



Development of Observation-Based Hybrid Learning Modules as Learning Media for Biodiversity Materials

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Abstract

This study aims to develop an observation-based hybrid learning module as a learning media for biodiversity material. This study uses research and development methods. This research was conducted at MA Darul Ulum Purwogondo Jepara. The subjects of this study consisted of a small-scale trial subject with 20 students and a large-scale trial subject with 68 students. Instruments and data collection techniques in the form of questionnaires and tests of students' cognitive learning outcomes obtained from the pretest and posttest scores. The results showed that (1) the observation-based hybrid learning module was declared valid by validators of media experts and material experts with an average score of 94.4%. (2) The results of the readability analysis of the module meet the very good criteria based on the teacher's response of 97.5% and the student's response of 83.6%. (3) The results of the feasibility analysis of the module based on the teacher's response of 95% and the student's response of 82.1% indicate the module is very feasible. (4) The results of the analysis of the effectiveness of the module to improve students' cognitive learning outcomes are the N-gain value of 0.70 with high criteria. The results of this study indicate that the observation-based hybrid learning module is feasible and effective to be used as a learning media for biodiversity material to improve students' cognitive learning outcomes.

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INTRODUCTION

The 2013 curriculum refers to the concept of modern learning in the 21st century which causes changes, namely from teaching (teaching) to learning (learning), from teacher-centered learning (teacher-centered) to student-centered learning (student-centered). Then from passive learning to active learning. The demands of the curriculum are that students and teachers must be more active. Students must be active in learning activities while teachers must be active in preparing learning tools and motivating students to study harder so that learning is more effective (Nugroho, 2012).

Biology is one of the subjects that has a lot of material that must be studied by students. One of the biology subject matter in the 2013 Curriculum is biodiversity. Biodiversity material studies the diversity of living things at the level of genes, species, and ecosystems. This material is taught in the odd semester of class X, even though students have not acquired knowledge about genes and ecosystems. Materials on ecosystems were delivered in the even semester of class X. This material on ecosystems was also obtained at the junior high school level, but at the junior high school level the material on ecosystems was only limited to the food chain and material on genetics was delivered in the even semesters of class XII.

Therefore, many students have difficulty in understanding the concept of biodiversity. The teaching materials available at school are only worksheets and textbooks. Thus, we need an appropriate teaching material in order to guide students in understanding the concept of biodiversity.

MA Darul Ulum Purwogondo Jepara is one of the schools that provides wi-fi facilities and can be used by students. Based on observations at MA Darul Ulum Purwogondo Jepara, the learning process is only a face-to-face activity, not yet implementing hybrid learning. The use of Wi-fi has not been fully utilized for the learning process by both teachers and students. In addition, students also like to look for opportunities to open internet services in the form of Instagram, Facebook and other networks.

An alternative solution is to combine face-to-face learning strategies with learning strategies using e-learning media. This learning strategy is called a

hybrid learning approach. Experts have provided several definitions of a hybrid learning approach or also called e-learning, including: a) A learning approach that combines flexible and quality instructors and electronic learning so that it can provide an optimal learning experience for students (Hart, et al., 2008). b) A learning approach that combines face-to-face learning and online learning (Garrison and Kanuka, 2004).

Through hybrid learning, students are expected to be able to learn independently, sustainably, and develop throughout their lives so that learning will be more effective, more efficient, and more interesting. Therefore, we need a learning media to help teachers and students in the learning process in the form of learning modules.

The module is a self-study package that includes a series of learning experiences that are planned and systematically designed to help students achieve learning goals. The main purpose of learning with modules is to increase the efficiency and effectiveness of learning in schools, both time, funds, facilities, and energy in order to achieve goals optimally (Mulyasa, 2013).

One alternative form of learning is to use observation-based hybrid learning module teaching materials. The selection of observation-based teaching materials as one of the learning media is because at MA Darul Ulum Purwogondo Jepara there are no teaching materials available. These teaching materials are arranged according to the characteristics in the observation-based learning process.

Based on the background of the problem, the researcher believes that it is necessary to develop an observation-based hybrid learning module on biodiversity material in high school as an alternative to improve biology learning outcomes. The aims of this study were to test the validity of the observation-based hybrid learning module as a biology learning medium, to analyze the readability and feasibility of the observation-based hybrid learning module as a biodiversity learning medium, and to analyze the effectiveness of the observation-based hybrid learning module as a biodiversity learning medium.

METHODS

This research is a development research (Research and Development) using research procedures from Sugiyono (2014) which includes 10 stages, namely potential and problems, data collection, product design, design validation, design revision, small-scale trial, product revision, trial large scale, product revision, and mass product. The product developed is teaching materials for observation-based hybrid learning modules as learning media for biodiversity materials. This module is equipped with online-based learning materials, website links, attached files, and online videos, as well as online homework.

