

Development of Biodiversity Practicum E-Module to improve Science Process Skills

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Abstract: The learning tools of the biodiversity practicum e-module in lectures using the e-module can be useful and serve as a guide or guide for science process skills activities. The purpose of the pelitian is to study the matter of Creating and Designing Products for Learning Tools E-Module Local Biodiversity to improve Science Process Skills and Conduct Feasibility and Practical Testson e-Modules Practicum Biodiversitas in terms of Cover, Module Design, Language and Material Content. While the method in this study uses the product development method from the e-module in practicum activities in the science process skills process which consists of research stages, namely formulating potentials and problems, collecting data, conducting research product designs, conducting product validation, carrying out product revisions, conducting product trials and continuing product revisions. The results showed in terms of expert validation that the biodiversity practicum e-module is suitable for use while the practicality test given by the questionnaire to students in response to the e- assessment The biodiversity practicum module is very practical to be used in the implementation of the biodiversity practicum.

Keywords: E-Module Practicum; Biodiversity; Science Process Skills

Introduction

Changing times with the development of technological knowledge are increasingly rapid in encouraging students to be able to compete regionally, nationally and internationally. The development process in Education must follow various curriculum changes. In changing the curriculum, lecturers and students are required to carry out in the process of lecture activities. It is known that curriculum changes in universities have progressed in launching the Merdeka Belajar Kampus Merdeka (MBKM) curriculum. The curriculum involves lecturers and students to carry out lectures. Therefore, a lecturer is required to have teaching materials or it can be said that the e-module is a guide to carry out the lecture process. Relevant to the results of the study which states that e-modules can also be interpreted as the form of teaching materials that are in accordance with the characteristics taught by the teacher as a guide and also have the ability to compile e-modules for use in the implementation of learning activities (Anwar, 2010).

Learning modules are teaching materials that are arranged systematically and interestingly which include material content, methods and evaluations that can be used independently to achieve the expected competencies (Anwar, 2010; I. Dewi & Lisiani, 2015; Nafaida et al., 2015; Subekti, 2018). The form of e-module is embodied in the print of digital technology with the help of electronic computers (Asy'syakurni et al, 2015).

Module development and honing the ability of students in developing science process skills (Azizah and Winarti, 2018). The implementation of this e-module is utilized in science process skills activities to carry out practicum learning. Science process skills in biodiversity practicum can improve students' ability to use learning tools (Baheivan & Kapueu, 2014). The existence of the discovery of concepts, principles, or theories that can improve cognitive and psychomotor in carrying out scientific process skills containing laws, facts, principles, theories are already acceptable.

Modules can be interpreted as teaching materials systematically and interestingly, both which include

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material content, methods and evaluations that can be used independently to achieve competencies that expected (Anwar, 2010). Modules are one of the concepts of teaching materials that are packaged as a whole and systematically, in them contain a set of planned learning experiences and are designed to help students mastering specific learning objectives (Daryanto, 2013). This module can provide knowledge for students both individually and in groups that improves achievement so that it is not boring (Depdiknas. 2008). Modules can also provide new colors that can make students feel more in carrying out real learning process activities and also develop the creativity of each student to the maximum (Fitri et al, 2013).

The learning process is independently and directed component parts in designing learning modules consisting of: (1) the preliminary stage using modules that formulate learning objectives and also competence; (2) this stage procedurally discusses the material content of the module contained in facts, concepts; (3) the stage of implementing tasks for students listed in the LKPD; (4) the last stage of evaluation measures the level of completeness of students in answering test questions (Firdaus et al, 2015). Integrated e-module Literature review no more than 1000 words by putting forward the state of the art in the field under study/technology developed. Relevant library sources/primary references and by prioritizing research results in the latest scientific journals and/or patents. Islamic scores on due diligence with respiration system materials are stated to be excellent in the assessment (Dewi and Lisiani, 2015). The development of modules based on science process skills still needs to be developed to hone the science process skills of students (Dewi and Primayana, 2019).

KPS can be developed in providing Exercises to learners consisting of several roles such as, (a) learners can develop their thoughts; (b) the memory of the learner; (c) provide learners with the opportunity to make a discovery; (d) learners may also learn from the concepts of the material to be studied; (e) providing intrinsic satisfaction for successful learners from the discoveries they make (Gall et al, 2003). Integrated KPS includes defining variables, identifying, recording data, transforming data designing problems collecting data, conducting experiments (Gita et al, 2018). KPS is expected that students can develop and discover from knowledge independently that is in accordance with the demands of the curriculum that has the concept of learning to be a facilitator and student-centered learning (Gormally et al, 2012)

Regarding this exposure, the implementation of e-modules is rarely used in the process of implementing lectures using the implementation of science process skills. This is a habit of lecturers and students to often use conventional modules and do not use e-modules. Whereas in the era of globalization now it has used

digital learning. This problem prompted the research team to create and design a biodiversity practicum e-module that will be carried out in the process of lecture activities on science process skills.

