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Developing Islamic-Based Botanical Encyclopedia as a Learning Resource

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ABSTRACT

Learning resources need to be developed based on current developments. The purpose of this research was to develop an Islamic-based Botanical Encyclopedia and test its quality. The method used to develop the encyclopedia was Research and Development (R&D) with the 4D model (Design, Define, Develop, and Disseminate) proposed by Thiagarajan in 1974 as the development model. The research instrument had been validated by the material, media, and integration experts. The average percentage of the validation result was 88% (a very valid category). The small-scale trial obtained a percentage of 89% (very valid), and the large-scale trial obtained a percentage of 85% (very feasible category). The results indicated that the developed Islamic-based Botanical encyclopedia could be used as a resource for independent learning.

Pengembangan Ensiklopedia Ilustrasi Botani Berintegrasi Islam Sebagai Sumber Belajar

Abstrak: Tujuan dari pengembangan penelitian ini adalah untuk mengembangkan ensiklopedia dan menguji kualitas ensiklopedia. Metode yang digunakan untuk mengembangkan ensiklopedia adalah Research and Development (R&D) dengan model 4D (Design, Define, Develop, Disseminate) yang dikembangkan oleh Thiagarajan tahun 1974. Instrumen pengumpulan data menggunakan lembar validasi oleh ahli materi, ahli media, ahli integrasi, guru biologi, peer reviewer, dan peserta didik Kelas XI SMA. Rata-rata persentase uji validitas adalah 88% yang tergolong dalam kategori sangat valid. Uji coba skala kecil mendapatkan persentase sebesar 89% yang menunjukkan sangat valid sehingga dapat dilanjutkan pada uji coba skala lebih luas. Uji skala lebih luas menunjukkan persentase sebesar 85% yang termasuk dalam kategori sangat layak. Hal tersebut menunjukkan bahwa Ensiklopedia Ilustrasi Botani layak digunakan sebagai sumber belajar mandiri.

INTRODUCTION

Plants' structure and tissue belong to organs' function (Baidlowi et al., 2020;

Widyarsih et al., Nd). The observation of outer morphology and inner morphology in plants is a source of knowledge (Oratmangun et al., 2017; Sari, 2017; Utari et

al., 2017). Also, learning experiences are needed to understand science and biology (Leksono et al., 2013; Mumpuni, 2013; Suryaningsih, 2017). Practicum activities in the surrounding environment positively influence students in obtaining their long-term knowledge and understanding (Aswita, 2017; Mahampang, 2017; Novitasari & Budijastuti, nd).

The information needed by students can be fulfilled through media and learning resources (Andriani, 2016; Anshori, 2018; Hardianto, 2007; Sugianto et al., 2013). Adequate learning resources are an instrumental sub-component of education (FAJRIR RAHMAN, 2013; Yunarko et al., 2015). Learning sources come from anywhere, and their existence can facilitate learning activities in various forms (Surani, 2019). Abundant learning resources are an interesting learning resource (Kristianto, 2016; Ma'rifah, 2020; Nurhayati, 2020; Wardinur & Mutawally, 2019). Arranging the encyclopedia in alphabetical order makes it easier for readers to find information (Pratama & Marlina, 2018). The encyclopedia contains information accompanied by pictures.

The encyclopedia is one of the most interesting learning resources. Therefore, its development is needed to become an attractive learning resource for students (Bramasta & Irawan, 2018; Saputra & Ekawati, 2017). Illustrated botanical encyclopedia is developed as a learning resource that emphasizes scientific recording and botanical accuracy to identify plants.

Education should be a balance between intellectual, emotional, and spiritual intelligence. Spirituality gives great meaning to the nation's life to always provide the best for the nation (Murdiono, 2010). Biology as a science contains values that can be applied contextually so that its

material can present Islamic values to students.

