



## Designing a module for learning plant biodiversity: An effort for conservation of local wisdom

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### ABSTRACT

This research aims to develop a module based on plant biodiversity and conservation in the Kudus area for high school students. The R&D research design, according to Borg & Gall, was implemented. The module was developed in five stages: research and information-gathering, planning; initial product development; preliminary field test; and product revision. Assessment and review of the module were performed by seven expert validators. Validity and reliability of the assessment instrument for the module were conducted and participated by 68 students. Thirty-one students became participants in the field test. Data were collected using a validation sheet and questionnaire. Data Analysis utilized excel, SPSS, and Rasch. Based on the assessment of validator experts, the module was declared valid. The module validation test gained an average score of 3.68 (very good). Students' responses showed that the Person measure was +3.22 logit, indicating that the students tended to agree with the proposed questions. The person and item reliability were 0.84 and 0.77, respectively. These values mean that the person reliability showed high consistency. The result of Rasch Analysis clarified the acceptance of students regarding the module both from Kudus and Non Kudus area. The results also showed students' interest and understanding of the issue of conservation and biodiversity, as well as their awareness of the local wisdom. It is recommended to develop a similar module as an effort of local potencies conservation.

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## INTRODUCTION

Indonesia is the largest archipelagic country worldwide with a great species diversity (Johnson et al., 2019). As an archipelago, Indonesia has unique and distinct biodiversity in each region. Among these great diversities, the bilih fish (*Mystacoleu-seus padangensis*) found on Lake Singkarak, West Sumatra; Gembrong goats in Bali; Motoro Kiki corn from Gorontalo; Buru Hotong barley of Buru Island (Maryanto et al., 2014).

Kudus Regency, one of the cities of Central Java Province, Indonesia is known as the place for strong local religious wisdom and traditional rituals, where local fruits and plants are commonly served as an offering during worship. Those local plants were found in the Muria Mountains, located on the north coast of Java and the center of the Muria Peninsula. The mountain is 1,594 m above the sea. This area has a great diversity of plants. Some popular species among the people are pari-joto, black pomegranate, and pakis or fern. In addition, Kudus is also rich in local wisdom for conservation efforts (Wibowo, Wasino, & Setyowati, 2012; Widjanarko, 2008)

Along with conservation and biodiversity, it is a pity that those plants have not been introduced and taught properly in science or biology class. The field test showed that the textbooks as one of the learning sources had not depicted the issue, while science teachers have not also integrated those localities in the learning. The teacher explained that the obstacles in learning biodiversity materials in Kudus High School are the time limitation and the difficulty in instilling the concept of students being aware of maintaining the environment. It was supported by the results of a survey which illustrates that 44.78% of students have low curiosity about the local potential of Kudus. Student awareness to learn local potential is also low, with 20.15% having very high interest while 44.03% belongs to the low-interest category.

These results figured out that the students were not familiar with the local plants and local wisdom, as they had no experience in learning those plants. The conservation efforts require community participation in various aspects, one of which is education (Bennett et al., 2017). Thus, designing the curriculum, creating a module for deeply understanding the biodiversity, and as a base for the idea of conservation, should be regarded seriously.

The research related to conservation and biodiversity learning tools showed very diverse results. It is reported that the local potentials, environmental literacies, and conservation attitudes can be used as the basis for the development of learning tools. (Kahar & Fadhilah, 2018). Learning biodiversity with local wisdom-based learning tools directly enhance students' learning outcome (Ramdiah, Abidinsyah, Royani, Husamah, & Fauzi, 2020). In addition, students' awareness, conservation concept, and linking local knowledge with modern knowledge can be improved by designing appropriate teaching materials (S. M. Leksono, Syachruraji, & Marianingsih, 2015), mini-research learning (S. Leksono, 2016), and modules (Triwijananti, Susilowati, & Ngabekti, 2014).

Integrating specific themes into the biodiversity learning module or resource provides a contextual experience about conservation. Knowledge and conservation skills can be optimized using modules integrated with ethnoscience (Rahayu & Sudarmin, 2015), local biodiversity (Kahar & Fadhilah, 2018), and local wisdom (Ilhami, Riandi, & Sriyati, 2018). Using a conservation learning module with scientific learning models is possible to improve students' knowledge and skills about biodiversity (Mansyur, Kartimi, & Roviati, 2016).

