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Geography Experiential Learning beyond the Classroom at the University for Natural Resource Management in Chris Hani West District, South Africa

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ABSTRACT
This a journey through landscapes beyond the confines of textbooks. In this journey, future educators immerse themselves in the study of geography and become part of the dynamic rhythm of the natural world. This research explored the transformative realm of experiential learning outside the traditional classroom. Here, field trips, outdoor projects, and hands-on workshops serve as a vibrant backdrop for understanding sustainable natural resource management. This investigation focused on using geography-focused experiential learning in resource management within the Chris Hani West District of South Africa. As global environmental challenges escalate, the need for innovative educational approaches has become unprecedented. This study, guided by David Kolb's experiential learning theory (ELT), adopted an interpretive research paradigm through a phenomenological lens. The purposive and snowball sampling methods were employed for participant recruitment, and one-on-one data collection provided deep insight into participants' subjective experiences. Thematic analysis was used to present our findings. The results disclosed the potential of experiential learning to cultivate environmental stewardship and empower individuals as active contributors to resource conservation efforts. Importantly, the study highlights the necessity and value of internships and apprenticeships in this educational paradigm. It further investigated the critical role of experiential learning in geography education for effective natural resource management. Some recommendations suggested promoting activities like field trips, habitat restoration efforts, and simulations to provide student teachers with essential hands-on experience and skill-building opportunities. State the contribution of this study to scholarship.

Keywords: *Experiential Learning, Effectiveness, Geography, Natural Resource Management, Classroom Settings.*

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INTRODUCTION
In an age increasingly defined by urgent environmental dilemmas and the imperative for sustainable resource management, the role of education has evolved beyond traditional classroom walls. Acknowledging the inherent limitations of purely theoretical learning, educators and researchers have leaned toward experiential learning as a critical vehicle for nurturing a deep understanding of complex

issues such as natural resource management.[1] This study explores the transformative possibilities of these experiential approaches in shaping sustainable resource management practices.

South Africa lacks a specific national education policy devoted solely to experiential learning, however linking the United Nations Sustainable Development Goals (SDGs) to geography-focused experiential learning initiatives in the Chris Hani West District illustrates how such educational endeavors can further broader global sustainability aims. Notably, SDG 1 targets global poverty eradication. Fang and Toole assert that geography experiential learning equips communities with sustainable resource management skills, enabling them to use resources more effectively and potentially break the cycle of poverty.[2] SDG 2 seeks to eliminate hunger, with a geographical understanding of food production and distribution as a critical tool for addressing food insecurity in the region.[3] SDG 3 focuses on health and well-being; effective natural resource management fosters healthier environments, mitigating pollution-related health risks.[4] SDG 4 guarantees access to quality education, with experiential learning providing meaningful educational experiences relevant to careers in geography and resource management.[5] SDG 5 promotes gender equality, highlighting that involving diverse groups in experiential learning, especially women and girls, can increase participation in education and decision-making processes surrounding resource management.[6]

SDGs 13 and 16 urge climate action; understanding the geographical dimensions of climate change enables students to contribute effectively to local climate initiatives.[7] By fostering environmental awareness and sustainable practices, experiential learning can help build resilient communities and promote stability within the district.[8] Additionally, SDG 17 emphasizes the necessity of partnerships to achieve educational goals. Vasconcelos et al. highlight collaboration among universities, community entities, governmental bodies, and NGOs as essential for successful experiential learning initiatives in resource management.[9] Integrating experiential learning across curricular segments specifically in geography, science, and environmental studies- is critical, as Mahlaba highlighted.[10] The South African education system seeks to bolster student teachers' practical experiences alongside theoretical knowledge to deepen understanding and refine critical thinking and problem-solving skills.[11]

Natural resource management challenges encompass the delicate balance between human needs and ecological preservation; escalating threats such as climate change, habitat loss, and pollution highlight the urgent necessity for sustainable resource management.[12] In response, educational programs must produce professionals with theoretical understanding and practical skills for tackling these intricacies.[13] While traditional classroom learning lays the foundation, it often lacks the immersive experiences needed to transition from theory to application. Experiential learning enables student