This research is in line with previous research on developing botanical illustrations as a learning resource (Hanif et al., 2016; Nur, 2016; Pertiwi & Susilo, 2014). Other studies integrate Islamic education and mathematics modules development (Arifudin, 2017; Ekawati et al., 2019). Also, research measures learning resources but with different media and materials (Kristianto, 2016; Nur, 2016; Nurhayati, 2020). Therefore, the novelty of this research is the integration between Islamic values and the learning resources. Each plant illustration is equipped with a description of the plant's parts, the classification, and the characteristics of the plant. The development of an illustrated botanical encyclopedia is expected to meet students' needs and improve students' scientific skills.

METHOD

This study employed the 4-D development model (Define, Design, Develop, and Disseminate) developed by Thiagarajan. The researchers focused only on three stages, namely Define, Design, and Develop. The Disseminate step can be refined in further research. The Define stage covered the front-end analysis, task analysis, concept analysis, and specific instructional objectives analysis. The Design stage consisted of designing, compiling, and printing the encyclopedia. The Develop stage covered the expert validation performed by material experts, media experts, integration experts, biology teachers, and peer reviewers. The trials consisted of a small-scale trial and a large-scale trial. The research framework is displayed as follows.



Picture 1. Research Framework of the 4-D Model

The research subjects were the eleventh-grade students of senior high school selected using probability random sampling techniques. The small-scale trial was implemented on nine students, and the large-scale trial was implemented on 48 students. The researchers' data collection techniques were interview, observation, specimen collection, documentation, illustration, and questionnaire.

RESULT AND DISCUSSION

The validation was performed by experts, biology teachers, and peer reviewers. The material expert was a Plant Systematics Course lecturer at UIN Walisongo Semarang (Rita Ariyana Nur Khasanah, S.Pd., M.Sc). The role of material experts is providing corrections to the information in the encyclopedia. The material expert validation aspects were material coverage, accuracy, activities, the material to develop thinking skills, language use, terms or symbols, and evaluation. The media experts focused on the layout and illustration of the encyclopedia. Nisa Rasyida, M.Pd., a biology lecturer at UIN Walisongo Semarang, was selected as the validator. The media validation aspects include general presentation organization, the usefulness of presentation, general appearance, and completeness of the encyclopedia. The integration validator was Luthfi Rahman, M. SI., MA, a lecturer at the Faculty of Ushuludin and Humaniora of UIN Walisongo Semarang. Integration experts focused on the scientific linkages between the verseization of Islamic values and humanization of Islamic science. A biology

teacher, Khamdanah, SP, S.Pd, was selected as the validator regarding the encyclopedia's accuracy. Biology teacher validation aspects included material coverage, completeness of the content, presentation components, layout, and language use. Peer reviewers strengthen the data. Peer reviewers' qualifications were biology education students who have taken Botanical Science courses. The peer reviewer validation aspects consisted of material coverage, presentation, language, and presentation suitability.

The validators provided assessment through questionnaires. The percentage of data from the encyclopedia's assessment validation results is presented in Figure 2.

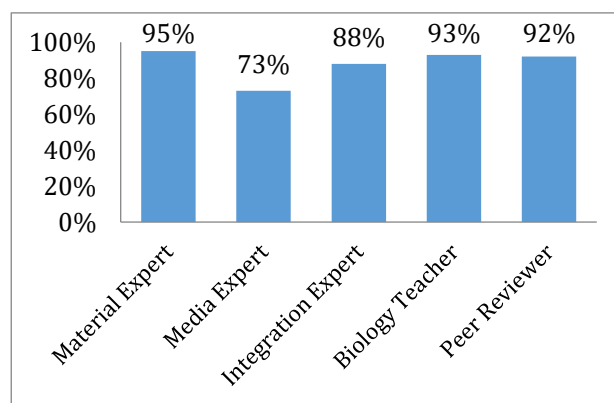


Figure 2. The Percentage of Validation Results

The percentage of validation results showed that the encyclopedia was very valid to be used as a learning resource. The percentage result of media experts was 73%, indicating that the encyclopedia was valid to be used as a learning resource, although a small-scale revision was required. The inputs and suggestions were used to revise the encyclopedia to continue to the field testing stage.

