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Developing science magazine integrated with contextual teaching and learning approach based on local potential in talang siring beach, Indonesia

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| ARTICLE INFO | ABSTRACT |
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| <p>Article history Received: 20 December 2022 Revised: 03 August 2023 Accepted: 20 October 2023</p> <p>Keywords: Contextual teaching and learning Science magazine</p> | <p>One of exciting learning media is magazine in which students prefer to read this rather than books since magazine contains of various colorful images and appropriate information. Magazine can be developed by integrating with science learning approach in order that students can comprehend the concepts easier. This study aims at developing science magazine which is integrated with contextual teaching and learning approach according to the study findings in Talang Siring. The research included in a research and development study, using Borg and Gall model. The research was conducted on October to November 2022, which is located in Talang Siring Pamekasan, Indonesia by identifying ecosystem of beach and mangrove. Furthermore, the observation findings were arranged systematically in developing science magazine. Science magazine was evaluated by experts in concept and learning media. Findings indicated that the science magazine is valid with media validity score 93.5 and content validity score 91.6. Therefore, it is appropriate to implemented in science learning. Therefore, it can be concluded that science magazine is able to be used as learning media in science learning process.</p> |

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INTRODUCTION

Science is one of branches of knowledge that discusses about nature and phenomenon of life that should be learned by students (Rahman et al. 2021). Science is a knowledge consisting of concepts that also refer to a process of acquiring knowledge (Rosamsi, Miarsyah, and Ristanto, 2019; Vu and Tchounikine, 2021). In acquiring science concepts, students conduct observation and experiment to explain, analyze, and describe natural phenomenon (Drummond & Murphey-Reyes, 2017). Science is also a curiosity in thinking about the nature in which anyone can have various ideas about how nature works. Science is more than memorizing and understanding concepts. It relies on how scientific advances are created, processed, and interpreted (Cheng, 2021; Espinoza-Figueroa et al. 2021). By comprehending the process of science can help us make better decisions and overcome problems.

There are several important concepts in the science process, they are about: 1) science is a process of investigation into the natural world, 2) scientists apply research methods to investigate the natural world, 3) scientific theories are testable explanations supported by various evidences, 4) scientific knowledge evolves with new evidence and perspectives, and 5) science comes from the several scientific attitudes such as critical thinking, creativity, curiosity, and problem solving skill (Susilawati et al. 2020). However, an effective science learning process can be achieved by addressing an exciting learning media. Learning media can be used to address information and knowledge to students (Rosamsi et al. 2019; Vu and Tchounikine, 2021). The use of learning media is useful in science learning since science concepts are mostly difficult.

One of these exciting learning media is magazine in which students prefer to read this rather than books since magazine contains of various colorful images and appropriate information. Science magazine is defined as a periodical publication type in which contains of news, articles, reports, and further information about science concepts (Fitriah, 2022). Furthermore, the contents in science magazine mostly based on scientific investigations, observations, or experiment. Science magazine can be used for learning process in order that students can enrich information not only from books, or other learning sources but also can be magazine (Anggraeni, Suratno, & Narulita 2022; Sativani Hayati & Gusti Putu Suryadarma, 2021). It has been reported that science magazine can address information more meaningful for students, improve students' learning motivation, present the difficult information become easier to understand, and give more meaningful experiences for students (Susilawati et al. 2020).

According to the observation result in July to August 2022, mostly students learn passively by reading book that impacts on low learning motivation. Students can increase their learning motivation by reading an interesting science magazine. Science magazine also can be developed by integrating with contextual teaching and learning approach. Contextual teaching and learning approach involves in the process of making learning process more meaningful to students by connecting the concepts in classroom to the real world (Ellizar et al. 2019). In addition, this learning approach also draws upon students' diverse thinking skills, motivation, experiences, and cultures (Anggraeni et al. 2022; Duda et al. 2022).

