Need Analyzing: The Importance of Ethnobotany-Based Modules in Mount Muria to Empower High School Students' Science Process Skills on Plant Classification Materials

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Abstract. The diversity of plants in the surrounding environment needs to be studied by students through observation and practice of plant classification. However, learning process in school haven't optimal. The objectives of this study are (1) identifying the factors that cause plant classification practices to compile a cladogram not being trained in the learning process by high school teachers; (2) analyzing the opinions of teachers and students about the importance of developing a diversity module and classification of plants in Mount Muria. This research is a qualitative descriptive. Gollecting data through a survey using questionnaires and interviews with 31 teachers and 173 students of Senior High School in Kudus Regency Data were analyze descriptive qualitatively and quantitatively. The results showed that plant classification material is difficult to understand because of: 1) complex matter and scientific name (77,4 %), 2) the need for more scrutiny when observing plant features (69,4 %), and 3) least the literature and material classification of plants covered only in outline (38,7 %). Students also depend on method and model used by teacher. Teachers and students agree that the study's results on using various plants on Mount Muria by the surrounding community (ethnobotany) are used as material for developing plant diversity and classification modules. The main reasons are 1) knowledge is contextual and is local wisdom; 2) the material will be more interesting to students, and 3) improve students' understanding of plant diversity and classification.

Keywords: ethnobotany, science process skills, plant diversity and classification

1   Introduction

The diversity of plants in the environment around students is essential for students to learn. Students will learn the names of plants and the surrounding community. In addition, the practice of plant classification also needs to be studied by students. Through plant classification, teachers can empower students' science process skills. But the reality, high school teachers have not practiced the practice of plant classification. The

main reason the practice of plant classification has not been implemented in schools is the absence of teaching materials such as modules. Learning using modules is very useful for teachers in delivering material to students; students are more creative and independent and easily master competencies [1].

Modules are one of the media and learning resources arranged systematically, and the language is easy for students to understand. Students can study the module independently or with the guidance of the teacher. Modules can also find out the weaknesses and strengths of students in achieving the competencies [2]. Learning modules are teaching materials that are arranged systematically and interestingly that include material content, methods, and evaluations that can be used independently to achieve the expected competencies [3], [4]. Modules can improve students' science process skills [5], [6].

Science process skills consist of primary, essential, and integrated skills [7]. Students can use science process skills to study the scientific process in research while allowing them to play the role of scientists in a real way [8], [9]. If you look closely, the primary process of Science process skills is the scientific method, which is systematic steps to solve the problem until it finds the answer. Science process skills are the ability of students to apply the scientific method in understanding, developing, and discovering science. By using the module of plant classification practice, Science Process Skills will be empowered. Students ctivities will provide scientific method training to students [10]. However, many factors cause the practice of plant classification has not been trained to students.

The objectives of this study are (1) identifying the factors that cause plant classification practices to compile a cladogram not being trained in the learning process by high school teachers, and (2) analyzing the opinions of teachers and students about the importance of developing a diversity module and classification of plants in Mount Muria.

2   Research Method

This research is a descriptive qualitative and quantitative research. The techniques used in collecting qualitative data are exploration of various plants on Mount Muria that are used by the surrounding community, qualitative analysis of lesson plans and teaching materials used by Biology teachers of Senior High School in Kudus Regency, interviews with 4 teachers and the reasons for the teacher's answers in questioner. Quantitative data was collected by giving quesinare to the research population, all biology teachers and high school students in Kudus Regency. The total respondentsor sample were 31 teachers and 173 students.

This research is focused on the issue of the importance of ethnobotany-based modules in empowering students' science process skills on the subject of plant diversity and classification.The triangulation technique is carried out as a data checking technique which is carried out by: (1) comparing the data from the questionnaire with the results of the interview, (2) comparing a person's reasons for choosing answers to the ques-

tionnaire, (3) comparing the results of the questionnaire and interviews with the contents of the lesson plans and teaching materials. used by teachers. The data analysis technique used in this research is quantitative analysis with percentage of data and qualitative data with (1) data reduction, (2) data presentation, and (3) verification.

