IJMERI Journal

Volume 02 Issue 01 | February 2024 Article 2

E- ISSN: 2980-4760
P- ISSN: 2980-4752

DOI: https://doi.org/10.17613/8x91-9g06

Ecopreneurship as an Innovative Pedagogy for Sustainable Development: An Action Research

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International Journal of Multidisciplinary Educational Research and Innovation is an international peer-reviewed academic journal that highly values the importance of developing knowledge in the field of multidisciplinary educational and innovative research. The journal's scope is broad, with the goals of disseminating information and providing a place for discussion, theoretical inquiry, practical applications, research discoveries, and experimentations in the field of education.

Recommended Citation
Maharjan, B., Manandhar, N. & Sunar, P. (2024). Ecopreneurship as an Innovative Pedagogy for Sustainable Development: An Action Research. *International Journal of Multidisciplinary Educational Research and Innovation, 2*(1), 1-9. https://doi.org/10.17613/8x91-9g06.

Published by IJMERI, Saint Joseph College, Southern Leyte, Philippines
Website: http://www.ijmeri.com/
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ORIGINAL ARTICLE

ECOPRENEURSHIP AS AN INNOVATIVE PEDAGOGY FOR SUSTAINABLE DEVELOPMENT: AN ACTION RESEARCH

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Received: November 2023

Revised: December 2023

Accepted: January 2024

Available: February 2024

ABSTRACT

Nepal has a diverse ethnic population, some of whom have indigenous knowledge. Their sociocultural knowledge has largely influenced their daily environmental sustainability practices as they highly respect Mother Nature. However, these days, in the name of modernization, people have slowly embraced Western culture and values by adding a disastrous footprint on the earth. They started to ignore the uniqueness of their indigenous knowledge, which prioritizes sustainability. Hence, this paper focuses on viewing indigenous knowledge as ecopreneurship and developing ecopreneurship as an innovative pedagogy for sustainable development. This paper applies action research to intervene in the current pedagogical practice to introduce ecopreneurship as an innovative pedagogy. The participants of this research are the teachers of grade eight of a private school from Lalitpur. This paper concludes that when students explore their indigenous knowledge, it creates an attachment to their indigenous know-how. They learn to value their ancestors' knowledge for their contribution to ecology, sustainability, and self-dependence. Furthermore, ecopreneurship enables their learning to be authentic and meaningful through their active involvement in producing eco-friendly material, which they showcased at the fair and motivated them to think and act as ecopreneurs for sustainable development.

Keywords: *indigenous knowledge, ecopreneurship, innovative pedagogy, action research*

INTRODUCTION

The environment and its sustainability have been the subject of concern as its condition deteriorates daily. The reason behind this is the continuous advancement of human living standards and their unlimited wants. In this regard, Appannagari (2017) stated that environmental and ecological modifications due to the current world's developmental activities initiated by modern humans are the reason for the environmental setbacks. Without thinking about the hazards caused to the environment, people have begun to manipulate the natural environment for their living. Thus, Taylor and Taylor (2019) stated that in the past decade, the United Nations prioritized education for sustainable development to harmonize with the interests of internationalizing economics, diversity of culture, and the natural surroundings. It has been crucial to instill in learners the principles of sustainable development from the school level to ensure that their every economic, political, or sociocultural activity is governed by conserving and preserving the natural environment.

Most people living in urban areas are accustomed to cozy and pleasant lives, leading to the abandonment of their unique knowledge of manufacturing eco-friendly materials such as mats from hay, straw or corn cover, earthen pots, copper or bronze vessels, etc. People started to embrace ready-made products imported from other countries. Such practices have increased people's dependency upon other countries even to satisfy their daily necessities. The COVID-19 pandemic and different

lockdowns have made people aware of their dependency on other nations. They realized they would die of hunger if other countries ceased to export their daily necessities.