The other scholars' works showed that the biodiversity module is one of the proper tools to enhance the students' conservation character. However, what kind of biodiversity module should be developed to improve students' awareness about the issue of conservation? Navarro-perez & Tidball (2011) suggest the guidelines for biodiversity education, encouraging students' critical thinking about protecting biodiversity. In other words, the learning target should be focused on promoting the thinking habit or thinking skills of students in participating in the conservation effort.

For that purpose, teachers have to connect what was learned by the students in the school with a real-life situation close to students' daily lives. Integration of local potential around students makes students more interested in learning science so that critical thinking and problem-solving skills can be improved (Putri & Aznam, 2019). Using facts and information found around made constructivist pedagogy easier to be implemented. Constructivist learning models allow students to develop quality of knowledge (Nugroho, 2017); one of them is guided inquiry (Colburn, 2000; Llewellyn, 2013).

Research related to incorporating the local knowledge and wisdom of plant biodiversity into learning modules for high school students has not been extensively carried out. It should be noticed. In the current high school curriculum, the biodiversity topic has the potential to instill a concern for the conservation of local biodiversity. This is an attractive topic to be explored. Based on the facts mentioned earlier, the research question was how to create a module for learning the conservation of local plant biodiversity in Kudus. The module was expected to increase students' knowledge, attitudes, awareness, and skills related to the conservation of local plant biodiversity.

## METHODS

### Research Design

The R&D was applied as the research design following Borg & Gall (1983). The steps were limited to the stage of the main product revision. The current report is the development of module driven from already reported exploration. It is previously reported the descriptive exploratory research to obtain bioecological information and

local wisdom in Muria (Mumpuni, Susilo, & Rohman, 2013; Mumpuni, Susilo, & Rohman, 2015). According to the reports, several local potencies of the plant diversity and local wisdom of the community were collected. Then, the module for students was compiled containing the mentioned information.

### **Instrument and Participant**

Two learning design experts, two subject matter experts, one learning media expert, and two learning practitioners (teachers in public schools) participated in the validation. Field tests for validity and reliability of the assessment instrument were conducted using 68 students as participants. Thirty-one students became participants. They randomly selected and classified as 19 students from Kudus area and 12 students from non-Kudus area. The validation sheet and questionnaire were used as instruments for validation. The learning module validation sheet was utilized to gather data about the review of the learning module from the validator. The questionnaire was employed to collect students' responses about the ease of understanding and the attractiveness of the module.

### **Procedure**

The module on Biodiversity and Conservation was developed in five stages: (1) the research and information-gathering stage; (2) the planning stage; (3) the initial product development stage; (4) the preliminary field test phase; and (5) product revision stage.

A literature study was organized to explore the literature and the results of preceding studies that were relevant to this research. The analysis established the basic problem, which was that no local plant biodiversity-based module had been developed. This module was targeted to teach students about attitudes, knowledge, and conservation skills. The topic is also based on character education to nurture the students' characters about the usages and conservation of biodiversity. Field studies were done by direct observation to schools about students' knowledge regarding the potential of local biodiversity and local wisdom, implementation of biodiversity learning, and opinions on incorporating local potential and local wisdom in learning biodiversity. These observations include teacher and students' activities and the learning process. The Standard of Competencies, Core Competencies, Basic Competencies, and the indicators for learning achievement of the Curriculum for High School Biology in Indonesia were analyzed initially in the planning stage. The next step was designing the integration of local biodiversity and local wisdom in the module. The involved expert qualifications (content experts, instructional design experts, instructional media experts, learning practitioners, and student responses) were also determined in this stage.

The initial product development was adjusted to integrate the local biodiversity potential and local wisdom (as a conservation effort) in the Muria Mountain Range to biology learning. The module was supplemented with the character values related to efforts to use and conserve biodiversity (Technical Guidelines for Developing High School Teaching Materials issued by the Ministry of National Education 2010). The module format follows the format by Prastowo (2012), modified as needed. The instruments to assess character are integrated into the instruments to evaluate the learning outcomes because character education aims to encompass thinking, feelings, and behavior (Zuchdi, Prasetya, & Masruri, 2013).

