Bioedunis Journal *Vol. 03 No. 02* Desember 2024
DOI: 10.24952/bioedunis.v3i2.11471

Bioedunis Journal
https://jurnal.uinsyahada.ac.id/index.php/Bioedunisi
Vol. 03 No. 02 Desember 2024
E-ISSN : 2829-7601

Validity Of The Media Booklet On Eubacteria Material Based On Research: Testing The Antibacterial Activity of Moringa Leaf Extract (Moringa oleifera L.)

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Abstract

The dominance of lecture and question-and-answer methods in education often limits the use of media in the learning process, reducing students' creativity and interest in the subject matter. This study aimed to assess the validity of a booklet as a supplementary learning resource on Eubacteria material for class X SMA/MA, incorporating research-based content on the antibacterial activity of Moringa leaf extract (*Moringa oleifera L.*). The research followed the ADDIE development model introduced by Dick and Carey, encompassing five phases: Analysis, Design, Development, Implementation, and Evaluation. The results indicated that at Muara Rupit State High School, the reliance on textbooks and teacher-provided summaries was insufficient to support an engaging and effective learning process. The developed booklet addressed these gaps, offering students opportunities to enhance critical thinking and cultivate scientific attitudes. Validation tests confirmed the booklet's content, language, and presentation met high-quality standards. In conclusion, the booklet serves as a valid and valuable educational tool for Eubacteria material. Further research is recommended to test its practicality and effectiveness in real classroom settings to optimize its integration into biology education.

Keywords: booklet media, Eubacteria, antibacterial activity, Moringa leaf extract, ADDIE model

INTRODUCTION

Education is a fundamental pillar of community and state development. It enables individuals to acquire the knowledge, skills, and values necessary to develop their potential while contributing to societal and economic progress. According to Salsabilah et al. (2021), education is a deliberate and planned effort to create a learning environment that actively fosters the spiritual, intellectual, moral, and social development of students. High-quality

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education maximizes individual potential and equips learners with competencies essential for personal and societal advancement (Gafi, 2019).

One critical aspect of quality education is the use of appropriate and engaging learning media to enhance students' motivation and understanding. The National Education System Law No. 20 of 2003 underscores the importance of such media in facilitating students' holistic development. Among the various types of instructional media, booklets represent a concise and practical tool for conveying information effectively. As compact printed materials, booklets are designed with engaging illustrations and clear text, making them suitable for diverse educational contexts, including student-centered learning (Intika, 2018).

Despite the potential benefits, traditional teaching methods such as lectures and question-and-answer sessions dominate many classrooms, resulting in limited use of innovative media. Consequently, students often rely solely on textbooks and teacher-provided summaries, which may not sufficiently engage them or foster critical thinking. To address this gap, booklet media offers a practical solution by presenting well-structured and visually appealing content to stimulate creativity and interest (Nela, 2023).

In this study, the booklet media was developed for Eubacteria material and integrated with research findings on the antibacterial activity of Moringa leaf extract (*Moringa oleifera L.*). Moringa leaf extract is a natural resource with proven antibacterial properties, making it relevant to the study of Eubacteria. By connecting real-world scientific research with educational content, the booklet aims to promote critical thinking and scientific inquiry among students.

Observations conducted at SMA Negeri Muara Rupit revealed that the current reliance on textbooks and teacher-generated summaries was insufficient to optimize the learning process. This situation underscores the need for supplementary learning media that can support students' understanding of Eubacteria material while fostering their interest and engagement.

This study evaluates the validity of the developed booklet as a supplementary learning resource, combining innovative media design with research-based content to enhance the learning experience and meet educational objectives effectively.

RESEARCH METHODS

The development of the booklet is based on the ADDIE development model introduced by Dick and Carry, namely consists of 5 stages namely: Analysis, Design,

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Development, Implementation, and Evolution. Although so, stage analysis, design, and development from the ADDIE model creation process are carried out in studies by researchers. This study changed and only reached the stage of Development.