[1] Omkar Joshi et al., "Benefits and Challenges of Online Instruction in Agriculture and Natural Resource Education," *Interactive Learning Environments* 30, no. 8 (2022): 1402–13.
[2] Jim Fang and Jacqueline O'Toole, "Embedding Sustainable Development Goals (SDGs) in an Undergraduate Business Capstone Subject Using an Experiential Learning Approach: A Qualitative Analysis," *The International Journal of Management Education* 21, no. 1 (2023): 100749.
[3] Fang and O'Toole, "Embedding Sustainable Development Goals (SDGs) in an Undergraduate Business Capstone Subject Using an Experiential Learning Approach: A Qualitative Analysis."
[4] Carlos Martínez-Hernández and Carmen Mínguez, "The Anthropocene and the Sustainable Development Goals: Key Elements in Geography Higher Education?," *International Journal of Sustainability in Higher Education* 24, no. 7 (2023): 1648–67.
[5] Martínez-Hernández and Mínguez, "The Anthropocene and the Sustainable Development Goals: Key Elements in Geography Higher Education?"
[6] Clara Vasconcelos et al., "Teaching Sustainable Development Goals to University Students: A Cross-Country Case-Based Study," *Sustainability* 14, no. 3 (2022): 1593.
[7] Vasconcelos et al., "Teaching Sustainable Development Goals to University Students: A Cross-Country Case-Based Study."
[8] Martínez-Hernández and Mínguez, "The Anthropocene and the Sustainable Development Goals: Key Elements in Geography Higher Education?"
[9] Vasconcelos et al., "Teaching Sustainable Development Goals to University Students: A Cross-Country Case-Based Study."
[10] S.C. Mahlaba, "Reasons Why Self-Directed Learning Is Important in South Africa during the COVID-19 Pandemic," *South African Journal of Higher Education* 34, no. 6 (2020): 120–36.
[11] Shireen Motala and Kirti Menon, "In Search of the'new Normal': Reflections on Teaching and Learning during Covid-19 in a South African University," *Southern African Review of Education with Education with Production* 26, no. 1 (2020): 80–99.
[12] Joanne M Moyer and A John Sinclair, "Learning for Sustainability: Considering Pathways to Transformation," *Adult Education Quarterly* 70, no. 4 (2020): 340–59.
[13] Helen Kopnina, "Education for the Future? Critical Evaluation of Education for Sustainable Development Goals," *The Journal of Environmental Education* 51, no. 4 (2020): 280–91.

teachers to engage directly with real-world challenges in natural resource management.[14] Although there is a growing recognition of experiential learning's importance in nurturing sustainability awareness and aptitude in natural resource management, there is a research gap concerning the long-term impacts of these experiential initiatives. Numerous studies may examine short-term outcomes like immediate shifts in knowledge or attitudes, but a scarcity of research captures how these experiences shape participants' career trajectories, behaviors, and decision-making over the long haul. This experiential learning is valuable in cultivating a profound grasp of environmental issues and sustainable practices. By placing student teachers in authentic contexts, experiential learning enriches their comprehension of ecological systems and instills a sense of responsibility and empathy toward the environment. Furthermore, it equips these educators with critical competencies such as data collection, analysis, and informed decision-making necessary for effective resource management. Against this backdrop, the study aims to investigate how geography-focused experiential learning beyond the classroom can support effective natural resource management in the Chris Hani West District, South Africa. The study further aims to reveal how experiential learning fosters sustainability competencies within natural resource management. By investigating the impacts of these experiences on the attitudes of participants, knowledge retention, skills acquisition, and future aspirations, we aim to provide insights that can enhance pedagogical methodologies, curriculum design, and policy frameworks in environmental education. Ultimately, exploring experiential learning and sustainable resource management has the potential to mold a new generation of professionals poised to confront the environmental challenges of our time.

LITERATURE REVIEW

Contribution of Geography Experiential Learning to Natural Resource Management

Experiential learning in natural resource management is identified as a hands-on educational methodology that actively immerses student teachers in real-world scenarios, empowering them to interact directly with the environments, processes, and stakeholders involved in managing natural resources.[15] This approach facilitates a deeper comprehension of the multifaceted challenges tied to sustainable resource use by transcending traditional classroom settings, as observed by Haleem et al.[16] Experiential learning occurs in genuine contexts, allowing student teachers to observe and engage with the natural resources they study.[17] This direct interaction cultivates an appreciation for the complexities inherent in ecosystems, landscapes, and the resources they encompass.

Managing natural resources necessitates understanding intricate interconnections among ecological, social, economic, and cultural dimensions.[18] Through experiential learning, student teachers confront the multi-dimensional nature of resource management, fostering insights into how different components influence one another. Turnbull, Chugh, and Luck emphasize that this form of education presents real challenges requiring critical thinking and informed decision-making, often within the constraints of limited information.[19] This experience nurtures essential problem-solving skills as students wrestle with trade-offs and consider the possible implications of various management strategies.[20]

Furthermore, successful resource management often hinges on collaboration among diverse stakeholders, including local communities, government bodies, industry representatives, and conservation groups. As Kopnina noted, experiential learning provides opportunities for student teachers to engage with these parties, enhancing their understanding of contrasting perspectives and the necessity

[14] Shu-Chen Cheng, Gwo-Jen Hwang, and Chih-Hung Chen, "From Reflective Observation to Active Learning: A Mobile Experiential Learning Approach for Environmental Science Education," *British Journal of Educational Technology* 50, no. 5 (2019): 2251–70.
[15] Roberto Rivas Hermann and Marilia Bonzanini Bossle, "Bringing an Entrepreneurial Focus to Sustainability Education: A Teaching Framework Based on Content Analysis," *Journal of Cleaner Production* 246 (2020): 119038.
[16] Abid Haleem et al., "Understanding the Role of Digital Technologies in Education: A Review," *Sustainable Operations and Computers* 3 (2022): 275–85.
[17] Mark Lubell, William Blomquist, and Lisa Beutler, "Sustainable Groundwater Management in California: A Grand Experiment in Environmental Governance," *Society & Natural Resources* (Taylor & Francis, 2020).
[18] Jorge Gustavo Rodríguez Aboytes and Matthias Barth, "Transformative Learning in the Field of Sustainability: A Systematic Literature Review (1999-2019)," *International Journal of Sustainability in Higher Education* 21, no. 5 (2020): 993–1013.
[19] Darren Turnbull, Ritesh Chugh, and Jo Luck, "Learning Management Systems, an Overview," *Encyclopedia of Education and Information Technologies*, 2020, 1052–58.
[20] Kaveh Asiaei et al., "Green Intellectual Capital and Environmental Management Accounting: Natural Resource Orchestration in Favor of Environmental Performance," *Business Strategy and the Environment* 31, no. 1 (2022): 76–93.

