

## Development of E-Modules Containing Ethno-STREAM Integrated Local Wisdom in Science Learning to Increase Environmental Literacy

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### Submission Track:

Received: 11-01-2024, Final Revision: 27-02-2024, Available Online: 01-03-2024

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### ABSTRACT

Teaching materials in the learning process have an important role in the field of education. The teaching materials that need to be developed are digital teaching materials based on students' local wisdom which have been integrated with the ethno-STREAM approach. The research purpose is to develop teaching materials in the form of e-modules containing local wisdom using an approach ethno-STREAM in science learning to increase environmental literacy. This research uses the Research and Development (R&D) ADDIE model. The research subjects were class V students at MI Darul Ulum Ngaliyan. Data collection techniques include interviews and questionnaires. The instruments used were media and material expert validation sheets, student response sheets, and interview guide sheets. The research data were analyzed using quantitative and qualitative descriptive analysis. The results of the research show that E-Modules Containing Local Wisdom Integrated with Ethno-STREAM in Science Learning are needed by class V students at MI Darul Ulum Ngaliyan Semarang.

**Keywords:** *e-module, ethno-stream, environmental literacy*

### INTRODUCTION (Cambria 12pt, Capital, Bold)

The development of technological progress is something that cannot be avoided in today's life. Technological progress will continue to go hand in hand with scientific progress. (Anggraeni, Syafa Herdiani, Tin Rustini, & Muh. Husen Arin, 2022). Advances in technology

and information have created renewal and innovation in various aspects (M, Herlina, Suripah, & Dahlia, 2022).

In essence, science is a scientific product, scientific process, and scientific attitude (Rahmawati, 2020: 1244), so it is hoped that if critical thinking skills can be combined via science learning with a variety of appropriate learning models, it will be able to encourage students to master science and technology and be able to look for solutions to various problems faced in everyday life.

It is important for science teaching materials in the 21st century to present elements of ethno-STREAM and scientific literacy in them as a form of support towards achieving science learning goals (Sari, L., Koto, I., 2023: 60-67) and environmental literacy skills.

The teaching and learning process regarding environmental literacy studies will run effectively if supported by the availability of supporting media, one of which is an electronic module. Electronic modules or e-modules are documents or articles in an electronic format that have many benefits for student learning media (Puspitasari, Hamdani, & Risdianto, 2020).

Observation results at MI Darul Ulum Semarang City show that students have not used media-based teaching materials such as digital modules or electronic modules, teachers still use printed books. Class V students said that they had difficulty understanding science lessons due to the limited use of teaching materials, so they needed additional teaching materials of a personal nature to help them understand science lessons.

Electronic modules will be developed using the ethno-STREAM approach based on students' local wisdom in science learning to increase environmental literacy. The ethno-STREAM approach is an abbreviation of ethno-Science, Technology, Religion, Engineering, Arts, and Mathematics (Melati, I.A., Hadi, K., 2022). Ethno-STREAM highly integrated learning suitable for training the soft skills needed in the 21st century, namely entrepreneurship soft skills and to develop these entrepreneurial soft skills, this can be done through the development of an integrated e-module ethno-STREAM (Fikrina, Sumarni, & Sumarti, 2023). Some of the benefits of the STREAM approach are that it makes students able

to solve problems better, be innovators, inventors, independent, logical thinkers, and technologically literate (Kurniawan, D. T., Dwi Santi, D. P., & Maryanti, S., 2020).

Electronic modules have the advantage that if an electronic module is lost, it can be found again on the internet or requested to be returned to the manufacturer. The size of an e-book is small so it can be stored on a compact disc or hard disk. E-books are easy to use with the help of devices such as laptops, cellphones, notebooks, and tablets owned by students (Kurniasih, 2021).

This research is supported by research on the development of local wisdom-based learning in schools showing that the development of learning tools which include lesson plans, teaching materials, LKPD, learning media, and learning assessments are designed by taking into account the principles of local wisdom can produce complete learning outcomes.

The STREAM approach is applied in the study of learning jumputan batik for class V students so that students can understand science, utilize developing technology such as computers, and the internet to help find concepts through inquiry, then present by paying attention to ethics and aesthetics as art and displaying science material with mathematical manifestations (et al. Sudarmin, 2021).

## **METHODS**

The research used is Research & Development (R&D) research. Research methods are used to produce certain products and test the effectiveness of products so that they function in society. The development procedure is the creation of a product that is useful as a research process. In this research, the ADDIE procedure was applied. This model consists of five phases or stages, namely as follows: (Analysis, Design, Development, Implementation, and Evaluation)(Triskawati & Silalahi, 2022).

The research sample at MI Darul Ulum Ngaliyan was 34 students. Data collection techniques use interviews and questionnaires. The instruments used were media and material expert validation sheets, student response sheets, and interview guide sheets.

