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Integration of Local Potential of Way Kambas National Park in Developing HOTS-Based Assessment Content in Biological Conservation Courses

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Abstract: The assessment of Higher Order Thinking Skills (HOTS) based on local potential has not been widely used in biological conservation education. Assessments like this aim to encourage students to think critically, analytically, and creatively, as well as familiarize students with solving problems in real contexts, especially in the conservation area of Way Kambas National Park (WKNP) in Lampung. This study aims to identify the local potential of WKNP conservation areas that have the potential to be integrated with the development of HOTS-based assessments in the Biological Conservation Course. The method used in this study is descriptive with a qualitative approach. Interviews were conducted with 6 informants. Triangulation techniques and data interpretation then analyzed the data obtained. The results of this study show that there is a lot of local potential in WKNP conservation area that has the potential to be integrated into the assessment content on 7 biological conservation materials that can be made HOTS-based assessments to hone students' high-level thinking skills.

Keywords: Assessment; Biological conservation; HOTS; Local potential; Way Kambas National Park

Introduction

Local potential is the potential of an area which includes the potential of natural resources, human resources, and geographical, cultural, and historical (Anisa, 2017). Local potential can be in the form of natural resources, culture, nature conservation, and others. Students can study biology in an engaging and accessible way by utilizing their local potential (Ajmi et al., 2024; Prawati et al., 2024; Febriyanda et al., 2022). Conservation areas can be one example of local potential that can be raised in learning. Conservation areas are valuable assets in maintaining biodiversity, ecosystem balance, and environmental sustainability.

Way Kambas National Park (WKNP) is one of the conservation areas that is quite famous outside the Lampung area. WKNP has a wealth of flora and fauna that is well maintained (Widowati & Agustin, 2015). In addition to being famous for its high biodiversity, WKNP is also known as a sanctuary for endangered Sumatran elephants and Sumatran tigers. In addition, there are also various types of flora and other endemic fauna. The local potential of WKNP has been widely used as a source of learning but has not been integrated into the form of assessment.

Higher Order Thinking Skills (HOTS) is the highest level of thinking at the cognitive level that allows students to process information effectively and efficiently. One way that can be done to train HOTS in students is by providing assessments of the type of reasoning used in the learning process. HOTS plays an important role in improving the effectiveness of the learning process and academic performance in higher

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education (Purwanti, 2020). HOTS indicators include critical thinking and creative thinking (Fatimah & Pahlevi, 2020). Critical thinking in education is a competency that will be achieved as well as a tool needed in constructing knowledge contained in 21st-century learning that has an impact on learning achievement, especially for students (Firdaus & Wilujeng, 2018; Laksono et al., 2023; Azhar et al., 2024; Ulfa et al., 2024). Besides that, as students' creative, rational, and logical thinking skills develop, students will be more courageous in expressing their opinions and creative ideas in the learning process (Khairani & Prodjosantoso, 2024; Suharti et al., 2024; Wansaubun, 2020). Higher-order thinking skills are very important to develop, as are students' student profiles (Manurung et al., 2024).

Assessment is the process of gathering information about student learning achievement (Mardhiyana & Jailani, 2017). Assessment can support lecturers in determining learning difficulties that arise in students. The contextual-oriented assessment developed to improve students' mathematical literacy and numeracy in this study is categorized as valid, practical, effective, and reliable (Jamil & Khusna, 2021).

Content related to the local potential of the Lampung WKNP conservation area identified by the researcher to be integrated into the focus of discussion in the HOTS assessment in the form of this test can help in developing a contextual-oriented assessment. Assessments like this can help familiarize students to think about solutions to solve real problems around them. Incorporating local potential into conservation biology learning will greatly help the process of students' awareness of the importance of nature conservation, and can clarify customary rules and rules about the relationship between humans and their natural environment (Irrubai & Subki, 2024; Apriana et al., 2020).

Previously, research has been carried out related to the development of question instruments based on local wisdom, such as the development of science literacy test instruments based on local wisdom in Trenggalek that can train students in improving science literacy skills (Murti & Sunarti, 2021). The development of science literacy test instruments based on local wisdom is also carried out in Lamongan Regency with the same expectations (Murti & Sunarti, 2022). In addition, the Higher Order Thinking Skills test instrument has also been developed with real-world problems based on Ngada local wisdom in junior high school science subjects in grade VII which is expected to develop HOTS in students (Ule et al., 2021). Research on the development of a local wisdom-based test instrument Kesenianku Rampak Bedug has also been conducted to train the science literacy skills of grade VIII junior high school students (Cahyahatini et al., 2023). Previous researchers have also developed critical and creative thinking questions based on the wisdom and local potential of Lombok Island in high school biology material (Muchsin, 2023).

Several previous studies also applied local potential content in learning. The ethnoscience-based mangrove module developed by Yuliarta et al. (2024) is effective in improving critical thinking skills. Previous researchers also developed problem-based learning student worksheets integrated with ethnoscience on acid-base material. This worksheet helps students understand and increases knowledge about ethnoscience in their area in accordance with acid-base. Students are interested in the learning process because they are provided with a tradition in their area (Marthin et al., 2024).

