Assessment of Learners' Proficiency in Albay Biosphere Reserve (ABR) Concepts: A Basis for Curricular Integration

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ABSTRACT

This research focused on determining the proficiency levels of Grade 8 learners in terms of Albay Biosphere Reserve (ABR) concepts across three domains: knowledge, sensitivity, and practice. Utilizing a descriptive research design with 41 Grade 8 respondents from Jovellar National High School, Jovellar Albay Philippines, the study identified a significant pedagogical gap despite Albay's UNESCO designation. Assessments revealed a foundational but incomplete grasp of local ecological systems wherein learners achieved a 'moderate' proficiency level in Knowledge (M=32.20), an ‘average’ level of Environmental Sensitivity (M=3.17), and a notable 2.53 mean interpreted as ‘moderately observed’ in Environmental Practices. The study highlights the need for developing lessons structured in supporting the integration of Albay Biosphere Reserve Concepts in science education.

Keywords: Albay Biosphere Reserve (ABR), Knowledge Proficiency, Environmental Sensitivity, Place-Based Education

INTRODUCTION

Biosphere reserves are designated as critical sites for conserving biodiversity while simultaneously supporting sustainable livelihoods and community well-being. According to UNESCO (2024), these areas serve as "living laboratories" for sustainable development.

In the Philippines, this mandate is legally reinforced by Republic Act No. 9512, also known as the National Environmental Awareness and Education Act of 2008, which mandates the Department of Education to integrate environmental literacy into the basic curriculum. For the Province of Albay, this takes on specialized significance due to its status as a UNESCO Biosphere Reserve (ABR). However, actual classroom observations reveal a gap between this global status and local pedagogy, where lessons often remain textbook-centric and disconnected from the students' immediate surroundings.

Addressing this gap necessitates a baseline evaluation of Knowledge proficiency. The success of educational mandates depends on identifying what learners currently understand about their protected landscapes. As the UNESCO SeaBRnet Reports (2019) indicate, there is a recurring lack of technical understanding regarding biosphere zonation and resource management among local stakeholders. Therefore, determining the proficiency of Grade 8 students regarding ABR concepts is essential to move beyond common science instruction toward place-based mastery which this study aims.

The second dimension of learner proficiency is Environmental Sensitivity, or the affective connection a student feels toward their natural heritage. This emotional engagement is a primary driver of environmental concern. As noted by Chawla (2020), place-based knowledge makes learning more meaningful and serves as a catalyst for developing positive environmental attitudes. In the context of Albay, a province identified by the UNDP Philippines (2023) as highly vulnerable to climate-induced disasters, measuring this sensitivity is crucial. Understanding whether students perceive the ABR as a vital protective shield or merely a geographic background is fundamental to diagnosing their readiness for ecological stewardship.

Finally, proficiency must be measured through Environmental Practice. A documented value-action gap often exists where awareness fails to translate into behavior. According to Steg and Vlek (2019), pro-environmental behavior is heavily influenced by individual motivation and the immediate school context. At Jovellar National High School, a decline in sustainable behaviors post-pandemic such as improper waste segregation and increased energy consumption highlights an urgent need to assess current practices. By evaluating these three domains; Knowledge, Sensitivity, and Practice, this study establishes the empirical baseline necessary to align with UN Sustainable Development Goal 13 and the EDCOM 2 priority of enhancing educational relevance.

METHODOLOGY

The study employed a descriptive-evaluative research design. Quantitative data was gathered through a researcher-made proficiency test validated by expert jurors (Mean Rating = 4.70/5.00). The domains evaluated were; (a) Knowledge: Cognitive mastery of biodiversity and ABR concepts, (b) Sensitivity: Affective responses to local environmental issues in terms of Awareness and Participation, and (c) Practice: Self-reported and observed sustainable behaviors.

To assess the proficiency levels of Grade 8 learners at Jovellar National High School, Schools Division Office (SDO) of Albay, during the school year 2025–2026. The respondents consisted of one intact class of forty-one (41) Grade 8 students significantly residents within the Albay Biosphere Reserve (ABR), providing a natural and immediate context for evaluating their lived experiences and ecological literacy within a UNESCO-designated "living laboratory."

For the statistical treatment of the data, the study utilized descriptive statistics to ensure a strong quantitative analysis. The mean and percentage were employed to describe the students' proficiency levels and mastery scores in each domain. Qualitative data from the respondents, stakeholder feedback, and teachers observation notes were categorized and themed to complement the numerical results, ensuring a comprehensive evaluation of the proficiency levels of Grade 8 learners in terms of Albay Biosphere Reserve (ABR) concepts.