## RESULTS AND DISCUSSION

The results obtained from research development are in the form of an E-Module containing local wisdom integrated with ethno-STREAM in environmental literacy study materials, to increase local wisdom integrated with the ethno-STREAM approach in environmental literacy study materials. The model stages used are ADDIE, consisting of analysis, design, development, implementation, and evaluation (Puspita, Nazar, Hanum, & Reza, 2021).

The steps for developing ADDIE model teaching materials start from the analysis stage, namely analyzing the problems that exist in science learning and environmental literacy studies. The second stage is designing the product and determining the shape of the resulting product. The third stage of development is developing the product and existing in a way to unify the contents of the ebook and complete the systematics.

The e-book teaching materials are then implemented by validating the media validator and material validator. The product draft created is validated and revised, then trials. The final stage is evaluating the trial results by collecting data, analyzing data, and revising until the final product development is created (Airlanda, 2021).

### Analysis Stage (analysis)

The analysis stage is analyzing the need for developing new products (models, methods, media, teaching materials) and analyzing the feasibility and requirements for product development (Maydiantoro, 2021). This stage is carried out to find valid data and information from the study of the object to be researched, before producing a product.

In this analysis stage, researchers made observations at MI Darul Ulum and conducted interviews with teachers and students regarding the e-modules used in class V for science content.

### Design Stage (design)

In this design stage, the researcher carries out the design of an electronic module related to the study of Jumputan batik which contains local wisdom and is integrated with

ethno-STREAM. At this stage, the researcher determines the KI/KD, determines the indicators and objectives of learning, and components along with KI/KD with the results of curriculum analysis implemented in schools (Marini & Silalahi, 2022). The next design stage is to determine the structure of the e-module including the introductory section (front cover page, word introduction, motivational words, instructions for use, concept map, KI KD indicators and learning objectives), contents section (let's observe, reading materials, learning activities, check ability to understand concepts) and closing section (answer key, bibliography and back cover).

#### Development Stage (development)

This development stage aims to see the feasibility of the e-module that has been designed. After receiving a feasibility assessment, the researcher also used criticism and suggestions from the validator as a guide to revise the e-module being developed (Alvariani & Sukmawarti, 2022). In this development stage, the researcher carries out the creation. The e-module in its entirety was then realized with a validation stage by two validators, material experts, and media experts.

#### Implementation Stage (implementation)

The implementation stage of the e-module development stage, namely The validation results from experts are used by researchers to improve or perfect the initial e-module that has been created so that the e-module is more relevant and meets the standard needs of students and teachers in learning activities. Then the product was tested on teachers and students (R & Susanti, 2020).

The results of testing with teachers are to determine the teacher's response to the product which includes the effectiveness and practicality of the product, while the results of testing the product with students directly are to determine the student's response to the e-module product through a questionnaire which includes the effectiveness and attractiveness of the e-module. The e-module that has been prepared at this stage is then applied in the learning process at the implementation stage (Nur Aini & Eka Lestari, 2022).

#### Evaluation Stage (evaluation)



The evaluation stage was carried out to evaluate the e-module based on the results of implementation for teachers and students and determine the follow-up as a final revision of the e-module (Febrianto & Puspitaningsih, 2020). The evaluation is formative and aims to assess the e-module product being developed in terms of validity experts, and small groups. An e-module based on local wisdom that is integrated with the ethno-STREAM multi-science approach to environmental literacy studies has been successfully developed by applying the ADDIE model.

Local wisdom-based e-modules integrated with the ethno-STREAM approach to Jumputan batik study materials can help students learn independently. The advantage of E-modules compared to printed modules is that they are interactive, making it easier to navigate, they can display videos, images and audio and are equipped with formative tests that can provide quick feedback (Pramana, Jampel, & Pudjawan, 2020).

The use of e-modules makes it easier for students to learn, the appearance is attractive, and the language used is communicative which will provide comfort for students in learning so that it will significantly increase student motivation and learning outcomes. Learning with local wisdom E-modules that are integrated with the ethno-STREAM approach in science and environmental literacy studies can have a positive influence on student learning outcomes. This combination of e-modules and the ethno-STREAM approach can be used in creating innovative learning so that students are motivated to learn.

#### **CONCLUSION** (Cambria 12pt, Capital, Bold)

Development of an E-module based on local wisdom that is integrated with the ethno-STREAM approach. Jumputan batik study material developed refers to the ADDIE model, namely the analysis stage, design stage, development stage, implementation stage, and evaluation stage. The results of the response questionnaire to this e-module received a positive response and this e-module can increase students' knowledge regarding environmental literacy study materials that are integrated with local wisdom and use the ethno-STREAM approach.



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