

The Practicality of Teaching Materials on Types of Crab in the Mangrove Forest Area to Improve Critical Thinking Skills for Islamic High School Students

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Abstract

The crabs are organisms that have a major role in the mangrove ecosystem. The preservation of the mangrove ecosystem cannot be separated from the roles and responsibilities of humans. This can be started by creating awareness and practicing thinking skills to provide solutions to various existing environmental problems. According to the results of the TIMSS study, the low scientific ability of Indonesian students, especially its implementation in the form of scientific literacy, has not shown a good improvement so that learning innovations are needed, one of which is the manufacture of environment-based teaching materials. The purpose of this study was to describe the practicality of the teaching materials "Crab Types in the Mangroves Area" in training students' critical thinking skills at MAN Tanah Laut. The type of research used is the Tessmer formative test. The research data were analyzed descriptively, practical data included the feasibility of using teaching material and student responses, indicating that the teaching materials developed were practical for use in learning and could improve the critical thinking skills of MA students.

Abstrak

Kepiting merupakan organisme yang memiliki peran besar dalam ekosistem mangrof. Kelestarian ekosistem mangrof tidak luput dari peran dan tanggung jawab manusia. Hal ini dapat dimulai dari menciptakan kesadaran dan melatih keterampilan berpikir agar dapat memberikan solusi-solusi dari berbagai permasalahan lingkungan yang ada. Hasil studi TIMSS menunjukkan rendahnya kemampuan sains siswa Indonesia terutama implementasinya dalam bentuk literasi sains belum menunjukkan adanya peningkatan yang baik sehingga diperlukan inovasi pembelajaran salah satunya dengan pembuatan bahan ajar berbasis lingkungan. Tujuan penelitian ini adalah untuk mendeskripsikan kepraktisan Bahan Ajar "Jenis Kepiting di Kawasan Mangrof" dalam melatih keterampilan berpikir kritis siswa MAN Tanah Laut. Jenis penelitian yang digunakan adalah uji formatif *Tessmer*. Data hasil penelitian dianalisis secara deskriptif, data kepraktisan meliputi kepraktisan penggunaan bahan ajar dan respon siswa, menunjukkan bahwa bahan ajar yang dikembangkan praktis untuk digunakan dalam pembelajaran dan dapat meningkatkan kemampuan berpikir kritis siswa MA.

A. Introduction

The crab is an organism that is resistant to changes in the ecosystem in mangroves (Tanod & Watanabe, 2000). Crabs have a role in the ecosystem, including in the food chain cycle. The holes made by crabs are useful as shelter and foraging, besides that they are also useful as gaps for oxygen to enter the deeper parts of the substrate, to improve anoxic conditions in the mangrove forest substrate (Nybakken, 1992).

The role of crabs that are so big in the mangrove ecosystem needs special attention so that the natural balance can be maintained. Humans are one of the determining factors to preserve the environment and have a role and responsibility to empower natural resources for the survival of the ecosystem. These roles and responsibilities must start from creating awareness and training thinking skills to provide solutions to various existing environmental problems.

Various ways can be taken to create awareness of the importance of protecting the environment, including by providing appropriate learning while in school. According to the results of a study conducted by TIMSS, the science skills of students in Indonesia are classified as low, especially the application in the form of scientific literacy. The need to design learning and conduct assessments that can stimulate increased scientific literacy is an important thing to do today in the world of education in Indonesia. Observing the current conditions, teachers should begin to move from teaching principles to learning to learn, both in terms of concepts (content standards) and processes (working scientifically) (Ridwan, 2010).

The lack of environment-based teaching materials, especially those related to crabs, makes researchers interested in developing teaching materials related to this. The teaching material regarding the types of crabs in the mangrove forest area aims to introduce the mangrove forest and the richness of the crab species in it to students and guide them in carrying out various activities to train them to become accustomed to critical thinking. Critical thinking skills are skills possessed by students to reason, synthesis skills in assessing, solving problems, making decisions to believe in things to be done. Critical thinking is the process of actively and skillfully formulating orderly reasons from conceptualizing, applying, analyzing, integrating (synthesis), or evaluating information collected through the process of observation, experience, reflection, reasoning, or communication as a basis for determining action (Nafiah Suhadi; Sari, Murni Saptana, 2019).