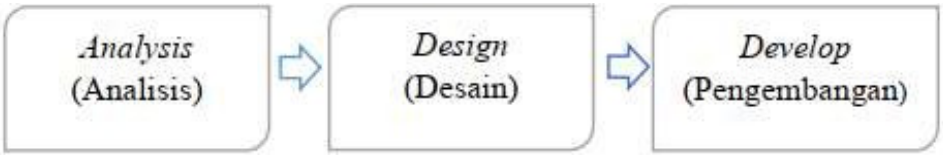

Figure 1. Stages of Booklet Development

In Research and development implementation, research is already in accordance ie ADDIE - based, the research used starts from stage Analysis up to the development stage. In the initial analysis step, it is necessary to conduct a needs analysis of the learning media and materials with the research subjects being teachers and students.

a. Needs analysis of teaching media

   At this stage, the interview with the biology teacher in high school to understand how to learn eubacteria material at school. As for those who want is know from the activity interview, how to learn eubacteria material at school, what the usual teaching materials used, and whether participants experienced trouble at times during the study.

   b. Analysis of eubacteria material

      This held analysis of eubacteria-based material several books used as book participant education, and books teacher's grip. Analysis results on eubacteria material and suggestions for developing this item later will used To develop a *Booklet* on the topic of capable eubacteria material to increase the motivation and enthusiasm of students.

The implementation of this study is to test the validity of the eubacteria material booklet using stages study as follows:

   a. Choosing topic materials

      At this stage, the researcher reviews the subtopics within the biology material, then analyzes the content to be presented and aligns it with the current curriculum, specifically the biology material for class X SMA/MA. The researcher also consults with the subject teacher to determine whether the proposed material is suitable for proceeding to the next stage (Putri, 2020).

   b. Setting up the criteria

      The establishment of these criteria is intended to design the content of the media to be

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presented using the Canva application. The criteria include content that aligns with students' learning experiences, a clear and easily understandable writing style, appropriate font size, the use of color in images, and well-organized material. (Putri, 2020).

c. Designing the media

The steps undertaken at this stage involve designing the biology learning media in the form of a booklet using the selected format and techniques. The outcome of this stage is an initial draft of the learning media, which includes the book cover (Title of the booklet, author's name, and supporting images representing the booklet's content), Booklet text, Preface, Table of contents, List of figures, Concept map, Basic competencies and learning objectives, Introduction to *Salmonella typhi* bacteria, supplemented with images of the bacteria, Bibliography, Glossary, Index, Author's profile

At the development stage, a validation (feasibility test) test and revision *Booklet* on the topic of activity test antibacterial and instrument test literacy environment has been arranged. As for activities performed as follows:

a. Validation (Test Appropriateness)

Practice request confession or permission that appropriate teaching materials used For need study known with term validation. For sufficiency teaching materials available acknowledged, and validated must resolved with participation holder interests, esp practitioners who are authorities in the field. Linguist For use language and expert substance from practitioner For material Teaching materials included party who can request give validation Because required related with the method applied. Expected instrument-developed tests and teaching materials are worthy for the learning process to teach after getting a validation expert. Validation results utilized For increased source Power learning used.

b. Revision

Refinement process booklet after getting input from the experts obtained from results activity validation called revision. From the results, validation obtained input For revision of the booklet that includes aspects important preparation booklet.

Development data was collected moreover formerly through interviews with teachers' lessons For analysis of teaching materials. After the media is finished and arranged, steps are

further validated by experts' material, media experts, and experts' Language with the use of questionnaire validation. On study This Instrument based collective data on *booklet media* using a validation sheet. A validation sheet is useful in counting the validity of the media created For review so that product the worthy of use (Rashid *et al.*, 2016). In research, This sheet validation was given to expert material, expert language, and media experts. The goal For measure the validity of the media developed by researchers.

In a study, sheet expert validation produces quantitative data later analyzed using technique data analysis viz with scale Likert (Sari & Suswanto, 2017) which in each level number accompanied with criteria so that the assessor understands them.

