



Tersedia online di EDUSAINS
Website: <http://journal.uinjkt.ac.id/index.php/edusains>
EDUSAINS, 11 (2), 2019, 255-263



Research Artikel

**EFFORTS TO IMPROVE SCIENTIFIC ATTITUDE AND PRESERVATION OF
LOCAL CULTURE THROUGH ETHNOBIOLOGY-BASED BIOLOGICAL
PRACTICUM**

**UPAYA PENINGKATAN SIKAP ILMIAH DAN PELESTARIAN BUDAYA LOKAL MELALUI
PRAKTIKUM BIOLOGI BERBASIS ETNOBIOLOGI**

Siti Sunariyati, Suatma, Yula Miranda

Universitas Palangka Raya
sunariyati1516@fkip.upr.ac.id

Abstrak

Potensi lokal yang ada di sekitar sekolah pada umumnya belum banyak dimanfaatkan secara maksimal sebagai sumber belajar biologi, oleh sebab itu perlu dikembangkan praktikum biologi berbasis etnobiologi sebagai upaya pelestarian budaya lokal. Tujuan penelitian ini adalah 1) mengkaji pengetahuan Etnobiologi dan meningkatkan sikap ilmiah peserta didik SMA melalui praktikum biologi. 2) mengintegrasikan budaya lokal masyarakat suku Dayak Ngaju di wilayah Kabupaten Gunung Mas pada materi pelajaran biologi. Tahap pertama merupakan penelitian deskriptif kualitatif, pada tahap ini dilakukan pengkajian potensi lokal berbasis etnobiologi meliputi sumber daya alam hewan, tumbuhan dan potensi lokal lainnya, yang dimanfaatkan masyarakat. Tahap kedua dilaksanakan praktikum biologi berbasis etnobiologi pada peserta didik kelas X di tiga SMA wilayah Kabupaten Gunung Mas dengan menggunakan angket respons peserta didik terhadap pelaksanaan praktikum. Hasil penelitian menunjukkan terdapat peningkatan sikap ilmiah setelah mendapatkan pembelajaran biologi berbasis etnobiologi dibanding kelompok kontrol dengan rata-rata skor sebesar 0,47 (kriteria sedang). Budaya lokal perlu didokumentasikan dan diajarkan kepada generasi berikutnya untuk menghindari kehilangan budaya lokal di wilayah setempat.

Kata Kunci: *Etnobiologi; Sikap ilmiah; Budaya lokal*

Abstract

Local potentials that exist around the school, in general, have not been maximally utilized as a source of biology learning. Therefore, it needs to be developed learning biology-based on ethnobiology efforts of preservation of local culture. The purpose of this research is 1) to study the knowledge of ethnobiology and to improve the scientific attitude of the learner of high school students through biology practicum. 2) integrate the local culture of the Dayak Ngaju tribe community in the Gunung Mas District area in biology subject matter. The first stage is qualitative descriptive research. At this stage conducted an assessment of local potency based on ethnobiology covering natural animal resources, plants, and other local potencies, which is utilized by society. The second stage is practicum based on ethnobiology biology of class X students in three high schools in Gunung Mas District by using the questionnaire of students' responses to the practicum implementation. The results showed that there was an increase in scientific attitude after obtaining biology learning based on ethnobiology- compared to the control group with an average score of 0.47 (medium criterion). Local culture needs to be documented and taught to the next generation to avoid losing local culture in the local area.

Keywords: Ethnobiology; Scientific attitude; Local culture

Permalink/DOI: <http://doi.org/10.15408/es.v11i2.13622>

INTRODUCTION

Along with the rapid development of information and communication technology in the era of globalization, the dissemination of information can be accessed easily and quickly throughout the world and consequently facilitate the entry of foreign cultural values into developing countries, including Indonesia. The existence of cultural differences can be a threat to the preservation of local cultural values. Individualistic attitudes that emerge in the era of globalization are mistakes in responding to globalization and can result in the disappearance of local culture. The waning of local culture indicates this in the young generation and the tendency of the next generation to follow cultures from outside (Sufia *et al.*, 2016).