According to the OECD PISA (2015) trials of knowledge questions that aim to measure

scientific literacy are displayed and in two units, namely 1) Standard unit, which consists of graphics, text, tables, and related questions, and 2) Interactive unit, in the form of interactive stimuli and related questions. Standard units measure the learning experience through scientific work and interactive units measure students' abilities in terms of technological literacy. Both of these abilities must be encouraged so that students have scientific and technological literacy. One way that might improve this is to design contextual learning following the student's environmental conditions. Belawati (2003) teaching materials are learning materials that are made systematically, which are used by teachers and students in the learning process. So teaching materials are a set of tools that contain learning material to evaluation, can be written or unwritten, used by the teacher in the learning process so that students achieve the desired learning outcomes including aspects of knowledge, behavior, and skills.

This study aims to describe the practicality of teaching materials "Types of Crabs in Mangrove Forest Areas" to practice the critical thinking skills of MA students. The benefit of this research is to provide practical teaching materials to students about the use of mangrove forests and the richness of crab species in mangrove forest waters. Teaching materials that are practical and easy to learn are expected to increase students' scientific literacy in schools.

B. Materials and Method

This research is a development research with formative evaluation using Tessmer's (1998) design. Development stages include (1) self-evaluation; (2) expert review; (3) one-to-one; (4) small group test; and (5) field test. Development research emphasizes formative evaluation so that the development model used aims to produce a prototype Tessmer, (1998). The practicality of teaching materials can be seen from the results of the assessment, the practicality of using teaching materials, and student responses. The research subjects were 15 students of MAN Tanah Laut, while the object was the teaching material "Types of Crabs in the Mangrove Forest Area". The research data were analyzed descriptively by looking at the average score of each aspect of the assessment by the observer. The formula used is as follows:

$$\text{Average } \bar{X} = \frac{\text{Amount } X}{n}$$

Information:

Average \bar{X} = Average Score

Total X = Total Score

n = Number of Aspects

The modified practicality category measurements from Sugiyono (2013) are presented in Table 1 below.

Table 1 Categories of Product Practicality

No	Score	Description
1	$85 \leq X \leq 100\%$	Very Practical
2	$70 \leq X < 85\%$	Practical
3	$60 \leq X < 70\%$	Quite Practical
4	$50 \leq X < 60\%$	Less Practical
5	$0 \leq X < 50\%$	Impractical

(Modified from Sugiyono, 2013)

C. Results and Discussions

The practicality of teaching materials was obtained based on trials of 5 students (expected practicality) and 15 students (actual practicality) which included data on the practicality of teaching materials and student responses. The results obtained in the form of the practicality of teaching materials and student responses are presented in Table 2 below.

Table 2 The results obtained in the form of the practicality of teaching materials and student responses

No.	Parameter	Expectations		Actual	
		S	TS	S	TS
1	Practicality of teaching materials	86,5	13,5	87.7	12,3
2	Student Response	88.0	12.0	94.7	5.3

Description: S = Agree; TS = Disagree

Based on the results of student responses (Table 2), students thought that the use of this teaching material was easy to learn. This is because the material presented contains descriptions and pictures as well as the same conditions as the original object. The presentation of teaching materials is made simply and in a language that is easy to understand and not too standard, making it easy to learn, so that it does not result in inefficiency in learning.

Another advantage of teaching materials is that the material content is compiled based on direct observation in the Pagatan Besar mangroves forest area so that it can be implemented in environment-based learning so that students are expected to be able to recognize the environment and be sensitive to these environmental problems. Nugroho (2018) states that to get used to using adaptive thinking and behavior systems, students must be introduced to the potential of the environment around them. This is reinforced by (Hadi & Anazifa, 2016) which states that environmental learning makes a person experience increased thinking skills, skills, and awareness of environmental issues.