These days, people have also been creating their disastrous footprints on the earth. They started converting agricultural land into residential areas, making it unsuitable for agriculture. Similarly, excessive use of plastic materials, outdated vehicles that emit harmful gas, and excessive use of chemicals like insecticides and pesticides to raise production levels diminish land's productivity and quality, impacting both environmental and human health. People have been continuously modifying the natural environment in the name of modernization. Thus, changing human lifestyles affects environmental health, causing ecological crises.

Holding on the environmental crisis and increment of people's dependency to sustain their lives at the center, this paper focuses on the exploration of the ways learners would be capable of continuing their livelihood by embracing eco-friendly activities that ensure sustainability through empathizing with the ways of environmental degradation in the name of modernization. Incorporating ecopreneurship as an innovative pedagogy focuses on instilling life skills among the learners to lead sustained and independent lives, keeping environmental health at the center. This paper explores integrating ecopreneurship as an innovative pedagogy to ensure sustainable development. Hence, this paper seeks to answer the question: How do we incorporate ecopreneurship as an innovative pedagogy for sustainable development?

This study will help teachers, teacher educators, and curriculum developers to encompass ecopreneurship in the curriculum and pedagogical practices as an innovative pedagogy for sustainable development. Incorporating ecopreneurship as an innovative pedagogy will help learners empathize with local issues and realize the significance of eco-friendly practices for sustained life. Similarly, it would enhance creativity, critical thinking, logical and rational decision-making, communication, collaboration, and problem-solving skills, including enhanced empathy, aesthetic, ethical, and moral values. This paper mainly focuses on the environmental hazards, among different risks, and implementing traditional knowledge to instill the ecopreneur concept among the learners.

Research Questions

1. How do we incorporate ecopreneurship as an innovative pedagogy for sustainable development?

RESEARCH METHODOLOGY

Research Design

The first author is an MPhil (Master of Philosophy) scholar in STEAM (Science, Technology, Engineering, Arts, Mathematics) Education at one of the universities in Nepal. During her studies, she reflected on her ancestors' practices and ways of living an independent and sustainable life. She realized that people have been abandoning their ancestors' knowledge due to busy schedules and started importing necessities from neighboring countries, increasing dependency and questioning sustainability. Thus, she felt the immediate need to address this issue through her research. She realized the need to integrate ecopreneurship as an innovative pedagogy to make the future generation independent and think from the perspective of ecological sustainability. Likewise, the second author is her supervisor, who also belongs to the indigenous group and has broad research experience in the local context. He guided and supervised the first author through critical comments on her draft and supported refining it into a publishable manuscript. Finally, the third is a critical friend and classmate of the first author who had been peer learners for almost a decade. She supported the first author from the initial days of planning this study until the final draft through her suggestions, critical comments, and constructive feedback.

This paper subscribed to Action Research as the research design where the first author investigated, planned, implemented, and reflected cycles. McNiff (2013) claimed, "Action research involves learning in and through action and reflection, and it is conducted in a variety of contexts, including the social and caring sciences, education, organization, and administration studies, and management" (p.15). The first author was concerned about increasing citizens' dependency on others to produce daily necessities. Thus, to make students self-reliant, the first author planned to engage them in creating eco-friendly materials. The participants of this study were the students of grade eight of one of the high schools of Lalitpur district. The time when the research took place was the time of Tihar, one of the major Hindu festivals in Nepal. During Tihar, different decorative items, lights, garlands, and different materials for puja are imported from neighboring countries, increasing the dependency. Sometimes, those decorative items and lamps are made of plastics, which are hazardous to the environment. Thus, the first author planned to give students a project to create an item that would be useful for the celebration of Tihar without using any materials that were hazardous to the environment. Then, the final product will be displayed at the fair, where students and teachers will buy the products. Students were divided into four groups and given a week. All the students came out with very innovative and creative products. Finally, the first author reflected on the whole process. Then, she took feedback from the teachers as well who visited the mini stalls as an evaluation because McNiff (1995) suggested that action research is the cycle of action and reflection where the researcher identifies the area that needs investigation, finds the solution, and implements that solution again and the solution is evaluated through reflection.