In addition, quite some previous researchers have conducted research related to higher-order thinking skills, but not many have done it on students. Research on the analysis of Science Process Skills (KPS) of prospective Biology teachers on HOTS has been carried out with the result that the contribution of prospective Biology teachers to HOTS has a low category. This happens because prospective students of Biology teachers are not used to working on HOTS questions (Safahi et al., 2020). However, in this study, the researcher conducted different research from previous studies, namely focusing on the development of HOTS question instruments based on the local potential of conservation areas in the conservation biology course. The HOTS question instrument developed describes well the local potential of conservation areas in the Lampung area, so that it can hone students' high-level thinking skills better about the environment and nature conservation in Lampung WKNP.

This research was conducted to develop HOTS questions based on the local potential that refers to the local potential in the Lampung WKNP conservation area. This research was conducted because it saw the local potential of conservation areas in Lampung that have not been utilized in the assessment content of the biological conservation course.

Method

This study uses a descriptive method with a qualitative approach. Qualitative methods are used to explore, describe, and understand a certain individual or group that is considered part of the problem or social phenomenon being studied (Creswell, 2014). The stages of qualitative data collection in this research are presented in Figure 1. Data collection was carried out by interviews, literature studies, and documentation studies. Semi-structured interviews were conducted with 6 informants at the East Lampung WKNP Center

office. The interview questions given to the resource persons included 36 questions to the PEH Coordinator regarding rhinos; 38 questions to the PLG Coordinator on elephants; 11 questions to the Intermediate PEH WKNP regarding flora and fauna as well as inventory activities in WKNP in general; 32 questions to the Public Relations of the Lampung WKNP Center regarding the history, flora and fauna, work programs, principles and issues of WKNP and the relationship between WKNP and the community; 2 questions to WKNP Public Relations staff regarding counseling to the community and WKNP partners; and 4 questions to PEH Muda regarding the types of ecosystems in WKNP and their current conditions. Literature studies are conducted by collecting data from scientific articles, news, and other credible and trustworthy sources. Meanwhile, the document study was carried out by examining several primary documents belonging to WKNP regarding the results of documentation from inventory activities carried out by WKNP.

Data analysis and validation of the correctness of the information obtained in qualitative data collection are carried out by triangulation techniques that use more than one source of information to compare and match (Denzin & Lincoln, 2009). The data triangulation technique by Denzin (2008) that was used in this research is presented in Figure 2. The information obtained is then compiled into a transcript and goes through the verbatim stage. The information obtained is then reviewed and reduced. After that, an analysis of conservation biology material that can be integrated based on the Conservation Biology Course Learning Outcomes and conservation biology materials that can be integrated with the local potential content of WKNP Lampung is carried out.

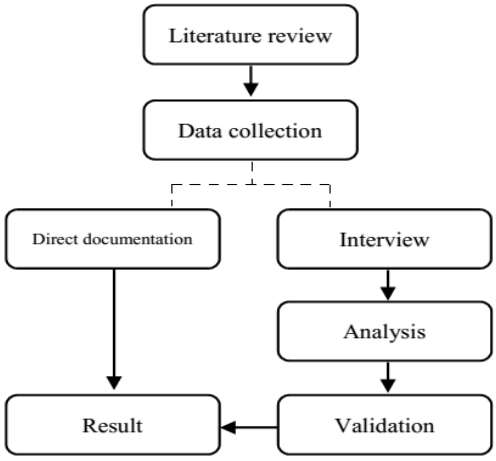

Figure 1. Qualitative research stages

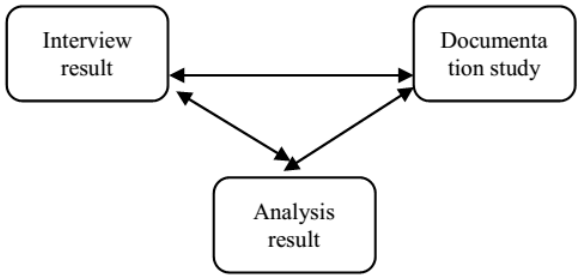

Figure 2. Data triangulation technique

Result and Discussion

After data collection and data reduction through qualitative data analysis stages, a recapitulation of Lampung WKNP local potential data was obtained, which included several types. The summation of the local potential found from this qualitative research is presented in detail in the Table 1.

Table 1. WKNP Information that Can be Integrated into Content

Type		
Local potential	Issues/ conflicts	Etc.
Typical fauna: sumatran rhino	Forest fires	WKNP's partner: YABI
Typical fauna: sumatran elephant	Temporary closure of WKNP for tourism activities	WKNP's partner: AleRT Indonesia
Typical fauna: sumatran tiger	Illegal fishing	WKNP's partner: PKHS
Typical fauna: tapirs	Human-elephant conflict	WKNP's partner: RPU
Typical fauna: sun bear	Elephant *endotheliotropic herpesvirus* (EEHv)	WKNP's partner: SRS
WKNP's buffer village	African Swine Fever Virus (ASFV)	WKNP's partner: WCS
Lowland rainforest ecosystem		WKNP's partner: KHS
Riparian ecosystem		GPS collar technology
Coastal forest ecosystem		
Mangrove forest ecosystem		
Swamp forest ecosystem		
Bird watching		
In-situ conservation: WKNP forests		
Semi-in-situ conservation: sumatran rhino sanctuary		
Semi-in-situ conservation: elephant training centre		

Based on Table 1, it is known that the information about the Lampung WKNP conservation area found from data collection through literature studies, document studies, and interviews with informants is as many as 29 main contents which include 15 local potentials, 6 issues, and 8 other topics related to Lampung WKNP.