This research took place in MA Darul Ulum Purwogondo Jepara and the time of the research was carried out in May - June 2021. The population in this study was students of grade X MIPA, X IPS 1, and X IPS 2 with 102 students. The subjects of the small-scale trial were students of grade X IPS with 20 students. Research subjects will be selected using the Cluster-Random Sampling technique. The subjects of the large-scale trial were students of grade X MIPA and grade X IPS 1 with 68 students.

Instruments and collection techniques in the form of questionnaire and tests of students' cognitive learning outcomes. Data analysis techniques in this

study were analysis of module validity by material and media experts, analysis of readability and feasibility of modules from student and teacher responses, and analysis of module effectiveness in the form of increasing students' cognitive learning outcomes against pretest and posttest scores using the N-gain formula of Hake (2002).

RESULTS AND DISCUSSION

Analysis of the pretest and posttest items was carried out by means of validity testing, reliability testing, level of difficulty and discriminating power tests on items. The results of the validity test showed that there were 25 valid items and 15 invalid items. Reliability test shows that the questions are very reliable with a score of 0.91. The level of difficulty test shows questions with difficult criteria of 2 items, medium criteria of 13 items, and easy criteria of 4 items. Meanwhile, the discriminatory test showed that there were enough criteria for 2 items, 19 items for the good criteria, and 4 items for very good criteria.

The validation of the observation-based hybrid learning module was carried out by media expert lecturers and material experts. The results of the recapitulation of assessments from media experts and material experts are presented in Table 1.

Table 1. Recapitulation of Validation of Media Experts and Material Experts

No	Expert	Aspect	Score	Category
1	Media	The feasibility of graphic	94.4	Valid
2	Material	The feasibility of content	94	Valid
		The feasibility of presentation	92.3	Valid
		Language evaluation	96.2	Valid
		Contextual evaluation	95	Valid
		Average score from material expert	94.4	Valid
Average			94.4	Valid

Based on the data in Table 1, the average value obtained from the two expert validators is 94.4% with very valid criteria. It was suggested by media experts to improve the source of the photo on the cover by avoiding plagiarism, adding the name of the supervisor as the author of the module, and giving different colors or markings to the key concepts in each sub-topic to make it clearer and more interesting. Meanwhile, what is recommended from material experts is to be more specific in the use

of scientific names, especially genus names with abbreviations. In addition, for local names of animal and plant species, standard equivalents (synonyms) are needed. Giving a standard equivalent (synonym) to the local name of a species also has an important role in the classification system of living things (Aseptianova, 2012). The validation data from media experts and material experts are used as the basis for revising the observation-based hybrid

learning module as a learning medium for biodiversity that was developed.

The results of the research on teacher and student responses to the readability of the observation-based hybrid learning module are included in the very good category with a teacher

response score of 97.5% and student responses of 83.64% (Table 2). Yuliana et al. (2012) stated that the readability level of the module is needed to identify difficult words, and identify the reactions of people who read to understand the words contained in the text.

Table 2. Assessment of Teacher and Student Responses to the Readability of the Module

No	Data	Results (Percentage)	Category
1	Teacher response	97.5	Very good
2	Students response	83.6	Very good

The results of the research on teacher and student responses to the feasibility of an observation-

based hybrid learning module can be seen in Table 3.

Table 3. Assessment of Teacher and Student Responses to the Feasibility of the Module

No	Data	Results (Percentage)	Category
1	Teacher response	95	Very good
2	Students response	82.1	Very good

The effectiveness of the observation-based hybrid learning module can be seen from its ability to improve students' cognitive learning outcomes. The N-gain results obtained after the pretest and posttest were 0.70 in the high category. The data on student learning outcomes can be seen in Table 4.

The results of this study indicate that the observation-based hybrid learning module is effectively used as a learning medium for biodiversity to improve students' cognitive learning outcomes.

Table 4. Results of Data Analysis of Student Learning Outcomes

No	Data	Results (Average)		N-gain	N-gain Category
		Pretest Score	Posttest Score		
1	Research Sample 68 students	40.53	82.71	0.70	High
2	Highest score	64	92		
3	Lowest score	12	68		

This research on the development of teaching materials is in the form of an observation-based hybrid learning module as a learning medium for biodiversity. This module contains the title, introduction, instructions for use, core competencies, basic competencies, learning objectives, table of contents, material summary, student activities, competency test, and bibliography. This module is also equipped with online-based learning materials, website links,

attached files, and online videos, as well as online homework. Modules are presented in an attractive form, clear writing and various images to improve student learning outcomes. The module is designed according to the material that refers to the syllabus and the criteria for a good module (Fajeri et al., 2015). The appearance of the module on the cover and the contents of the module can be seen in Figure 1.