The validation stage was conducted to assess the module's validity. The module's validity was identified through the results of the validation analysis by the validator. Aspects of being validated were: conformity with content standards, completeness and depth of material, and evaluation instruments, and the suitability with local wisdom and potential. According to the validator's suggestion, after the module has been revised, it is field-tested using students as the respondents/participants. The module was constantly improved and refined based on the assessment from experts, practitioners, and students. The initial revision was based on advice from experts and practitioners. The later improvement was based on the readability test and students' feedback questionnaire.

### **Data Analysis Techniques**

Expert validation data were acquired in both qualitative and quantitative data. The qualitative data was the critics and suggestions from the validator. Quantitative data were obtained from the assessment using validation sheets. The data were analyzed using descriptive analysis techniques. Score data were calculated on average and percentage. The conclusion of the product quality is based on criteria by Adnyana (Setyowati, 2011). Field-tested data for validity and reliability were tested with SPSS 16.

Students' questionnaire was analyzed Rasch Model using the @Winsteps V. 3.83.2. Ordinal raw data is processed into logit (log odds unit), resulting in an equal interval (Sumintono, 2018). The Rasch analysis results represented the students' responses. Number + N or K codes for student. (K) Student from Kudus area and (N) Student from non-Kudus area. For example, 09N means the ninth student from non-Kudus area. I for an item of the questionnaire was shown in Supplementary Material.

## **RESULTS AND DISCUSSION**

### **Module Development**

The module was constructed based on the local biodiversity and local wisdom of the Muria Mountains in the Kudus region, representing contextual learning. It was expected that the students would be more interested and have the eagerness and willingness to manage and develop the local biodiversity in the future. Learning

objectives were adjusted to the current curriculum. The integration of local biodiversity, local wisdom, characters, and conservation efforts are shown in [Table 1](#).

**Table 1**

Details of Integration of Local Biodiversity in Basic Competencies in Biodiversity Topic.

Basic Competencies	Characters, Biodiversity, and Local Wisdom
<p>1. Admiring, preserving, and conserving the orders and complexity of God's creation in Biology and its related problem according to students' religion.</p> <p>2. Upholding scientific attitude (honesty, discipline, responsibility, caring, environment friendly, cooperation, collaboration, peace-loving, responsive, proactive) in the learning process inside and outside the classroom.</p>	<ul style="list-style-type: none"> <li>– Just, Grateful, responsible, and caring (directed to efforts for biodiversity conservations).</li> <li>– Moral messages about the targeted characters were incorporated into the module.</li> <li>– Tasks for students were used to develop the characters supporting the conservation. For example: Please write two paragraphs about your gratefulness, responsibility, and caring attitude toward Indonesian biodiversity.</li> </ul>
<p>3.2 Analyze different levels of biodiversity in Indonesia and its threats and preservation</p>	<ul style="list-style-type: none"> <li>– Subtopic 1. A general overview of biodiversity and conservation efforts in Muria Mountain Range</li> <li>– Subtopic 2. Levels of Biodiversities Genetic Biodiversity: red and white pamelorange; old and new variants of byar bananas; and the wulung, red, and white pomegranate. Species Biodiversity: parijoto (<i>Medinilla javanensis</i> Blume, 1831 and <i>Medinilla verrucosa</i> Blume, 1831); pakis paku tiang (<i>Cyathea contaminans</i> Copel., 1909) and pakis urang (<i>Diplazium esculentum</i> (Retz.) Sw., 1803) Ecosystem Biodiversity: Muria Forest, Mothel-Muria Waterfall, Parijoto farms, pamelorange farms.</li> <li>– Subtopic 3. Biodiversity in Indonesia Muria biodiversity is a part of Indonesian biodiversity.</li> <li>– Subtopic 4. Usages of the Biodiversity. Biodiversity has three economic values: usages value, choice-value, and living value (Barbier, 1994). Usage value includes both direct value (consumptive and productive values) and indirect value (non-consumptive). All those values are based on the Murian biodiversity.</li> <li>– Subtopic 5. Efforts for Conservations of Biodiversity. Describing the threats to local biodiversity, conservation efforts (include local wisdom), and the importance of research and developments in biodiversity for the future.</li> </ul>
<p>4.2 Presents the results of observations of various levels of biodiversity in Indonesia and proposed conservation efforts</p>	