for inclusive decision-making.[21] This engagement also cultivates adaptability, enabling student teachers to navigate an ever-evolving landscape characterized by unexpected challenges and ecosystem variability.[22]

Resource management invariably involves ethical considerations surrounding equity, environmental justice, and the long-term ramifications of decisions.[23] Experiential learning fosters reflection on these ethical facets as student teachers observe the real-world effects of differing management approaches. As Moseley et al. suggested, this learning bridges the gap between theoretical frameworks and practical applications, allowing student teachers to assimilate learned concepts into tangible experiences and vice versa.[24] This engagement cycle enhances their understanding of academic theories and solidifies lasting knowledge retention.[25]

Natural resource management is often fraught with uncertainty regarding climate change, resource scarcity, and market fluctuations.[26] Experiential learning equips student teachers with the confidence to confront uncertainty and develop dynamic strategies for resource management.[27] Encouraging a holistic view of interactions that define ecosystems and resource use, this approach instills a mindset appreciative of complexity, leading to a recognition that reductive solutions are rarely adequate.[28] Through real-world immersion, experiential learning strengthens student teachers' familiarity with natural resource management, equipping them with vital practical skills for navigating contemporary challenges associated with sustainable resource use in interconnected environments.[29]

THEORETICAL FRAMEWORK

Experiential Learning Theory (ELT) by David Kolb (1970)

This study incorporates David Kolb's Experiential Learning Theory (ELT), which emphasizes the essential role of experiences in the educational process. As established by Passarelli and Kolb, ELT posits that learning is most effective when individuals engage in concrete experiences, reflect on these experiences, conceptualize theories or ideas from these reflections, and subsequently apply their insights to future situations.[30] The emphasis on active engagement, reflection, and application renders this theory particularly relevant to sustainability education beyond the classroom and aligns seamlessly with the nuances of natural resource management.[31]

ELT encourages active participation in real experiences related to environmental issues and resource management challenges.[32] Instead of solely acquiring knowledge from textbooks, student teachers actively engage in activities, such as field excursions or community projects, enriching their comprehension of sustainability concepts.[33] For example, student teachers may investigate local

[21] Kopnina, "Education for the Future? Critical Evaluation of Education for Sustainable Development Goals."
[22] Ashraf Alam, "Mapping a Sustainable Future Through Conceptualization of Transformative Learning Framework, Education for Sustainable Development, Critical Reflection, and Responsible Citizenship: An Exploration of Pedagogies for Twenty-First Century Learning," *ECS Transactions* 107, no. 1 (April 24, 2022): 9827–40, https://doi.org/10.1149/10701.9827ecst.
[23] Eliseo P Marpa, "Navigating Environmental Education Practices to Promote Environmental Awareness and Education.," *Online Submission* 2, no. 1 (2020): 45–57.
[24] Christine Moseley et al., "Road to Collaboration: Experiential Learning Theory as a Framework for Environmental Education Program Development," *Applied Environmental Education & Communication* 19, no. 3 (2020): 238–58.
[25] Yared Nigussie Demssie et al., "Combining Indigenous Knowledge and Modern Education to Foster Sustainability Competencies: Towards a Set of Learning Design Principles," *Sustainability* 12, no. 17 (2020): 6823.
[26] Anna Mróz, Iwona Ocetkiewicz, and Barbara Tomaszewska, "What Should Be Included in Education Programmes–The Socio-Education Analysis for Sustainable Management of Natural Resources," *Journal of Cleaner Production* 250 (2020): 119556.
[27] S M Constantino et al., "Cognition and Behavior in Context: A Framework and Theories to Explain Natural Resource Use Decisions in Social-Ecological Systems," *Sustainability Science* 16, no. 5 (2021): 1651–71.
[28] Kgosietsile Velempini and Bruce Martin, "Place-Based Education as a Framework for Tourism Education in Secondary Schools: A Case Study from the Okavango Delta in Southern Africa," *Journal of Hospitality, Leisure, Sport & Tourism Education* 25 (2019): 100197.
[29] Marcellus Mbah, Sandra Ajaps, and Petra Molthan-Hill, "A Systematic Review of the Deployment of Indigenous Knowledge Systems towards Climate Change Adaptation in Developing World Contexts: Implications for Climate Change Education," *Sustainability* 13, no. 9 (2021): 4811.
[30] Angela M Passarelli and David A Kolb, "Experiential Learning Theory," *Student Learning Abroad: What Our Students Are Learning. What They're Not, and What We Can Do About It*, 2023.
[31] Moyer and Sinclair, "Learning for Sustainability: Considering Pathways to Transformation."
[32] Moseley et al., "Road to Collaboration: Experiential Learning Theory as a Framework for Environmental Education Program Development."
[33] Demssie et al., "Combining Indigenous Knowledge and Modern Education to Foster Sustainability Competencies: Towards a Set of Learning Design Principles."

ecosystems to understand biodiversity better or participate in community clean-up initiatives to grasp pollution's impacts on resources.

