen group was carried out well entirely.

Reaction Principle Component

presents a conducive atmosphere in listening to the material. The material was responded positively, supporting the learning process. The participants listened to the material well from mangrove experts and public health experts. They listened to the material by sitting well, orderly, and easily arranged. Two observers have agreed that the Reaction Principle Component of the ELM reliability percentage of agreement R (PA) is 100%. The average result of observations of the conduct of the first meeting reaction principal components was 3.6, and the average result of observations of the implementation of the components reaction principle of meeting two was 3.6. It means that the principal component of the reaction in the learning of the first meeting and the second meeting of the two fishermen groups was carried out well entirely.

Support System Component was concerned about the condition of the room and the learning atmosphere, learning devices in the form of video documentaries, multiple-choice questions, computers, and LCD. Two observers have agreed that the Support System Component ELM reliability percentage of agreement R (PA) is 100%. The average result of the observations of supporting system implementation components in the first meeting was 3.7, and the average result of observations of the implementation of components meeting two support systems was 3.7. It means that the components of the support system in the learning of the first meeting and the second meeting of the two fishermen groups were carried out well entirely.

The practicality determination of the model was done by being assessed by two educational experts. They observed the implementation of the syntax component, the social system, the principle of reaction, and the support system. The assessment results show R (PA) = 100%, which means it was implemented entirely.