Table 1. Action Research Intervention

S. No.	Activities
Week 1	Rapport building with my participants, orienting my research issues, and developing the strategies to implement ecopreneurship as an innovative pedagogy for sustainability.
Week 2	Video on environmental pollution (To build empathy among participants with the ecological issue) Interact with the students regarding the cause of such pollution and engage them in critical thinking processes. Brainstorm by posing different questions: Was there used to be such pollution during the time of our ancestors? What are the reasons behind the environmental issues these days? How was the daily lifestyle of the ancestors? How did they sustain their lives? Assignment: Gather the information on how your ancestor's daily life used to be and what they did to sustain their lives
Week 3	After each student collected the information from their family members, they divided students into groups, shared the data they collected, and wrote it on newsprint paper.
Week 4	Assigned project work. As Tihar is coming, we must buy many decorative and puja items to celebrate Tihar. Thus, each group can develop their own creative and innovative ideas to produce the materials necessary for the Tihar, the materials developed by the students will be exhibited in the school mini-fair. All the students and teachers would also participate in buying your product.
Week 5:	Took an update about the students' work progress. How well is the collaboration going on? How is the project work going on? Have you been able to design the product necessary for Tihar?

Week 6	Fair at school. All the students in their groups came out with their products, and they even kept the price tag on their materials. Teachers and students from different classes came to observe and buy their favorite materials. Interacted with the teachers and other students regarding the fair. Took field notes and did recordings of the interactions as well.
Week 7	Reflection from the teachers and students regarding the implementation of ecopreneur as an innovative pedagogy for sustainable development

The first author collected the data by observing the students' engagement in the production of products. She also got engaged in jotting down her observations in the field notes. During the students' project engagement, she recorded the interactions with the students. Similarly, the first author recorded the interaction with teachers during the fair. Likewise, she transcribed all those observations, field notes, and recordings into narrative form. Then, she coded the narratives and generated suitable themes.

Data Analysis

The first author collected the data based on the fieldwork, transcribed it, and interpreted it into suitable themes. The following section develops the argumentations based on the designed themes.

Ecopreneurship for Contextualized Learning Pedagogy

Teacher: This is amazing how students came out with different materials that are needed for celebrating Tihar like batti (made up of cotton to light while worshiping god), jajanka (garland made of thread), tika of different colours, garlands, lamps, rangoli paper, candles, and other decorative items. As they produce the material that is useful for Tihar, they can sell the maximum number of their products. I believe this is what we call contextual learning. Students learn in their own real-world context. They make connections between their learning and their real-life experiences. Students learned to create the product that the context demands. This will ultimately help them have a great experience, and this experience will help them in their future career.

The pedagogy that teachers plan will be authentic and meaningful if the plan engages students themselves in their learning and that engagement is connected to their real-life experiences. Dewi and Primayana (2019) explained that in contextual pedagogy, facilitators design their pedagogy to motivate learners to connect their learning and knowledge and apply them in their real lives. Thus, it is necessary to design the teaching and learning practice so that students' learning is contextual. Putri et al. (2018) also claimed that students' learning should be contextual and related to their daily lives. Contextual learning helps students to connect their learning and experiences.

Students: There are many things that we were unaware of in the materials that are used during the Tihar. Usually, our parents buy or make the arrangements for the things necessary for Tihar. We were just used to participating in the celebration. But when we were given the project, we explored the things used in Tihar among the group members and interacted with our parents to learn more about them. Engaging ourselves in producing things required for our festival helped us better understand our festival and what is necessary for the festival. If we were not involved in this project work and were only taught from the book, we would rote memorize the content.