Culture is a component that is very meaningful for a nation because the culture is the glue of the nation and is a characteristic of a country. With the existence of culture, a country can be distinguished from other countries because each country has a different culture. The role of culture is critical, it is necessary to preserve cultural values in the community so that the culture is not extinct. If seen from the reality, there are a lot of young people who do not care about their culture, For this reason, there needs to be socialization and attention from the government as well as public awareness, especially the Indonesian people, to preserve local cultural values in their respective regions.

Indonesia has a variety of ethnic, cultural, and diverse flora, fauna, and ecosystems that need to be preserved. Traditional knowledge possessed by each tribe or ethnicity is passed down from generation to generation, including the use of plants as traditional medicine (Arum *et al.*, 2014). One of the preservation of local cultural values can be done by integrating the local knowledge of the community, primarily indigenous people in each region of Indonesia through education, namely through learning biology.

Biology is one of the principal branches of science in human life. Biology can be found in almost every area of life. However, there are still those who think that biology is not essential, so

students do not have the motivation to study biology seriously. Biology courses aim to provide knowledge, skills and behaviors and activities of students outside of school so that students have insight broad about the state of the environment and the needs of the community under the values / rules that apply in their area and preserve and develop the noble values of local culture.

Education in the global era also seeks to encompass aspects of attitudes that are an urgency in the dynamics of education today. So that learning is needed to build a nuance that allows the development of students' attitude dimensions. The attitude applied in learning biology can be done by giving examples of activities, learning attitudes in learning biology cannot be done by being taught to students directly but through the practicum. Scientific attitudes and love of the environment can be formed through learning that links the object of learning with the meaning of life. So that slowly, the right attitude can emerge in the students.

The introduction of environmental, social, and cultural conditions to students enables them to be more familiar with their environment. The introduction and development of the environment through education is directed at supporting the improvement of the quality of human resources and ultimately directed at increasing the ability of students to understand the local cultural environment. The significance of studying plants, animals, and their environment in their interests for human welfare, can be explained that plants and animals as food, fuel, medicine, as building construction materials, craft making, culture, and many other products in an area can be utilized to the maximum.

One of the 2013 curriculum requirements applied by the government is to emphasize learning that prioritizes the intellectual experience of students in order to obtain meaningful learning. The 2013 curriculum orientation including making use of the environment as a source of learning and involving the community in educational activities must be realized in concrete actions (Mulyasa, 2013)

The phenomenon of practicum implementation also shows that what students do becomes less meaningful, one of the causes is that the practicum instructions have not been well designed, so the results of the practicum are not following the expected concepts and principles. This condition gave rise to thoughts to develop practicum guides that refer to local potential based on ethnoecology, as a source of learning biology that is always available in the student environment. The implementation of biological practicum does not have to be done in a laboratory, but can also be carried out in the surrounding environment. As stated, Rustaman (2009) that in biology practicum activities in general, students are required to make notes of the observed objects.

Biology learning innovations can be implemented using a meaningful model that integrates the scientific approach by integrating local knowledge of the community in the learning process through biology-based ethnobiology. Ethnobiology is the study of biological knowledge from certain ethnic/cultural groups about plants and animals and the relationships between them (Anderson, 2011). Ethnobiology is a scientific study of the dynamics of the relationship between society, biota, and the environment, which is multidisciplinary, which combines social and biological science approaches. Ethnobiology aims to investigate the knowledge of biology and the environment based on culture. Ethnobiology-based biology phenomena that are practiced aside from increasing understanding of concepts also educate scientific attitudes. Through this strategy, students are expected to learn comprehensively, the content (content) of the lesson, methods, as well as attitudes that can be controllers and filters. Because basically, students learn biology based on natural phenomena as a model that can show positive and negative behavior.

The implementation of ethnobiology learning is limited in three branches of science. They are ethnobotany that studies the knowledge of local communities about plants. Ethnozoology examines the knowledge of local communities about the use of animals around them, and ethnoecology examines the knowledge of local communities in

understanding the ecosystem around their homes. Many aspects of ethnobiology can be related to several aspects of biology learning based on local environmental conditions. Biology subject aims to provide knowledge, skills, and behavior and activities of students outside of school so that students have a solid insight into the state of the environment and community needs under the values / rules that apply in their area and preserve and develop values sublime local culture.