Integration of Local Potential into Conservation Biology Materials

Information related to the local potential of WKNP Lampung that has been obtained is then analyzed for its relationship with the material in the biological conservation course. Some of the considerations that are the basis for integrating local knowledge with learning materials are biological conservation course learning outcomes, learning indicators in each material, and the relationship between local potential and conservation biology sub-materials.

Based on Table 2, the local potential content of WKNP Lampung that the researcher has filtered refers to the content that can be linked to conservation biology material. These materials focus on the Lampung WKNP conservation area which includes, the potential of Natural Resources, threats to natural resources, the extinction rate of typical species, conservation activities, conservation-based tourism, conservation-based cooperation programs, and problems in conservation areas in WKNP. Integrating the findings of local potential as biology learning content can create more meaningful learning and can stimulate to relation of the information obtained with relevant biological knowledge in the cognitive structure in the form of various facts, concepts, and generalizations that have been possessed (Sudirgayasa et al., 2021). Local potential content also allows students to find a very meaningful relationship between abstract ideas and practical applications contextually (Widowati, 2012).

Table 2. Results of Integration of Local Potential into Biological Conservation Materials

Course Learning Outcomes (CLO) of biological conservation CLO-1. Able to analyze the basics of biological conservation and conservation efforts in protected areas CLO-2. Able to evaluate the basics of biological conservation and conservation efforts in protected areas CLO-3. Able to provide responses to problems about existing conservation areas		
Materials	Contents	Learning indicators
WKNP's potential natural resources	Sumatran rhino, Sumatran elephant, Sumatran tiger, Tapirs, Sun bear, Lowland rainforest ecosystem, Riparian ecosystem, Coastal forest ecosystem, Mangrove forest ecosystem, Swamp ecosystem	Students are able to analyze the potential of typical fauna in WKNP. Students are able to analyze various types of typical ecosystems in WKNP.
Threats to natural resources in WKNP	Illegal fishing, Viruses that attack fauna in the WKNP area: EEHv, Viruses that attack fauna in the WKNP area: ASFV, Illegal hunting	Students are able to analyze the causes of illegal fishing, the spread of deadly viruses and poaching in the WKNP. Students are able to evaluate how to handle illegal fishing, the spread of deadly viruses and poaching in the WKNP.
Typical species extinction rates of WKNP	Extinction rate of sumatran elephants, Extinction rate of sumatran rhino, Extinction rate of sumatran tiger, Extinction rate of tapir, Extinction rate of sun bear	Students are able to analyze the level of extinction of 5 key WKNP mammals. Students are able to evaluate how to handle the extinction of 5 key WKNP mammals.
Conservation activities in WKNP	In-situ conservation: WKNP forest, Semi in-situ conservation: sumatran rhino sanctuary, Semi-in-situ conservation: elephant training center, Conservation activity policy in WKNP	Students are able to evaluate in-situ conservation activities in the WKNP conservation area. Students are able to evaluate semi-in-situ conservation activities in the WKNP conservation area.
Conservation based tourism in WKNP	Temporary closure of WKNP for tourist activities, Re-activating WKNP with a conservation-based tourism concept, Bird watching	Students are able to analyze the potential of WKNP as conservation-based tourism. Students are able to analyze various problems of tourism activities in conservation areas. Students are able to create ideas for conservation-based tourism activities.
Conservation-based cooperation program in WKNP	Buffer village, YABI, AleRT Indonesia, PKHS, RPU, SRS, WCS, KHS	Students are able to analyze the role of buffer villages in the WKNP conservation area. Students are able to analyze the role of WKNP partners in conservation activities in WKNP.
Problems in Conservation areas in WKNP	Human-elephant conflict, Illegal fishing, Forest fires by hunters, GPS collar technology	Students are able to analyze various problems that occur in the WKNP conservation area. Students are able to create solutions to solve problems that occur in the WKNP conservation area.

The results of the integration of local potential into the content of conservation biology material have gone through several reductions. This stage needs to be carried out for processing material recommendations and material analysis so that it can conclude in the form of the expected subject matter (Kuntarto et al., 2021). First, it begins by analyzing the existing overall conservation biology material and relating it to the context of local potential. Second, analyze and reduce the recommendation material that has been made with all the information about the Lampung WKNP conservation area obtained through qualitative research. The process of reduction and determination of conservation biology materials based on the local potential of WKNP Lampung is described in Table 3.

Table 3. Reduction Process and Determination of Biological Conservation Recommendation Material

