Jurnal Scientia
Volume 13 , Number 03, 2024, DOI 10.58471/ scientia.v13i03
ESSN 2723-7486 (Online)
https://infor.seaninstitute.org/index.php/pendidikan

Conservation Biology Courses With A Local Wisdom Approach In Forming Environmental Care Attitudes And Environmental Problem Solving Ability

Fahmy Armanda[1*], Muhammad Dekar[2], Wulandari Saputri[3]
[1]Biology Education, Samudra University, [2]Primary School Teacher Education, Battuta University, [3]Master's Degree in Biology Education, Muhammadiyah University of Palembang

ArticleInfo
Keywords:
Conservation,
Biology,
Care,
Attitude,
Problem Solving

ABSTRACT
Conservation Biology lectures are a subject in education that provides students with the experience to understand the concepts of biodiversity, issues and efforts in biological heritage conservation, mitigation, solutions, and promotion of conservation efforts, as well as collaboration with stakeholder involvement in conservation efforts. This course requires students to develop an environmental and conservation awareness attitude as well as problem-solving skills related to environmental damage and biodiversity loss. This study aims to analyze environmental awareness and problem-solving skills arising from environmental damage and biodiversity loss. The research method used is descriptive qualitative, and data is collected through observation, questionnaires, interviews, and essay questions. The results of this study show that environmental awareness and problem-solving skills related to environmental issues are at a high level. It is hoped that the results of this study can serve as a foundation for the development of conservation biology lectures to foster environmental awareness and problem-solving skills related to environmental damage and biodiversity loss issues, thereby supporting the benefits of conservation biology education.

Corresponding Author:
Fahmy Armanda
Biology Education, Samudra University
fahmyarmanda@unsam.ac.id

INTRODUCTION

Environmental problems that have emerged in recent decades are the result of environmental changes due to the increasing human population growth each year. Data from the Indonesian Central Statistics Agency (BPS) states that the population growth rate in Indonesia reached 1.11% over the past two years, with a total human population of 280 million people (BPS 2024). The increasing human population leads to the expansion of land needed for residential areas, resulting in more massive land clearing. Deforestation has become a global issue caused by various increasingly complex factors, both directly and indirectly, affecting environmental damage (Silva & Rodgers 2018). Not only land clearing but other factors such as the massive increase in the number of motor vehicles, production waste, and endemic disease interactions also continue to threaten the survival of organisms on earth.

Jurnal Scientia
Volume 13 , Number 03, 2024, DOI 10.58471/ scientia.v13i03
ESSN 2723-7486 (Online)
https://infor.seaninstitute.org/index.php/pendidikan

These global environmental issues are also felt by almost all regions in Indonesia, including areas on the East Coast of Aceh, such as East Aceh Regency, Langsa City, and Aceh Tamiang Regency. Langsa City is one of the areas on the East Coast of Aceh that experiences flooding during the rainy season due to the overflow of Krueng Langsa (Mutia et al. 2020). The overflow of water from Krueng Langsa into residential areas is caused by the narrowing of the watershed due to residential development and waste accumulation. Ecological disasters like floods also frequently occur in several regions in East Aceh Regency and Aceh Tamiang. Mitigation and prevention of ecological disasters like floods, which occur in almost every region, are the responsibility of every community member, as each individual has a role in preventing these ecological disasters. Higher education institutions, as educational entities, also have a responsibility to shape students who are capable of managing and solving problems in the community and providing solutions based on scientific studies and research.

The Conservation Biology course, as one of the subjects offered in higher education, is expected to provide solutions to emerging environmental problems. The course focuses on the study of biodiversity conservation and environmental protection using various management techniques and approaches. The most suitable approach for implementing biodiversity and environmental conservation in the Conservation Biology course is through local wisdom in the community (Armanda 2020). Through a local wisdom-based Conservation Biology course, students are expected to develop competencies in understanding conservation concepts, solving environmental problems by prioritizing local wisdom concepts, and fostering environmental care attitudes in their daily activities.

Based on the competencies required from the Conservation Biology course, environmental care attitudes need to be developed as part of a student's personality. An individual with an environmental care attitude will tend to respond positively to measures preventing and addressing environmental damage based on the education they have received. It is hoped that the Conservation Biology course can instill an environmental care attitude in students, making it a part of their character. This character can be shaped based on local wisdom values, especially those related to environmental care. Our ancestors had various ways to protect nature and the environment (Librata et al. 2019), and through the knowledge of local wisdom, these practices can be continuously applied by the current generation.