Ethnobiology-based biology learning is one alternative learning option oriented to the potential of the local area. Therefore students from elementary to high school level need to be equipped with ethnobiology knowledge in order to foster awareness and preserve local culture. As stated by Kraipeerapun and Thongthew (2007) that by developing learning based on the wealth of knowledge of local communities some advantages can be taken from local resources, which can help students to develop their understanding of the content and nature of knowledge based on government science standards and learning by contextual. In connection with local problems, efforts need to be made to increase students' awareness of the environment. One of them is through ethnobiology-based biology learning.

METHOD

Research activities carried out from January to July 2018, which consists of two stages. The first stage was a qualitative descriptive study. At this stage, an analysis of the needs of the biological practicum was carried out at 3 (three) Senior High Schools (SMA) in Gunung Mas Regency, namely SMAN 1 Sepang, SMAN 1 Kurun, and SMAN 1 Tewah. The second stage is to study ethnobiology-based local potential in the area that utilizes natural resources of animals, plants, and other local potentials, which are related to ecosystems in the local area. To explore information on local potential based on ethnobiology in the research area, the community in Gunung Mas Regency utilizes the identification and grouping of plants, animals, and other natural resources, then used as a basis for developing practicum development

products. Data collection on plant and animal species used by the Ngaju Dayak tribe in Gunung Mas district, using a questionnaire and structured interview techniques with informants. From the results of the explanation and explanation obtained, then tabulated and concluded. Data analysis is carried out by organizing data and systematically compiling data obtained from questionnaires and interviews, documentation, and field notes. Then the data were analyzed descriptively using percentages.

RESULT AND DISCUSSION

Results of Needs Analysis in Regional High School District Gunung Mas

The results of a questionnaire analysis filled out by 30 students in Sepang, Kurun, and Tewah High Schools observed in this study. It is included the students' knowledge about ethnobiology and the students' interest in learning ethnobiology. It showed that: 1) 80% of respondents (students) had not known the term ethnobiology. 2) 60% of students do not know the types of plants, animals, and the environment that are used by residents. 3) the majority of students (60%) stated that they obtained knowledge about plants and animals that were used from parents, while 30% stated that they obtained knowledge from teachers and 10% from the internet. 4) students are never invited to learn about the environment outside the classroom and are less introduced to learn various types of plants, animals that are used by the community. 5) constraints of practicum activities in schools, among others, limited facilities and infrastructure of practicum, limited classrooms, so that science laboratories are used for other activities, and there are no practical guide books supporting biology subjects. An overview of ethnobiology learning needs in the study area can be seen in (Figures 1 and 2).