Materials	Learning indicators
Analysis 1	
Scope of biological conservation.	Students are able to analyze the scope of biological conservation studies.
Conservation biology ethics, biological ethics and ecological values.	Students are able to analyze the application of conservation biology ethics, biological ethics and ecological values in life.
Threats to biodiversity, extinction rate, local extinction, habitat destruction, habitat fragmentation, habitat degradation.	Students are able to analyze threats that may exist to biodiversity. Students are able to analyze potential extinction rates for local species. Students are able to analyze habitat destruction, habitat fragmentation and habitat degradation that occur in the surrounding area.
Species level conservation (ex-situ and in-situ).	Students are able to analyze the problems that exist in ex-situ and persistent conservation in the surrounding area. Students are able to evaluate the benefits of ex-situ and in-situ conservation.
Community level conservation.	Students are able to analyze existing problems at community level conservation in the surrounding area. Students are able to evaluate the benefits of creating community level conservation.
Way Kambas National Park (WKNP).	Students are able to analyze how conservation areas are divided in terms of size and zoning. Students are able to evaluate the role of the surrounding community in Lampung WKNP. Students are able to choose the right action in order to protect Lampung WKNP. Students are able to analyze the relationship between traditional law communities and the Lampung WKNP.
Environmental conservation.	Students are able to analyze things that can damage the environment around conservation areas. Students are able to evaluate appropriate actions to take to preserve the environment around conservation areas.
Conservation-based tourism activities.	Students are able to analyze the potential of WKNP as conservation-based tourism. Students are able to analyze various cases related to conservation areas. Students are able to provide problem solving solutions and relevant responses.
Analysis 2	
Way Kambas National Park's potential natural resources: Sumatran rhino, Sumatran elephant, Sumatran tiger, Tapirs, Sun bear, Lowland rainforest ecosystem, Riparian ecosystem, Coastal forest ecosystem, Mangrove forest ecosystem, Swamp ecosystem.	Students are able to analyze the potential of typical fauna in Way Kambas National Park. Students are able to analyze various types of typical ecosystems in Way Kambas National Park.
Threats to natural resources in Way Kambas National Park (WKNP): Illegal fishing; Viruses that attack fauna in the WKNP area: Elephant *endotheliotropic herpesvirus* (EEHv); Viruses that attack fauna in the WKNP area: African Swine Fever Virus (ASFV); Illegal hunting.	Students are able to analyze the causes of illegal fishing, the spread of deadly viruses and poaching in the WKNP. Students are able to evaluate how to handle illegal fishing, the spread of deadly viruses and poaching in the WKNP.

Materials	Learning indicators
Typical species extinction rates of WKNP: Extinction rate of sumatran elephants, Extinction rate of sumatran rhino, Extinction rate of sumatran tiger, Extinction rate of tapir, Extinction rate of sun bear.	Students are able to analyze the level of extinction of 5 key WKNP mammals. Students are able to evaluate how to handle the extinction of 5 key WKNP mammals.
Conservation activities in WKNP: In-situ conservation: WKNP forest; Semi in-situ conservation: sumatran rhino Sanctuary; Semi-in-situ conservation: elephant training center; Conservation activity policy in WKNP.	Students are able to evaluate in-situ conservation activities in the WKNP conservation area. Students are able to evaluate semi-in-situ conservation activities in the WKNP conservation area.
Conservation based tourism in WKNP: Temporary closure of WKNP for tourist activities, Re-activating WKNP with a conservation-based tourism concept, Bird watching.	Students are able to analyze the potential of WKNP as conservation-based tourism. Students are able to analyze various problems of tourism activities in conservation areas. Students are able to create ideas for conservation-based tourism activities.
Conservation-based cooperation program in WKNP: Buffer village, YABI, AleRT Indonesia, PKHS, RPU, SRS, WCS, KHS.	Students are able to analyze the role of buffer villages in the WKNP conservation area. Students are able to analyze the role of WKNP partners in conservation activities in WKNP.
Problems in conservation areas in WKNP: Human-elephant conflict, Illegal fishing, Forest fires by hunters, GPS collar technology.	Students are able to analyze various problems that occur in the WKNP conservation area. Students are able to create solutions to solve problems that occur in the WKNP conservation area.

Based on Table 3, at analysis stage 1, 8 pieces of conservation biology material were determined which were estimated to be able to be integrated with the local potential content of the Lampung WKNP. At analysis stage 2 it was narrowed down to 7 pieces of material. Some material was deleted and added, as well as changing the title of the material. This change is adjusted to the qualitative data on local potential obtained. In analysis 2, it was determined that several material contents were removed including, the scope of conservation biology, conservation biology ethics, biological ethics, and ecological values, habitat fragmentation and degradation, and also environmental conservation. Meanwhile, some of the new material added includes natural resource potential, conservation-based cooperation programs, and problems in conservation areas.

Integration of Local Potential to the HOTS Framework

After the preparation of the table of integration of local potential for conservation biological materials, the HOTS framework was prepared based on the Bloom Taxonomy as described in Table 4.

Table 4. Results of HOTS Framework Development

HOTS dimensions	Learning indicators
C4 – Analyze	Students are able to analyze the potential of typical fauna in WKNP.
	Students are able to analyze various types of typical ecosystems in WKNP.
	Students are able to analyze the causes of illegal fishing, the spread of deadly viruses and poaching in the WKNP.
	Students are able to analyze the level of extinction of 5 key WKNP mammals.
	Students are able to analyze the potential of WKNP as conservation-based tourism.
	Students are able to analyze various problems of tourism activities in conservation areas.
	Students are able to analyze the role of buffer villages in the WKNP conservation area.
	Students are able to analyze the role of WKNP partners in conservation activities in WKNP.
	Students are able to analyze various problems that occur in the WKNP conservation area.
C5 – Evaluate	Students are able to evaluate how to handle illegal fishing, the spread of deadly viruses and poaching in the WKNP.
	Students are able to evaluate how to handle the extinction of 5 key WKNP mammals.
	Students are able to evaluate in-situ conservation activities in the WKNP conservation area.
	Students are able to evaluate semi-in-situ conservation activities in the WKNP conservation area.
C6 – Create	Students are able to create ideas for conservation-based tourism activities.
	Students are able to create solutions to solve problems that occur in the WKNP conservation area.