In addition to environmental care attitudes, the Conservation Biology course aims to develop problem-solving abilities in students. Environmental damage leads to environmental problems, and each problem requires different solutions based on its causes and impacts. The problem-solving ability that needs to be developed in students is their capability to address environmental issues. Problem-solving skills are crucial for students as the next generation. Through these skills, students make correct decisions by acting cautiously, systematically, logically, and considering various perspectives, ensuring the solutions provided effectively address the problems (Rimba & Ranny 2023).

Environmental care attitudes and problem-solving abilities are two competencies that can be developed in students through direct learning based on cases in the Conservation Biology course. As a subject in the Biology Education Program at the University of Samudra,

Jurnal Scientia
Volume 13 , Number 03, 2024, DOI 10.58471/ scientia.v13i03
ESSN 2723-7486 (Online)
https://infor.seaninstitute.org/index.php/pendidikan

the Conservation Biology course, through direct learning with local wisdom approaches, has learning outcomes that support the development of these competencies in students. Therefore, it is necessary to analyze students' environmental care attitudes and problem-solving abilities after participating in the Conservation Biology course to strengthen the function of this subject.

METHOD

This research is a descriptive quantitative study with a sample of 30 students from the Biology Education Program at the University of Samudra taking the Conservation Biology course. Data on environmental care attitudes were collected using questionnaires and interviews, while environmental problem-solving abilities were assessed through essay questions based on environmental cases. The data on environmental care attitudes and problem-solving abilities were analyzed descriptively. The indicators for environmental care attitudes were modified from Irfanti et al. (2016), while the indicators for environmental problem-solving abilities were modified from Ridhwan et al. (2020). The Likert scale was used for environmental care attitude assessment. The interval scales for environmental care attitudes and problem-solving abilities are shown below.

Table 1. Likert Scale for Environmental Care Attitude Statements

Category	Scale Score
Strongly Agree	5
Agree	4
Undecided	3
Disagree	2
Strongly Disagree	1

Table 2. Interval Values for Environmental Care Attitude and Problem-Solving Ability

Interval Value	Criteria
85-100	Very High
65-84	High
45-64	Moderate
25-44	Low
<24	Very Low

RESULTS AND DISCUSSION

Environmental Care Attitudes

Data on environmental care attitudes based on local wisdom in students were collected at the end of the course with habituation of providing stimuli to students to foster environmental care attitudes. The indicators for expected environmental care attitudes in students are shown below.

Table 3. Indicators of Environmental Care Attitudes

Aspect	Indicator
Efforts to prevent environmental	Maintaining environmental cleanliness

Jurnal Scientia
Volume 13 , Number 03, 2024, DOI 10.58471/ scientia.v13i03
ESSN 2723-7486 (Online)
https://infor.seaninstitute.org/index.php/pendidikan

Aspect	Indicator
damage	Reducing plastic use
	Managing waste according to type
	Reducing carbon emission production
	Saving energy use
	Educating the community on environmental protection
	Treating fauna and flora as humans
	Knowing local wisdom in environmental management
Efforts to repair environmental damage	Caring for or planting trees
	Recycling or reusing used items
	Actively participating in humanitarian activities for natural disasters

The results of the environmental care attitude analysis in students from the questionnaire are as follows

Table 4. Results of Environmental Care Attitude Questionnaire

Criteria	Frequency	Relative Frequency
Very High	6	20%
High	17	56.7%
Moderate	7	23.3%
Total	30	100%

Based on the table above, it can be seen that 56.7% of students scored in the high category, 20% in the very high category, and 23.3% in the moderate category for environmental care attitudes. This can be attributed to the experience and understanding provided by lecturers during the Conservation Biology course, encouraging students to practice actions that protect the environment, fostering positive attitudes and views towards environmental sustainability and the equality of rights among all living beings created by God (Librata et al. 2019). Habit formation and initial perceptions are crucial in shaping one's attitude and character, so instilling and habituating positive actions towards environmental sustainability can form positive characters and attitudes (Syarief, 2022).