In the context of natural resource management, experiential learning holds particular significance. ELT's iterative process of concrete experience, reflective observation, abstract conceptualization, and active experimentation parallels the complexities intrinsic to sustainable resource management. [34] Engaging in hands-on activities like habitat restoration or water quality analysis allows student teachers to witness the immediate results of their efforts. Reflection post-activity fosters a deeper understanding of the foundational concepts associated with resource management, ultimately connecting their experiences to broader ecological theories. [35]

Informed by these insights, student teachers are poised to apply newfound knowledge to novel challenges. For instance, they might conceptualize and implement conservation initiatives grounded in ecological principles. Underpinning this active learning process, ELT catalyzes critical thinking, problem-solving, and integrative understanding of sustainability, empowering student teachers with vital skills essential for future contributions to the field. Constantino et al. assert that integrating ELT into sustainable education enhances students' comprehension while cultivating a sense of responsibility, empathy, and environmental stewardship.[36]

By engaging with real-world challenges, student teachers are better prepared to confront the complexities surrounding sustainability and natural resource management throughout their careers and personal lives.[37] This multifaceted and dynamic approach to education prepares them for their future roles and instills values that encourage long-term commitment to environmental sustainability.

METHODOLOGY

Research Design

This study employed a qualitative research design to investigate the experiential learning of geography beyond the classroom at secondary schools in the Chris Hani West District. Qualitative methods are particularly effective in unpacking complex phenomena and gaining insight into participants' perspectives and experiences. According to Rezigalla, qualitative research design facilitates a comprehensive exploration of intricate subjects through detailed analysis of non-numerical data.[38] This approach enabled the researcher to capture rich insights into the participants' experiences. A case study design was used explicitly for its capability to unveil nuanced meanings, patterns, and themes, thereby providing a deeper understanding of the research topic.

Participant Selection

Purposive sampling was employed to identify student teachers from a university in the Chris Hani West District as participants. Additionally, snowball sampling was used to further expand the participant pool. The target group included geography students at their second-year level. The sample encompassed male and female lecturers and student teachers to enhance diversity, resulting in ten participants, comprising five lecturers and five student teachers. A smaller sample size was strategically chosen to capture various perspectives and experiences. As Lai et al. noted, larger sample sizes can complicate data collection and interpretation, while smaller sizes can provide a more manageable scope.[39] However, Hu et al. (2020) emphasised that the ideal sample size should be guided by the research parameters, participant diversity,

[34] Sigit Priatmoko and Nilna Iqbal Dzakiyyah, "Relevansi Kampus Merdeka Terhadap Kompetensi Guru Era 4.0 Dalam Perspektif Experiential Learning Theory," *At-Thullab: Jurnal Pendidikan Guru Madrasah Ibtidaiyah* 4, no. 1 (2020): 1–15.
[35] Mróz, Ocetkiewicz, and Tomaszewska, "What Should Be Included in Education Programmes–The Socio-Education Analysis for Sustainable Management of Natural Resources."
[36] Constantino et al., "Cognition and Behavior in Context: A Framework and Theories to Explain Natural Resource Use Decisions in Social-Ecological Systems."
[37] Demssie et al., "Combining Indigenous Knowledge and Modern Education to Foster Sustainability Competencies: Towards a Set of Learning Design Principles."
[38] Assad A Rezigalla, "Observational Study Designs: Synopsis for Selecting an Appropriate Study Design," *Cureus* 12, no. 1 (2020).
[39] Fan Lai et al., "Oort: Efficient Federated Learning via Guided Participant Selection," in *15th {USENIX} Symposium on Operating Systems Design and Implementation ({OSDI} 21)*, 2021, 19–35.

resource availability, and data saturation, wherein new information ceases to emerge from additional participants.[40]

Data Collection Methods

According to Swain, Hagaman, and Leader-Janssen, data collection methods involve systematically gathering information to address specific research questions.[41] Data was collected through semi-structured interviews.[42] One-on-one interviews were conducted with lecturers while focus group discussions facilitated open dialogue among student teachers about their experiences with field trips, outdoor projects, and various experiential learning activities related to geography and natural resource management, with lecturers regarded as subject experts.

Data Analysis

Thematic analysis was adopted for the analysis and presentation of data. As Runkler and Thomas suggest, thematic analysis is a qualitative data analysis technique used to identify, analyze, and interpret patterns or themes within qualitative datasets.[43] Mölder et al. assert that researchers systematically organize and categorize qualitative data to identify recurring ideas or patterns.[44] This study analyzed qualitative data collected from individual interviews and focus group discussions through thematic analysis. This involved pinpointing themes, patterns, and recurring concepts to derive insights into participants' perceptions and experiences of experiential learning in the context of natural resource management.

Ethical Considerations

Ethical considerations that protect participants' rights, privacy, and well-being are paramount in research.[45] During this study, ethical principles, including obtaining informed consent from all participants, ensuring confidentiality and anonymity, and respecting participants' perspectives and experiences were strictly adhered to.