In Table 4, the 3 HOTS cognitive dimensions were developed into 15 indicators based on material in the Conservation Biology Course which has integrated the local potential of the Lampung WKNP. The HOTS dimension with the most indicators is C4-Analyzing with 9 indicators. This is because analyzing is a thinking skill that covers a wide scope so it has the potential to be developed into more measurement indicators (Prihastuti et al., 2021). The ability to analyze in the cognitive dimension of HOTS means breaking down material into its constituent parts and determining the relationships between the parts the relationship between these parts and the overall structure or goal. Meanwhile, the ability to evaluate in the HOTS cognitive dimension means making decisions based on criteria and/or standards. In the development of the HOTS assessment, the least indicator is C6-Creating. This is because this indicator is focused on essay questions only, of which there are not many in the test instrument developed. The ability to create in the HOTS cognitive dimension means combining parts to form something new and coherent or to create an original product (Laalah et al., 2021).

Development of HOTS-Based Assessment Based on Conservation Biology Materials

Conservation biology materials that have been integrated with the local potential content of WKNP Lampung can later be developed into HOTS-based assessments by researchers. The development of assessments in conservation biology learning based on local potential is very important in terms of learning evaluation and achievement of learning objectives expected by educators. In this context, educators can be triggers and facilitators of learning, for example through open-ended questions about problems in conservation areas related to the local potential of WKNP Lampung, providing feedback based on local potential as a reflection to increase understanding of the material, and providing examples of local potential that are relevant to the learning material to increase the curiosity of students to build a desire to independently explore the local potential that exists around them.

The integration of local knowledge in learning can provide hands-on experience to support contextual learning (Marthin et al., 2024; Parmin & Peniati, 2012). In addition, students will find it easier to understand learning content in a local context (Sriyati et al., 2022). Therefore, the ability of educators to innovate in incorporating local context into the assessment is needed to achieve the set learning goals (Leksono et al., 2015). The following in Table 5 describes the form of assessment development that can be implemented from local potential-based conservation biology materials that have been made by researchers.

Table 5. Form of Implementation of Using Materials in HOTS Question Items

HOTS dimensions	Question items
C4 - Analyze	A tame elephant was found dead at the Way Kambas National Park Elephant Training Center, East Lampung on Sunday, October 30 2022. It is currently suspected that the tame elephant died due to being infected with the Elephant endotheliotropic herpesvirus (EEHv). This virus is quite virulent and usually attacks elephant calves under 12 years of age. But unfortunately, this disease cannot be detected early.

Figure 3. Sudden elephant death at WKNP (Sources: kompas.co.id)

What is the most appropriate effort to be taken by the Way Kambas National Park Elephant Training Center health team to anticipate this incident so that it does not happen again?
Providing medication regularly to cure elephants that have been infected with EEHv
Involving elephants in ecotourism to increase training center income
Reduce the frequency of medical examinations of elephants to avoid stress on elephants
Providing smaller, more confined habitats for elephants reduces the risk of exposure to the EEHv
Routine examinations and regular blood tests for early detection of EEHv in elephants

HOTS dimensions	Question items
C5 - Evaluate	 **Figure 4.** Group of elephants in WKNP (Sources: batiqa.com) WKNP is a national park that is sensitive to technological developments. This technology is used to assist WKNP in conservation activities. One of the technologies used is a GPS collar. GPS collars began to be used in 2017 to overcome conflicts between elephants and communities around conservation areas. A GPS collar is installed on the leader of the elephant group to monitor the elephant's movements. If you look at its function, what makes this technology effective to use? GPS collars help elephants communicate with local people. GPS collars help protect elephants from predator threats. GPS collars monitor elephant movements to help reduce conflict with communities. GPS collars can help elephants determine their direction of movement so they don't get lost GPS collars provide additional physical protection to elephants
C6 - Create	Way Kambas National Park (WKNP) is one of the tourist attractions that is busy with visitors during Eid al-Fitr. As in previous times, the number of visitors always overflowed before WKNP finally closed temporarily. On Eid al-Fitr in 2024, WKNP will reopen and the enthusiasm of visitors is still the same. The increasing number of visitors certainly creates a situation that is not conducive. In your opinion, what policies are appropriate for WKNP to implement to make the situation more conducive? (Write at least 2 opinions)

In Table 5, three forms of implementation of conservation biology content are displayed which have been integrated with the local potential of the Lampung WKNP by the recommended learning indicators. These two multiple-choice questions refer to questions that hone the ability to analyze and evaluate a problem in the content of the question. Meanwhile, one essay question refers to questions that hone the ability to create ideas or creative ideas.

Questions like this can familiarize students with contextual case-based questions. Students' problem-solving abilities are indirectly honed through these types of questions. Questions that are integrated with the local potential of the surrounding conservation areas, such as local wisdom that contains problem-solving content in conservation biology courses like this, can help students gain meaningful learning (Gunawan & Indrayani, 2021; Agustin & Razi, 2023; Rafidah et al., 2024). Other studies say that learning resources with a problem-based learning context have been proven to improve their critical thinking skills (Putri et al., 2024; Pratiwi & Setyaningtyas, 2020).