RESULTS AND DISCUSSION

The validity test of the booklet consists of the analysis of learning media and the analysis of needed eubacterial material.

a. Analysis Need Media Learning

   At this stage, the interviews for analysis of the need for learning media on eubacteria material at Muara Rupit State High School that results in biology teacher interview obtained results participant educate use textbooks and summaries from the teacher is considered not enough maximum in the teaching process, so need For developing useful *booklet* media accompany student schoolgirl in develop think critical and attitude scientific.

b. Analysis of Eubacteria Matter

   Analysis material eubacteria analyzed Competence Core (KI) and Basic Competencies (KD). Based on the results analysis material they found that KI and KD discussed eubacterial material. This is integrated into the *booklet* media as a media learning addition For participant education.

In the designing stage, a booklet media design was carried out that was adapted to the KI and KD of the eubacteria material. The process of making *booklet* media uses the help of the Canva application and is printed using A5 paper. At the stage of development, validation, and revision of booklet media by experts to get information related to weaknesses and strengths from the booklet media that has been created by the author. In research, This is the data obtained from load results booklet media validation. Based on feasibility test or validation that has been tested by 3 validators, then got its results whole by 95%. With

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thereby third validation the state that the *booklet* media on eubacteria material class X SMA/MA the valid and worthy of use in learning at school. The results show that product in the form of *booklet* media on Eubacteria class X SMA/MA material. Then the *booklet* media was repaired based on criticism, suggestions, and comments from every expert. The objective did it revision product is that the learning media has been designed to become worthy and good quality for use.

This study aims to create a product in the form of *booklet* media with load Eubacteria material for class X SMA/MA previously has Validity test carried out by experts language, expert material, and media experts. The term " validity " refers to the level of accuracy scale moment operate objective measurement. If something instrument is in a way accurate to operate function the measurement test the said has validity tall. This matter indicated that results measuring something measurement that is magnitude right describe real-world conditions from the object being measured.

Next *booklet* media will validated by experts' language, expert materials, and media experts to ensure the following rules. Component language material shaped learning *booklet* will verify by experts language, expert material in eye lesson biology will ensure encapsulated eubacterial material in learning media shaped *booklet* has validated with good and one expert in the field of learning media will evaluate appearance from the media created. Objective validation This is to determine whether the *booklet* media has reached level appropriateness for use in learning at school.

Aspect evaluation validation material involves evaluation content and structure from something material that is displayed. Aspect validity shows the depth draft or the material explained mastered in a way proportional, as well extent of the material learning supports the learning process. Temporary aspect structure involves suitability material with concepts discussed, layout material, and roles the images presented in the material as well as Already cover evaluation validation media aspect.

Evaluation fill involves consideration of suitability between fill with the material presented as well as the extent to of the media used supports the learning process. Temporarily in matter structure, assessment involves indicators like size and type letters, background, images, and composition color Which are in accordance. Validation of language also becomes aspect important with existing emphasis on the use of appropriate language, the structure of clear sentences, and appropriateness Language with development cognitive students, sentences are correct and easily understandable as well as use communicative language.

Validation test material learning obtained yield 92.8% with very valid category, because material learning Already loads fill material appropriate to the K13 syllabus, presentation of the material is complete and systematic as well as material learning is easily understood. According to Rehusisma (2017), Content used in activity learning should really content help achievement indicators, condition competency, and competency base.

Media validation tests obtained results with a very valid category of 96.4% due to *booklet* media from facet Rated aspect contains capable learning media help the learning process, use appropriate font size and type, appropriate images and colors so that accompany participant educate in learn material. Hamalik (1986) stated that the use of educational media in the classroom can inspire and motivate students For involved in activities, trigger interest, and desire, and even affect the psychological self (Junaidi, 2019).

CONCLUSION

Based on the research conducted, the booklet media created by the researcher has undergone validation testing and been evaluated by experts, including a language expert, a subject matter expert, and a media expert. The evaluation results classify the booklet media as "Highly Valid," with an average score of 95%. Therefore, the booklet media is deemed suitable for use during learning activities and can assist students in studying the material presented.

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