

Development of Local Wisdom-Based Science Learning E-Book Modules for Madrasah Aliyah Students

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ABSTRACT

This research aims to produce a product in the form of a digital-based module intended for Madrasah Aliyah (MA) students. The research and development used in this study is the 4D model which stands for define, design, develop, and disseminate which is simplified to only a partial development stage. Data were collected through observation, interview, and documentation methods. The results showed an overview of the digital-based module development process, including analysis of learning needs, curriculum, students, subject matter, tasks, and formulating learning objectives. The design stage includes media selection, format, and initial design of digital-based modules. The development stage is only partially carried out and will involve making modules using the design that has been prepared. This digital-based module is hoped to help smooth the learning process, overcome obstacles in understanding science subjects, and allow students to learn independently at school and at home. In addition, the module also includes elements of local cultural preservation that can be an added value in education in the Madrasah Aliyah environment.

Keywords: Development, Digital-Based Module, Local Wisdom, Science

A. INTRODUCTION

Science learning, including the introduction of natural concepts for children, is an effort to help children discover certain concepts and processes in life. In other words, science learning for children is essentially used as a medium to stimulate aspects of development and maximize the potential that exists in children (Styowati & Utami, 2022). Local wisdom-based science learning is a science learning approach that utilizes local wisdom as a learning resource. Science learning based on local wisdom can help students understand science material better and increase students' interest and motivation to learn (Tresnawati, 2018). Learning media also has an important role in local wisdom-based science learning (Karyadi et al., 2016). Some types of learning media that can be used include learning modules. Science learning based on local wisdom can be done by integrating it into the learning materials of (Daerah & Pada, 2018).

In local wisdom-based science learning, it can be utilized as a learning resource. This can help students understand science concepts more realistically and develop conservation character. In addition, science learning based on local wisdom can also help students appreciate and preserve the local culture around them (Prasetyo, 2013). Local wisdom-based science learning media in fostering conservation character. This study aims to explore how local wisdom-based science learning media through original science reconstruction can deepen science concepts and foster conservation characters (Khusniati, n.d.).

Science learning based on local wisdom raised about the ark. Local wisdom is knowledge or part of the ethical development of a region so it must be part of the educational content in maintaining the character of the nation (Nurasiah et al., 2022). At first, the ark was a religious ceremony commonly held to commemorate the death of Husayn in Karbala. In the ceremony, the ark was intended as a representation of Husayn's grave. According to South Asian sources, the miniature tomb was first used in commemoration of Husayn's death in the 14th or 15th century. When in the 17th century the British stationed Indians in Bengkulu to look after British trade interests there, this tradition was carried over by (Salleh, 2014). Tabut is a cultural tradition celebrated in Bengkulu and surrounding areas, brought by Indian Muslim immigrants from (Rimapradesi & Jatmika, 2021). The tradition involves a sacred ritual called the tabut ceremony, which can only be performed by descendants of Imam Senggolo or the family of the tabut (Suradi et al., 2020). The ceremony is held once a year during the month of Muharram, which is the first month in the Islamic calendar (Kurniawan & Badiah, 2022).

The Ark ceremony is considered an important part of local culture and serves as a

symbol of identity and cultural values for the people of Bengkulu. The ceremony is also seen as a way to integrate local culture with the Islamic traditions (Handayani, 2018). Overall, the tabut tradition is an example of how cultural practices can be brought to a new place by migrants and become integrated with the local culture over time. It also highlights the importance of preserving traditions and cultural values, as they serve as a way to connect people to history and identity.

Learning media in the form of digital-based modules is one form that can be used in the teaching and learning process (Sofyan & Pradipta, 2021); (Wulandari et al., 2023). Development of learning media in the form of digital-based modules can be done in several stages. In the development of learning media in the form of digital-based modules, these stages can be adjusted to the needs and objectives of the development of learning media. The first stage of developing learning media in the form of digital-based modules is defined. The goals and objectives of the development of learning media in the form of digital-based modules. For example, improving student learning outcomes in certain subjects or making it easier for students to understand certain concepts. The second is design, where design the structure and content of the digital-based learning module. Determine the material presented, the way of presentation, and the features that will be used in the module. For example, using images to clarify concepts. And third, development, which is making digital-based learning modules in accordance with the design that has been made.

The purpose of developing digital module-based learning media is to create alternative learning media that students can use to improve their learning outcomes (Kurniawan & Badiyah, 2022). Digital modules can be used to present learning materials in an interactive and interesting way and can be accessed through various devices such as computers, tablets, and smartphones (Irmawati et al., 2023); (Mahendri et al., 2022).

Digital-based learning modules based on previous research results show that they can be relied upon as an alternative learning media. The advantages of digital-based learning modules, such as easy accessibility and flexibility, become important points that emphasize the effectiveness and efficiency of their use (Hanif, 2021). With this evidence, further development and application of digital-based learning modules can be a positive step in improving the quality of learning.