The module described the diversity of local plants, local wisdom, and its conservation efforts. These contents have been adjusted to the curriculum of biology learning. There are two species of Parijoto (*Medinilla javanensis* Blume, 1831 and *Medinilla verrucosa* Blume, 1831); two varieties of pamelorange (*Citrus maxima* (Burm.) Merr., 1917): red and white pamelorange with different colors of fruit flesh; two varieties of byar banana (*Musa paradisica* L., 1753) with the different color of stem and fruit skin; Three varieties of pomegranate (*Punica granatum* L., 1753), the wulung (purple), red, and white; and two different *Cycas* plants, pakis kathok or paku tiang (*Cyathea contaminans* Copel., 1909), and pakis urang (*Diplazium esculentum* (Retz.) Sw., 1803). The local biodiversity is presented in [Figure 1](#).



**Figure 1.** Local Plants Found in Muria Mountain Range (a) Parijoto; (b) Pomegranate; (c) Byar banana; (d) Pakis urang; (e) Pamelorange

Parijoto and pakis were preserved because of local myths. In contrast to Parijoto, Pamelorange, bananas, and pomegranate cultivation was carried out in the residents' home farms individually to meet the market demand. Land clearing was avoided because they knew the dangers of it. This local plant cultivation is performed by the community independently or with the help of the local government. This conservation method was supported by various related organizations which concerned with supporting conservation efforts. There are village official administration bureaus, PNPM (*Program Nasional Pemberdayaan Masyarakat* or National Community Empowerment Program) on Tourism, PMPH (*Paguyuban Masyarakat Pelindung Hutan* or Association of Forest Protecting Community), MRC (The Muria Research Center), and The Sunan Muria Foundation.

The residents have practiced the principle of local wisdom in their conservation efforts (Mumpuni et al., 2015). What is on around Muria can be utilized as the source of livelihood. Thus, we must do the right things to sustain our nature. This is in accordance with the research (Widjanarko, 2008) and (Wibowo et al., 2012). Muria society has a pattern of attitude to take needs from nature based on necessity. Also, the ceremony named “*sedekah bumi*” is carried out as an embodiment of gratitude to God for the abundant results of nature and as an opportunity to share with others. The local wisdom of the Muria society adheres to an ecocentric ethical pattern that is applied by maintaining environmental sustainability and biodiversity. This pattern is typically followed by people located around the slopes of the Muria Mountains.

Module is compiled with a contextual approach and used inquiry learning that helps students to construct knowledge. Evaluation questions in the module have also been tested. The instrument's validity and reliability were checked with SPSS, and it confirmed that the instrument was valid and reliable. The appearance of module is showed in Figure 2.

This module was essential to the conservation effort. The bioecological exploration of local diversity showed that these local plants have significant economic value. Raising this awareness to the local communities was very important to take care of and preserve the local plants. This extraordinary potential must be used as soon as possible so outsiders will not take it, and the local community will only be used as the consumers. Conservation awareness must be understood and integrated into all human activities, such as education (Bennett et al., 2017). Integrating the concept of bio-conservation in biology learning aimed to promote high school students' environmental literacy and awareness. It can be done with the contextual approach.

# 5 | UPAYA KONSERVASI KEANEKARAGAMAN HAYATI

## Pendahuluan

"Ketika masyarakat lokal semakin masuk dalam sistem ekonomi berbasis uang tunai, maka nilai-nilai, adat istiadat dan hubungan dengan alam akan terkikis perlahan (Indrawan dkk, 2012)".

Kalimat tersebut menggambarkan bahwa pemanfaatan keanekaragaman hayati yang berlebih akan memberikan dampak pada banyak pihak, termasuk ragam budaya masyarakat lokal. Hal tersebut menjadi salah satu ancaman kelestarian berbagai keanekaragaman hewan dan tumbuhan khas Indonesia. Upaya konservasi harus segera dilaksanakan baik melalui kearifan lokal maupun upaya konservasi insitu dan eksitu. Ini menjadi tugas kita untuk menyelamatkan kelestarian keanekaragaman hayati Indonesia yang berpotensi luar biasa.