Credibility and Trustworthiness

Credibility refers to the accuracy and truthfulness of research findings, assuring that they effectively measure what they are intended to.[46] Trustworthiness relates to the consistency and stability of results over time and across various contexts.[47] Upholding credibility and trustworthiness are essential for ensuring the reliability of the information presented in this study. The researchers implemented strategies to enhance these qualities, including triangulation of data sources, member checking with participants to validate findings, and reflexivity to recognize and mitigate potential biases.

PRESENTATION OF FINDINGS

Theme: The Role of Experiential Learning in Geography Education for Natural Resource Management in Secondary Schools

Question: How can geography experiential learning beyond the classroom benefit natural resource management in the Chris Hani West District, South Africa?

[40] Yunfan Hu et al., "Participants Selection for From-Scratch Mobile Crowdsensing via Reinforcement Learning," in *2020 IEEE International Conference on Pervasive Computing and Communications (PerCom)* (IEEE, 2020), 1–10.
[41] Kristine D Swain, Jessica L Hagaman, and Elizabeth M Leader-Janssen, "Teacher-Reported IEP Goal Data Collection Methods," *Preventing School Failure: Alternative Education for Children and Youth* 66, no. 2 (2022): 118–25.
[42] Syed Haider M Rizvi and Muntazir Abbas, "From Data to Insight, Enhancing Structural Health Monitoring Using Physics-Informed Machine Learning and Advanced Data Collection Methods," *Engineering Research Express* 5, no. 3 (2023): 032003.
[43] Thomas A Runkler and Thomas A Runkler, "Data Preprocessing," *Data Analytics: Models and Algorithms for Intelligent Data Analysis*, 2020, 23–36.
[44] Felix Mölder et al., "Sustainable Data Analysis with Snakemake," *F1000Research* 10 (2021).
[45] Anna-Maija Pietilä et al., "Qualitative Research: Ethical Considerations," *The Application of Content Analysis in Nursing Science Research*, 2020, 49–69.
[46] Harsh Suri, "Ethical Considerations of Conducting Systematic Reviews in Educational Research," *Systematic Reviews in Educational Research: Methodology, Perspectives and Application*, 2020, 41–54.
[47] Suri, "Ethical Considerations of Conducting Systematic Reviews in Educational Research."

The data gathered from participants strongly agree on the effectiveness of experiential learning in enhancing students' understanding and management of natural resources. However, concerns were raised regarding the costs and organization of these programs, as reflected in the excerpts below.

Lecturer A emphasised the significance of students experiencing the ecosystems firsthand, stating, *"When student teachers go out into the field, whether it is a forest, a river, or a conservation site, they witness the natural processes they have been reading about in textbooks. This direct experience helps them connect the dots between theory and what is happening."* This statement illustrates the transformative nature of fieldwork, demonstrating that direct engagement with the natural environment allows student teachers to close the gap between theoretical understanding and real-world processes. The phrase "connect the dots" suggests that experiential learning provides a more comprehensive understanding of geographical concepts, enabling students to internalize and apply complex environmental principles by observing them in their actual settings.

Lecturer B echoed these sentiments, adding, *"These trips help students feel a real connection to the environment. Learning about a river's ecosystem in class is one thing, but it is a whole different experience to stand by that river and see how it all works."* This affirms the importance of linking emotional and sensory dimensions of learning through field experiences. Participant H emphasizes that experiential learning promotes intellectual comprehension and emotional engagement with environmental issues. The contrast between classroom learning and experiential learning in nature facilitates an understanding of ecological systems, which is crucial for shaping students' attitudes toward natural resource management. This emotional connection is vital in motivating future actions related to conservation and sustainability.

The student teachers who participated in focus group discussions resonated with their lecturers by providing personal reflections on how firsthand experiences in ecosystems clarified the significance of conservation in ways that classroom discussions could not achieve. Lecturer C shared that *"When we visited the local wetland, I realised how vulnerable these ecosystems are. Being there and observing firsthand made the importance of conservation so much clearer than what we discussed in class."* This observation indicates that fieldwork enhances students' awareness of environmental fragility, which may lead to more responsible attitudes and behaviors toward resource management. It aligns with the idea that experiential learning reinforces theoretical concepts and instills a sense of responsibility and urgency in safeguarding natural resources.

There is a collective recognition among lecturers and student teachers about the multifaceted benefits of experiential learning in geography education. Field experiences nurture cognitive, emotional, and ethical aspects of understanding, all of which are crucial for effective natural resource management. Both lecturers and student teachers emphasized the importance of integrating hands-on learning opportunities into the curriculum to develop engaged and informed future educators and environmental stewards.

All participants addressed the importance of hands-on activities like tree planting and habitat restoration. Lecturer C highlighted, "*These are not just exercises; they give students practical skills and a sense of responsibility toward the environment. When you plant a tree, you learn about photosynthesis and contribute to the planet's health."*

The quotation above highlighted the significance of hands-on activities, such as tree planting and habitat restoration in environmental education. It highlights a shared belief among educators that these practical experiences equip students with essential skills and instill a sense of responsibility towards the environment. By engaging in such activities, students connect theoretical knowledge, like photosynthesis, with real-world applications, fostering an emotional and ethical commitment to ecological sustainability and encouraging them to contribute positively to the planet's health.