In this study, the science magazine was developed by integrating the concepts which also based on the observation results in Talang Siring Beach. As it is already stated that Madura has many beautiful nature and ecosystem, one of them is in Pamekasan. Talang Siring is one of popular beach in Pamekasan which has beautiful ecosystem. It is on the southern coast of Madura with rocky and partly sandy characteristics. Talang Siring Beach is the habitat of various kinds of biota, such as molluscs, crustaceans and algae (Fahmi, Abdullah, & Irhasyuarna, 2021; Insani et al., 2019). Several types of molluscs from the bivalve group found on Talang Siring Beach include *Anadara granusa*, *Anadara antiquata*, *Meretrix* spp., *Crassostrea* spp., and *Adrana patagonica*. The diversity of bivalves on the Talang Siring Beach is one of the local potentials which is a special attraction for Talang Siring Beach, where the people around Talang Siring Beach often use bivalves to make Madurese specialties food such as petis, renggingang, crackers, and so on. Apart from that, Talang Siring Beach has a variety of mangrove potential. There was four types of mangroves on Talang Siring Beach, including *Rhizophora lamarkii*, *Sonnerata alba*, *Avicennia marina* and *Pemphis adicula* (Sadili, 2011). Another potential of Talang Siring beach is marine products in the form of fish. Talang Siring beach fishermen still maintain the traditional fish catching tool called a bagan. Bagan usually operated not only in a fertile and calm waters, but also have strong currents, with catches in the form of anchovies, selar, layur, mackerel and cuttlefish (Fahmi, Abdullah, & Irhasyuarna, 2021; Insani et al., 2019).

According to the observation in Talang Siring beach, it is assumed that there is abundant of ecosystem that can be enriched in science magazine. The reason why the science magazine should be developed is that science magazine is one of interesting science learning materials. It is also proved that science magazine can interact students because this science learning materials consist of many figures and information that can make students easy to comprehend science concepts. In addition, science magazine contains of simple information that can improve students' learning motivation (Martahan & Nasution, 2023). Therefore, by conducting early observation and identification in the ecosystem of Talang Siring then fill up into the science magazine, it is expected that students can learn the science concepts easier. Furthermore, the science magazine can also be used to assist students into what and how students analyze. In conclusion, science magazine that has been developed by integrating with contextual teaching and learning approach can guide students in the learning activities that close to the real world in order that students can understand the concepts related to real-life. According to the previous views, this study aims at developing science magazine which is integrated with contextual teaching and learning approach according to the study findings in Talang Siring.

METHODS

Research Design

This study included in a research and development type that has been already conducted on October to November, 2022. This research used Borg and Gall research and development model which is included in a process to develop and validate the educational products such as teaching materials, media, and methods. This research and development model consists of several stages, i.e., 1) need analysis, 2) design, 3) review the initial design, 4) try in one-to-one base, 5) revise, 6) develop a prototype, 7) try in a small group, 8) revise and finalize, and 9) implement field test (Heinich et al. 2012).

Population and Samples

The population in this research was about students in a certain University, with students who have already learned about science education. Furthermore, the samples taken from its population were 32 students in one class. The research subject was decided and chosen using a non-probability sampling technique, in the type of purposive sampling. The students were chosen according to the aim of this study and were also selected according to the certain criteria and considerations, such as development of thinking process, learning styles, and learning background.

Students in class 5B consisted of 2 boys and 30 girls in the age of 19-20 years old. They have already studied science concepts during four semester before in which the concepts were integrated in this study. According to the observation result during the learning process, students also preferred to learn using interesting learning media, therefore it is proper to conduct a learning process by using a science magazine.

Instrument

The instrument used in this study was observation, interviews, and questionnaires. Observation and interview were conducted to collect data of ecosystem in Talang Siring Pamekasan. Meanwhile, the questionnaires were used to find data of validity of science magazine and also student response toward science magazine. Observation instrument consists of aspect in observing and identifying ecosystem of beach and mangrove in Talang Siring. Besides, the interview instrument consists of questions related to traditional behaviour that is done by local society and fishermen. Then, the questionnaire instrument consists of two types, validity and response. Validity contains of aspect of media and contents related to science magazine.

Procedure

This research and development adopt on Borg and Gall research and development model in which is conducted based on the steps .