Conclusion

The local potential of the Way Kambas Lampung National Park has the potential to be integrated into the learning of the Conservation Biology Course, where based on the results of the analysis that has been carried out there are 7 materials based on the local potential of the Lampung WKNP that can be used in this course, namely, the natural resource potential of WKNP, threats to natural resources in WKNP, level of extinction of species typical of WKNP, conservation activities in WKNP, conservation-based tourism in WKNP, conservation-based cooperation program in WKNP, and problems in the conservation area in WKNP. It is hoped that the results of the identification and development of a local potential framework in the form of recommended conservation biology material can become a reference and material in developing the HOTS assessment that will be carried out next.

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Author Contributions

A. A. J.: conceptualized and selected the methodology, wrote the original draft, did some literature studies and collected the research data, analyzed and discussed the research results. S. S., & R. S.: selected the methodology, discussed the research results, also as supervisors and research data validators.

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Conflicts of Interest

The authors declare no conflict of interest.

References

Agustin, S., & Razi, P. (2023). Validity of E-Book Based on Problem-Based Learning with Higher Order Thinking Skills Oriented for Senior High School. *Journal of Physics: Conference Series*, *2582*(1). https://doi.org/10.1088/1742-6596/2582/1/012066

Ajmi, M. A., Mustakim, S. S., Roslan, S., & Almehrizi, R. (2024). Psychometric Characteristics of the Numerical Ability Test for Gulf Students. *Int J Eval & Res Educ*, *13*(4), 2552–2561. https://doi.org/10.11591/ijere.v13i4.28917

Anisa, A. (2017). Meningkatkan Keterampilan Berpikir Kritis Peserta Didik Melalui Pembelajaran IPA Berbasis Potensi Lokal Jepara. *Jurnal Inovasi Pendidikan IPA*, *3*(1), 1–11. https://doi.org/10.21831/jipi.v3i1.8607

Apriana, E., Munandar, A., & Rustaman, N. Y., & Surtikanti, H. K. (2020). Pengembangan Program Perkuliahan Biologi Konservasi dengan Pendekatan Kontekstual Berbasis Kearifan Lokal Aceh. *Visipena Journal*, *11*(1), 1–15. https://doi.org/10.46244/visipena.v11i1.1086

Azhar, A., Manik, R. E., Nabila, R., Natuna, D. A., Irawan, D. (2024). Critical Thinking Skills of Students Through Guided Discovery Learning Model Assisted by PhET Media on Stationary and Walking Wave. *Jurnal Penelitian Pendidikan IPA*, *10*(7), 3548-3555. https://doi.org/10.29303/jppipa.v10i7.7212

Cahyahatini, A. F., Sjaifuddin, S., & Taufik, A. N. (2023). Pengembangan Instrumen Tes Berbasis Kearifan Lokal Kesenianku Rampak Bedug untuk Melatih Keterampilan Literasi Sains Siswa SMP Kelas VIII. *Jurnal Bahana Manajemen Pendidikan*, *12*(1), 207–213. https://doi.org/10.24036/jbmp.v12i1

Creswell, J. W. (2014). *Research Designs: Qualitative, Quantitative, and Mixed Methods Approaches*. California: Sage.

Denzin, N. (2008). *Collecting and Interpreting Qualitative Materials*. Los Angeles: Sage Publication.

Denzin, N. K., & Lincoln, Y. S. (2009). *Qualitative Research*. Yogyakarta: Pustaka Pelajar.

Fatimah, S., & Pahlevi, T. (2020). Pengembangan Instrumen Penilaian Berbasis HOTS (Higher Order Thinking Skills) pada Kompetensi Dasar Menerapkan Sistem Penyimpanan Arsip Sistem Abjad, Kronologis, Geografis, Nomor, dan Subjek di Jurusan OTKP SMKN 1 Bojonegoro. *Jurnal Pendidikan Administrasi Perkantoran (JPAP)*, *8*(2), 318–328. https://doi.org/10.26740/jpap.v8n2.p318-328

Febriyanda, Y., Sunandar, A., & Setiadi, A. E. (2022). Habitat Utilization by Long-Tailed Monkeys (*Macaca fascicularis*) in Gunung Palung National Park as a Biology Learning Resource. *Jurnal Penelitian Pendidikan IPA*, *8*(5), 2392–2398. https://doi.org/10.29303/jppipa.v8i5.1869

Firdaus, M., & Wilujeng, I. (2018). Pengembangan LKPD Inkuiri Terbimbing untuk Meningkatkan Keterampilan Berpikir Kritis dan Hasil Belajar Peserta Didik. *Jurnal Inovasi Pendidikan IPA*, *4*(1), 26– 40. https://doi.org/10.21831/jipi.v4i1.5574

Gunawan, P. A., & Indrayani, L. (2021). Meningkatkan Keterampilan Sosial Siswa dengan Menerapkan Model Pembelajaran Berbasis Masalah. *Jurnal Pendidikan Ekonomi Undiksha*, *13*(1), 44-49. https://doi.org/10.23887/jjpe.v13i1.32090

Irrubai, M. L., & Subki, S. (2024). The Local Wisdom of Awik-Awik in Marine Conservation in Sekotong, West Lombok, West Nusa Tenggara, Indonesia. *Jurnal Penelitian Pendidikan IPA*, *10*(7), 3932-3941. https://doi.org/10.29303/jppipa.v10i7.7435