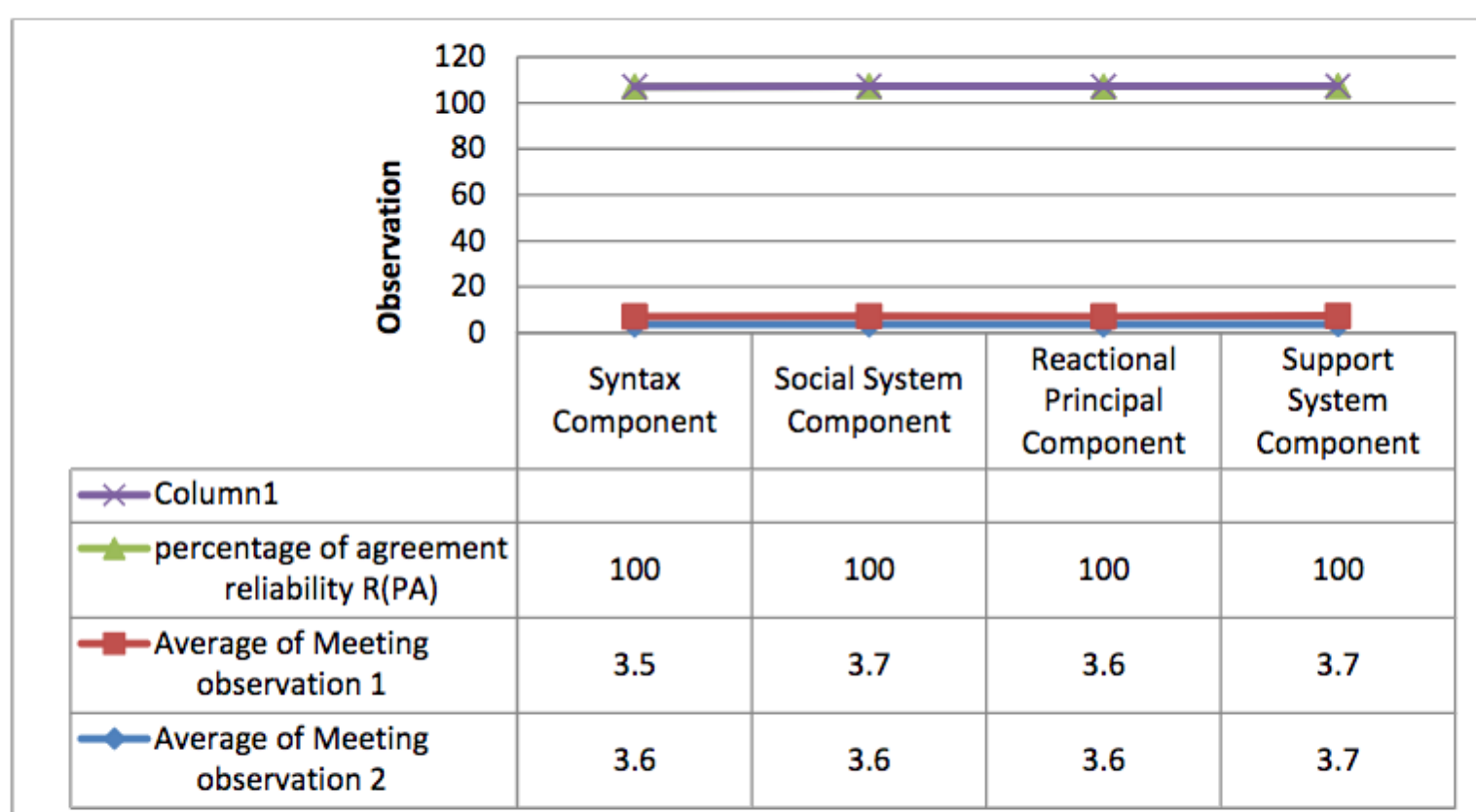


Figure. 4. Results of reviewer assessment of the Practicality Analysis of the first and the second meeting.

Effectiveness Analysis

Trial of the First Meeting

The measured effectiveness was the ability of fishermen to understand the material using documentary videos. In the first trial meeting, the number of participants in the fishermen study group was 25 people and coded according to the answer sheet code for mangrove forest material, domestic waste, environmental sanitation, and livable homes. Waste is the one that might give severe damage to environment (Lofrano & Brown, 2010). The results of the scores obtained by each participant learning from the four materials are scored averagely for statistical analysis descriptive. The results of the analysis are described as follows: (1) the average mastery score

was 47.5. In general, this score illustrates the passing grade of the learning outcomes of fishermen groups from four material; (2) 62.5 was the highest score obtained by participants of the fishermen study group and the lowest score was 35; (3) The median score was 47.5. It indicates that there were 50 % of them get a score of 47.5; (4) the mode score was 45. It indicates that the combined score of the mangrove forest knowledge material, environmental sanitation, domestic waste, and livable homes was 45 that mostly obtained by the participants. Score obtained from the learning process are complex because it contains pedagogic, psychology and didactic components (Snowman & McCown, 2011). The detail information can be seen in graph 5.

