

## Development of Gadung Tuber Processing E-Module Based on Discovery Learning at SMAN 1 Seteluk, West Sumbawa Regency

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### Abstract

*This research aims to determine the feasibility of an e-module for processing gadung tubers (*dioscorea hispida*) based on a discovery learning model and to determine the readability test of developing an e-module for processing gadung tubers (*dioscorea hispida*) based on a discovery learning model by students in class X-6 of SMA Negeri 1 Seteluk. This e-module was developed using a 4D development model by Thiagarajan, but this research was limited to the 3D stage. The 3D stages are Definition, planning (Design) and development (Develop). Based on the research results, it shows that the e-module was declared valid according to the validation results of 63.75%, the readability test by teachers was 78.75% and the readability test by students was 76.13%. Thus, e-modules are suitable for implementation in the learning process by teachers in the future.*

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## 1. INTRODUCTION

21st century learning is expected to utilize technological media in the learning process (Anggraeni et al., 2018). Current education policy in Indonesia encourages all levels of education, especially universities, to take advantage of advances in digital technology and educational computing in the era of revolution 4.0. The 2013 curriculum requires participants to have the capacity to develop creativity, curiosity, and the ability to form judgments to form critical thinking (Fadhli 2021). The use of media is expected to have a positive impact on the learning process, feedback and achieving optimal results. The teaching and learning process has two very important and related elements, namely teaching methods and learning materials. The choice of a particular teaching method will influence the teaching media (Adawiyah et al., 2021). The role of the teacher in this case is very important in the learning process with the hope of achieving learning objectives and the use of teaching materials in the form of modules.

The function of teaching materials is to support or guide students in their use in teaching and learning activities. Utilization and empowerment of modules to support learning is important in increasing the efficiency and quality of learning, increasing mastery of material by teachers and students. Developing educational learning materials in module form can be done using a computer or smartphone. One of the media that can be developed is an interactive learning module in the form of an electronic module or e-Module. The advantage of using electronic modules (e-modules) is that electronic modules (e-modules) are packaged in digital form which can be equipped by adding images, videos, audio, links in three-dimensional form contained in the Three Dimensional (3D) application features. Another advantage is that E-modules have advantages compared to printed modules because they are interactive and make them easier to use, allowing for the display of images, audio, video and animation, and are equipped with formative quizzes that allow direct feedback (Azkiya et al., 2022). Apart from that, this 3D-based electronic module (e-

module) provides a resulting display in the form of each page that can be flipped or turned back and forth so it looks like a real book.

Based on the results of researchers' observations on October 6 2023 at SMA Negeri 1 Seteluk, several problems were found, including students experiencing difficulties in learning biology due to the ability to master students' knowledge (cognitive) and psychomotor skills in the material presented which was still simple and not being able to maximize their critical thinking abilities. As a result of interviews with biology teachers, information was obtained that they had never developed teaching materials that suited the needs of students in achieving maximum learning goals. An alternative solution to overcome this problem is by using appropriate learning media and supported by innovative learning models.

The learning model that is felt to be appropriate to apply is Discovery Learning. This learning model makes learning more meaningful because it can change passive learning conditions into more active ones, especially in Biology Science subjects so that it can train students to express their opinions and be active in discussions in class. Electronic modules (e-Modules) are expected to help stimulate students' interest and motivation in developing their own ideas, feelings and imagination in improving critical thinking skills in accordance with students' needs. This article aims to increase the reader's insight and knowledge regarding research development innovations that have been carried out by researchers, namely a product in the form of developing an e-Module for processing gadung tubers based on Discovery Learning for class X students at SMA Negeri 1 Seteluk, West Sumbawa Regency.

## 2. METHOD

This research includes 4D development research which consists of four stages, namely Define, Design (Planning), Develop (Development), and Dessiminate (Dissemination). The product produced in this research is an electronic module (e-Module) which will discuss the processing of gadung tubers (*Discorea hispida*). It's just that this research was carried out only up to the Develop stage, in accordance with research conducted by (Rahmawati et al., 2020). The stages in 3D are as follows:

### 1. Definition Stages (Define)

Stages This aims to apply learning. At this stage the researcher carried out steps such as analyzing students' abilities in recognizing types of tubers, analyzing the processing of gadung tubers (*Discorea hispida*) and formulating learning objectives regarding processing gadung tubers.

### 2. Planning Stages (Design)

Stage planning is intended to develop a sketch of the e-Module as a product to be made. The design focus in this research is determining the e-module components that will be used and creating an initial design.