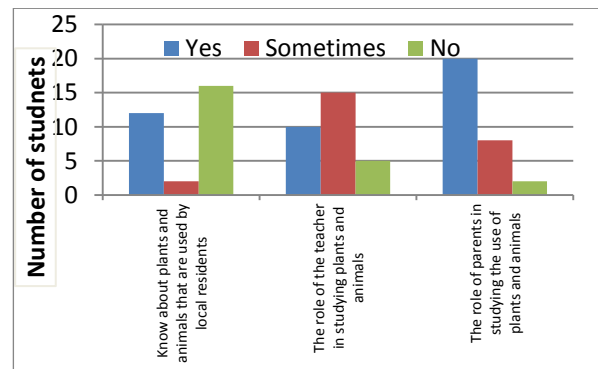


Figure 1. Learners' knowledge about plants that are used by the Population

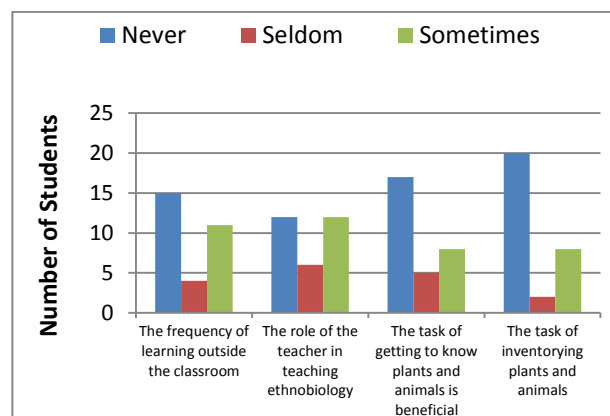


Figure 2. Student's Statement on Ethnobotany Learning

Based on the findings of learning problems in high schools in the study area, 50% of students stated that they had never been invited by a teacher to study in the environment (outside the classroom), and 60% of students stated that the teacher had never given an assignment to recognize and inventory the plants and animals in around. This results in a lack of insight into the knowledge and critical attitudes of students towards their environment. The introduction of the environment is essential to do, following the demands of the 2013 curriculum, environmental empowerment is a learning approach that seeks to increase the involvement of students through empowerment as a learning resource. Learning through the Project-Based Learning model by observing and doing directly in the surrounding environment can improve the competence and understanding of scientific concepts and attitudes of students (Wijayanto *et al.*, 2017). So students can ask something they want to know to others in their

environment who are considered competent about the problem at hand.

According to Magnani (2016), the revitalization of traditional skills and knowledge about the use of local plants shows the opportunity to obtain useful plant data and its environment, thereby encouraging direct involvement of children in understanding their environment. In all laboratory-based activities, students are trained to plan and carry out investigations, engage in arguments from evidence, analyze, and interpret data. Understanding the concept of biology is a fundamental ability that must be mastered by students in learning biology.

Ethnobiology-based learning primarily draws closer and integrates students with their environment, so that love, care, and responsibility towards the environment are embedded. It is essential to equip students with various life skills and skills to develop themselves optimally and maintain local culture. Learning approaches developed using environmental and collaborative approaches are expected to facilitate and foster students' social competencies and skills. The long-standing local knowledge of the community needs to be continued by future generations, and the learning is packaged in the form of science called ethnobiology.

The results of the questionnaire analysis distributed to teachers teaching in class X of SMAN-1 Sepang, Kurun and Tewah, and supported by the results of structured interviews, showed the following characteristics: 1) the average teacher already had a Strata 1 (S1) education qualification, so has met the minimum requirements as determined by the government. 2) Teachers' knowledge of ethnobiology, most teachers do not yet know the term ethnobiology and have not received ethnobiology knowledge while undergoing lectures or while teaching in high school. 3) During the learning process, students are never invited to study outside the classroom to get to know the surrounding environment. 4) Teachers very rarely give practicum or project assignments to students. 5) Teachers tend to dominate the class when delivering learning material, so students have minimal opportunity to participate during the

learning process. 6) The teacher rarely introduces the names of surrounding plants and animal species that are used by residents, due to limited learning time to complete the target material in the textbook. Most teachers do not mind if ethnobiology is added to biology in high school. Teachers, as learning facilitators, can choose the environment to determine the right way to utilize in learning. One example of participation in community activities directly can foster motivation and learning experiences in life real.

Results of Ethnobiology-Based Biology Practicum Towards Scientific Attitudes

The results of the experimental group's scientific attitude questionnaire showed an increase in scientific attitude compared to the control group. The scientific attitude which is measured in scientific attitude includes five aspects, which are curious attitude, honest attitude, open-minded attitude, respectful attitude towards data, and perseverance attitude. Data on the measurement of scientific attitudes of students can be seen in (Table 1).

Table 1. Average score of scientific attitudes of grade X students in Kurun SMAN-1, SMAN-1 Tewah and SMAN-1 Sepang

School	Initial Score	Final Score	N-gain	Criteria
SMAN-1 Kurun	66,50	79,84	0.45	Medium
SMAN-1 Tewah	62,03	81,09	0,48	Medium
SMAN-1 Sepang	61,19	81,23	0,50	Medium
Rerata			0,47	Medium

Based on data from the scientific attitude questionnaire results, most students showed an increase in scientific attitudes after carrying out a biology-based ethnobiology practicum. Through the N-gain analysis test for SMAN-1 Period of 0.45, for SMAN-1, the N-Gain score is 0.48 for the Sepan SMAN-1 score of N-Gain 0.50 with an average N-Gain score of 3 high schools of 0.47 which shows that there is an increase in scientific attitude with moderate criteria.