RESULTS AND DISCUSSION

This study determined the learners ' levels of ABR knowledge, sensitivity and practice through designed tests, structured to align with a detailed table of specifications. The tests aimed to gauge the cognitive understanding and emotional engagement of learners regarding various ABR and environmental concepts and scales. ABR knowledge provides a cognitive understanding of environmental issues fostering a personal connection to the natural world.

Table 1. Level of Knowledge in Albay Biosphere Reserve (ABR) Concepts of the Respondents

ABR Concepts	Mean Score	%	Verbal Interpretation
DRR & Climate Resilience	3.59	71.71	Moderate
Environmental Awareness & Biosphere Interaction	3.49	69.76	Moderate
Community Based Disaster Management	3.07	61.46	Moderate
Sustainable Renewable Energy Development	3.46	69.27	Moderate
Sustainable Mobility & Environmental Planning	3.76	75.12	Good
Energy in Natural Ecosystems	3.56	71.22	Moderate
Energy Transformation in Natural Process	2.93	58.54	Moderate

Mechanical Energy in Environmental Systems	2.71	54.15	Moderate
Conservation of Energy in Natural Systems	2.93	58.54	Moderate
Sustainable Hydropower & Resource Management	2.71	54.15	Moderate
TOTAL	**32.20**	**64.39**	**Moderate**

The data presented reveals that the overall baseline knowledge in ABR concepts of the respondents falls under the "Moderate Knowledge" category, having a mean of 32.20 and with 64.39 percent. The results presented underscore a critical educational gap.

The assessment shows that DRR & Climate Resilience (Mean: 3.59, 71.71%) and Environmental Awareness (Mean: 3.49, 69.76%) both fall within the Moderate range. This shows that while students have a foundational awareness of environmental issues, they may lack the hazard literacy required for proactive engagement. Research indicates that while many students can identify environmental problems, they often struggle with the scientific reasoning and systems thinking necessary to implement solutions (Lee et al., 2025). The Moderate score in Community-Based Disaster Management (Mean: 3.07) reflects global trends where disaster risk reduction (DRR) education is often integrated into curricula but remains at a theoretical level rather than a practical, community-based level (Frontiers in Sustainability, 2026).

Sustainable Mobility & Environmental Planning got the highest, which earned a Good verbal interpretation (Mean: 3.76, 75.12%). This higher performance is likely due to the initiatives of sustainable development and urban planning concepts in modern curricula. Access to clean and green campus initiatives and eco-friendly infrastructure has been shown to significantly boost students' environmental intentions and their ability to conceptualize sustainable planning (Frontiers in Psychology, 2025).

Since the students are more proficient in conceptualizing broad planning goals than understanding the physical laws, the data suggests an integration between environmental awareness and technical literacy.

Table 2. Level of Environmental Sensitivity of the Respondents

Environmental Sensitivity Scale	Mean	%	Interpretation
Awareness	3.45	69.00	Average Level of Environmental Sensitivity
Participation	2.88	57.64	Average Level of Environmental Sensitivity
TOTAL	3.17	63.33	Average Level of Environmental Sensitivity

Table 2 presents the level of environmental sensitivity among Grade 8 students, measured across two dimensions: awareness and participation. The scale used ranges from 1.00 to 5.00, with scores categorized into levels from very low to high environmental sensitivity.

The results from the Environmental Sensitivity Scale indicate that the respondents have an Average Level of Environmental Sensitivity, with a total mean score of 3.17 (63.33%). While there is a foundational recognition of environmental issues, there is a visible performance gap between mental awareness and physical action.

The table shows that Awareness (Mean: 3.45, 69.00%) scores higher than Participation (Mean: 2.88, 57.64%). This variation is a well-documented phenomenon in environmental psychology known as the Value-Action Gap. Even when individuals possess a moderate level of environmental knowledge and sensitivity, this does not automatically translate into active participation in conservation efforts. Recent studies suggest that while educational institutions are successful at increasing "cognitive" sensitivity (knowing that an issue exists), they

often struggle to foster "conative" sensitivity, the drive to actually participate in pro-environmental behaviors (Frontiers in Psychology, 2025). The lower score in

Participation (57.64%) suggests that respondents may face barriers such as a lack of perceived behavioral control or insufficient opportunities for engagement. Research indicates that environmental sensitivity is often passive; individuals may feel concerned about the climate but lack the environmental self-efficacy to believe their individual actions such as waste segregation or community cleanup will make a difference (MDPI Sustainability, 2024). Furthermore, participation levels are often suppressed when environmental education is purely theoretical rather than project-based or community-linked.