While engaging students in their project, they explored it among the group members. They also interacted with their parents because the given project was related to their context. In this regard, Suryawati and Osman (2017) claimed that contextual pedagogy facilitates learners to build connections in the appropriate and significant context. This engagement and exploration help students instill different skills like inquiry, communication, rational and logical decision-making, critical thinking, etc. Thus, Dewi and Primayana (2019) argued that there is a need to adopt a contextual learning environment so that students construct their own knowledge, build capabilities to think critically and have autonomy in their learning. Through contextual learning, students can engage and connect their learning with real-

life experiences, which help them construct their own knowledge where they can master their own learning. Hasruddin and Rezeqi (2015) claimed that contextual learning allows students to improve their learning. This learning enhances the students' higher-order thinking rather than just remembering and understanding. Bustami et al. (2018) explained that contextual learning allows students to progress, expand their horizons, create new knowledge, and apply that knowledge and skills in academic and personal life. He also claimed, "Contextual Teaching and Learning requires the students to experience rather than memorize" (p. 455). Thus, contextual learning is a tool to connect learning and experiences to make students" learning authentic and meaningful, along with stimulating higher-order thinking (Manandhar, 2022). Ecopreneurship as an innovative pedagogy is an approach for linking classroom learning to real-world contexts, where students can observe the direct impact of their actions and foster a deeper understanding and application of sustainability principles. In this process, the approach requires contextualized learning environments that encourage students to think critically and solve problems within a specific context. The hands-on approach fosters students' creativity and provides abilities to identify environmental challenges and develop innovative and sustainable solutions (Rastogi & Sharma, 2018). The pedagogy supports contextual learning for fostering sustainable mindsets. This helps students prioritize sustainability, which balances economic growth and environmental preservation.

Pedagogy for Enhanced Ecopreneur Skills

Teacher: I am very impressed with the students' work. They made the decorative items through their house's waste plastic bottles, used glass, and other waste materials. They seemed to produce these things while keeping the environment in their mind. If the students were made aware of the environmental crisis and directed their activities to preservation and protection, they would surely be responsible citizens. In this way, we can prepare students to solve problems related to the environment. So, producing the things needed for Tihar while keeping the environment at the center is a wonderful idea.

Different countries have been facing various environmental crises related to pollution. The teacher expressed her thoughts that it is necessary to prepare students so that they can solve any problems that come forth. Abidin and Hariyono (2020) also explained that engaging students in such activities helps them learn the concepts and enhance their problem-solving abilities, which is crucial in this 21st century. The teacher was also impressed with the idea of producing environmentally friendly material. Suryaningsih and Aripin (2022) stated that when the facilitator includes ecopreneurship in the pedagogy, it is an option for the facilitator to plan learning to enhance entrepreneurship and interest in environmental sustainability. The teacher also claimed that making students engaged in such learning helps them be a responsible citizen in the future. Ifeoma et al. (2020) argued, "An ecopreneur would like to make the world a better place by increasing or at least protecting the environment" (p. 2). Thus, engaging students in producing materials while keeping sustainability in mind helps them enhance their ecopreneur skills.

Students: This is the very first time we were engaged in producing materials, and our handmade materials were exhibited for sale (laughs). In our group, we brainstormed and even interacted with our parents regarding how we could make our products different, innovative, and creative from those of other group members. These are the outcomes of our hard work and dedication.

The students expressed their willingness to create something innovative and creative so that their products would differ from other groups. This project motivated them to be creative, use local resources, and consider environmental sustainability. Suryaningsih and Aripin (2022) stated, "Instilling the value of ecopreneurship by making products with local resources is expected to create prospective entrepreneurs who are creative and have a concern for environmental exploitation for profits" (p. 28).

Similarly, students expressed their feelings that when their products are different, innovative, and more creative than others, it will attract customers from which they can earn more. Love et al. (2009) claimed that when an organization's people are innovators, they can profit. Suryaningsih and Aripin (2022) also

argued that the selling price of a product would be high if the materials were designed creatively. Thus, to instill ecopreneur skills among the students, they should be motivated to produce a creative product, keeping environmental sustainability in mind to sustain in the market.

Ecopreneurship education as a tool is robust for fostering stewardship of students. Likewise, we can engage the students in projects linked with environment preservation and sustainability, such as using recycled materials, waste management, etc., where students learn about sustainability principles and can play a role in preserving the environment for humanity. By involving students in problem-solving skills to solve environmental issues, the pedagogy of ecopreneurship encourages students to identify problems and ideas for sustainable solutions, generate solutions, design sustainable products, and make decisions (Hays & Reindeers, 2020). For this, the design thinking approach and ecopreneurship can complement education.