The findings from the current study indicated that experiential learning encourages students to tackle real-world challenges. Lecturer D remarked, *"These activities help students learn how to work together and solve problems. Planning and executing a project like a community garden teaches them about the environment, teamwork, and leadership."* Involvement in such projects nurtures individual learning while encouraging a sense of community and cooperation among students. The quotation above disclosed the benefits of experiential learning, mainly through projects like community gardens, which enable students to confront real-world challenges. It also indicates that such activities promote teamwork,

problem-solving, environmental awareness, and leadership skills. This approach fosters individual learning and nurtures a sense of community and cooperation among students, demonstrating the effectiveness of hands-on experiential education in developing essential skills and social bonds.

The emotional satisfaction derived from engaging in meaningful projects was also emphasised. Student Teacher E expressed, *"Working on a habitat restoration project made me feel like I was contributing to something important. It is more than just theory; it is about taking action and seeing the results of our efforts."* The quotation highlights how working on essential projects can make people feel good and fulfilled. Student Teacher 5 shares that participating in a habitat restoration project was rewarding because it felt like they were making a real difference. They point out that it is not just about learning theories in the classroom but also about taking real action and witnessing the positive outcomes of their hard work. This shows that practical experiences can be very fulfilling and meaningful.

The findings from this study stress the need for students to be prepared for the genuine challenges they will face in their careers. Student teacher B proposed incorporating simulations, stating, *"Students can see the consequences of their decisions without the real-world risks by creating simulated scenarios like managing a forest fire or dealing with a drought. It is a safe way to practice problem-solving and critical thinking."* The previous quotation disclosed and suggested using simulations as a teaching method. They believe that by creating scenarios like managing a forest fire or handling a drought, students can explore the outcomes of their choices without any real-world dangers. This approach allows students to practice critical thinking and problem-solving in a safe environment.

The role of critical thinking in experiential learning was further emphasized. Student Teacher C noted, *"Participating in a simulation about water scarcity made me truly understand the difficult choices communities face. Seeing how interconnected everything is and the importance of making informed decisions."* This quote discloses the intricate nature of managing natural resources and the interconnectedness of multiple factors. It highlighted the critical need for informed decision-making, demonstrating how immersive educational experiences can enhance comprehension of real-world challenges and equip individuals to tackle complex issues thoughtfully.

The finding suggests that engaging directly with real-world scenarios helps students align their interests and skills to their career aspirations, emphasising the transformative impact of experiential learning on professional development. Student teacher E pointed out, *"These experiences give students a chance to apply what they have learned in class to real-world situations, and they often come back with a clearer sense of what they want to do in their careers. Plus, internships help them build connections in the industry, which can be invaluable later on."* The statement highlights that internships enable students to apply their classroom learning to real-world scenarios, helping them clarify their career goals. Additionally, these experiences foster valuable industry connections that can enhance future job prospects, making internships a crucial element of professional development.

The findings from the study revealed concerns regarding experiential programs' financial implications. Student teacher C cautioned, *"Field trips, for example, can be expensive, and if they are not well-organized, they might be more like a day off than a valuable learning experience. Planning these activities carefully ensures they are worth the investment."* The quotation above emphasizes that while field trips can offer valuable educational experiences, they can also be costly and might lack focus if not well-organised. It stresses the importance of careful planning to ensure that these excursions provide meaningful learning opportunities rather than serve as a day off.

The findings from this statement highlight the necessity for accessible experiential learning programs, suggesting a need for institutional support and innovation. Student Teacher D added, *"While I see the benefits of these experiential learning opportunities, I sometimes worry about funding. It would be great to have more affordable options to ensure every student has access to these experiences."* The quotation established experiential learning opportunities, such as hands-on projects and internships, to benefit student engagement and skill development. However, they express concern about the funding required for these experiences, which may create barriers for some students. They advocate for more affordable options to ensure that all students, regardless of their financial background, have access to these valuable learning experiences, highlighting the importance of inclusivity in education.

The findings reveal that immersive, hands-on experiences not only enrich students' understanding of ecological issues but also empower them to recognise their role in shaping sustainable futures. Student

teacher E stated, *"Experiential learning helps students understand the bigger picture. When they engage directly with the environment and the communities affected by natural resource management, they learn about the ethical and social aspects often missed in the classroom."* The quotation highlights the importance of hands-on, experiential learning in understanding the broader ethical and social dimensions of natural resource management. It suggests that while traditional classroom settings can teach theoretical concepts, real-world engagement with the environment and communities provides deeper insight into the human and social impacts of natural resource management. By directly interacting with affected communities and natural surroundings, learners are exposed to the complexities of ethical decision-making, community values, and the social consequences that are often difficult to grasp through lectures or textbooks alone. This kind of learning encourages a more holistic understanding of the subject matter.