## Eksplorasi



Gambar 5.1. Larangan Perusakan Hutan: hal ini disebabkan adanya pihak luar yang menjarah hutan (Sumber: Dokumentasi Kistantia dkk)

Larangan pengambilan paku pohon, anggrek, dan satwa di Hutan Muria terutama daerah Colo mulai digalakkan (gambar 5-1). Hal ini dilakukan karena jumlah tumbuhan dan satwa tersebut mulai habis. Padahal eksplorasi keanekaragaman hayati di Pegunungan Muria belum selesai. Masih banyak spesies yang belum diketahui namanya, bahkan belum ditemukan untuk diteliti lebih lanjut. Lantas apa yang akan terjadi pada berbagai spesies baru yang ada di Pegunungan Muria jika ancaman perusakan hutan tidak dicegah?

Materi 5: Upaya Konservasi Keanekaragaman 81

## Merancang Kegiatan Pengamatan

Dari daftar gambar yang disediakan di bawah ini, pilihlah 1 tumbuhan lokal sesuai dengan pengamatan yang akan kalian lakukan!



Sumber: Dokumentasi Kistantia dkk

Coba tulis apa yang akan kalian lakukan pada kegiatan pengamatan untuk memanfaatkan salah satu tumbuhan tersebut (dapat melalui studi literatur atau praktik langsung) (susun rancangan kegiatan pengamatan seperti contoh pada materi 1):

Materi 4: Pemanfaatan Keanekaragaman Hayati 66

Figure 2. Appearance of module which was developed following the contextual and inquiry approaches.

## Results Analysis by Validators

The analysis of the feasibility and readability tests indicated the module has good quality. The module validation test gained an average score of 3.68 (very good) and does not require revisions. However, several revisions were performed to improve the module's quality corresponding to the comments and suggestions from the expert validators.

Learning design experts focused more on implementing the stages of the inquiry. In inquiry learning, students are expected to build independent knowledge to achieve learning goals (Kuhlthau, Maniotes, & Caspari, 2007; Llewellyn, 2013). The subject matter experts suggested using more straightforward sentences (Kadarko, Delf, & Sjarif, 2010) and stated that the modules had incorporated local biodiversity and conservation. Learning media experts focused more on graphical issues, such as fonts, sizes, colors, and images.

Education practitioners (teachers) provided a good assessment regarding the use of the module to assist the learning process. Based on interviews, this module is particularly different compared to common textbooks in school. The textbooks are usually contained theoretical concepts of the material. They gave advice on inquiry activities that were seldom taught to students, the weakness of which students will experience difficulties during the scientific process. However, it was suggested to use a simpler language to teach the inquiry process to students. The teachers said the learning module based on the local biodiversity was a new contextual media that suits the needs of current students.

## Students' responses toward the module

To discover the students' responses toward the module, questionnaires and Rasch analysis were conducted. It was organized to find out various problems, such as (1) flaws in the module, such as typographical, font, and image layout errors; (2) the graphical attractiveness of the module; (3) the students' knowledge about biodiversity in Muria Mountains and its conservation efforts; (4) students' understanding regarding the learning module with guided inquiry models; (5) students' responses to character development integrated into the module, and (6) students' opinions and suggestions toward the module.