Ecopreneurship Pedagogy as an Interdisciplinary Approach

Teacher: In this engagement, the students are learning multiple disciplines. For example, (showing rangoli paper), these kids have made different geometric shapes using compasses and protractors in this paper. Students are learning science concepts where they make rangoli by mixing different colours to bring out new ones. Students are learning about Tihar, part of social studies, and their creativity, designs, and drawings are arts. In this way, multiple disciplines are involved in a single project. Students also enhanced with different skills, like creativity, critical thinking, interactive and collaborative skills, logical and rational decision-making, and problem-solving skills.

The teacher claimed they introduced multiple disciplines to the students in a single ecopreneur project. Rizhniak et al. (2021) explained that when an integrated approach is introduced, it will help facilitators to have competence in their pedagogical practices. This ultimately helps students become acquainted with the knowledge of different subjects. Rather than only knowing the subject, the teacher further claimed that integration helps instill different student skills and abilities. Costley (2015) explained that the integrated approach is a student-centered approach that facilitates students to get engaged, enhances their learning, and motivates them to learn, ensuring higher-order thinking skills, collaborative learning, and students' viewpoints are highly valued in integrated learning.

Students: Our engagement in this project helped us to have a deeper understanding of the Festival Tihar. While producing the materials, we also brought the concepts of science and math. For instance, while making the rangoli design paper, we utilized the concept of geometrical shapes, and for designing this lamp, we brought the concept of science. This further helped us to have a deeper understanding of the science and math concepts. It was exciting to work in a group as we also learned from each other.

The students tried to express the view that they learn by doing. Costley (2015) stated, "Students can link their experiences in the classroom to the real world and make sense of experiences from their lives" (p. 3). The link of the students' learning with their real-world experience helps them to learn and have an in-depth understanding of the content. Angus (2020) claimed that one should set an objective mainly towards learning through an integrated approach. Students have a deeper understanding of the content when actively involved, which can be possible by experiencing it alone.

Similarly, the students claimed that they even learned from each other. Drake and Reid (2018) explained that in integrated learning, students often collaborate, which helps enhance their interaction skills. Thus, students are equipped with authentic and meaningful learning experiences, leading to an in-depth understanding of the content and enhanced collaboration and communicative skills.

Ecopreneurship Pedagogy for Glocal Citizen

Teacher: Our community, nation, and the world need citizens who can think out of the box, think critically, possess collaboration and communication skills, make decisions logically and solve any problem, have moral, ethical, and aesthetic values, and are creative and innovative. We are preparing students for a future that does not exist, and every stakeholder is responsible for instilling students with adequate knowledge and skills to make them locally and globally responsible citizens. Let's say Glocal citizen for

21st-century. Thus, how the ecopreneur project was prepared gives students the idea of sustaining their lives, keeping environmental sustainability in mind.

The teacher expresses her thoughts on preparing students for this ever-changing society and world of the 21st century. Ball et al. (2016) claimed that to direct one's life and work in a diversified and multiplex setting, students must possess different skills, including leadership, collaboration, work efficiency, decision-making, goal setting, etc. Any citizen can sustain in society or the world if they have leadership qualities, can set achievable goals, have courage and determination to achieve those goals through effective communication and collaboration skills, can tackle the challenges and issues that come forth, have empathetic feelings towards other, possesses good moral values and ethics and is creative, innovative and initiative. The teacher also expresses her thoughts of making students glocal citizens because Mannion (2015) claimed the importance of glocal citizenship in today's context as we have been facing the issue of environment and climate change, and in this context, glocal education is crucial to enhance the capability of learners to read the concepts critically and apply it to analyze the problems and draw up the solutions. In this regard, Friedman et al. (2015) also explained that the present context demands education for glocal citizenship, which brings out the consciousness to integrate global apprehension with local practice. Thus, the glocal citizens are working towards addressing the global challenges through local initiation and practice. The data above showed that the skills and values are crucial for students to become global and local responsible citizens who can contribute to society. The entrepreneur projects cater to students' learning about sustainability to become aware citizens. In today's world, education must instill the necessary values, knowledge, and skills in students to become responsible citizens who can collaborate, communicate, think critically, make informed decisions, and solve problems. Ecopreneurship education as pedagogy helps foster skills of sustainability that encourage students to think globally and act locally, motivating them to become glocal citizens.