3   Result and Discussion

3.1   Factors causing the practice of classification of plants to compile a cladogram have not been trained in high school students

Based on the analysis of questionnaire data and interviews, perception of plant determination and classification aa follow.

Table 1. Perception about plant determination and classification material

Perception from	Difficult to understand	Easy to understand
Teacher	77,4 %	22,6 %
Student	70,5 %	29,5 %

   Table 1 show that most of of teachers stated that the material for determination and classification of plants was less interesting and difficult to understand. It is caused several factors, namely 1) complex material and scientific naming there is Latin, 2) the need for more carefulness when observing plant features, and 3) at least the literature and material classification of plants covers only in outline. In addition, 22.6% of teachers stated that plant classification materials phonetically and phylogenetically are easy to understand if teachers can be creative and apply learning methods appropriately. Some learning models used in plant classification materials include discovery-based, problem-based, project-based, and lectures. Teachers' understanding of the determination and classification of plants in the good category, but some obstacles occur when practicum determination and classification of plants with students which are caused by several factors such as limited mastery of teacher knowledge and skills and this makes students less interested in determination and plant classification materials. In contrast, the factor of students is the large number of scientific or Latin names that are rarely applied in life. Classification is a complex activity [11]. The difficulty that often occurs in the practice of plant classification is the large diversity of plant species and the high variability among species. Explain that practice for identifying and classifying of plants is difficult for students [12]. Plant classification have trained by teacher through some learning models as follow.
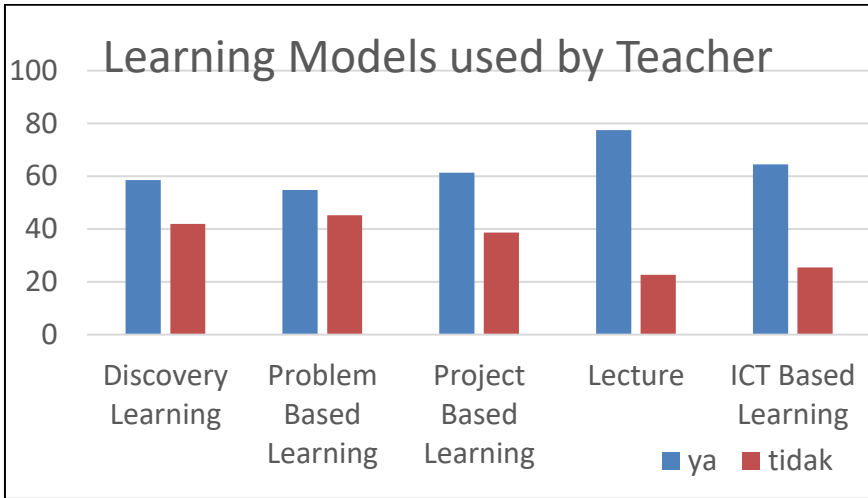
Fig. 1. Learning Model Used by Teacher in Plant Classification material

Based on figure 1, the most learning model used by teacher is lecture (77,4 %4. Teacher explain the material by power point or video. Students don't do practice how to identify and classify plants. The main reason is there is no modul or guide book about plant classification. The second model is project-based learning (61.3 %). Students will produce a product related to plant classification materials. The resulting product can be in the form of a plant preserve (herbarium) from several plants, this makes students interested when studying the material so that it becomes easy to understand. However, in this model, some teachers have not carried it out because it takes a lot of time. The third model is discovery-based learning (58.1%). The discovery-based learning model makes students' understanding easier, and there will be student activity in learning.. The forth model is problem-based learning models (54,8 %). Students will be more inter-ested in plant classification material by providing stimulus from the teacher in the form of related problems. We recommend that 45.2% of teachers state that the problem-based learning model is unsuitable because it requires a long duration. However, all of the models have not trained science process skills in plant classification. It is different with learning process of plant classification in the world. Applied the field trip strategies and discovery learning models to see the usage of science processing skills in students [12].