Based on the analysis of scientific attitudes, it is seen that there is an increase in the scientific attitude of students after being given an ethnobiology-based biology practicum. Improved scientific attitudes of students in carrying out the practicum can occur because the practicum involves many senses that play a role. That not only listening but some other senses play, for example, such as limb movements to write activities, eyes to see, ears to listen and skin to feel increased attitude so Ethnobiology-based ethnobiology practicum can improve the scientific attitude of students compared to without practicum.

The results showed that ethnobiology-based biology practicum was successful in encouraging students' scientific attitudes. Ethnobiology-based biology practicum activities can improve students' scientific attitudes. This happens because this practicum activity covers five aspects of scientific attitudes, namely curiosity, honest attitude, open-mindedness, respect for data, and perseverance. Students look thrilled and enthusiastic when carrying out practical activities in the field because of these activities. They gain exciting and enjoyable learning experiences so that they look more active and able to work together when doing a practicum. One example of students' scientific attitudes when observing in the field is the aspect of students' curious attitude seen through the involvement of students in preparing observation activities, listening to researchers' explanations about the activities carried out, being actively involved in observing activities, and gathering evidence about the object of observation. Practical activities will give meaning if the activities are well planned, giving the opportunity to choose alternative procedures, design experiments, collect data, and interpret the data obtained.

According to Hunaepi (2016), the scientific attitude of students can emerge through interactive activities based on local knowledge so that it can foster flexibility and foster student interest in learning. Observation activities carried out in the environment around the school will add to the learning experience and can influence the scientific attitudes of students. Activities of students actively in the steps of observation activities, help develop

scientific attitudes in students. The attitude of students will be more positive or negative, depending on the object being observed. It is according to their views about the benefits or the object for themselves. It was further stated that the scientific attitude scale is expressed in the form of a statement to assess the respondent through a specific range of values. One of the attitude scales used is the Likert scale.

Observation is a process of obtaining information about an object using sensory devices. The more senses are used, the more complete and comprehensive information that can be collected about the object being observed. The learning process that occurs during the course of practicum activities can improve students' scientific attitudes. Ethnobiology based practicum activities can arouse students' learning motivation, so students tend to be more active and focused during the activity. When discussing answering the questions contained in the practicum guide, students can work together in-group members and are required to prove for themselves the truth of a theory. Following the results of Sunariyati *et al* research (2017), learning biology can not only be done in the classroom. The hallmark of learning biology is the existence of practicum activities both in the laboratory and outside the laboratory (in the surrounding natural environment). Many biological concepts are complicated, so we need an activity to facilitate students in understanding the concept. For example, knowing various types of animals, plants, and the environment in the surrounding environment can increase curiosity and arouse interest in learning. Practicum activities are very suitable to facilitate students' learning through direct experience. Practicum provides an opportunity for students to get a picture in a real situation about what is obtained in theory, and sensory contact occurs. Besides, in practicum activities, students do not just observe directly but must appreciate, be directly involved in the actions, and take responsibility for the results. Through ethnobiology-based practical activities, students will gain research experience that can encourage them to construct their knowledge, think scientifically and rationally.

Development of Ethnobiology-Based Biology Practicum

The concept of ethnobiology development is inspired by a variety of potentials, namely natural and non-biological natural resources (SDA) potential, geographical, cultural, and historical, in an area. Biology material in high school, which has been carried out in the Gunung Mas district area, local potential in schools has not been utilized to the fullest. Therefore it should be introduced to students that in the environment around their schools, there is also biological material that must be observed.