However, conditions causing differences in the percentage of environmental care attitudes among students integrated with local wisdom approaches were found, possibly due to many students in the Conservation Biology course coming from outside Aceh, resulting in different interpretations of Acehnese local wisdom in environmental management. The local community's understanding of the environment will differ from that of people from outside the area (Jumriani et al. 2021). Local wisdom in an area is synonymous with the area's management by indigenous communities (Iwan et al. 2019). In addition to social influences, other factors affecting environmental care attitudes include the psychological aspect of each student, such as learning motivation, habits, and interest in the material.

Jurnal Scientia
Volume 13 , Number 03, 2024, DOI 10.58471/ scientia.v13i03
ESSN 2723-7486 (Online)
https://infor.seaninstitute.org/index.php/pendidikan

Environmental Problem-Solving Abilities

Data on students' environmental problem-solving abilities were obtained from questions given by lecturers based on cases in the Conservation Biology course. The indicators for expected environmental problem-solving abilities in students are shown below.

Table 5. Indicators of Environmental Problem-Solving Abilities

Aspect	Indicator
Identifying problems	Ability to identify problems arising from environmental damage
	Understanding the problem's causes
Formulating problems	Ability to analyze problem formulations arising from environmental damage
	Understanding the problem's causes and impacts
Planning solutions	Ability to plan solutions to problems arising from environmental damage
	Making plans based on identified problems
Implementing solutions	Ability to implement solutions to problems arising from environmental damage
	Developing solutions according to problem planning
Evaluating solutions	Ability to evaluate solutions to problems arising from environmental damage
	Evaluating and concluding solution results

The results of the environmental problem-solving ability analysis in students from the essay questions are as follows

Table 6. Results of Environmental Problem-Solving Ability Questions

Aspect	Question No.	Average	Criteria
Identifying problems	1	90	Very High
	2	60	Moderate
Formulating problems	3	82	High
	4	84	High
Planning solutions	5	64	Moderate
	6	84	High
Implementing solutions	7	80	High
	8	60	Moderate
Evaluating solutions	9	85	High
	10	86	High
Total Average		77.5	High

Based on the table above, it is evident that the environmental problem-solving abilities of the sampled students have an average score of 77.5, which falls into the High criteria. This can occur because it is supported by case study learning, which requires students to provide solutions to environmental problems that arise with the stimulus of environmental damage cases. Environmental problem-solving ability is the process by which students

solve a problem they face until the issue is no longer a problem. Problem-solving ability is the skill or potential possessed by students to solve problems and apply them in daily life (Iwan et al., 2024).

To develop environmental problem-solving abilities, efforts are needed to train and improve these abilities to create quality human resources (Afifah et al., 2024). In learning with the provision of cases that fit the real context, it will develop students' ability to develop hypotheses and their thinking skills so that they can provide solutions to environmental problems (Porzecanski et al., 2021). In conducting learning with real contexts, lecturers play a role in shaping students' initial understanding to build a bridge of their thinking (Wibowo et al., 2023) so that they can develop the ability to provide solutions for solving environmental problem

CONCLUSION

Conservation biology lectures with a local wisdom approach can serve as a platform to shape environmental care attitudes and character, and enhanced environmental problem-solving abilities for students. The learning process, supported by the habituation of positive behaviors, direct learning, the provision of context-appropriate cases, and a community-based approach within local wisdom, can enrich students' experiences and understanding in developing competencies within themselves. Thus, students who play a significant role in the future can become agents of solutions to environmental problems and conservation challenges that arise in line with contemporary challenges (Slater et al., 2024) and be strengthened by their habits in performing positive activities toward the environment. Therefore, the role of conservation biology lectures is crucial in shaping new characters ready to exemplify good environmental practices and provide solutions to emerging environmental problems without disregarding indigenous communities within the local wisdom of the area.