An Average Level of total sensitivity (3.17) serves as a critical baseline. According to Hungerford and Volk's traditional model of environmental behavior, sensitivity is a "level one" entry-point variable. Without moving this score from "Average" to "High," it is unlikely that individuals will progress to the higher-level "ownership" and "empowerment" stages required for lifelong environmental stewardship (Journal of Environmental Education Research, 2024). The current findings suggest that while the respondents are not indifferent, their sensitivity has not yet reached the tipping point necessary to trigger consistent environmental advocacy.

The respondents might lack familiarity with the principles of sustainability, including conservation efforts, waste reduction, and the importance of renewable energy sources. Students' responses on the pretest of environmental sensitivity awareness questions revealed that while there was a general recognition of environmental issues, some answers lacked depth, specificity, and personal reflection. This highlights a foundational awareness of resource depletion and solid waste management issues in Albay.

The mention of "waste of trees" specifically links to concerns within the ABR's zones, where deforestation is a primary threat. Despite feeling "not good at it," the student expresses a desire to help: "So I will gawa my own work to help in another way." This is a highly significant finding for participation data. It shows that even when students feel academically overwhelmed by complex ABR concepts, they still possess an innate drive toward alternative participation. They seek ways to contribute that don't require technical expertise, such as localized, personal actions.

One of the most critical findings is the respondent's answer to Question 3: "It's not help me because it to hard it for myself." This reveals a cognitive barrier to environmental literacy. Even if information is available via news or social media, the language or technicality of "biodiversity protection" and "ABR concepts" may be too complex for some learners.

For solutions, the respondent suggests "clean up" and "tree planting." The student associates environmental protection with physical/restorative actions rather than policy or systemic change. This suggests that although students are aware of environmental concepts, their ability to articulate meaningful insights and demonstrate genuine emotional engagement with environmental issues remains limited. This result is supported by a study analyzing students' environmental awareness profiles, which found that environmental awareness is often overlooked in character education. As a result, many students exhibit indifference toward environmental issues. This indifference not only diminishes their personal engagement in environmental protection but also influences the attitudes of their peers, ultimately weakening collective efforts toward environmental preservation and restoration (Kim et al., 2022). The findings emphasized the importance of integrating values based and affective components into environmental education to foster deeper emotional engagement and meaningful reflections among learners.

In terms of participation, preliminary data reveals that students' environmental sensitivity participation was somewhat limited with some students expressing hesitation or choosing not to participate many showed a clear willingness to engage in environmental activities. When asked about sustainable practices at home, the respondent writes: "when we have a lot of trash we clean it and we should borning [burning] it." This is a critical finding. Despite the respondent's positive intent to "clean," they identify open burning as a sustainable solution. In the context of the Albay Biosphere Reserve, this indicates a deep-seated misconception about waste management. Open burning is illegal under RA 9003 (Ecological Solid Waste Management Act) and is detrimental to the air quality of the biosphere.

The respondents noted their participation in "Brigada Eskwela" before the first day of school suggests that environmental practice for students in Albay is heavily tied to school-based institutional programs. “I joined the Brigada in the school before the first day of school.” The Brigada Eskwela serves as a primary entry point for environmental participation, reinforcing the quantitative data that "School and Peer Engagement" is a significant driver of environmental practice.

The respondent expresses a strong "Yes" to joining a group “becose [because] I want to laerne [learn]" the community group protect environmenta [environment]." This shows a high level of social Interest. The student recognizes that their individual knowledge may be limited (linking back to the "it's hard for myself" sentiment in previous images) and views a "community group" as a vehicle for learning. It suggests that students in Albay value social learning and collective action over solitary study.

The mention of "burning trash" as a helpful activity highlights a major educational gap in the Bicol region. According to Aguilar (2021), many households in rural Albay still practice "pagsisiga" (backyard burning) because they view it as a way to "clean" the surroundings. This finding explains why environmental practices might have been "Moderate" students are active, but their actions are sometimes misguided. The student's desire to "learn from the community group" aligns with Villaluz et al. (2024), who found that participatory workshops in the Philippines are more effective at changing environmental behavior than standard lectures. The students "Yes" confirm that there is an untapped volunteer spirit in the ABR that simply needs the right educational framework to be activated.

The integration of environmental knowledge and sensitivity is a fundamental precursor to the development of responsible ecological behaviors (Fenitra R.M. et al., 2021). While knowledge provides the cognitive framework necessary to navigate complex environmental issues, sensitivity serves as the affective driver that translates this understanding into sustainable daily actions. This interaction is vital for nurturing a generation that possesses both the intellectual capacity and the emotional dedication required for global environmental stewardship.

