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Bacteria Magz as an Alternative Learning Resource on Bacteria Concept for Senior High School Level

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Abstract

This study aimed to determine the feasibility of *Bacteria magz* as alternative learning resources on the bacteria concept of senior high school. The method used in this research is a descriptive method. We used three experts to validate the *Bacteria magz* with expertise and experience in learning media, bacteria concepts, and alternative learning sources. The results of the expert test evaluation on the aspect of the media were 93,25%, while on the material aspect was 87,5%. The average value of the *Bacteria magz* as alternative learning sources was 90,37%. The *Bacteria magz* as alternative learning resources on bacteria concept was very suitable for ten grade students of senior high school.

Keywords: *Bacteria Magz,* Alternative Learning Resource, Bacteria Concept, Validation

INTRODUCTION

In this modern era, it has the impact of changes in various fields, one of which is the field of education competing to make improvements to improve education. Updates that can be made to meet the challenges of the times are by utilizing existing technological developments. The use of alternative learning resources can be used to facilitate learning activities to be more effective and efficient. According to Siregar & Nara (2010), learning resources are useful for adding and expanding the horizons of knowledge in the classroom, providing accurate and up-to-date information, and providing positive motivation.

Learning resources are everything that students can use to study materials and learning experiences in accordance with the objectives to be achieved. Learning resources here include people, tools and materials, activities, and the environment (Sanjaya, 2010). One of the alternative learning resources used in the learning process is magazines. Nurudin (2014) states that a magazine is a collection of stories, articles printed on quarto sheets of paper bound in book form with content characteristics adapted to the target reader. The advantages of learning resources in magazines can support students' understanding of the material explained by the teacher and provide interesting learning nuances. This is in accordance with Daryanto (2010), which states that in magazines that contain warm and actual reading material, they have the latest data that discusses topics that attract readers' attention, increase knowledge, improve critical reading and practical skills.

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Based on the results of interviews with Indonesian Biology teachers from several public high schools, it was explained that teaching and learning activities in schools, especially in the concept of bacteria, only used teaching materials in the form of worksheets. The use of teaching materials in the form of worksheets regarding the material in question generally does not attract students' interest because the content and appearance of the design are too monotonous. Therefore, an alternative learning resource is needed in the form of a magazine on the sub-concept of bacteria regarding nitrogen-fixing bacteria in chili plants to attract students' attention to foster learning motivation. In addition, alternative learning sources in magazines can also be a companion to the main material so that students gain broader insight because the contents of the magazine are in the form of the latest actual information.

METHOD

This research used the descriptive method. The experts are media experts and material experts who two lecturers and one science teacher represent. It aims to see the initial product and provide input for improvement (Susilana & Riyana, 2009).

The product feasibility test was carried out using a Likert scale. Each indicator is given a score, and the number and percentage are calculated. The scoring for the Likert scale questionnaire is presented in Table 1.

Table 1. Criteria for scores obtained from product feasibility test questionnaires

Score each indicator				
Very not good	Not good	Enough	Good	Very good
1	2	3	4	5

The data obtained is data in the form of numbers, then the results of the assessment of the magazine's feasibility test are classified into five categories. The magazine's feasibility assessment results can be seen in Table 2. (Widyoko, 2009)

Table 2. Criteria for the assessment of the magazine's due diligence

The feasibility	Score (%)
Very worth it	81 – 100
Worthy	61 – 80
Decent enough	41 – 60
Not worth it	21 – 40
Not feasible	0 – 20

All of the aspects and indicators in the assessment were calculated. Then, we described, analyzed, and concluded each expert test. We used the percentage assessment table described above (Purwanto, 2013).

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RESULTS AND DISCUSSION

In compiling *Bacteria Magz* as an alternative learning resource, an evaluation needs to be carried out to determine the feasibility of the magazine. Based on the product feasibility test results in the form of a magazine that has been assessed by two material experts consisting of a Biology Education lecturer and a teacher from SMAN 5 Cilegon, Indonesia. In addition, media experts consist of two Biology Education lecturers. The assessment is carried out for the material aspect, which includes the feasibility of content, presentation, and language feasibility. In contrast, the media aspect consists of the sub-aspects of graphics and presentation. The results obtained from each aspect can be seen in Figure 1.