The introduction of environmental, social, and cultural conditions to students enables students to become more familiar with their environment. The introduction and development of the environment through education is directed at supporting the improvement of the quality of human resources and ultimately directed at improving the ability of students. Learning biology will be natural for students to understand if supported by direct observation of real objects. Therefore there is a need for practicum activities related to biological material that can be observed in daily life. School, as a place for educational programs, is part of the community, which is also a miniature of the community. Therefore, educational programs in schools need to provide broad insights to students about the specificities that exist in their environment.

Based on the analysis of the needs and findings of learning problems, according to the demands of the curriculum in developing regional potential, ethnobiology-based biology practicums need to be developed for the enrichment of more contextual biological material. Learning approaches are developed using constructivism and collaborative approaches, with the hope that this learning can facilitate and foster an understanding of scientific concepts and attitudes of students. Long-standing local community knowledge needs to be continued by future generations to preserve local culture.

The life of the Dayak Ngaju people who are very close to natural resources and the environment

has a role in the knowledge of the use of plants, animals, and the environment. Human interaction with plants is an experience of traditional knowledge that has been passed down from the ancestor to the next generation. So, directly, the local knowledge that is owned by the community is an ethnobiological knowledge. Ethnobiology learning is one of the efforts to integrate local people's knowledge and wisdom with curriculum demands. The role of the community in recognizing forests is something that needs to be preserved. It is including the ability to recognize the names of almost every tree encountered. School is a place to develop students' knowledge and skills, through ethnobiology learning the knowledge and skills of students can be improved, and contribute to improving education in rural areas. This is in line with the thought of Bennett (2005) stated that more attention is needed on ethnobiology today, compared to the past in scientific disciplines, Ethnobiology needs to be integrated with related disciplines or other programs. Ethnobiology is an intermediary for conservation biology, natural resource management, and environmental education.

Based on the results of research, learning biology in secondary schools has not provided the value of useful local knowledge. Students no longer know much useful information. If this information has not been documented, local knowledge will quickly disappear. As one of the critical intermediaries in maintaining local knowledge through the integration of ethnobiology material into biology learning material, it was also stated by Kraipeerapun and Thongthew (2007) that in developing the material it should be included necessary information obtained from the needs of rural communities about (1) the use of plants in ethnobotany studies, (2) the principles of sustainable natural resource management, (3) rural philosophy for education and (4) constructivist theory in learning biology.

Integration of Ethnobiology in High School Biology

Ethnobiology learning in high school can be started early, starting from the tenth grade to the twelfth grade and adjusted to the intellectual

development of students. The introduction of culture early on means exploring indigenous knowledge or local wisdom that enables lifelong learning in the community. Thus the teacher acts as a mediator and facilitator of learning, and students can learn from the environment actively. Ethnobiology learning, not only train students to learn in the environment, but can also strengthen the moral values and local culture of the community. Ethnobiology learning is designed through an environmental approach, making it possible to be integrated into biology subjects in high school.

The relationship between concepts can be explained based on stable traits such for example from the aspect of ethnobotany that can be studied in coconut plants (*Cocos nucifera*). All parts can be utilized in everyday life. From these examples, the concept categories in the botanical field can be explained through the parts of the coconut plant organs in the form of roots, stems, leaves, flowers, fruits, and seeds, related to their use with other scientific disciplines, for example in terms of socio-economic, socio-cultural and health. The concept of growth and development, in terms of biology starting from the beginning of the growth of seeds, can also be observed as the habitat/place of life that is typical of coconut plants can be associated with geography and ecology. In agriculture, it can be related to the way of cultivating coconut plants. In biological biology, students can be trained to classify and observe the morphology of coconut plants from the roots, stems, leaves, flowers, fruits, and seeds, all of which can be utilized by the community to meet their daily needs. The existence of material that connects concepts based on the experiences of students, the learning becomes meaningful.

Likewise, for the use of animals, in terms of ethnozoology, some animals have various benefits. For example, earthworms (*Lumbricus Terrestris*), which are invertebrate animals, have many benefits when viewed from several aspects. Among them in agriculture is used as soil fertilizers. Earthworms are also used for fishing bait. In the health sector, it is useful for typhus. This is ethnozoological material that can be included in biology lab guides.