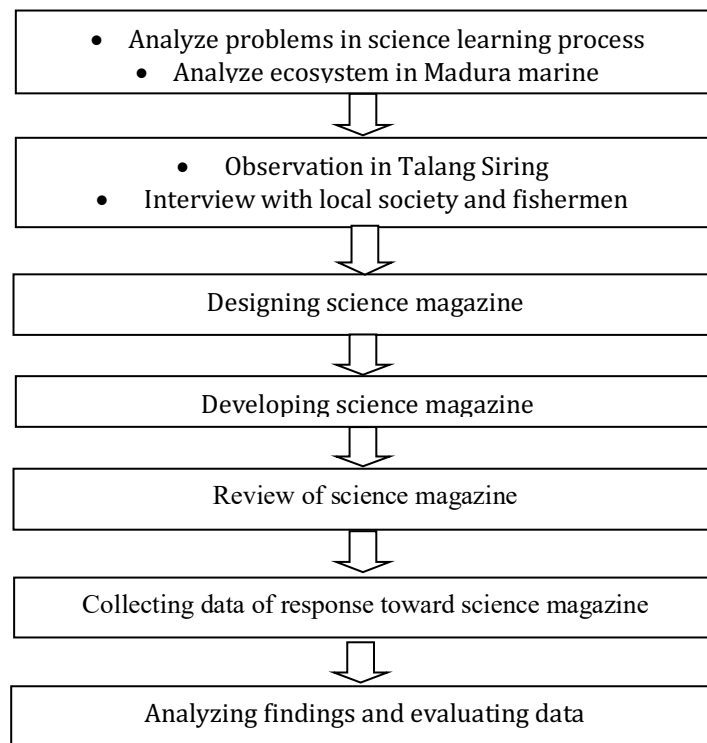


Figure 1. Research Procedures

According to the procedures in [Figure 1](#), it can be described that this study began at analysing problems in the science learning process and ecosystem in the Madura marine. In addition, the step is continued by observing the ecosystem in Talang Siring beach and having interview with local society and fishermen. According to the observation and interview findings, the science magazine was designed using *Canva* and then developed. After the science magazine was developed, the magazine was validated by experts in learning media and the content. Based on the validation results, the science magazine was revised and then continued by collecting data of response toward the magazine. Lastly, the data was analyzed and evaluated briefly.

Data Analysis Techniques

Data of validation is obtained from the validation score that is measured using a formula below.

$$P = \frac{\sum x}{\sum y} \times 100\% \text{ (Auliya and Lazim, 2020)}$$

Note:

P = Score of validity

$\sum x$ = Number of answers

$\sum y$ = maximum score

In addition, the total score is measured using a formula below.

$$v = \frac{\sum_{i=1}^n P}{n} \text{ (Akbar, 2013)}$$

Note:

n = number of experts

P = Score from every expert

v = Average score from all experts

Furthermore, the criteria of validity is based on the criteria below.

Table 1.

Criteria of Validity

| Score | Category | Note |
|------------------|---------------------|-----------------------------------|
| 0 < score ≤ 40 | Not valid at all | Cannot be used at all |
| 40 < score ≤ 55 | Less valid | Can be used with major revisions |
| 55 < score ≤ 70 | Moderate | Can be used with minor revisions |
| 70 < score ≤ 85 | Valid | Can be used with small revisions |
| 85 < score ≤ 100 | Very good and valid | Can be used without any revisions |

RESULTS AND DISCUSSION

This study was conducted by developing science magazine according to the observation result in Talang Siring Pamekasan. Furthermore, the science magazine is validated by two experts, in the aspect of media and content. The result of development of science magazine is shown in the [Figure 2](#).



Figure 2. Science Magazine

The science magazine was developed toward the findings from the survey and observation in Talang Siring beach. Talang Siring beach has diverse ecosystem, including beach and mangrove ecosystem. The diversity of invertebrates such as bivalves can be found in Talang Siring beach. Furthermore, the ecosystem of mangrove in this beach also dominates prettily. According to that view, the science magazine was developed to provide information related to the ecosystem in Talang Siring beach. Furthermore, the science magazine was developed by experts and the result of validation toward the science magazine is represented in the [Table 2](#).

Table 2.