Method

This research was conducted using the e-module of the local biodiversity course to improve the skills of the science process, namely using research and development methods from Borg & Gall (1983) including: research and information collection, planning, product design, limited trials, major product revisions, wide-scale trials, operational product revisions, field trials, revisions final product, and dissemination. Such stages can be summarized into three stages, limited to the development stage until the product revision section can be presented below.

The research and information collection stages are included in this step, including literature studies related to the problems studied, observations about the e-module practicum biodiversity used for learning in accordance with the independent curriculum is contained in the RPS, needs analysis and preparation to formulate a research framework.

The design stage of the biodiversity practicum e-module consists of the process of designing the e-module and validation of the design. The development stage of the biodiversity practicum e-module consists of the preparation of the e-module and the validation of the e-module. The research stage is limited to the development stage. In this step, there are also two activities carried out, namely conducting product development and expert validation (expert judgement) both in terms of material.

Data collection was carried out in the study using several techniques such as documentary studies, questionnaires, and experiments. The instruments in the research used include: laptops (to collect research results in the form of articles obtained from national journals and international journals), validation questionnaire sheets (content questionnaires and constructs for the module validation process). In the implementation of validation in the biodiversity practicum e-module, it is carried out with biology education lecturers at Samudra University consisting of 2 teams of experts (validators), namely material experts and media experts. Furthermore, it is carried out with feasibility tests and practicality tests.

Result and Discussion

The results of the data from the implementation of research by developing a biodiversity practicum e-module that can improve science process skills. The data obtained based on the results of the research can be seen

in the presentation below according to the stages of research and development research:

Research And Information Collection Stage

At this stage, an information collection study was carried out regarding the independent curriculum at the Biology Education Study Program, Faculty of Teacher Training and Education, Samudra University. Where all lecture activities are stated in the RPS. The material contained in the e-module of the biodiversity course is in accordance with the material taught to students. The practicum e-module is designed to apply science process skills. How to include elements of science process skills in biodiversity courses starting with: (a) teachers first formulate Learning Outcomes (CPL) (b) include aspects of science process skills in the subject matter, in the process or product of science, (c) package students' science process skills in RPS. Literature studies are to examine from the materials used such as materials, images, and from supporting reference materials from books, journals contained in the help of the Google search engine.

Design Stage Of E-Module

Initial product development includes drafting modules for both front and back module covers, achievement indicators, content, materials, test questions, and covers. The whole is packaged in modules, so that students become more active in constructing their knowledge (Suryani, 2018). So, at this stage, the preparation of the biodiversity practicum e-module is carried out based on data obtained in the preliminary study. The preparation of the biodiversity e-module is also carried out by reviewing the feasibility of the experiment to be applied to students in the Biology Education Study Program. The stages in the biodiversity practicum e-module that have been prepared include: (a) Cover/ cover, (b) Preface, (c) Table of Contents, (d) competency standards, (e) basic competencies, (f) indicators, (g) learning objectives, (h) introduction, (i) material, (j) tools and materials, (k) work procedures, (l) preliminary tasks, (m) bibliography (n) observation sheets and skill activity sheets science process. The stages that have been made are then used as a reference for the design of the e-module practicum charged with biodiversity. The preparation of the draft e-modul practicum biodiversity was carried out by the research team by utilizing references. To find out the draft of the cover e-module biodiversity practicum bag that distinguishes before and after revision can be seen in Figure 1 which explains that the cover e-module of biodiversity practicum.

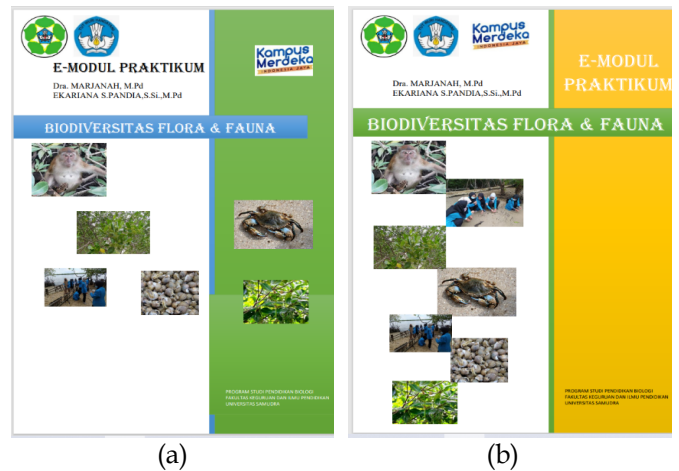


Figure 1. Cover Design (a) Draft e-module of biodiversity practicum, (b) E-Module e-module of biodiversity practicum After Revisi.