Table 3. Level of Environmental Practice of the Respondents

Environmental Practice Scale	Mean	%	Interpretation
Application & Sustainable Practices in School	2.58	51.67	Moderately Observed
School and Peer Engagement	2.71	54.17	Moderately Observed
Integration of Albay Biosphere Reserve Lessons	2.29	45.83	Fairly Observed
TOTAL	**2.53**	**50.56**	Moderately Observed

The integration of the qualitative behavioral observations with the Environmental Practice Scale (Total Mean: 2.53 / 50.56%) reveals a disconnect between classroom system and real-world application. While students may possess the words of environmentalism, their habits indicate a state of environmental disengagement.

The score for Application and Sustainable Practices in School (Mean: 2.58, 51.67%) is reflected by the observation of students mixing waste and leaving utilities running. This represents a classic Value-Action Gap, where individuals fail to align their behaviors with their stated values or known information. In environmental psychology, this is often attributed to a lack of procedural knowledge. Students know that pollution is bad (declarative knowledge), but they haven't internalized how to change their habits or why their individual actions matter (procedural knowledge). Studies suggest that without nudges, visual or social cues that prompt action, theoretical knowledge remains inactive (Kollmuss & Agyeman, 2024).

School and Peer Engagement (Mean: 2.71, 54.17%) remains "Moderately Observed," supported by reports of students walking past litter or ignoring leaking faucets. This behavior suggests an unclear view of responsibility, where students assume stewardship is the role of the administration or janitorial staff. Research on campus sustainability indicates that when environmental topics are only discussed during graded quizzes, students

categorize the environment as an academic burden rather than a public duty. This leads to the bystander effect in conservation, where students do not feel empowered to intervene in environmental degradation unless explicitly instructed (Journal of Environmental Psychology, 2025).

The lowest performing area, Integration of Albay Biosphere Reserve Lessons (Mean: 2.29, 45.83%), is a significant finding. Learners ' reliance on textbook examples like tigers and rainforests while ignoring the Albay Biosphere Reserve indicates a lack of place-based literacy. When students view Mt. Mayon merely as a tourist icon or a threat “lahar drills as breaks", they fail to develop nature relatedness. Studies show that "Geographic Alienation" is knowing more about global issues than local ecosystems and hindrance the development of a stewardship mindset.

Localized education is essential for moving learners from a "Fairly Observed" status to active protection of their unique UNESCO heritage (Sobel, 2024). The data of the "Academic Environmentalist": a student who can define "ecology" for a grade but treats a "Clean-and-Green" drive as a chore. The Moderate to Fair observation levels suggest that environmentalism in the school is currently performative rather than instinctive.

To bridge this gap, the school must shift from "Globalized Learning" (tigers and climate change) to "Local Stewardship" (Mayon’s health and waste reduction). By transforming earthquake and lahar drills from "breaks" into lessons on the geological and biological importance of the Bicol region, the school can foster the sense of urgency and ownership currently missing in the learners’ body.

SYNTHESIS OF FINDINGS

The study reveals that Grade 8 respondents possess a "Moderate" level of baseline knowledge (64.39%) and an "Average" level of environmental sensitivity (63.33%), yet struggle significantly in the domain of environmental practice (50.56%). While students demonstrate "Good" proficiency in broad concepts like Sustainable Mobility, they falter in technical areas such as Mechanical Energy and Energy Transformation, suggesting that their understanding of the Albay Biosphere Reserve (ABR) is more conceptual than scientific. Furthermore, a pronounced Value-Action Gap exists; although students are aware of environmental issues, their participation remains "Moderately Observed," often hampered by cognitive barriers and persistent misconceptions most notably the belief that "open burning" is a sustainable waste management solution.

CONCLUSION

It is concluded that the current curriculum at Jovellar National High School is successful in fostering "cognitive" sensitivity but fails to provide the procedural knowledge and place-based literacy necessary to move students from passive awareness to active, instinctive stewardship of their UNESCO heritage.

To bridge the gap between theoretical knowledge and practical action, it is strongly recommended the integration of ABR concepts in the curriculum, shifting from globalized examples to localized, place-based pedagogy that utilizes Mt. Mayon and the Bicol zonation as living laboratories. Finally, specialized teacher training workshops, in coordination with APSEMO and PTCAO, are essential to equip educators who can correct deep-seated misconceptions and inspire a cultural shift where environmentalism is treated as a public duty rather than an academic chore.

Conflict of Interest

The author confirms that there is no conflict of interest to declare for this publication.

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