The findings disclosed a critical need for a holistic approach to environmental education. This perspective is vital in training future leaders who must consider the socio-political dimensions of environmental decisions, aligning with contemporary discussions that emphasize equity and inclusion. Student Teacher F reflected, *"Experiencing local conservation efforts in our community highlighted for me the social justice issues intertwined with environmental management. It is not just about the science; it is about the people and communities involved."* This quotation highlights the participant's ideal that environmental management involves more than just scientific principles. It also encompasses social justice concerns. By participating in local conservation efforts, students became aware that decisions about the environment often have profound social implications, such as fairness in resource distribution, the rights of marginalised communities, and equitable access to natural resources. It also established that environmental management is not only about preserving ecosystems but also about ensuring that the needs and rights of all community members are considered in the process.

Furthemore, the findings from this study identified a significant gap in conventional pedagogies that focus on theoretical understanding without adequate real-world application. Further critiques of traditional classroom learning were voiced by Lecturer A, who stated, *"It often fails to prepare students for the real-world complexities of resource management."* the quotation points out that some educational methods may fall short in preparing students for the complex, multifactorial realities of managing resources in real-world scenarios. It calls for more practical, experiential approaches to bridge this gap.

The findings also make a compelling case for the benefits of experiential learning, particularly in fostering critical thinking and decision-making skills necessary for effective resource management. Lecturer B emphasised, *"Experiential learning encourages critical thinking and better decision-making,"* The quotation emphasizes that experiential learning enhances critical thinking and decision-making skills. By engaging in real-world tasks and reflective experiences, learners analyes situations, question assumptions, and apply theoretical knowledge to practical scenarios, leading to more informed and effective decisions.

The study revealed that experiential learning goes beyond textbook education by developing practical skills like adaptability, flexibility, and initiative. These essential abilities prepare learners for success in real-world professional settings. Student Teacher C remarked, *"Experiential learning gives us practical experience that textbook learning cannot. We learn to adapt, be flexible, and take the initiative in real-life scenarios, which will serve us well in our future careers."* The quotation advocates for the importance of experiential learning in developing practical skills, adaptability, and initiative, all of which are essential for thriving in both real-life scenarios and future careers. It contrasts this with the more theoretical knowledge offered by textbooks, which may not fully prepare individuals for the complexities of the real world.

Finally, the necessity of an interdisciplinary framework in education was highlighted by Student Teacher D, who noted that experiential learning often requires the integration of knowledge from ecology, economics, and sociology. *"This interdisciplinary approach is essential for tackling the complex issues in natural resource management, where everything is interconnected."* The quotation emphasizes that an interdisciplinary approach is crucial for effectively addressing the complex and interconnected challenges in natural resource management. It highlights the need for insights from various fields to develop comprehensive solutions that consider the intricate relationships between natural resources, ecosystems, and human activities.

DISCUSSION

A recurring theme gathered from participants in this study is the critical importance of hands-on experience in educational settings. Engagement in experiential learning promotes direct interaction between student teachers and the natural environment, leading to a tangible connection with theoretical concepts. As Priatmoko et al. attest, such interaction reinforces academic knowledge and cultivates a deeper understanding of how this knowledge applies in real-world contexts.[48] This sentiment was echoed by Participants A, B, and C, who highlighted that experiential learning is not merely ancillary but fundamental in bridging the gap between theory and practice.

Velempini et al. also support this view, noting that practical exposure derived from experiential learning is indispensable when grappling with the intricacies of resource management.[49] Students develop crucial problem-solving skills and practical insights through active participation in hands-on activities, such as field trips and habitat restoration. This is further supported by Participants E and H, who emphasized integrating reflective practices in the experiential learning process. Such reflection enables student teachers to assess their experiences critically, thus reinforcing their understanding of resource management challenges.

Moreover, Velempini et al. emphasize that experiential learning often incorporates interdisciplinary approaches, allowing students to understand the interconnectivity of ecological, economic, and societal factors in resource management. This multifaceted perspective is crucial in developing a comprehensive understanding of addressing complex environmental challenges. Demssie et al. corroborated this by noting that experiential learning fosters critical thinking and encourages student teachers to evaluate complicated resource management issues holistically.[50] Constantino et al. further assert that experiential learning equips them with the skills to devise practical solutions grounded in real-world contexts.[51]

However, the issue of cost and logistical efficiency remains a significant barrier to implementing practical, experiential learning activities. Participant E, alongside Demssie et al., highlighted that the financial burden associated with field trips and site visits can limit their feasibility and overall impact.[52] As such, a careful balance of planning and resource allocation is necessary to maximize the benefits of these learning experiences. The concerns raised about the limitations of traditional classroom instruction further emphasize the necessity of integrating experiential learning in a meaningful way. Participants A and B noted that conventional methods often fall short of conveying the nuanced realities of natural resource management, necessitating more hands-on engagement to facilitate better understanding.

Alam advocates a fusion of harmonious classroom and experiential learning within curricula.[53] This integrated approach emphasizes practical and theoretical skills and highlights the ethical, cultural, and practical aspects influencing resource management decision-making elements often overlooked in contemporary discussions. Such a comprehensive curriculum will ensure that future resource managers are well-rounded and equipped to make informed decisions.