B. METHOD

The 4D model is a research and development model used to develop learning tools, including interactive e-modules (Rahmatsyah & Dwiningsih, 2021); (Muqdamien et al.,

2021). The model was developed by S. Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel in 1974 and consists of four main stages: define, design, development, and disseminate (Hendroanto & Fitriyani, 2019); (Putri & Reinita, 2022); (Silfi Melindawati & Adriantoni, 2022). The research stages of developing a digital-based module of local wisdom can be limited to the design stage and part of the development stage (product manufacturing).

In the process of developing a digital-based module of local wisdom for madrasah students, the steps that can be followed are as follows: The stages of the 4D model are as follows: define. At this stage, the developer needs to refer to the development requirements, analyse and collect information on the extent to which the development needs to be done (Lawhon, 1976). In the module development phase, the activities carried out include analysis of learning needs, and curriculum which includes Learning Outcomes (CP), appropriate materials, tasks, and Flow of Learning Objectives (ATP). This aims to plan the product design based on the results of the needs analysis and the suitability of the module to the needs of the learners.

Design, where this stage was developed in the study, involved four steps: developing a criterion-referenced test (standardized test development), media selection, format selection, and preliminary design (initial design) (Rahmawati et al., 2022). Development where the development is to make the design into a module product. The process of testing the validity of the product will be continued in further research. To collect data in the development phase of the local wisdom digital-based module, several methods were used including direct observation and interviews with students and educators. Data collection tools used observation sheets and interview guidelines.

C. RESULT AND DISCUSSIONS

The defined stage carried out several activities, namely:

Analyse learning needs

The first stage in the learning needs analysis at Madrasah Aliyah Negeri 1 Kota Bengkulu involved interviews with several teachers who teach P5 (Pancasila Student Profile Strengthening Project) subjects. These interviews discussed the local wisdom-based teaching modules used in the related learning process. The second stage showed that the results of the interviews revealed the need for teaching material media devices in supporting

the learning process and the lack of related references. From the results of these interviews, it appears that the need for teaching material media devices and related references is very important to support the learning process. This shows the need to develop teaching modules based on local wisdom and utilise appropriate media tools to meet the learning needs of students.

The third stage in analysing the selection of materials is tracing the ark, which is exploring culture and science in the ark process. After conducting interviews and observations, the results showed that the learning resources available at the madrasah have not accommodated material about local wisdom and there is no science-based guide. Therefore, efforts need to be made to develop learning resources that can accommodate the material. This can be done by involving experts and practitioners in their fields, as well as utilising information and communication technology to develop interactive and interesting learning resources for students. Thus, learners can gain a better understanding of local wisdom and science of the ark procession, as well as develop skills and knowledge that are useful in everyday life.

Curriculum analysis

The results of curriculum analysis at Madrasah Aliyah Negeri 1 Kota Bengkulu show that it uses an independent curriculum. Learning resources mostly come from the publications of the Ministry of Education and Culture. The delivery of materials and practices is based on the ease of obtaining materials and the economic ability of students. This provides an opportunity for learners to experience knowledge as one of the character-strengthening processes as well as to learn in the surrounding environment.

Learner analysis

Analyze the learners to determine their background knowledge and process skills. This analysis was conducted through interviews with students in class X in 2022/2023. The results of the analysis obtained information where the new learning is P5 with the theme of local wisdom which previously never existed in Madrasah Tsanawiyah level learning. This shows the development in the curriculum and the addition of learning materials that are relevant to local wisdom. Thus, the analysis of learners in madrasah needs to pay attention to the knowledge and process skills related to the theme of local wisdom in order to meet the learning needs of students in accordance with curriculum developments. In addition, the results of the analysis can also be the basis for developing learning strategies that are more

in line with the needs of students.

Material analysis

To analyze materials related to local wisdom and science in the procession of the ark, one can consider the learning objectives of the subject. Focus on aspects of local wisdom such as tradition, culture, and local values related to the ark procession, as well as its relation to science concepts such as physics, chemistry, or biology involved in the procession. Thus, material analysis can help in planning relevant and meaningful learning for learners.

Task analysis

To determine the form of reflection to be done in the task, it is necessary to analyse the task first. The form of reflection can be adjusted to the type of task given, whether a knowledge or skill task. For example, if the task given is a knowledge task, then the form of reflection that can be given is a written test or oral test. Meanwhile, if the task given is a skill task, then the form of reflection that can be given is a portfolio or direct observation. In addition, in determining the form of reflection, it is also necessary to consider the learning objectives to be achieved. The chosen form of reflection should be able to help learners understand the material better and improve their ability in the concept or skill learned.

Formulation of learning objectives

From the results of the analysis of materials and tasks that have been carried out, learning objectives can be formulated to understand, analyze, and evaluate learning materials about local wisdom.

The design stage carried out several activities, namely:

Media selection

Based on the results of the analysis at the defining stage, the research decided to make a digital-based module as a medium in delivering the material. This is due to the lack of media as a relevant reference to be delivered to students. In this context, efforts to create a learning process that can mobilise all learning and effective ways of learning become very important.