Figure 1 explains that the cover e-module of biodiversity practicum before and after revision. The changes that occurred from the two covers that corresponded to validators such as in the aspects of using color, spelling, and writing. The module cover becomes more attractive and in accordance with the target object, namely students of the Biology Education Study Program Draft cover e-module biodiversity practicum that has been designed further validated by experts, namely by two module design experts and biodiversity material experts.

Validation Of Biodiversity Practicum E-Module

E-Module Practicum Biodiversity as a learning tool that is developed and can be said to be of high quality, if it meets several criteria, yes: 1) validity is carried out with module feasibility tests. Module validation is carried out by providing a draft of the biodiversity practicum e-module and questionnaire to 2 material expert lecturers and e-module design experts. The assessment of the e-module validation includes several components, namely: the characteristics of the e-module, the quality of the e-module and language. A recapitulation of the percentage of validity of the e-module design on each design component can be seen in Figure 2.

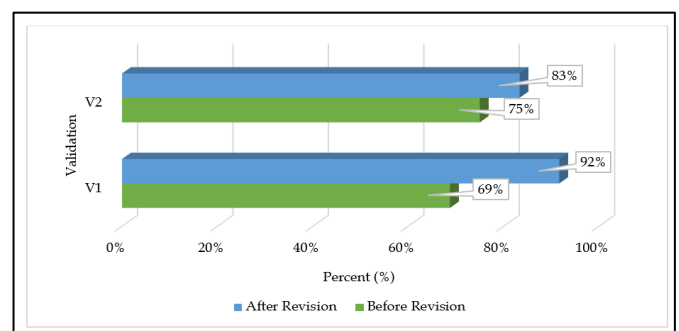


Figure 2. Validity of the Design of The Biodiversity Practicum E-Module on Each Design Component

The results of the validation of the biodiversity practicum e-module design in Figure 2 show that the two validators gave different assessments of the design of the biodiversity practicum e-module s. The highest percentage of design components is in the components of module quality elements, namely aspects of format, organization, attractiveness, letter shape and size, space/space, and consistency. The characteristic components of the module and language according to the two validators are still low, so the practicum module is revised according to the validator's input and suggestions. In addition, the results of the questionnaire answers are also used as a reference in the revision of the module. The repaired module is then given back to the validator for further discussion before testing. The revision is complete if the validator has declared that the developed module is valid (Yerimadesi, et al., 2018). The revised practicum module design is module cover, addition of module delimiters, and binding. The results of the answer to the overall module design validation questionnaire can be seen in Figure 3.

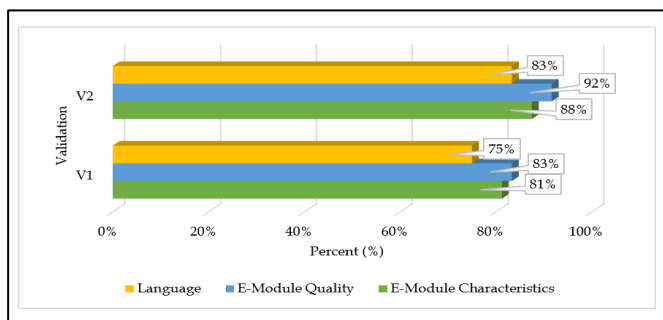


Figure 3. Validation of Biodiversity Practicum E-Module Design by Expert

Based on Figure 3, the average percentage of module designs before the revision percentage increases after the revision process. E-Modul practicum biodiversity is declared valid and can be used in the learning process of lectures. Therefore, the revision of the biodiversity e-module design was only carried out once. Modules that have a very high validity in the language aspect mean that they are communicative, information clarity, according to spelling Indonesian and use the language effectively and efficiently. Modules developed using font types and sizes in accordance with the standards for assessing learning materials, correct layout or layout, illustrations, drawings and photos as well as designs that look clear and attractive as well as guidelines for writing teaching materials (Prostowo, 2011). In addition to the design of the biodiversity-charged practicum e-module, the content or material contained in the biodiversity e-module was validated by two experts in the field of biology. The percentage of validity of isi e-module practicum charged with biodiversity in a nutshell can be seen in Figure 4.