The application of standards for the ICT-based learning process to plant classifica-tion material of teachers in the Kudus district describe in table 2.

Table 2. Media used by teacher in plant determination and classification learning

Perception from	ICT-based learning process	Non ICT-based learning process
Teacher	77,4 %	22,6 %
Student	70,5 %	29,5 %

Based on table 2, teachers in Kudus Regency used ICT-based learning process in plant classification. It was such as the help of the internet network to access data, the use of google search engines, google meet applications, PlantNet applications and Plantlist in learning plant classification materials. In addition, some teachers are still experiencing difficulties in developing IT-based teaching materials and limited existing facilities. Learning tools that teachers use to identify plants using dichotomous identification keys. Classifying plants to compile a cladogram has not been trained by teachers in high school students because there is no teaching material such as modules. Practice guide Compiling the cladograms contained in the package book is insufficient. The media that teachers have used are biology package books, power points, and youtube videos.

Learning media used by teachers as follow:
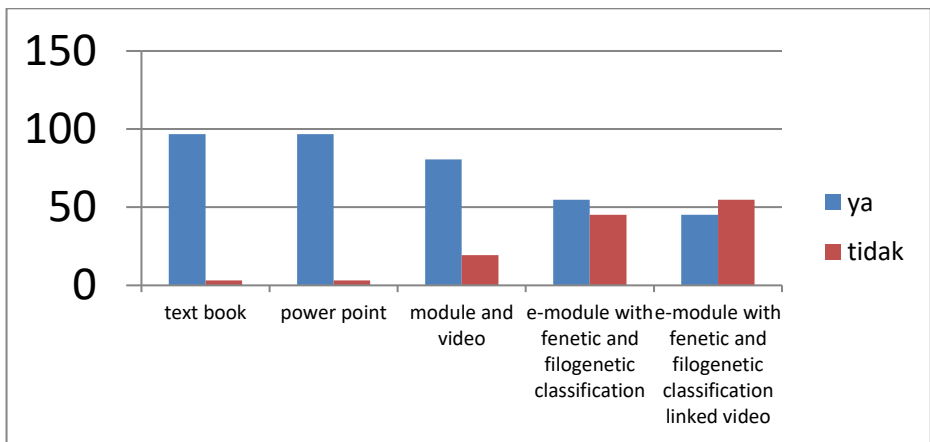
Fig. 2. Learning Model Used by Teacher in Plant Classification material

Based on figure 2, most of teachers used text book and power point for plant classification learning (96,8 %). It was related with the most learning process used by teachers. Most teachers explained how to determine and classify the plants by lecture (picture 1). Fewer teachers used module or video (80,6 %). Fewer teachers used e-module that explained plant classification practice phonetically and phylogenetically (54,8) and only 45.2 % teachers used e-module with video-linked explained plant classification practice phonetically and phylogenetically. There are 54.8% of teachers stated that the

use of e-books in learning only contains plant classification material without being accompanied by access to youtube videos or in the form of barcodes or links containing material coverage so that students can deepen the material further This data explain that learning media is needed for the practice of phonetic and phylogenetic plant classification such as module.. Module with plant classification practice is expected help teachers to empower science process skills of students. Therefore, module development needs to be done.

3.2 Opinions of teachers and students on the importance of developing modules on diversity and classification of plants on Mount Muria

Based on the questioner and interview with senior high school teachers and students in Kudus district, the data of teachers and students opinion about the importance of developing modules on diversity and classification of plants on Mount Muria as follow.