Ethnobiology-based biology learning processes tend to emphasize the provision of direct experience to develop competencies and foster thinking skills. Through scientific thinking, patterns will foster scientific attitudes. The formation of scientific attitudes, as demonstrated by science scientists, can be developed through science process skills, so that science process skills can be used as a measurement tool to determine students' abilities in terms of observing, grouping and inferencing. These three things can be achieved if there is an attitude of mutual cooperation, responsibility, and conscientiousness during the learning process. This component is a scientific attitude that must be developed to students.

Ethnobiology-based biology learning does not always have to be by reading, writing, remembering, and not just interacting and communicating among fellow students of the material that has been given by the teacher to students. Biology learning can create direct interactions between students, and the object of learning learned the environment. The environment is a unity of space and with all objects and conditions of living things, including humans and their behavior and other living things. The environment with its problem aspect is one example of learning biology resources that can be used to support learning biology in schools. The environment has a vital role as a source of learning, especially in the material ecosystem. This learning environment resource will further enrich the students' insights and knowledge because they are not limited to learning in the classroom. Besides, the truth is more accurate because students can experience it directly and optimize the potential of the five senses to communicate with their environment.

CONCLUSION

The results showed that ethnobiology-based biology practicum was successful in encouraging students' scientific attitudes. Scientific attitudes of students can emerge through interactive activities based on local knowledge, to foster flexibility, and foster students' learning interest. Also, through

ethnobiology-based biology labs can help preserve local culture, as a relay bridge for the local knowledge of the community to the next generation.

REFERENCES

- Anderson E. N. 2011. *Ethnobiology: Overview of a Growing Field*, Department of Anthropology, University of California, Riverside, CA2011 by Wiley-Blackwell. All rights reserved, Published by John Wiley & Sons, Inc., Hoboken, New Jersey, Published simultaneously in Canada.
- Arum, G.P.F., Retnoningsih, A., & Irsadi, A. 2012. *Etnobotani Tumbuhan Obat Masyarakat Desa Kaseneng Kecamatan Sumowuno Kabupaten Semarang Jawa Tengah*.
- Bennett, B.C. 2005. *Ethnobotany Education, Opportunities, and Needs In The U.S Department of Biological Sciences*, Florida International University, Miami, FL 33199 USA.
- Hunaepi. 2016. Assessment of higher Order Thinking Skills. *Prosiding Seminar Nasional Pusat Kajian Pendidikan Sains dan Matematika Tahun 2016*. Mataram 12 Maret 2016.
- Kraipeerapun, K & Thongthaw. S. 2007. The development of ethnobotany curriculum for students in rural schools: An approach that incorporates the needs and insights of lokal communities. *International Education Journal*, 8(1)64-70.
- Magnani, N. 2016. Reconstructing Food Ways: Role of Skolt Sami Cultural Revitalization Programs in Local Plant Use. *Journal of Ethnobiology*, Volume 36 Published by: Society of Ethnobiology.
- Mulyasa, E. 2013. *Pengembangan dan Implementasi Kurikulum 2013*. Bandung. Remaja Rosdakarya.
- Sufia, R., Sumarmi., & Amirudin, A. 2016. Kearifan Lokal Dalam Melestarikan Lingkungan Hidup (Studi Kasus Masyarakat Adat Desa Kemiren Kecamatan Glagah Kabupaten Banyuwangi). *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan Universitas Negeri Malang*, 1 (4): 726-731.
- Sunariyati, S., Suatma., & Miranda. Y. 2017. Pengembangan Praktikum Biologi di Sekolah Menengah Berbasis Etnobiologi. *Proceeding Biology Education*, 14 (1).
- Wijayanto, H., Utomo.S.B., & Haryono. 2017. Upaya Peningkatan Sikap Ilmiah dan Prestasi Belajar Siswa melalui Penerapan Project Based Learning Dilengkapi Media Webquestpada Pembelajaran Kimia materi Sistem Koloid Kelas XI IPA 2 SMAN Gondang Rejo 2015/2016. *Jurnal pendidikan Kimia (JPK)*, 6 (1) : 39 – 45.