The revised encyclopedia was then tested on nine students. The small-scale trial aspects included material coverage, presentation, language, and suitability. The

percentages obtained in this stage are presented in Figure 3.

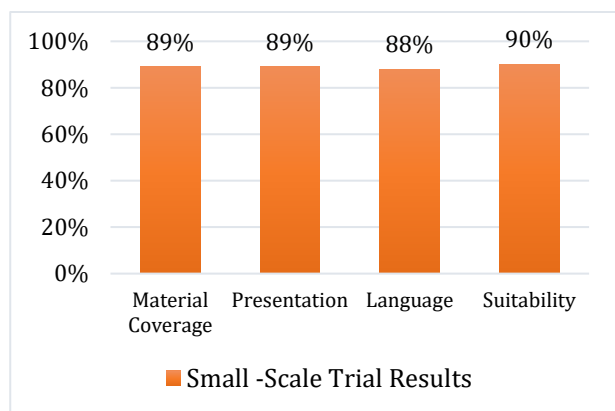


Figure 3. Small-scale Trial Results

The average percentage of the small-scale trial was 89%. The descriptive analysis of these percentages showed that the encyclopedia was very valid to be used as a learning resource without revision. These results provided the basis for researchers to test the encyclopedia on the large-scale trial.

A large-scale trial was carried out to determine the feasibility of the encyclopedia. The assessment was carried out by 48 eleventh-grade students of senior high school through questionnaires. The aspects of feasibility were material coverage, presentation, language, and suitability of the presentation. The results of the large-scale trial are presented in Figure 4.

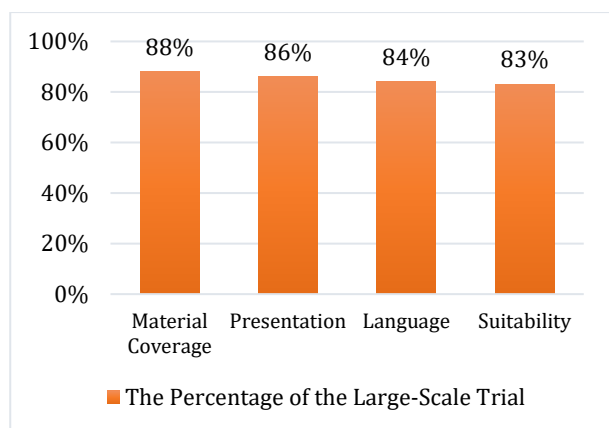


Figure 4. The Percentage of the Large-Scale Trial

The average percentage of the large-scale trial was 85% in the very feasible category. The descriptive analysis of these percentages showed that the developed encyclopedia was very suitable to be used as a learning resource. Here is the display sample of the encyclopedia:



Figure 5. The Display of the Encyclopedia

The encyclopedia was constructed based on the identification of the research results by taking pictures of each species. The materials were compiled and designed using an application to develop an attractive encyclopedia arrangement. The media expert then validated the revised encyclopedia. After meeting the valid assessment criteria, the encyclopedia was printed as the final product.

The results obtained by researchers are in line with previous studies using encyclopedias. Encyclopedias effectively improve learning achievement (Hanif et al., 2016). Nur (Nur, 2016) discovers that learning resources can improve memory, basic language skills, and enrichment activities.

CONCLUSION

This research's final product was an Illustrated Botanical Encyclopedia that can be used as a learning resource. The percentage of the feasibility test was included in the very feasible category. The results were based on the assessments performed by media experts, material experts, integration experts, biology teachers, peer reviewers, and students. It is suggested to improve this research further so that this research can be used as a reference for further research.

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