DISCUSSION SUMMARY

In summary, this study highlights a strong consensus among participants regarding the invaluable role of experiential learning in geography education for natural resource management. These hands-on experiences deepen students' understanding of complex ecological systems and equip them with vital practical skills essential for their future careers in this field. Although significant concerns were raised

[48] Priatmoko and Dzakiyyah, "Relevansi Kampus Merdeka Terhadap Kompetensi Guru Era 4.0 Dalam Perspektif Experiential Learning Theory."
[49] Velempini and Martin, "Place-Based Education as a Framework for Tourism Education in Secondary Schools: A Case Study from the Okavango Delta in Southern Africa."
[50] Demssie et al., "Combining Indigenous Knowledge and Modern Education to Foster Sustainability Competencies: Towards a Set of Learning Design Principles."
[51] Constantino et al., "Cognition and Behavior in Context: A Framework and Theories to Explain Natural Resource Use Decisions in Social-Ecological Systems."
[52] Demssie et al., "Combining Indigenous Knowledge and Modern Education to Foster Sustainability Competencies: Towards a Set of Learning Design Principles."
[53] Ashraf Alam, "Mapping a Sustainable Future through Conceptualization of Transformative Learning Framework, Education for Sustainable Development, Critical Reflection, and Responsible Citizenship: An Exploration of Pedagogies for Twenty-First Century Learning," *ECS Transactions* 107, no. 1 (2022): 9827.

about the financial implications and logistical organization of these experiential activities, the study ultimately advocates for a balanced integration of experiential learning with traditional educational methods. This approach is pivotal in preparing student teachers to address the complexities of natural resource management while fostering critical thinking, ethical awareness, and a robust connection to environmental issues in the next generation of educators.

Although the advantages of experiential learning are well-documented and celebrated, challenges related to cost, efficacy, and the limitations of traditional forms of education continue to exist. A blended educational model that harmonizes experiential learning with theoretical instruction while paying particular attention to ethical and cultural dimensions is essential. This method would significantly enhance student teachers' capacity to navigate the intricate landscapes of sustainable resource management, equipping them better for the complex dilemmas they will encounter in their professional lives. The study highlights that fostering resilience, adaptability, and ethical considerations must become integral components of geography education, better preparing the next generation of educators and resource managers.

RECOMMENDATIONS

In light of the findings presented, educators and institutions involved in natural resource management education should prioritize experiential learning within their curricula by actively promoting initiatives such as field trips, habitat restoration projects, and simulations to provide student teachers with essential practical exposure and skill development. Additionally, there is a call for promoting interdisciplinary learning to help student teachers understand the interconnectedness of various elements in resource management, which is vital for addressing complex challenges. Encouraging critical thinking and problem-solving is crucial for preparing student teachers to evaluate intricate resource management scenarios and propose realistic, data-informed solutions. Furthermore, higher education institutions should emphasize reflective practices within experiential learning, allowing student teachers to process their experiences and deepen their understanding of resource management issues while also addressing concerns regarding the costs and effectiveness of these experiential learning activities.

CONCLUSION

The findings of this study reveal the profound value of experiential learning within the realm of natural resource management. Participants consistently highlighted its benefits, such as hands-on experience, skill enhancement, critical thinking development, and the facilitation of direct engagement with environmental variables, which cultivate a deeper understanding of complex concepts. Experiential learning also encourages a holistic view, interdisciplinary thinking, and the ability to craft practical solutions grounded in real-world contexts. Nonetheless, the challenges related to costs and efficiencies are acknowledged, suggesting that they may not always align with educational goals. Conversely, classroom-based learning is perceived as limited in its ability to convey practical dimensions and complexities associated with resource management. Consequently, the consensus advocates for an integrated educational approach that marries classroom and experiential learning. This framework should also embrace ethical, cultural, and practical dimensions to cultivate well-rounded resource managers. By embracing this comprehensive approach, student teachers will be better equipped to tackle the diverse and multifaceted challenges inherent in sustainable resource use.

IMPLICATIONS

Geography lecturers will be encouraged to incorporate experiential learning methodologies into their curricula to enhance student teachers' understanding of natural resource management. Organizing field trips, outdoor activities, and interactive experiences will enable lecturers to provide practical opportunities that complement theoretical knowledge gained in classrooms. Student teachers can significantly benefit from such experiential activities, fostering connections between theoretical concepts and real-world applications. This approach deepens understanding and instills a sense of responsibility toward conserving and managing natural resources. Additionally, education leaders are urged to allocate resources and support for extracurricular activities related to geography education, which may include investments in field trip logistics, outdoor equipment, and collaborations with local environmental

organizations to enrich student teachers' learning experiences and deliver a more robust educational framework.

Successful experiential learning initiatives necessitate collaboration between schools and local communities. Local authorities can assist schools by granting access to natural sites, sharing expertise on environmental matters, and involving student teachers in community-driven conservation efforts. Such partnerships strengthen community relationships and promote a collective commitment to sustainable resource management. Ultimately, this study advocates integrating experiential learning approaches within educational policies and frameworks. As a result, policymakers will be incentivized to promote outdoor education and fieldwork opportunities within the national curriculum, ensuring that all student teachers have access to hands-on learning experiences that cultivate environmental stewardship. Furthermore, environmental organizations (NGOs) and advocacy groups can be vital in supporting schools in implementing experiential learning initiatives. They can offer educational resources, facilitate workshops and training for educators, and create opportunities for student teachers to engage in conservation projects and community outreach activities.

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