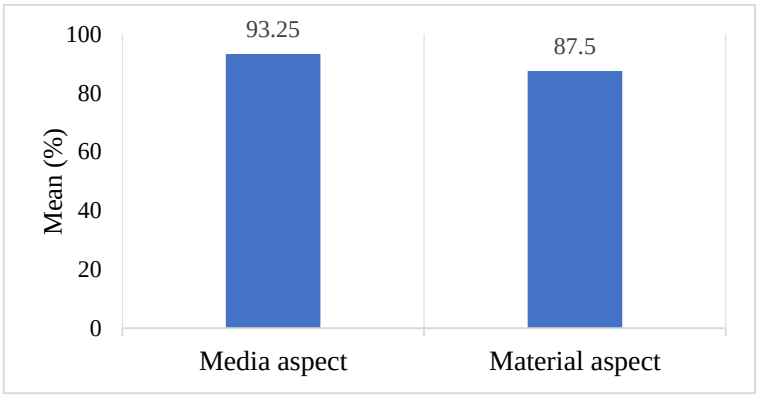

Figure 1. *Bacteria Magz* Expert Assessment Test Results on Media Aspects and Material Aspects

Based on the expert test assessment results listed in (Figure 1), it can be seen that in the media aspect, the average score is 93.25%. This shows that *Bacteria Magz* belongs to the very feasible category. This statement is in accordance with Widyoko (2009), which states that the very feasible category is in the range of numbers 81-100. The material aspect got an average score of 87.5%. This shows that *Bacteria Magz* belongs to the very feasible category. The expert test results get an average final score of 90.37%. From the mean for each aspect, it can be seen that *Bacteria Magz* is classified as very feasible to use.

The assessment of the media and material aspects is based on the experts. The sub-aspects of the media aspect can be seen in Figure 2.

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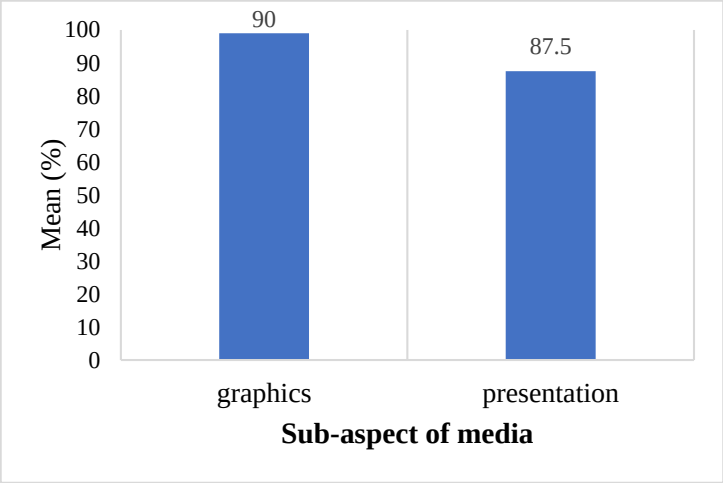

Figure 2. Assessment Results on Sub Aspects of Media Bacteria Magz

Based on (Figure 2), the sub-aspect of graphics gets a value of 99%, so it is classified in the very feasible category. According to media expert II, Bacteria Magz is very interesting in terms of size, color, and legibility, so that this magazine can make readers interested in reading it. This opinion is in accordance with the magazine's criteria, which must be made interesting to read the latest information presented. This is supported by Daryanto (2010), which states that the function of the magazine itself, namely in magazines containing warm and actual reading material, includes the latest data that discusses topics that attract readers' attention, increases knowledge, improves critical reading, and discussion skills.

The presentation sub-aspect scored 87.5%, which was included in the very feasible category. According to media expert 1, *Bacteria Magz* is good enough to provide information and sources for supporting images. Still, there is a lack of consistency in writing descriptions and sources for supporting images. Media expert 1 suggested that the captions and sources in the supporting images should be corrected to look more consistent. This is in line with the statement of Ardhanariswari & Hendariningrum (2014), which says that in making magazines, it is necessary to pay attention to order and balance regarding the anatomical structure. The anatomical structure in question is the text and images in the magazine. It is intended that the content presented in the magazine has an appearance that attracts readers' attention.

In addition to the assessment of the media aspect, another aspect, namely the material aspect, consists of several sub-aspects, including content feasibility sub-aspects, presentation sub-aspects, and language sub-aspects. The assessment of each sub-aspect of the material can be seen in Figure 3.