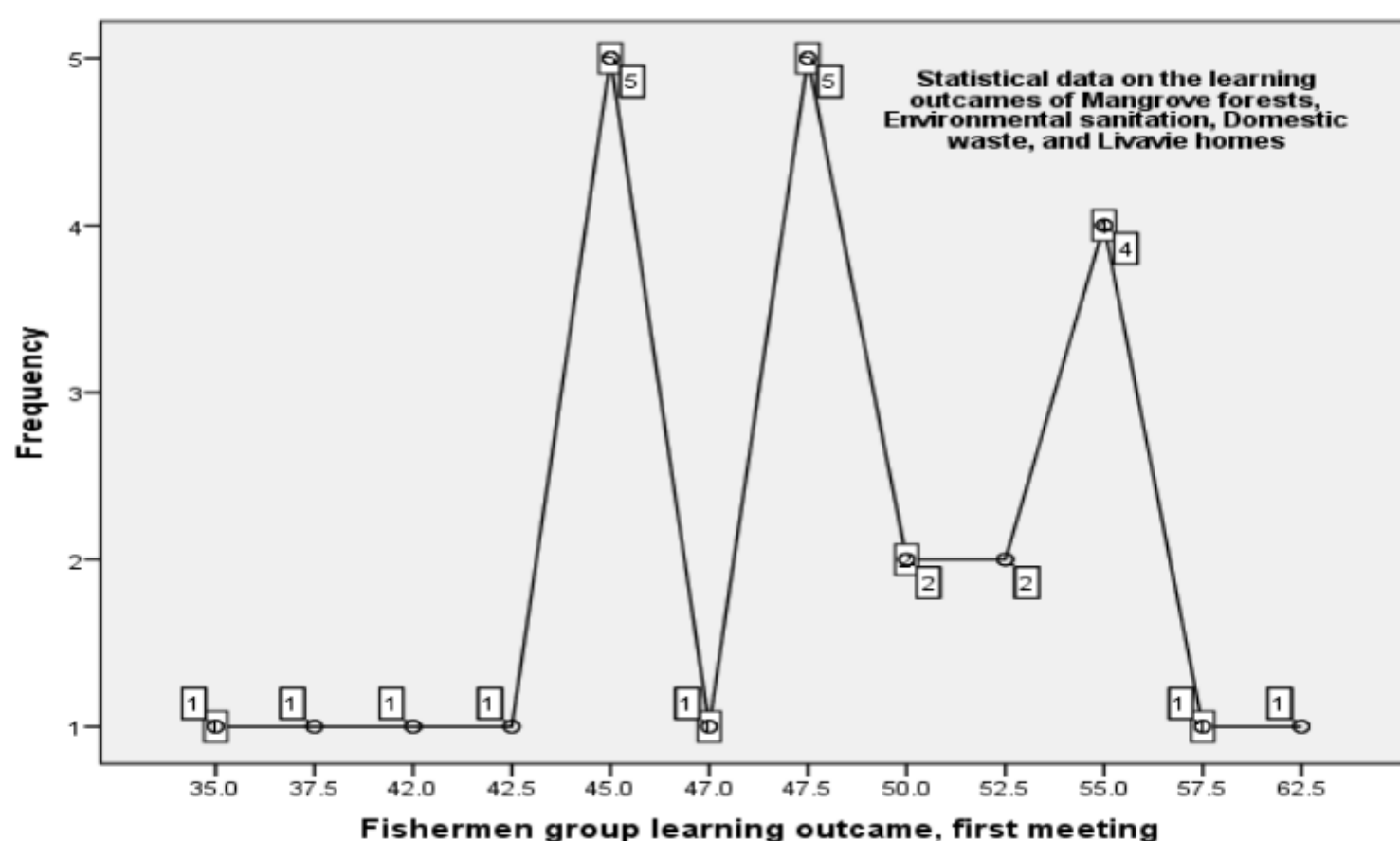


Figure. 5. Mastery Learning results of the first meeting

(Arifin, 2009) stated that determining the learning outcomes of the first meeting can be grouped into five categories. It can be seen in the following table

Table 1.1 Distribution of frequencies and categories of learning outcomes of the first meeting

No	Score	Category	Frequency	Percentage
1	85 – 100	Very High	0	0
2	65 – 84	High	0	0
3	45 – 64	Average	21	84
4	25 – 44	Low	4	16
5	0 – 24	Very Low	0	0

The learning outcomes in the first meeting for the very high category was 0%. The average category was 84% taken from 21 people out of 25 people. The low category was 16%. The level of education of the participants varies. 48% from elementary school and 52% were ranging from not graduating junior high, high school, to higher education. (Kudryavtsev et al, 2012) stated that Environmental Education in Indonesia still need to be improved in terms of cognitive and affective aspects.

Trial of The Second Meeting

The accuracy of effectiveness was conducted in the second meeting. The concepts were the same as the first trial. Twenty-five participants of fishermen learned and were coded according to the answer sheet. The codes were mangrove forest material, domestic waste, environmental sanitation, and livable homes.

Learning outcomes were analysed descriptively. Statistical analysis was stated as follows: the average score of the material mastery increased to 60.6. This score generally illustrates that the passing score increased from the combined score of the four materials. 80 was the highest combined score achieved by participants, and the lowest score was 37.5. The median score was 62.5. It indicates that 50 % of them obtained 62.5 from the combined score of the four items. The mode score was 55. It shows that the combined score of mangrove forest knowledge, environmental sanitation, domestic waste, and livable homes was the most obtained score by the fishermen study group, generally material mastery of the fishermen group are low due to uncommon method learning through documentary video (Asri et al., 2019).

The detail is shown in figure 6.