The teaching material has an attractive cover design equipped with an animation which is considered to be able to provide motivation in studying the types of crabs in the mangrof forest. Complete presentation of material and practice critical thinking skills with 5 sub indicators, namely Clarifying Meanings, Suspecting Alternatives, Questioning Evidence, Analyzing Arguments and Drawing Conclusions (Facione, 2011). The results of observations on the practicality of the teaching materials carried out also support this. The questions arranged in the teaching material also affect critical thinking skills and stimulate students to take an active role in learning activities. This is reinforced by the opinion (Nugraha & Binadja, 2013) that the questions contained in the material affect the activeness of students.

The teaching material has an attractive cover design equipped with an animation that is considered capable of motivating studying the types of crabs in the mangrove forest. The complete presentation of material and practice critical thinking skills with 5 sub-indicators, namely Clarifying Meaning, Suspecting Alternatives, Questioning Evidence, Analyzing Arguments, and Drawing Conclusions (Facione, 2011). The results of observations on the practicality of the teaching materials carried out also support this. The questions arranged in the teaching material also affect critical thinking skills and stimulate students to take an active role in learning activities. This is reinforced by the opinion (Nugraha & Binadja, 2013) that the questions contained in the material affect the activeness of students.

The superiority of the teaching materials developed in the form of instructions for the use of teaching materials can be understood easily, the content of the material is compiled based on direct observation in the Pagatan Besar mangrove area so that it can be implemented in environment-based learning. The teaching material is also considered quite interesting because it is equipped with animation and is considered capable of motivating studying the types of crabs and mangrove forests. Saraswati (2013) states that the process of learning activities using an environmental approach raises the interest of students in learning the subject matter. This is reinforced by Irwandi *et al.* (2019) who state that contextual learning resources packaged with a local environment will provide a lot of information and enrich students' learning experiences to explore potential and problems in the surrounding environment.

Students agree with the teaching materials because they can understand the material presented easily. Based on the results of the students' actual responses, it was found that an average of 94.7%

agreed and only a few disagreed (5.3%). This is in line with the results of research (Nafiah Suhadi; Sari, Murni Sapta, 2019) which states that the average response is 93.16%, which means that the teaching material is very practical. Nieveen (1999) states that product development can be said to be practical if the product is easy for students or teachers to run and is richer than student textbooks. Therefore, the assessment of users (students) is needed. Teaching materials that have been proven to be very practical must still be evaluated by students, this is so that the teaching materials can truly be understood by readers (Mbulu & Suhartono, 2004)

Practicality is a criterion for the quality of teaching materials seen from the level of ease with which teachers and students use the teaching materials developed, Nieveen (1999). Tessmer (1998) states that the practicality test is focused on data on students' abilities to confirm the successful improvement of product results before field testing is carried out. According to (Sunismi & Fathani, 2016) very practical teaching materials can be used by students to be more effective and efficient.

Based on this theory, the practicality of the teaching materials developed in terms of student responses assessed by students and the practicality of teaching materials observed by two observers is considered practical.

D. Conclusion

Teaching materials "Types of Crab in the Mangrove Forest Area" are classified as practical teaching materials. This can be seen from the results of the practicality of teaching materials on average that actually, 87.7% agreed and only a few expressed disagreement (12.3%). Meanwhile, based on the results of students' responses to the teaching materials "Crab Types in the Mangrove Forest Area", the actual average results were 94.7% and only a few disagreed (5.3%). This shows that the teaching material "Crab Types in Mangrove Forest" which was developed was practically used in learning to improve students' critical thinking skills. The development of "Crab Types in Mangrove Forest" Teaching Materials has several weaknesses in implementing it, namely that it takes a long time to carry out activities and extra supervision from the teacher. This is because students can be careless about their learning objectives. After all, they prioritize their joy and their desire to try new things.

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