Jamil, A. F., & Khusna, A. H. (2021). Pengembangan Asesmen Berorientasi Kontekstual untuk Meningkatkan Kemampuan Literasi Matematis dan Numerasi Mahasiswa. *Jurnal Ilmiah Mandala Education*, *7*(4). https://doi.org/10.58258/jime.v7i4.2385

Khairani, R. N., & Prodjosantoso, A. K. (2024). Effect of Creative Problem Solving Models with Ethnoscience on Students' Problem Solving Ability and Scientific Attitudes. *Jurnal Penelitian Pendidikan IPA*, *10*(1), 360–370. https://doi.org/10.29303/jppipa.v10i1.5734

Kuntarto, E., Sofwan, M., & Mulyani, N. (2021). Analisis Manfaat Penggunaan Aplikasi Zoom dalam Pembelajaran Daring bagi Guru dan Siswa di Sekolah Dasar. *Jurnal Pendidikan Dasar Nusantara*, *7*(1), 49–62. https://doi.org/10.29407/jpdn.v7i1.15742

Laalah, E. T., Raturandang, J. O., & Jantje, N. (2021). Analisis Kemampuan Berpikir Tingkat Tinggi Siswa SMA Kelas X pada Konten Biologi. *Jurnal SAINS Pendidikan Biologi*, *2*(3), 189–195. Retrieved from https://ejurnal.unima.ac.id/index.php/bioedusains/article/view/4885

Laksono, P., Wicaksono, A., & Habisukan, U. H. (2023). Pendampingan Pemanfaatan Simulasi PhET sebagai Media Interaktif Virtual Laboratorium di MTs Tarbiyatussibyan. *Jurnal Anugerah*, *4*(2), 179-192. https://doi.org/10.31629/anugerah.v4i2.4843

Leksono, S. M., Syahruroji, A., & Marianingsih, P. (2015). Pengembangan Bahan Ajar Biologi Konservasi Berbasis Etnopedagogi. *Jurnal Kependidikan*, *45*(2), 168-183. https://doi.org/10.21831/jk.v45i2.7494

Manurung, R. P., Boleng, D. T., Lumowa, S. V. T., Akhmad, A., Sukartiningsih, S., Daru, T. P., Maasawet, E. T., & Rambitan, V. (2024). Development of Learning Tools Social Emotional Defense to Improve Learning Outcomes and Critical Thinking Skills in Human Reproductive System Materials in SMP Negeri 2 Intu Lingau. *Jurnal Penelitian Pendidikan IPA*, *10*(7), 3838-3849. https://doi.org/10.29303/jppipa.v10i7.7505

Mardhiyana, D., & Jailani, J. (2017). Pengembangan Model Asesmen Pembelajaran Matematika SMA Berdasarkan Kurikulum 2013 Developing of Assessment Model of Mathematics Learning in Senior High School DBased On Curriculum 2013. *PYTHAGORAS: Jurnal Pendidikan Matematika*, *12*(2), 135–148. https://doi.org/10.21831/pg.v12i2.17586

Marthin, E. F., Hardeli, H., Oktavia, B., & Kurniawati, D. (2024). Development of Problem-Based Learning Student Worksheet Integrated with Ethnoscience on Acid-Base Material. *Jurnal Penelitian Pendidikan IPA*, *10*(7), 3886-3893. https://doi.org/10.29303/jppipa.v10i7.7930

Muchsin, A. (2023). *Pengembangan Soal Berpikir Kritis dan Kreatif Berbasis Kearifan dan Potensi Lokal Pulau Lombok pada Materi Biologi SMA* (Thesis). Universitas Pendidikan Indonesia. Retrieved from http://repository.upi.edu/100922/

Murti, W. W., & Sunarti, T. (2021). Pengembangan Instrumen Tes Literasi Sains Berbasis Kearifan Lokal di Trenggalek. *ORBITA: Jurnal Kajian, Inovasi dan Aplikasi Pendidikan Fisika*, *7*(1), 33–43. https://doi.org/10.31764/ORBITA.V7I1.4386

Murti, W. W., & Sunarti, T. (2022). Pengembangan Instrumen Tes Literasi Sains Berbasis Kearifan Lokal di Trenggalek. *ORBITA: Jurnal Kajian, Inovasi dan Aplikasi Pendidikan Fisika*, *8*(1), 52. https://doi.org/10.31764/orbita.v8i1.8337

Parmin, P., & Peniati, E. (2012). Pengembangan Modul Mata Kuliah Strategi Belajar Mengajar IPA Berbasis Hasil Penelitian Pembelajaan. *Jurnal Pendidikan IPA Indonesia*, *1*(1), 8-15. https://doi.org/10.15294/jpii.v1i1.2006

Pratiwi, E. T., & Setyaningtyas, E. W. (2020). Kemampuan Berpikir Kritis Siswa Melalui Model Pembelajaran Problem Based Learning dan Model Pembelajaran Project Based Learning. *Jurnal Basicedu*, *4*(2), 379–388. https://doi.org/10.31004/basicedu.v4i2.362

Prawati, L., Sunandar, A., & Setiadi, A. E. (2024). Development of an Ethnobotanical Encyclopedia on the Antar Ajong Ceremony. *Jurnal Penelitian Pendidikan IPA*, *10*(7), 3957-3967. https://doi.org/10.29303/jppipa.v10i7.8350