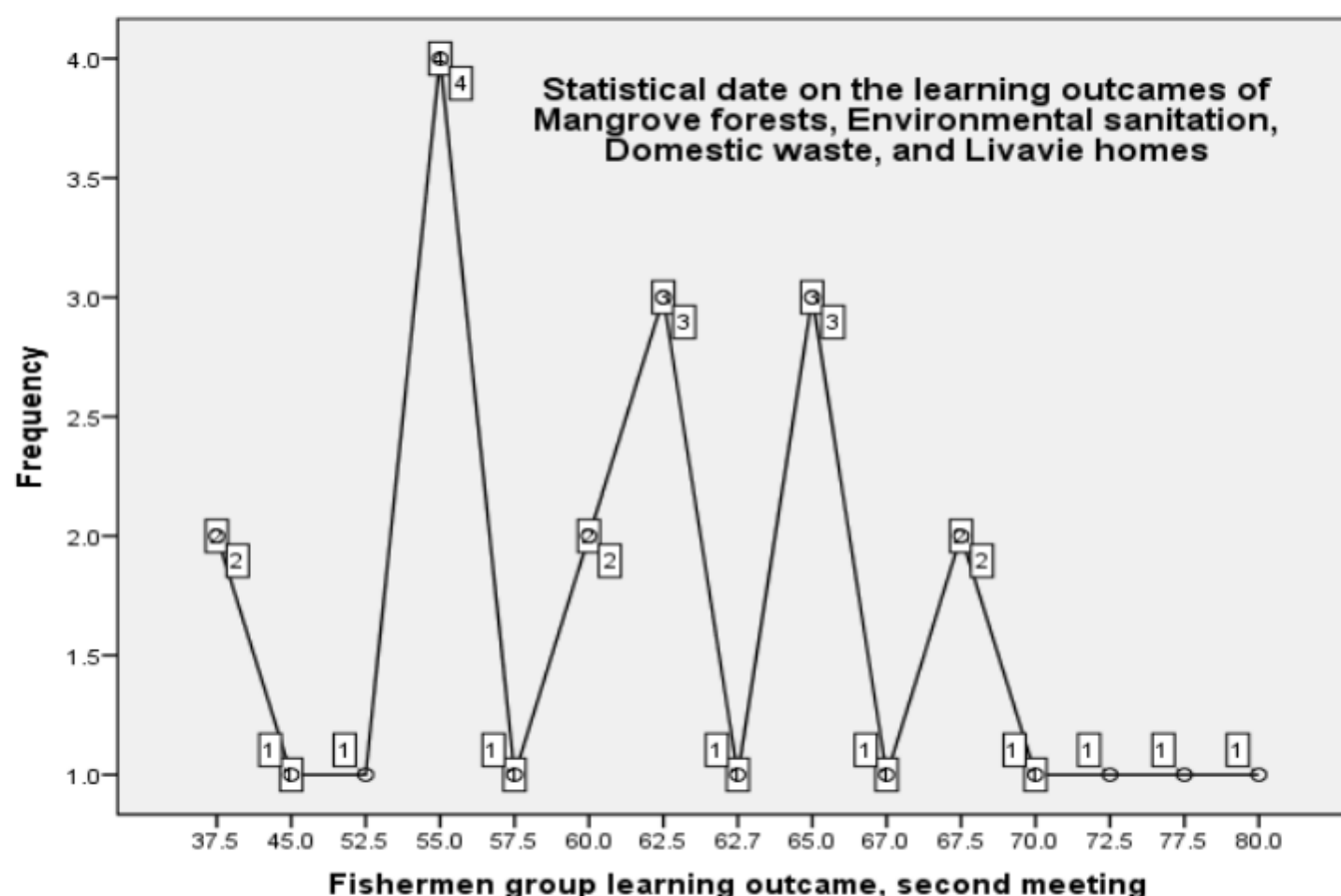


Figure. 6. Learning outcomes mastery of the meeting material two

Table 1. 2. Distribution of frequencies and learning outcomes of the two meetings

No	Score	Category	Frequency	Percentage
1	85 – 100	Very High	0	0
2	65 – 84	High	10	40
3	45 – 64	Average	13	52
4	25 – 44	Low	2	8
5	0 – 24	Very Low	0	0

Distribution of frequencies and learning outcomes of the second meeting is presented in Table above.

The learning outcomes of the second meeting increased. The high category was 40%, and in the average category was 52% taken from 13 out of 25 people. The lowest score was 8% taken from 2 people.

The implementation of the Model component (LE) using documentary videos was observed by two people as observers to determine the percentage of agreement for the syntax component 100%, 100% social system, 100% reaction principle, and 100% support system. It means that two observers have agreed that all model components have been implemented properly.

Discussion

Validation Model

The assessment results of the educational and multimedia experts on the implementation of the ELM was Very Valid. It means that the ELM and Video documentary are suitable to be used to increase knowledge, change attitudes, and behaviour of coastal residents in Palopo, due to the coastal residents poverty that leads them to damage and pollute the environment (Eggen, 2012).