The initial design of the electronic module (E-Module) is as seen in the following image:



Figure 1. E-Module Cover Design

3. Development Stage (Develop)

In this development phase, products that have been planned in the initial design from the previous stage will be implemented this year. Finally, the e-Module that has been designed will undergo a validity test by validators, teaching staff and students to assess the suitability of the e-Module product.

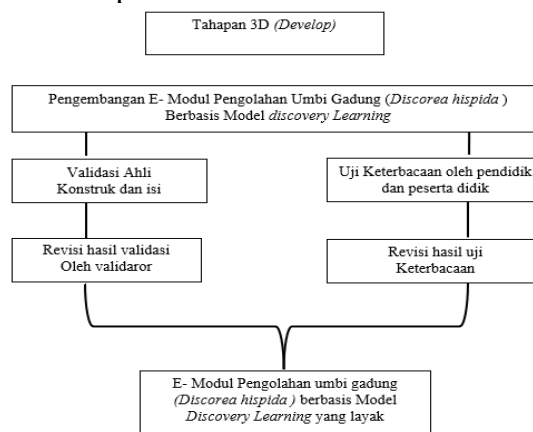


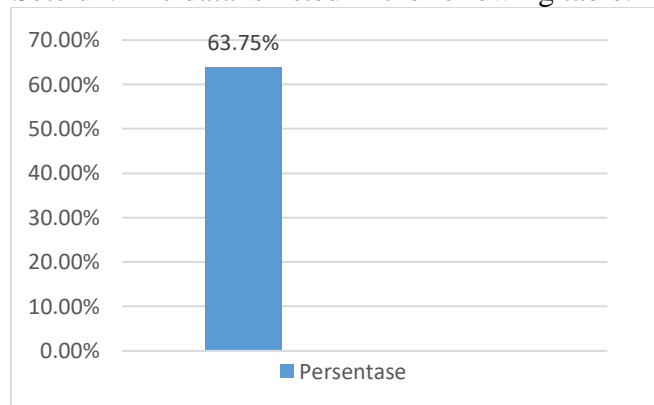
Figure 2. 3D Stage Flow Diagram

3. RESULTS AND DISCUSSION

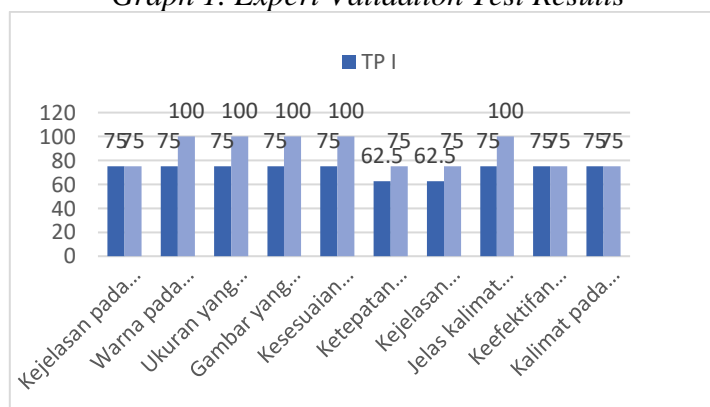
The findings from the development E-Module research that has been carried out are in the form of e-Modules that are suitable and ready to be used by teachers and students. Eligibility criteria are obtained from the results of a fairly good expert validator assessment of the content of the e-Module which has been developed in accordance with the assessment indicator items determined after revisions have been made to certain items. Meanwhile, students' responses after carrying out the e-Module readability test were easy to understand based on the criteria. The development of the e-Module for processing gadung tubers based on Discovery Learning which has been carried out by research has become a research innovation for current education, especially those related to innovative learning media for students so that it can help develop abilities both in terms of cognitive, appetitive and psychomotor skills. Apart from that, choosing the right learning model is very important to achieve maximum learning goals as expected, both for the benefits for teachers and

students. This research is supported by a study of relevant previous research results, thereby strengthening the researchers' findings on research innovations that have been carried out.