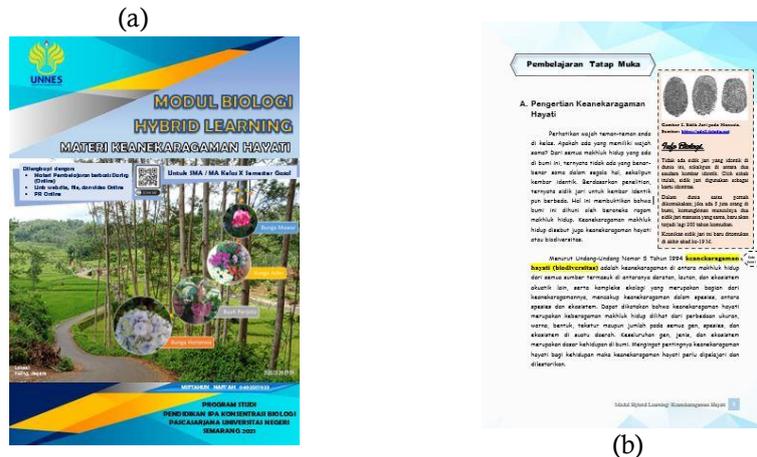


Figure 1. Display module part (a) cover; (b) module content

Observation-based hybrid learning modules can be used in both in-class and out-of-class learning. Face-to-face learning in class aims to provide an outline of the materials and modules used. Students can also do online learning in the form of chatting using the WhatsApp application media in class groups with teachers or between students, so that students learn more time to understand the material being studied. Online discussions using WhatsApp groups can produce interesting learning and can be a solution to the limited availability of time. Barhoumi et al. (2015) explained that hybrid learning using WhatsApp creates an effective discussion after discussion in class. Safi'isrofiyah et al. (2017) that WhatsApp is effective for increasing students' learning motivation and cognitive learning outcomes.

Mulyasa (2013) stated that the main purpose of the module system is to increase the efficiency and effectiveness of learning in schools, both time, facilities, and energy in order to achieve goals optimally. This module is presented more on observations or observations of the surrounding environment, so that students are more interested in learning than memorizing material. Research by Suwono & Wibowo (2018) shows that observation-based learning can improve questioning skills, biological literacy and biology learning achievement.

Several previous researchers have developed a hybrid learning module that aims to improve student learning outcomes, among others by Kurniawati (2011) showing that the hybrid learning module is effectively used on the subject matter of hydrocarbons in terms of student activities, student

perceptions, and student learning outcomes. Relevant to the statement of Pratiwi et al. (2014) module-based hybrid learning can be applied in high school and improve critical thinking skills and student learning outcomes. Hart, et al. (2008) stated that the hybrid learning module is a learning module in the form of a combination of flexible and quality instructors and electronic learning so that it can provide an optimal learning experience for students.

This observation-based hybrid learning module on biodiversity material has several advantages and limitations in its implementation. The advantages obtained from the use of observation-based hybrid learning modules include 1) an attractive module display containing a variety of images, videos, and links/links as additional information; 2) This hybrid learning module allows students to learn outside the classroom, but still under the supervision of the teacher. Communication between students and teachers is maintained even though students and teachers are not in the same room; 3) The use of this learning module can summarize a long learning time, so that teachers can still meet curriculum targets and help students learn more efficiently and not just memorize a material; 4) improve science process skills and student learning outcomes, so that students are active, enthusiastic and have high curiosity when learning material takes place, with students daring to express their opinions, especially in the aspect of asking questions.

This observation-based hybrid learning module has several things that need to be improved, including 1) the material presented in the module is still limited to biodiversity material, 2) online

learning activities are still limited in the form of discussions using the WhatsApp group application and 3) teachers are expected to have mastered use of technology, including basic skills in operating programs on computers and the internet.

Obstacles experienced by researchers while developing this observation-based hybrid learning module product include the availability of internet networks (wi-fi) in schools and outside schools that are still experiencing problems, such as slow connections and large quotas, so that some students still cannot online with other teachers and students. The facilities and infrastructure owned by the school already provide wi-fi facilities for students, but the connection is quite slow so students still have difficulty participating in online learning. In addition, students have not read the instructions for using the module so that when working on online questions and discussions there are still misconceptions between students and teachers. The obstacles that teachers may experience when using the module are that the teacher has not read the instructions for using the module, the online learning that is carried out requires the teacher to always be online with the students.

CONCLUSION

From the results of the research that has been carried out, it can be concluded that the observation-based hybrid learning module as a learning medium for biodiversity based on the validation results of media experts and material experts has been declared valid/good with an average value of 94.4%, so it can be used for the process. student learning. The observation-based hybrid learning module received a very positive response from teachers and students regarding the level of readability and feasibility of the observation-based hybrid learning module as a learning medium for biodiversity material. The observation-based hybrid learning module as a learning medium for biodiversity is more effectively used to improve learning outcomes compared to conventional learning without using modules. The results showed an increase in the posttest score compared to the pretest score using an N-gain score analysis of 0.70 with high criteria.

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