Prihastuti, I., Widodo, A., Liliasari, L., & Riandi, R. (2021). Designing and Implementing Critical Thinking Instruction Through Video-Based Training: A Case Study. *European Online Journal of Natural and Social Science: A Case Study*, *10*(4), 502–514. Retrieved from https://european-science.com/eojnss/article/view/6265

Purwanti, S. (2020). Analisis Kemampuan Mahasiswa dalam Menyelesaikan Soal IPA Tipe HOTS. *JIPVA (Jurnal Pendidikan IPA Veteran)*, *4*(1), 93–101. https://doi.org/10.31331/JIPVA.V4I1.1102

Putri, H. S., Oktavia, B., Yerimadesi, Y., & Alizar, A. (2024). Development of E-Module Acid-Base Based on Problem Based Learning Oriented Chemo-Entrepreneurship to Improve Student's Critical Thinking Skills. *Jurnal Penelitian Pendidikan IPA*, *10*(7), 4033-4039. https://doi.org/10.29303/jppipa.v10i7.7943

Rafidah, H. N., Rachmadiarti, F., & Prastiwi, M. S. (2024) Stepping Together with Nature of Malang Raya: The Development Environmental Changes E-Book Based on Problem Based Learning (PBL). *Jurnal Penelitian Pendidikan IPA*, *10*(7), 3556-3568. https://doi.org/10.29303/jppipa.v10i7.7377

Safahi, L., Pusporini, A., Susilo, S., & Akbar, B. (2020). Analisis Keterampilan Proses Sains Calon Guru Biologi Terhadap HOTS. *Biodik*, *6*(1), 35–45. https://doi.org/10.22437/bio.v6i1.8565

Sriyati, S., Marsenda, P. H., & Hidayat, T. (2022). Pemanfaatan Kearifan Lokal Orang Rimba di Jambi Melalui Pengembangan Bahan Ajar untuk Meningkatkan Literasi Lingkungan Siswa. *Jurnal Pendidikan Sains Indonesia*, *10*(2), 266-278. https://doi.org/10.24815/jpsi.v10i2.23548

Sudirgayasa, I. G., Surata, I. K., Sudiana, I. M., Maduriana, I. M., & Gata, I. W. (2021). Potensi Ekowisata Lembu Putih Taro sebagai Konten dan Media Pembelajaran Biologi Berbasis Kearifan Lokal Hindu Bali. *Jurnal Imiah Pendidikan dan*

Pembelajaran, *5*(2), 343. https://doi.org/10.23887/jipp.v5i2.36424

Suharti, D. I., Tukiran, T., & Raharjo, R. (2024). Validity of Creative Interactive-Web and Seamless Learning Media and Learning Models to Improve Students' Creative Thinking Skills and Cognitive Learning Outcomes in High School Biology Subjects. *Jurnal Penelitian Pendidikan IPA*, *10*(7), 3770-3779. https://doi.org/10.29303/jppipa.v10i7.8279

Ule, L., Kua, M. Y., Rewo, J. M., Ngurah, D., Laksana, L., & Bakti, C. (2021). Pengembangan Instrumen Tes Higher Order Thinking Skill dengan Real World Problem Berbasis Kearifan Lokal Ngada pada Mata Pelajaran IPA SMP Kelas VII. *Jurnal Citra Pendidikan*, *1*(4), 554–562. https://doi.org/10.38048/JCP.V1I4.334

Ulfa, Z. M., Rosidin, U., & Abdurrahman, A. (2024). Development of Instrument Soft Skill Assessment in Problem-Based Learning to Improve Students' Collaboration Skills, Communication Skills, and Social Skills. *Jurnal Penelitian Pendidikan IPA*, *10*(7), 3681-3688. https://doi.org/10.29303/jppipa.v10i7.754

Wansaubun, W. A. (2020). Upaya Meningkatkan Kreativitas dalam Memecahkan Masalah dengan Menggunakan Model Pembelajaran Creative Problem Solving (CPS). *Arfak Chem: Chemistry Education Journal*, *3*(2), 220–226. https://doi.org/10.30862/accej.v3i2.305

Widowati, A. (2012). Optimalisasi Potensi Lokal Sekolah dalam Pembelajaran Biologi Berbasis Kontruktivisme. *Majalah Ilmiah Pembelajaran*, *8*(2), 1–12. Retrieved from http://blue-ap.org

Widowati, H., & Agustin, D. (2015). Inventarisasi Keanekaragaman Anggrek (Orchidaceae) di Hutan Resort Way Kanan Balai Aman Nasional Way Kambas sebagai Sumber Informasi dalam Melestarikan Plasma Nutfah. *Bioedukasi (Jurnal Pendidikan Biologi)*, *6*(1), 38–46. https://doi.org/10.24127/bioedukasi.v6i1.156

Yuliarta, S. R., Masruhim, M. A., Hardoko, A., Candra, K. P., Sukartiningsih, S., Daru, T. P., Massawet, E. T., Masitah, M., & Hudiyono, Y. (2024). The Development of an Ethnoscience-Based Mangrove Module in Improving Student's Critical Thinking Abilities and Concern for the Environment at SMA IT Daarul Hikmah Bontang. *Jurnal Penelitian Pendidikan IPA*, *10*(7), 3739-3750. https://doi.org/10.29303/jppipa.v10i7.7456