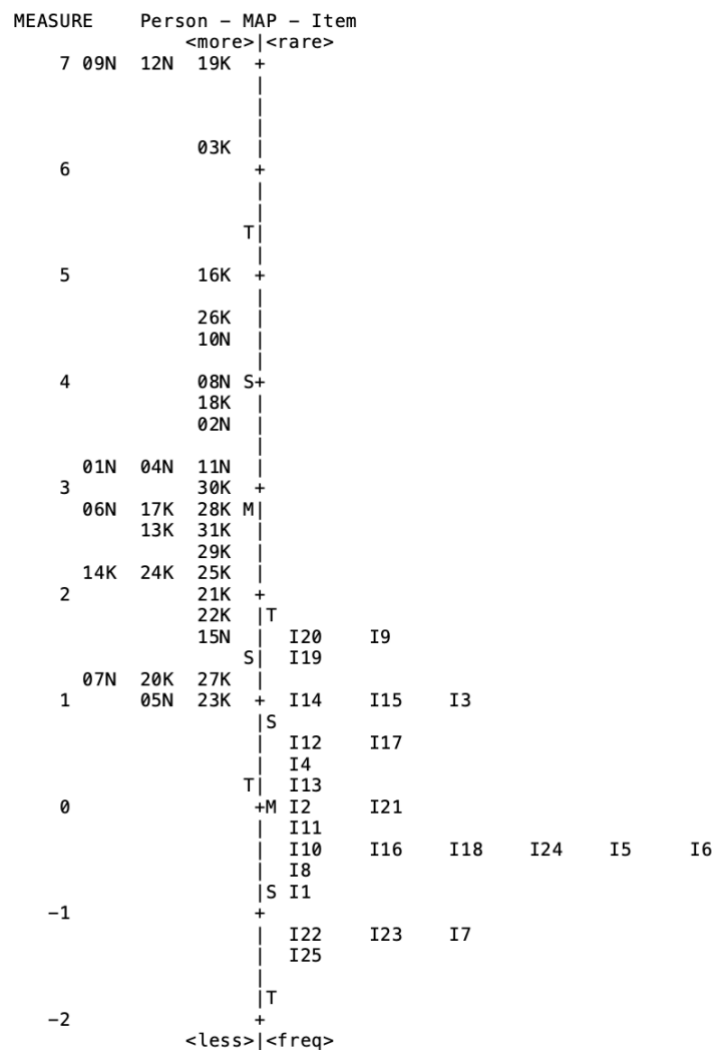
Table 2 described the quality of students as respondents and the questions. This quality was measured to ensure that the data curation of the students' responses toward the module was appropriately collected. Person measure was +3.22 logit which indicates that the students tended to agree with the question items. The person and item reliability were 0.84 and 0.77, respectively. These values mean that the person reliability showed high stability, while the reliability of each item of the questions was consistent enough. Additionally, the Alpha Cronbach value was more than 0.9. According to Linacre (2012), it showed positive interaction between person and item. Overall, the response and questions have high quality.

**Table 2**

The statistical evaluation summary of the response and questions.

	Measure logit (SD)	Separation	Reliability	Alpha Cronbach
Person	3.22	3.41	0.84	0.91
Item	0.00	2.8	0.77	

Figure 3 showed the distribution of the response and questionnaire item. The left panel is the distribution of response, whereas the right panel is the distribution of the questionnaire items. Questionnaire item number 20 (I20) and 9 (I9) were two questions with the most disagree commented by the students. Question I20 was about the design of the module. It meant that the design or the layout of the module should be improved. Question I9 asked about the individual ability of student to study by inquiry. It suggested that additional figures or illustrations should clearly serve the instructions and the explanations in the module. On the other hand, questionnaire item number 25 (I25) was the easiest to agree with by the students. Item I25 was about the value regarding the responsibility to protect the sustainability of local potencies and diversity. It meant one of the purposes of the module, which is introducing the local potency to the student was accomplished.



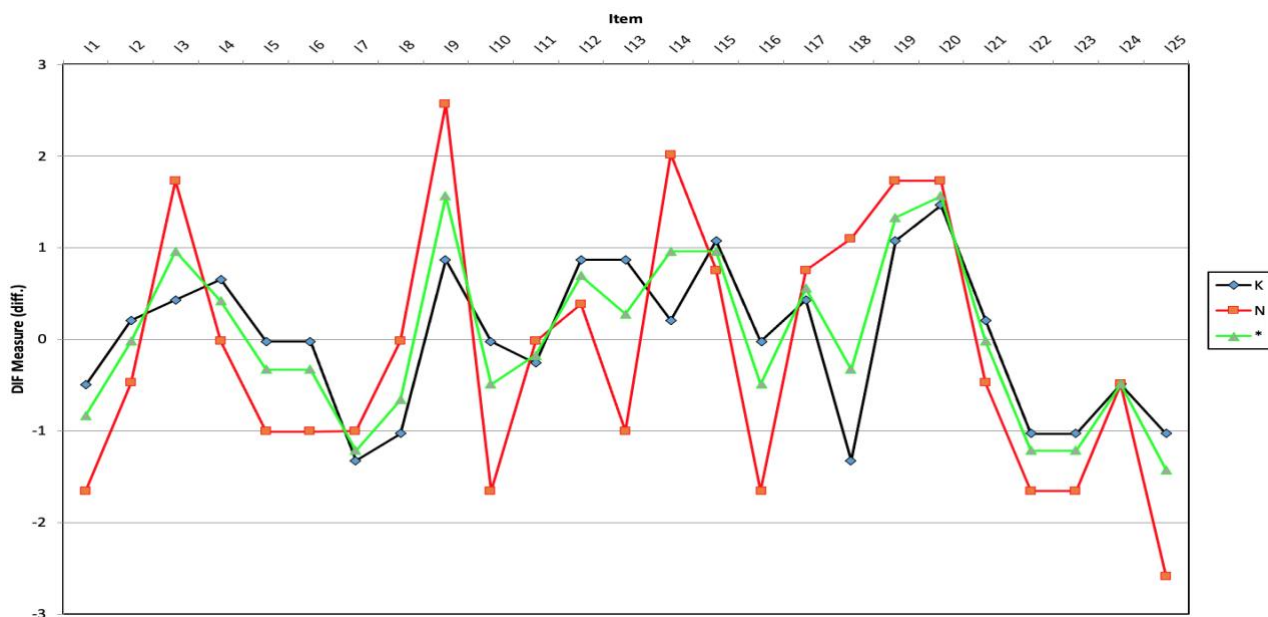
**Figure 3.** The variable map of the respondents and questionnaire item. (T) two standard deviations, (S) one standard deviation, (M) Mean, (K) Student from Kudus area, and (N) Student from non-Kudus area