REFERENCES

Afifah, S. N., Muhdhar, M. H. I. Al, Suhadi, S., Aisyah, D. F. N., & ... (2024). The The Linkage Between Problem Solving Skills and Social Attitudes with Environmental Literacy of 10th Grade Students at SMAN 7 Malang. *22*(1), 102–111. https://doi.org/10.19184/bioedu.v22i1.43776

Armanda, F. (2020). Integrasi Alquran Dalam Pembelajaran & Penelitian Biologi Konservasi Berbasis Indigenous Knowladge. *Prosiding Seminar Nasional Pendidikan Biologi*, *5*(1), 16–20. http://proceedings.radenfatah.ac.id/index.php/semnaspbio

BPS. (2024). Catalog : 1101001. In *Statistik Indonesia 2024* (Vol. 1101001). https://www.bps.go.id/publication/2020/04/29/e9011b3155d45d70823c141f/statistik-indonesia-2020.html

Irfianti, M. D., Khanafiyah, S., & Astuti, B. (2016). Perkembangan Karakter Peduli Lingkungan melalui Model Experiential Learning. *Unnes Physics Education Journal*, *5*(3), 73–76. http://journal.unnes.ac.id/sju/index.php/upej

Iwan, I., Sumitro, S. B., Ibrohim, I., & Rohman, F. (2024). the Effect of Pbl Integrated With Igya Ser Hanjob'S Local Wisdom To Improve Students' Problem Solving Skills in

Conservation Biology Courses. *Jurnal Eduscience*, *11*(1), 20–32. https://doi.org/10.36987/jes.v11i1.5537

Jumriani, Ilmiyannor, M., & Mi'rajiatinnor, D. (2021). Strengthening Environmental Care Attitudes Through Social Wisdom-Based Social Studies Learning. *Proceedings of the 2nd International Conference on Social Sciences Education (ICSSE 2020)*, *525*(Icsse 2020), 65–69. https://doi.org/10.2991/assehr.k.210222.009

Librata, W., Gunawati, D. G., & Triyanto, T. (2019). Formation of Character of Environmental Care Based on Local Wisdom in Surakarta. *Budapest International Research and Critics Institute (BIRCI-Journal) : Humanities and Social Sciences*, *2*(4), 274–280. https://doi.org/10.33258/birci.v2i4.614

Mutia, E., Lydia, E. N., & Purwandito, M. (2020). River Map Sungai Krueng Langsa sebagai Pengendalian Banjir Kota Langsa (River Map of Krueng Langsa River as Flood Control in Langsa City). *Jurnal Teknologi*, *12*(2), 141–150.

Porzecanski, A. L., Bravo, A., Groom, M. J., Dávalos, L. M., Bynum, N., Abraham, B. J., Cigliano, J. A., Griffiths, C., Stokes, D. L., Cawthorn, M., Fernandez, D. S., Freeman, L., Leslie, T., Theodose, T., Vogler, D., & Sterling, E. J. (2021). Using case studies to improve the critical thinking skills of undergraduate conservation biology students. *Case Studies in the Environment*, *5*(1). https://doi.org/10.1525/cse.2021.1536396

Ridhwan, Sumarmi, Ruja, I. N., Utomo, D. H., & Sari, R. M. (2020). Measuring students environmental problem solving ability across gender and school differences using paper based testing. *International Journal of Emerging Technologies in Learning*, *15*(13), 303–320. https://doi.org/10.3991/ijet.v15i13.11709

Rimba, F., & Ranny, R. (2023). Analysis of Environmental Problem-Solving Ability of Students In Class XI Social Science at State Senior High School 17 West Jakarta. *Tunas Geografi*, *12*(1), 9. https://doi.org/10.24114/tgeo.v12i1.42473

Silva, A. M. da and, & Rodgers, J. (2018). Deforestation across the World: Causes and Alternatives for Mitigating. *International Journal of Environmental Science and Development*, *9*(3), 67–73. https://doi.org/10.18178/ijesd.2018.9.3.1075

Slater, H., Fisher, J., Holmes, G., & Keane, A. (2024). Mismatch between conservation higher education skills training and contemporary conservation needs. *Conservation Science and Practice*, *6*(4), 1–14. https://doi.org/10.1111/csp2.13112

Syarief, E. (2022). International Journal of Energy Economics and Policy The Effect of Environmental Care, Environmental Knowledge, and Perceived Consumer Effectiveness on Attitudes and Buying Intentions of Electric Vehicles. *International Journal of Energy Economics and Policy |*, *12*(5), 505–511. http:www.econjournals.com

Wibowo, N. A., Sumarmi, S., Utaya, S., Bachri, S., & Kodama, Y. (2023). Students' Environmental Care Attitude: A Study at Adiwiyata Public High School Based on the New Ecological Paradigm (NEP). *Sustainability (Switzerland)*, *15*(11). https://doi.org/10.3390/su15118651