The benefits of using documentary videos as Environment Learning Model as a method of sharing information are (1) Documentary videos are adequate to be used because participants found it the same as they watch it from TV broadcasts. Individually, the material is easy to remember because It is equipped with pictures of their environment. However, it also creates difficulty in terms of understanding the material due to the variety level of participants' education. (2) The fishermen group is shown a documentary video as media to share information. In the learning process, participants were challenged due to the speed of reading, memorizing and working on problems. Asri et al. (2015) argues that the Environmental Education Model learning using computer media is implemented by local-hosting and online. Students experience difficulty to understand online material. They are limited by the time of each subject and continue working on questions online on Environmental Education material in Vocational Schools.

Practicality

Two approaches can measure practicality. The first one is the theoretical approach. It is based on the results of an educational expert assessment of the implementation of the ELM component using documentary videos as an information method. It was declared feasible to be used as a learning model to help participants in learning, obtaining information and knowledge. Rusman & Cepi (2011) stated that the function of media in learning process is as learning aids and sources.

Nordyke (2011) argues that models of teachers are really models of learning as we help students acquire information, ideas, skills, values, ways of thinking, and means of expressing themselves, we are also teaching them how to learn.

The second is the empirical approach. It is based on observations of the implementation of the components of the ELM using a documentary video. The components are the syntax component, social system, reaction principle, and supporting systems. The average observation of the first trial was 3.62, and the second trial remains 3.62, with the reliability of the percentage of agreement R (PA) is 100%. It means that all the components of the model are well-implemented, but several aspects need to be improved in terms of function.

Effectiveness

The effectiveness of the Model uses documentary videos from the learning outcomes of mangrove forests, domestic waste, environmental sanitation, and livable houses. One of the supporters of effectiveness is the validity of the learning tools as a whole in a very valid category. The learning outcomes of the descriptive statistical analysis of mastery of the first trial material obtained an average score of 47.5 from the number of study participants in the fishing group of 25 people. It means that the material mastery ability of the four materials falls into the "Medium" category so that it is considered that the understanding of material mastery is not evenly distributed as a whole in the fishermen study group and perch has not been successful. Continued with two trials, the average score of material management increased by 60.6 from the number of study participants in the fishing group of 25 people,

with the ability of material mastery remaining in the "medium" category, and ten people already in the high category, it is hoped that changes in behavior can act to preserve the forest, mangroves, healthy living, and recycling waste. The participants were given various statements about personal environmental behavior (Kanuka, 2010; Levy et al., 2018). The results of their responses on a Likert scale indicates that most of the behaviors in the statements are not frequently practiced. The more frequently practiced behaviors have to do with issues of cleanliness, recycling, electricity, and buying local produce. Two factors have led to an increase in mastery of the material in the second trial phase, namely: (1) documentary videos as a method of information are new, thus providing encouragement, motivation, and encouragement to learn; (2) the material presented in the documentary video did not change in the second trial so that the completion of answering questions was easier because it had been studied in the first try.

CONCLUSION

According to the research results that it is appropriate to use ELM as documentary video media to teach mangrove forests, domestic waste, environmental sanitation, and livable homes to coastal residents. The ELM model was assessed by educational experts and media experts to figure out its validation.

The results of the assessment show that (1) the validity of the reliability coefficient instrument is $R = 1$. Overall, the instrument meets the validity

and reliability requirements. (2) The validity of the ELM Book of 3.75 is in the "very valid" category with a reliability coefficient of $R = 0.96$. (3) The validity of the learning plan of 3.84 is categorized as "very valid."

The ELM implementation was conducted twice at the coastal population. The results show that (1) the first trial refers to the implementation of the syntax component, the social system, the principle of reaction, and the support system entirely implemented, but still need to be improved. (2) Improvements were made before the second trial, which still refers to the implementation of the components. The results of the assessment show 87.5 percent, which indicates ELM is quite practical to use.

Material mastery of the learning process represents the effectiveness of the ELM. The results show that (1) the learning process of the first trial concern on four subjects, namely mangrove forests, environmental sanitation, domestic waste, and houses. The average score was 48.4 from 25 participants. The score was still very low. (2) In the second meeting, the results of material mastery obtained an average score of 60.8. It demonstrates an improvement in learning outcomes so that the ELM can be categorized as effective.

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