Some relevant research shows efforts to improve learning through various media. For example, research on Adobe Flash-based digital learning media in primary schools and the impact of its use. The results showed that interactive learning media assisted by Adobe

Flash can improve students' understanding and learning outcomes (Purwati, 2021). In addition, other research shows that e-modules can increase learning effectiveness and help students understand the concepts better (Suryani & Saparuddin, 2022). From the results of these studies, it can be concluded that the use of digital media can be an effective strategy in improving learning. Therefore, making digital-based modules as a medium for delivering material can be the right step in creating an effective learning process and mobilising all learning resources. Where efforts are needed to create a learning process that can mobilise all learning resources and effective ways of learning.

Format selection

Based on the research, the development of digital learning media using PDF Professional flipbook format is considered effective and interesting. A study shows that digital learning media development training using PDF Professional flipbook software has improved teachers' ability to develop digital learning media (Mahardika et al., 2022). In addition, the development of PDF Professional flipbook-based e-modules has also been shown to improve student learning outcomes (Charina Wadah et al., 2022). The results of other studies show that the use of PDF Professional flip-based e-flipbook learning media is considered effective and practical in improving student understanding (Ngizzah et al., 2023). Flipbook PDF Professional is a digital book format that allows users to flip book sheets like reading a printed book. This format has been used in the development of digital learning media, such as e-modules, and has been proven effective in improving student learning outcomes as well as teachers' ability to develop digital learning media. Interactive features and attractive appearance make this format an effective and practical choice. Therefore, PDF Professional flipbook format can be a good choice in the development of digital learning media.

Initial design development

The initial design stage of this local wisdom digital-based module will include various components tailored to the needs of students. The components that will be included in the module include title, preface, table of contents, list of images, instructions for use, concept map, introduction (e-module identity, learning material, learning objectives), material, summary, and author's bio. Previous studies have shown that the development of digital-based modules of various formats, including Professional PDF flip, has provided good results in improving (Aquarel, 2017); (Nugroho et al., 2018); (Aisyah et al., 2018).

The development stage is carried out up to the manufacture of the product, not to the next stage due to time constraints. Making this digital-based module uses the Canva application and Heyzine flipbook. The appropriate digital-based module template is taken from the Canva application and then redesigned as needed.

Title page and preface



Figure 1. Title Page and Preface

The title page contains the word teaching module. The typeface used is horizon size 41 in blue color. The title of this module is Tracing the Ark: Exploring Culture and Science in the Ark Procession. The typeface used is montserrat classic with a size of 17.3 in blue while it is arranged by using size 15. At the bottom for the name using space mono letters size 17 in blue. The title of the preface uses monsterat font size 11 in blue color.

Table of contents and images list

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Figure 2. Table of Contents and Images list

Materials



Figure 3. Materials

The title of the material uses poppins font size 11.9 in blue color. The research conducted shows that integrating local cultural contexts including chemistry, physics and biology in learning such as the tabut procession can provide an interesting interdisciplinary approach. The tabut procession, which is a religious tradition in some regions, especially in Bengkulu City, combines various aspects such as art, belief and natural science. This shows an awareness of the importance of integrating local culture in science learning. While not specifically addressing the procession of the tabut, this study shows a trend towards combining science content with local culture in educational contexts. When incorporating this material it is important to respect and understand the cultural values and beliefs of the communities involved. The ultimate goal is to enrich students' understanding of the science material while appreciating and respecting the local cultural heritage. In addition, this approach can help students see how science is closely linked to everyday life and culture. By integrating science in learning about the ark procession, educators can create a deep and meaningful learning experience for learners while also proconserving local culture and traditions.

Bibliography and glossary

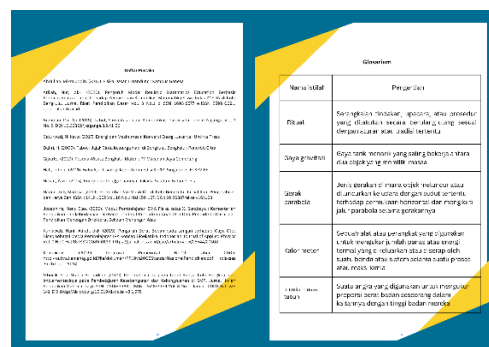


Figure 4. Bibliography

The titles of the bibliography and glossary use canva sans fonts size 10 and 15 in blue. The glossary page contains foreign words with their meanings.

D. CONCLUSION

The development of digital-based modules aims to overcome the limitations of local wisdom-based science learning resources at the madrasah level, as well as to provide convenience in understanding the material. The process of developing this digital-based module goes through several stages, first the define stage which includes analysis: learning needs, curriculum, students, material, tasks, formulation of learning objectives. Second, the design stage includes selection: media, format, making initial designs. Third, the development stage which includes making learning media products. In the context of research, researchers use the 4D model which is limited to the development stage to develop digital-based modules. At the define stage, it was concluded that local wisdom-based science learning media was needed to help students carry out the learning process. This need was followed up at the design stage by determining the media, and the results determined the development of digital-based modules as a medium for presenting learning materials with PDF Professional flipbook format. At the development stage, all initial designs are made in the form of digital-based module learning media products.

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