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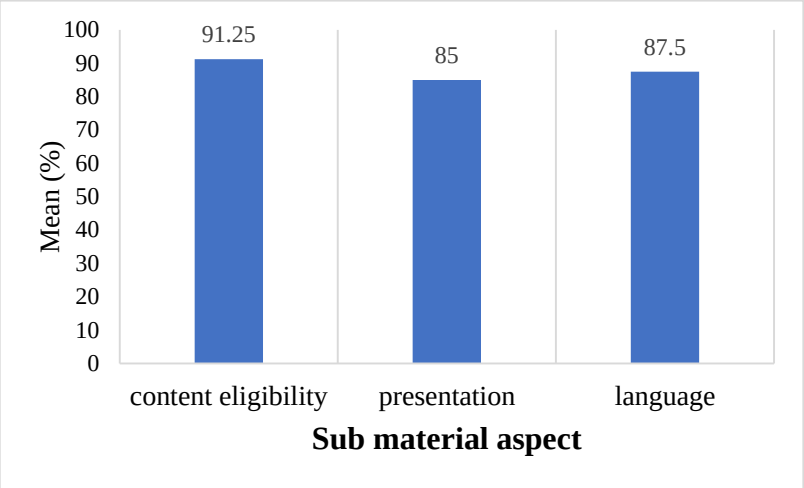

Figure 3. Assessment Results on Bacteria Magz . Material Sub Aspects

Based on (Figure 3), it can be seen that the content feasibility sub-aspect got an average score of 91.25%, which is included in the very feasible category. According to material expert I, *Bacteria Magz* can be used as an alternative learning resource on the sub-concept of bacteria in schools. This is also supported by material expert II, who stated that *Bacteria Magz* can be used as an alternative learning resource. It is because of *Bacteria Magz* contains material on the bacteria concept and is also equipped with the role of bacteria for the environment, especially nitrogen-fixing bacteria, which describes the characteristics of each genus. It will increase insight into the bacteria concept for readers. This is in accordance with Hamid's statement (2009), which explains that magazines are a place to find information and contain actual news. They are expected to provide a more concrete learning experience, broaden horizons, provide accurate information, and stimulate critical thinking. In addition to increasing reader insight, the use of alternative learning sources in the form of magazines can increase student interest in learning as is the case with Hamid & Nuswowati's research (2015), which explains that based on the results of the questionnaire analysis of student learning interests obtained, the average value of the interest questionnaire before learning using magazines is 2.99, while the average value of the interest questionnaire after learning to use magazines is 3.17 with good criteria. This shows that there is an increase in student interest in learning, although the results are not significant.

The presentation sub-aspect got an average score of 85%, and the language sub-aspect got an average score of 87.5%, both of which were included in the very decent category. The presentation sub-aspect got the lowest mean score compared to the content feasibility and language sub-aspect. According to material expert I, this is because there are several terms

whose meaning is not explained in the glossary section. In addition, the order of terms in the glossary has not been arranged alphabetically. Asfuriyah (2014) explains that the glossary is a list of essential terms in the text with an explanation of the meaning of these terms and written alphabetically. Therefore, improvements were made to improve the magazine by adding several terms accompanied by their meanings in the glossary.

According to material expert II, the presentation of material and language used in Bacteria Magz is relatively easy to understand so that readers will find it easy to understand the contents of the magazine. This is in accordance with Mustikarini's statement (2016), which explains that magazines are visual media in the form of prints that resemble books, but the presentation is much lighter. This is intended to make it easier for readers to understand the concept. After students can easily understand the concepts in the magazine, of course, this will impact student learning outcomes. In line with the research of Dani et al. (2017), which explains that there is a difference between the average value of student learning outcomes who use Biology Magazines (Biomagz) and the average value of student learning outcomes who do not use Biomagz. Data on student learning outcomes obtained the average (mean) for students who use Biomagz is 85.64, and for students who do not use Biomagz are 71.79. This shows that the average value of student learning outcomes who use Biomagz is higher than those who do not use Biomagz.

CONCLUSION

Based on the results of the study, it can be seen that the results of the feasibility test for alternative learning sources in the form of magazines on the bacterial concept of class X SMA, which are assessed from the media aspect and material aspects get a score of 93.25% on the media aspect, while in the material aspect it gets a score of 87.5 % so that it can be seen that the results of the feasibility test on the product in the form of a magazine got a final average score of 90.37% which belongs to the very feasible category for use in class X SMA students.

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