Table 3. Teachers and students opinion about the importance of developing modules on diversity and classification of plants on Mount Muria

Opinion	Teachers	Students
Teachers and students know that Mount Muria as learning resource for plant classification practice phonetically and phylogenetically	83,9 %	37 %
Local plants in Mount Muria used to explain plant classification practice phonetically and phylogenetically material	100 %	82,1 %
Local plants in Mount Muria (Parijoto, Talas, Pamelo, Loncor, etc.) will be more interesting for students in plant classification phonetically and phylogenetically study	96,8 %	85 %
Local plants in Mount Muria (Parijoto, Talas, Pamelo, Loncor, etc.) will support contextual learning interesting in plant classification phonetically and phylogenetically	100 %	84,4 %
Local plants in Mount Muria (Parijoto, Talas, Pamelo, Loncor, etc.) can be used as learning resource for plant classification practice phonetically and phylogenetically	9,7 %	20,8 %
Teachers or students go to Mount Muria for plant classification practice phonetically and phylogenetically	35,5 %	37 %
Teachers and students utilyze local plants in Mount Muria (Parijoto, Talas, Pamelo, Loncor, etc.) plant classification practice phonetically and phylogenetically	100 %	90,2 %
Module with local plants in Mount Muria (Parijoto, Talas, Pamelo, Loncor, etc.) can increase students' interest in learning of plant classification practice phonetically and phylogenetically	93,5 %	76,3 %
Module with local plants in Mount Muria (Parijoto, Talas, Pamelo, Loncor, etc.) can solve students' difficulties in learning plant classification practice phonetically and phylogenetically material	93,5 %	83,2 %

Based on table 3, most teachers (83.9%) and students (37 %) know that Mount Muria as learning resource for plant classification practice phonetically and phylogenetically. They know how to learn about the classification of plants in the Mount Muria Area located in the village of Colo, Dawe, Kudus Regency. The use of the Muria mountain area as teaching material is due to the abundance of plant diversity that can be interesting, including typical plants so that students know the richness of Muria's local flora,

with the variety of existing plants so that there is a need for classification to facilitate students' understanding. Contextual learning by utilizing the wisdom of local plants in the Mount Muria Area can be used in plant classification materials phonetically and phylogenetically. Following the response of all teachers who stated that using contextual learning combined with the Mount Muria Area will increase students' learning motivation by providing tangible examples as learning resources, bringing plants into the classroom, or inviting direct observation in the Muria mountain area. So that students can find out the diversity of typical plants in the Kudus district.

Increased motivation to learn makes it easy for students to understand plant classification materials, and students can develop a phenetic and phylogenetic search for plant kinship relationships. The common use of data as a source of information related to plant diversity in the Muria Mountain Area makes students less able to apply the relationship between plant biodiversity phonetically and phylogenetically.

The use of data or sources of information owned by local plants in the Mount Muria Area as a source of learning plant classification material by teachers is still low (35.5%) because teachers do not have the opportunity to explore information related to classification materials in the Mount Muria Area. Only a few teachers carried out the application of learning biology material for plant classification material phonetically and phylogenetically by taking biological diversity data from the Mount Muria Area as a new learning source.

All biology teachers agreed that the Muria Mountain Area could be used to explain concepts related to the phenetic and phylogenetic classification of plants. So that it makes students interested in learning when learning biology can be done by the concentration of local plants of Mount Muria by the people of Colo village.

4   Conclusion

Based on the results of research and discussion, it can be concluded that the main factor of plant classification practice to compile a cladogram has not been trained on students is the absence of teaching materials such as modules that are practical as a study guide. Teachers and students argue that developing a plant diversity and classification module based on plant ethnobotanical research in Mount Muria must be done immediately. The main reasons are 1) knowledge is contextual and is local wisdom; 2) the material will be more interesting to students, 3) improve students' understanding of plant classification and 4) empower students' science process skills by practice plant classification phonetically and phylogenetically

5   Recommendation

The results of this research show that a learning material such as module very needed for increase students' understanding and empower science process skills. However, the research to development module of plant classification phonetically and phylogenetically based on local plants in Mount Muria need to be done. Furthermore, the module

was tested for validity and effectiveness in empowering science process skills in high school students.

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