Validity of Science Magazine

| Aspect of Validity | | Score of Validation | |
|--------------------|---------------|---------------------|------|
| Media | Simplicity | 100.0 | 93.5 |
| | Visualization | 90.0 | |
| | Efficiency | 90.5 | |
| Media | Concept | 85.0 | 91.6 |
| | Language | 90.0 | |
| | Curriculum | 100.0 | |

According to the experts' comments and validation score, science magazine is valid and can be used for science learning without any revisions. It is assumed that science magazine is good and appropriate for science learning since it contains of science concepts that integrated to the real-world which comes from the observation result in Talang Siring beach at Pamekasan. The science magazine consists of contextual concepts. Regarding to the contextual-based science magazine, it can help students in getting better understanding and also motivate students. It also can encourage students to explore more about their thinking related to certain concepts. By having the science magazine, students can also express themselves by reading more, acquiring their cognitive process that will enable them to perform more efficiently in comprehension. As it is already stated that science magazine provides interesting information and figures that can attract students' learning motivation. This learning media can also reduce students' bored by lighten up students' mind. Science magazine can also help students to focus more in learning science concept since they are happy so that they are able to understand the concepts easily.

Science magazine developed in this study was valid and reached very good score since the learning media provides meaningful and easy-understand concepts. Students are able to expose a wide variety of description and a plenty of interactive content. The science magazine not only provides information and science concepts, but also pictures and games that can enhance students' learning interests. This science magazine can also help educators to ask students in growing their reading literacy. By having colorful photos, science magazine can bring an array of science concepts for students. Students can attain the variety of texts that encourage them to read, learn, and interact with others, showed by the score of validity. Science magazine also can foster the students' curiosity since students are showed by information that might be far away from students. The science magazine provide additional information, such as related to Petik Laut that can engage students who want to explore more related to the information. In addition, the science magazine encourages students in critical thinking and analysis by presenting multiple perspectives on complex contextual issues. This science magazine is able to enhance the students' learning experience, since the science magazine includes a plenty of visuals such as photographs, illustrations, and diagrams that help students in understand the concepts and make the content much more visually appealing.

The science magazine provides information, articles, features, and ideas that deliver valuable information on a specific topic or a variety of subjects. This science magazine is used to educate and enlighten readers on new developments and insights. Contextual teaching and learning approach involves in the process of making learning process more systematical and meaningful to students by connecting the concepts in classroom to the real world (Littenberg-Tobias and Reich, 2020; Purwati, Marasabessy, and Damopolii, 2019). In addition, this learning approach also draws upon students' diverse thinking skills, motivation, experiences, and cultures. As it has been described that contextual teaching and learning approach can increase students' learning motivation (Dewi and Alam 2017; Fahmi, Abdullah, and Irhasyuarna, 2021). If students are motivated and interested in learning, then students are easier in understanding the concepts (Program, 2020; Syarifah and Astuti, 2020). It has been also proved that science learning media which integrates to this approach can improve students' thinking processes (Syarifah and Astuti, 2020).

In this study, the science magazine was developed by integrating the concepts which also based on the observation results in Talang Siring Beach. As it is already stated that Madura has many beautiful nature and ecosystem, one of them is in Pamekasan. Talang Siring is one of popular beach in Pamekasan which has beautiful ecosystem. By conducting early observation and identification in the ecosystem of Talang Siring then fill up into the science magazine, it is expected that students can learn the science concepts easier. Furthermore, the science magazine can also be used to assist students into what and

how students analyze. In conclusion, science magazine that has been developed by integrating with contextual teaching and learning approach can guide students in the learning activities that close to the real world in order that students can understand the concepts related to real-life.

CONCLUSION

This study aims at developing science magazine which is integrated with contextual teaching and learning approach according to the study findings in Talang Siring. The survey and observation were conducted in Talang Siring Pamekasan by identifying ecosystem of beach and mangrove. Furthermore, the observation findings were arranged systematically in developing science magazine. Science magazine was evaluated by experts in concept and learning media. Findings indicated that the science magazine is valid and appropriate to implemented in science learning. Therefore, it can be concluded that science magazine is able to be used as learning media in science learning process.

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