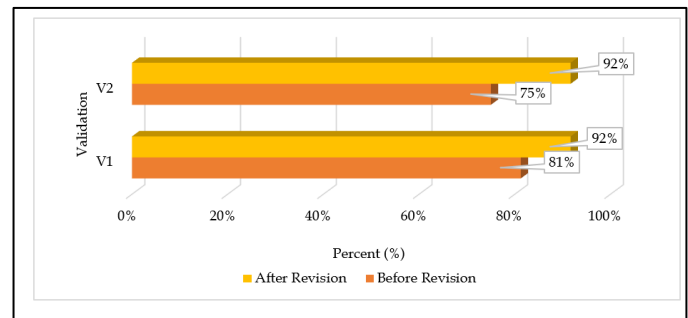


Figure 4. Validation of the contents of the Biodiversity Practicum E-Module by experts

The percentage of material validation before and after the revision averages an increase. Referring to the results of the answers to this questionnaire, several improvements were made based on the input of material expert validators, namely (a) adjusting the concepts in the biodiversity practicum e-module to the needs in learning, (b) adding images of the tools and materials used, (c) adding the format of the course assignment report bio diversity (c) add attachments. Modules that have a very high category of content validity and aspects of feasibility are: (1) in accordance with the demands of core competencies and material competencies for user needs; (2) module preparation in accordance with student development; (3) the preparation of the e-module is in accordance with the needsof the learning material; (4) the module has the correct substance of the material, (5) the content of the module can add insight; and (6) the characteristics of the e-module in accordance with moral and social values (MoNE, 2008).

Practicality test of E-Modul Practicum Biodiversity

The practicality test of the biodiversity practicum e-module is carried out by applying practicum activities. Furthermore, students fill out a questionnaire to provide opinions on the application of the biodiversity e-module that has been developed. Based on the calculation of the percentage of student responses regarding the biodiversity practicum e-module, it can be obtained in Figure 5.

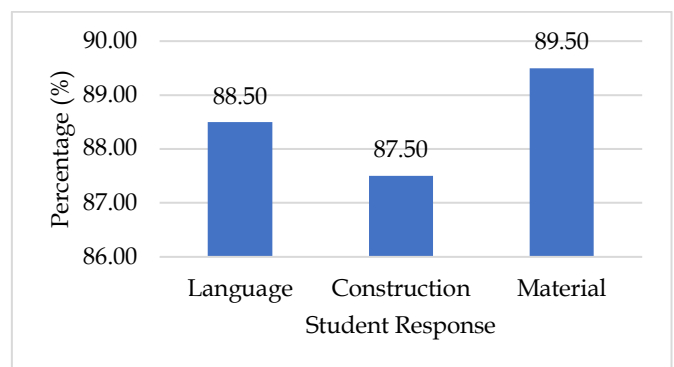


Figure 5. Practicality of Student Response to Biodiversity Practicum E-Module

The results showed that from three aspects related to 5 criteria in the practicality test, namely 1) very practical; 2) practical; 3) quite practical; 4) less practical; 5) very impractical. The number of statements from the practicality questionnaire was 12 statements and 3 indicators, namely Language with a percentage value of 88.5% was declared very practical, while construction with a percentage value of 87.50 was stated is very practical and furthermore the material with a percentage value of 89.60% is declared very practical. Thus, it can be stated that it is very practical to mean that it is easy to understand the content of the biodiversity Practicum e-module.

The results of the above research are supported from the research that has been carried out that the modules developed are based on science process skills, which include observing, clarifying, communicating, measuring, predicting and concluding with hasil research shows that there is an increase in learning outcomes and an increase in the science process skills of students (Rosa, 2015).

The guided inquiry-based science learning e-module developed is valid, practical, and effective in improving students' science process skills. this is also supported by research (Suryani, 2015) that modules in this context are modules that are media used as tools to understand biological material, as well as being able to provide pleasure in learning biology subjects (Surya et al, 2021). Research conducted by Liyan also states that modules can be used as teaching materials or effective learning media for students (Rizqi et al., 2013). The Ministry of National Education also stated that science process skills can be used as guidelines in the development of several student skills, namely in the form of physical, intellectual skills and social (Arsih, 2016).

The science process skills in the biology learning module on the excretory system material that were developed are inserted into simple experiments that can be done by students independently. This research is also supported by research (Mei et al., 2007) which states that there is a significant increase in the competence of science process skills and having a high percentage of process skills indicates that students are more aware of the relevance of science in the lives of students.

After being validated by media experts, material expert, linguist, then the test is carried out try the first stage, which is a limited trial. Test limited try is meant to get an overview to find out the quality of the module developed. Limited trial conducted to class VIII students as much as 5 people at MTsN 2 Bandar Lampung (Widyawati & Prodjosantoso, 2015). Student selection done randomly or randomly. Test results limited try get 76% percentage with interesting criteria

Conclusion

Based on the results of the research and discussion that has been described, it can be concluded that the biodiversity Practicum e-module product. the analyzed consists of three categories with a percentage value of very valid aspects with a value of 87.50% on the quality element of the e-module, then the practicum module is declared suitable for use as a practicum guide while the results of the module practicality test on a small scale against studentsas users obtained a percentage of 89.60% in the very good category in the very good category in material aspects.

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