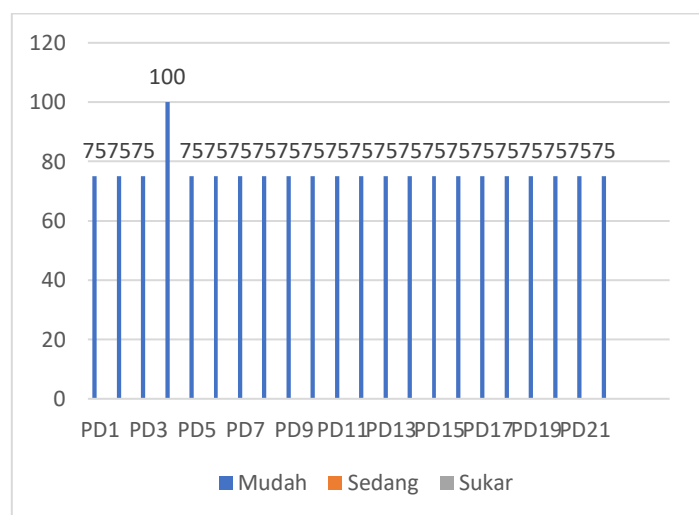
The research results are in the form of e-Module validation results by validators, readability test results by biology subject teachers, and readability tests by Class X students at SMA Negeri 1 Seteluk. The data is listed in the following table.



Graph 1. Expert Validation Test Results



Graph 2. Validation results of e-module readability tests by educators



Graph 3.E - Module Readability Test Results by students

Previous research that is relevant to this research is Development of a Smartphone-Based Electronic Module (E-Module) on Excretory System Material in Humans for Participant Educate Class XI SMA with research results in the form of Smartphone-based E-Module product on human excretory system material for Class XI SMA students which

uses 3 stages of the 4-D model, and is also categorized as valid and very practical for teachers and students (Rambe et al., 2022). According to research conducted by (Rahmawati et al., 2023) Research results based on module validation show an average score of 77.5% in the good category.

#### 4. CONCLUSION

The conclusion of this research is that the e-Module that has been developed is suitable and ready to be used in the learning process by teachers and students in the future. This is in accordance with the results of product validation by the two validators. Apart from that, the e-Module that has been developed is easy for readers to understand according to the results of the readability test carried out by class X students at SMA Negeri 1 Seteluk.

#### 5. SUGGESTION

The suggestion of this research is that it is hoped that future researchers can apply this e-Module in the learning process so that its effectiveness can be determined. Researchers can also add other materials to this e-Module so that it is more comprehensive and the example questions can be made more varied in order to improve the quality of the next e-Module.

#### 6. ACKNOWLEDGEMENT

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#### 7. BIBLIOGRAPHY

- Adawiyah, Fatniaton, Sekolah Tinggi, Ilmu Tarbiyah, and Al-Azhar Diniyyah. 2021. "Variasi Metode Mengajar Guru Dalam Mengatasi Kejenuhan Siswa Di Sekolah Menengah Pertama." 2(1). <https://E-Journal.Upr.Ac.Id/Index.Php/Parislangkis>.
- Anggraeni, Desak Made, and Ferdinandus Bele Sole. 2018. "E-Learning Moodle, Media Pembelajaran Fisika Abad 21." *Jurnal Penelitian dan Pengkajian Ilmu Pendidikan: e-Saintika* 1(2): 57.
- Fadhli, Rahmat. 2021. "Implementasi Kompetensi Pembelajaran Sepanjang Hayat Melalui Program Literasi Di Perpustakaan Sekolah." *Jurnal Kajian Informasi & Perpustakaan* 9(1): 19.
- Hidayati Azkiya, M. Tamrin, Arlina Yuza, and Ade Sri Madona. 2022. "Pengembangan E-Modul Berbasis Nilai-Nilai Pendidikan Multikultural Di Sekolah Dasar Islam." *Jurnal Pendidikan Agama Islam Al-Thariqah* 7(2): 409–27.
- Rahmawati, Fitri, Ari Ashari, and Muhammad Zuhariadi. 2023. "Indigenous Knowledge in Reducing HCN Content in the Processing of Gadung Tubers (*Dioscorea hispida*) as Student Teaching Materials." *Jurnal Penelitian Pendidikan IPA* 9(12): 10929–35.
- Rahmawati, Fitri, and Sahratullah. 2020. "Validitas Petunjuk Praktikum Bioteknologi Berbasis Guided Inquiry Untuk Peserta Didik Sma Di Kabupaten Sumbawa Barat." *Bioscientist : Jurnal Ilmiah Biologi* 8(2).
- Rambe, Khadijah, and Ristiono. 2022. "Pengembangan Modul Elektronik (E-Modul) Berbasis Smartphone Tentang Materi Sistem Ekskresi Pada Manusia Untuk Peserta Didik Kelas XI SMA." *Jurnal Biologi dan Pembelajarannya* 17(2).