Rasch analysis resulted in 34.3% of Raw variant value instead of 20% minimum value (Sumintono & Widhiarso, 2014). It indicated the appropriate measurement toward the students' evaluations regarding the module. Based on Table 3, the score of observing average increased from score 1 (strongly disagree) to score 4 (strongly agree). The ranges from smallest score were 0.33; 1.22; 1.97; 3.66. Thus, the rating scores were clearly understood by the response.

**Table 3**  
The summary of category structure.

Category Label Score	Observed average
1	0.33
2	1.22
3	1.97
4	3.66

Additionally, the response of the questionnaire consisted of two groups: Student from Kudus area (K) and Student from non-Kudus area (N). The result of Rasch Analysis showed the acceptance of students regarding the module both from K, and N. Figure 4 showed the items of I9, I13, I14, and I18 have higher positive differences than the normal curve. They were positively answered by K response, but not N response. These items were about the local potency of diversity in Kudus area. It is likely because N response are rarely being exposed or learned by the local potency of Kudus area. However, item I24, which was a question about the students' interest in local potency, was unbiased (there was no difference among K, N, and normal curve). Overall, the N response were unfamiliar with the local potency in the Kudus area, but they are interested. Also, a glossary of terms related to local potency in Kudus area is necessary.



**Figure 4.** Respondent Differential Item Functioning to detect the bias. (K) Student from Kudus area, (N) Student from non-Kudus area, and (\*) normal curve.

Based on the overall results, the students from the Kudus area and non-Kudus area positively responded to the module about local potency and diversity. The need for additional clear explanations and a glossary were identified. Improvements were carried out corresponding to the students' critics and suggestions. By reading the module, the student can accept and agree on protecting the local potency and diversity. This module is supposed to be an effective learning material to support education for sustainable diversity. Studying biodiversity in a contextual and constructivist way improved the students' understanding, attitudes, and skills about conservation (Ardoin, Bowers, & Gaillard, 2020).

### Local Biodiversity-Based Learning Module as the Effort for Conservation

The tourism potential in Muria can be turned out to be a risk to preserving Muria's biodiversity. Meeting the demand from tourists such as souvenirs in the form of parijoto, pakis haji, pakis urang, byar banana, and pomegranate are rising. Thus they must be exploited in more significant amounts. Increased market demand encourages the community to be more creative and innovative in finding solutions while still paying attention to the economic aspects of local communities and biodiversity conservation.

The ancient principle said, "what is on the right and left sides of Muria can be the source of living," which is still used by the local people today. Doing good things to nature by keeping it sustainable is the key. The enactment of this attitude is expressed in land management methods, which involved the rule of just taking what you need for and not being excessive. For example, parijoto will be collected only on order. In forest lumberjacking, the harvested trees must be replaced with similar plants. It is also considering the pattern of plant reproduction. If the



plant is still too young and has not produced seeds, it should not be taken or cut down. These conservation principles have been integrated into the module.