RESULTS AND DISCUSSION

Today's world demands learners with creativity, imagination, critical thinking, communication, rational and logical dialectics, collaboration, and problem-solving skills including moral, ethical, aesthetic, and empathetic values, considered 21st-century skills. In this regard, Santos et al. (2019) stated that teachers have started leaving the conventional approach to rote memorization and validation rather, they stated to focus on shaping analytic and reflexive individuals, having the ability to solve problems to acknowledge the demands of today's world. It is evident that an old mindset does not lead to a new path because Nichols (2023) argued that the conventional approach to education includes the authoritarian thinking of the teachers and provides direct instruction to the students. This approach makes students passive learners who can only receive the information provided rather than creating or constructing their own knowledge. Such an approach brings barriers to acquiring skills necessary to lead a sustained life in the competitive and dynamic world. Hence, it is necessary to discard traditional teaching and learning practices to meet the demands of the 21st century. The educational system should challenge the traditional approach to teaching and learning by facilitating learners in the learning process through innovative pedagogy. Moyer (2016) claimed that it is crucial to facilitate learners with 21st-century learning space and change to prepare them for critical situations in their personal and professional lives and beyond. Thus, transforming the current conventional approach is necessary to instill 21st-century skills among learners.

Globally, people are facing different environmental issues. Learners must be aware of the reasons and consequences of those issues at the school level. So, incorporating ecopreneurship as an innovative pedagogy helps learners empathize with environmental issues, work to solve those issues, and sustain one's life in a competitive context. Aryanto and Syaodih (2017) claimed, "Ecopreneurship development in primary school is a form of 21st-century learning innovation" (p. 599) because the implementation of

ecopreneurship as an innovative pedagogy mainly helps learners to be critical of their action, take rational decisions, solve problem through creativity and innovation with moral and ethical values. Abidin and Hariyono (2020) explained that learners' ability to solve the problems that are linked to environmental issues is solved through ecopreneurship pedagogy. For this, the facilitator should engage learners in constructing their knowledge through their experiences. McCarthy (2010) stated, "Learning is conceived as a four-stage cycle where the learner must go through each stage- experiencing, reflecting, thinking and acting" (p. 134). Thus, the facilitator engages learners in experiencing the ancestors' knowledge, reflecting on their practices, and thinking of further steps from the ecopreneur perspective to apply it in their real lives. For this, it is necessary to plan a project using an integrated approach facilitating contextual learning so that learners are engaged in ecopreneur activities because Suryaningsih and Aripin (2022) explained that when the learners are involved in the creation of different materials of their own context, it helps learners to enhance their capabilities to investigate more leading to their growth in their ecopreneurial interest. Such an interest leads to solving the global issue of environmental sustainability through contextual or local steps. This leads to a change in the living style of the people because Mannion (2015) claimed that glocalization plays an essential role in transforming people's everyday lives. Thus, he argued that glocalized pedagogy prioritizes reflecting critically and acknowledging the crucial and significant interconnections among learners' local and global standpoints.

CONCLUSION

Keeping the global issue of environmental crisis at the center, taking initiation from the contextual action through engaging students in the construction of their knowledge, applying the constructed knowledge in the real-life situation to solve the global issue and at the same time sustaining life in the competitive and dynamic world is a key for incorporative ecopreneurship as an innovative pedagogy for sustainability. Such an approach helps instill 21st-century skills among the learners. It enhances critical thinking, communication and collaboration skills, logical and rational decision-making, problem-solving, creative thinking and imaginative skills, ecopreneurship skills and shapes learners as a glocal citizen.

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