The local biodiversity-based module has several advantages. First, it incorporates the local potential and wisdom into the learning materials. Primack (2013) explained that the textbooks written on local conditions could contribute to biodiversity conservation efforts. One way to introduce biodiversity conservation is to use local content and languages. Students and researchers can learn the material while promoting the potential of the region.

Second, this learning module promotes biodiversity conservation with an ecosophy approach. It is an approach that combines intellectual, spiritual, and emotional dimensions in environmental preservation efforts (Alikodra, 2012). The ethical and moral principles of conservation must be raised early in the education process to solve environmental problems holistically. This inspired the students to analyze the problems cognitively and train their morality and affective to care for and protect the environment. Zulfah & Aznam (2018) also showed that the learning modules about the environment with a self-reflection journal could improve students' interpretation skills and environmental understanding.

Third, the module was organized according to the Indonesian-Curriculum, covering various competencies in spiritual attitudes, social attitudes, knowledge, and application of knowledge. These competencies can be developed using the biodiversity module by incorporating local potential and wisdom. Ordinance of the Ministry of National Education No. 37 the Year 2018 described the high school curriculum as a reference for developing curriculum structure at the national level and the development of local content at the regional level. This is supported by Zurqoni, Retnawati, Arlinwibowo, & Apino (2018) which showed that the use of scientific based learning within the learning process in the 2013 curriculum has an effect on improving student character.

Another advantage was that the module was produced employing the contextual and scientific approach. The contextualization was shown on the local potential and local wisdom in Muria Mountains Range, Kudus Regency, incorporated in this module. The photos used in the module were documentation taken from around the Muria Mountains. It contextualizes the learning process and promotes students' interest in learning it. Thus, students are expected to apply what they learn in the efforts to conserve local biodiversity.

## CONCLUSION

Local biodiversity is an asset that must be carefully preserved and utilized. The potential of local plant diversity and its conservation efforts can be used as a learning resource, one of which is the module. Local biodiversity and local wisdom of the Muria Mountains were utilized as a biology learning source in a module. This module has been composed to satisfy the criteria of a good learning module. Also, students responded positively to this module. The module based on the local biodiversity has many advantages, including providing knowledge of local biodiversity to students, becoming one of the conservation efforts, supporting national education goals, building the students' characters, and using contextual approaches that can motivate the students. It would be better if tested openly in large groups, as the effort of local biodiversity conservation by raising public awareness. It is recommended to develop similar modules as the efforts for natural conservation through education.

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## Appendix 1.

### Students' Responses Toward The Module Instrument

Code	Statement	Score			
		4	3	2	1
I1	The title is short, clear, and describes the module's content.				
I2	A preface provides the benefits to be obtained by studying the module.				
I3	The background attracted the interest of students to learn about biodiversity.				
I4	A brief description exposition briefly about what matters to be discussed in the module.				
I5	The concept map gives essential information on the relationship between topics, so it is easier to see the material as a whole. The map is served in each matter.				
I6	The module's guidance is clearly written so that I can study the module efficiently.				
I7	The materials are elaborated and described in detail, deep and easy to understand				
I8	The summary contains important matters and is easy to understand				
I9	I (student) understand the material in the module by doing learning activities using guided inquiry (learning by finding)				
I10	A glossary uses simple sentences to help students understand the materials.				
I11	The closing part of the module contains activities that can help the students to have better knowledge and application of biodiversity and conservation.				
I12	The sentence in the module is readable and easy to understand				
I13	Information in the module is easy to understand				
I14	Words and terms in the module are easy to understand				
I15	There are no noticeable errors in the module, such as typing, printing, or layout.				
I16	The module's fonts (color, type, and size) are appropriate and readable.				
I17	The layouts (sentence, picture, table, etc.) are appropriate.				
I18	The material contains attractive illustrations (table, image, and photos) and is easy to understand				
I19	The cover of the module is attractively designed.				
I20	The main content of the module is interestingly presented.				
I21	The module helps students to understand the complete knowledge of biodiversity and conservation in the Muria area.				
I22	Information on the module increases students' knowledge regarding the local potency and local wisdom of plant biodiversity.				
I23	I feel proud and grateful for Indonesia's potency by reading this module.				
I24	By reading this module, I am interested in exploring local biodiversity and conservation in Indonesia.				
I25	I consciously felt responsible for preserving the potential biodiversity and local wisdom.				