

ASSESSING THE IMPACT OF A BLENDED LEARNING APPROACH UTILIZING AN ECOLITERACY E-MODULE ON ELEMENTARY SCHOOL STUDENTS' ENVIRONMENTAL KNOWLEDGE IN INDONESIA**Trisni Handayani^{1,2,*}, Yufiarti², Etin Solihatin² and Mohamad Syarif Sumantri²**¹ Faculty of Teacher Training and Education, Universitas Muhammadiyah Prof Dr Hamka, Indonesia^{1,2} Post-Graduate School of Elementary Education, Universitas Negeri Jakarta, Indonesia¹ trisnih79@gmail.com**ABSTRACT**

This study assessed how well an Ecoliteracy E-Module integrated into a blended learning approach improved the comprehension of environmental issues among Indonesian elementary school students. The study used a posttest-only control group and a quasi-experimental design. The Ecoliteracy E-Module was used with project-based learning to enhance students' environmental literacy, creativity, and teamwork abilities. According to the research, blended learning, which includes incorporating the Ecoliteracy E-Module, is a suitable and successful educational model, particularly during the pandemic, where technology is crucial. According to the study, students in the experimental group achieved an average score of 88.45%, compared to 79.25% in the control group, which showed a significant difference in scores between the experimental and control classes. As a result, using the Ecoliteracy E-Module in project-based blended learning helped elementary school students better understand environmental concepts, underscoring the importance of the module in environmental education.

Index Terms: Blended Learning; Ecoliteracy E-Module; Elementary School Students; Environmental Knowledge; Indonesia.

INTRODUCTION

As we work to satisfy our fundamental survival needs, which Abraham Maslow classified as needing food, shelter, and clothing, human interaction with the environment is a necessary part of our existence. This interaction, whether positive or negative, significantly impacts the ecosystem. Unfortunately, with the progress of science, information, and communication technologies and the emergence of concepts like the Internet of Things and ChatGPT, humans have become adept at exploiting the environment for their own gains. This has resulted in environmental pollution, ozone depletion, and extensive damage to our surroundings, emphasizing the urgent need for students to learn about the environment.

With a population exceeding 270 million, Indonesia faces a significant challenge in managing its daily volume of organic and inorganic waste. One of the primary issues contributing to this problem is the low level of awareness among society regarding proper waste disposal, processing, and selection. This lack of environmental care exacerbates the situation. For instance, the country produces a staggering 11,330 tons of garbage daily, with an average daily individual waste generation of 0.050 kg. When calculated annually, this amounts to a staggering 4,078,800 tons.

Based on data from the Environmental Fund Management Agency in 2008, the waste pile steadily increased from 315m³/day in 2005 to 365m³/day in 2010. Projections indicate that it will reach 42 m³/day in 2014, 498 m³/day in 2020, and a staggering 581 m³/day in 2025. However, with the trash carriage capacity currently only reaching 60%, the waste pile will continue to grow unless there is a significant improvement in society's awareness and practices regarding waste management.

Given the alarming reality of high trash production, the significant portion (40%) of uncollected waste, and the urgent need to discourage littering, it becomes imperative to promote environmental awareness directly and indirectly. It is crucial for students who actively contribute to the progress of Indonesian education to receive education on environmental laws as part of their curriculum. In addition to the traditional legal-formal approach, an alternative strategy is required to ensure legal socialization effectively adapts to significant changes. One such

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approach is the knowledge enhancement model, also known as the Awareness, Interest, Desire, Action (AIDA) model, developed by Shoenfield (1987) [1]. This model is anticipated to facilitate a responsive and comprehensive approach to legal socialization, promoting positive behavioral change toward environmental preservation.

The Ecoliteracy E-module has applications in various sectors, including industry, medicine, and agriculture, for socialization activities. Its usage has also expanded to public relations operations, which involve implementing socialization processes that begin with raising participants' awareness of their problems. Subsequently, communicators aim to generate interest and foster a sense of desire among participants. Once individuals have their awareness, interest, and concern aroused, they are more likely to be motivated to take action.

Through this awareness-focused socialization approach, individuals are expected to acquire knowledge, understanding, and awareness of their rights and responsibilities concerning environmental conservation. In the greater Jakarta area, socialization efforts have been initiated in schools, starting from primary education levels. The objective is to instill a sense of anti-littering awareness among students as a preventive measure to cultivate their consciousness about environmental cleanliness. As a result, schools in the Jakarta region of Indonesia actively participated in a campaign promoting no littering awareness.

LITERATURE REVIEW

Socialization can be seen as a type of communication that aims to influence the behavior of individuals. It involves a communicator conveying specific symbols, often verbally, to shape the recipient's actions. However, socialization goes beyond mere communication and is a form of influence. Establishing effective socialization requires more than a brief introduction, as numerous critical factors must be considered.

As defined by Indonesia's Department of Judicial Affairs in 1998, legal socialization enhances society's legal awareness by providing informal legal explanations. The goal is for each member of society to learn and comprehend their rights, obligations, and authorities. Consequently, this fosters a legally conscious attitude and behavior where individuals possess knowledge, understanding, and compliance with the law.

I. Ecoliteracy Approach

Promoting eco-literacy involves utilizing various dissemination mechanisms and popularizing emerging ecological concepts. To effectively socialize the Eco-literacy E-module, several models of developmental theories of socialization proposed by experts can be employed. These include the innovation diffusion model introduced by Rogers [2], which later evolved into environmental care material [3]. Additionally, the social marketing model [4], the communication planning model [5], and social mobilization [6] can be utilized. Each model involves a systematic process of disseminating ideas, albeit some are rooted in sociology [2] and marketing [4]. Consequently, some individuals consider the approach to distributing developmental ideas as a field of study in socialization management.

The Eco-literacy E-Module is a socialization process that initiates with the awareness stage, where a communicator raises clients' consciousness about their issues. This module has been successfully employed in various socialization programs related to agriculture, health, and industry. Subsequently, efforts are made to generate interest and ignite the passion and desire of clients. The objective is to leverage clients' heightened awareness, interest, and curiosity to motivate them to decide and take action. However, when considering the environmental care concerns of students, a critical viewpoint arises, suggesting that such a model is more suitable for socializing tangible goods rather than intangible ones.

II. Environment Concern

The term "environment" encompasses the physical conditions, such as soil, water, solar energy, minerals, flora, and fauna, found on land or in the sea and the human-created institutions that determine how those conditions are utilized. The environment encompasses both the biotic and abiotic elements that surround us. The living environment is where living and non-living entities coexist, develop, and grow.

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The environment comprises both abiotic and biotic components. Abiotic components include non-living entities such as soil, water, air, atmosphere, humidity, light, and sound. On the other hand, the biotic component includes all living organisms, including plants, animals, humans, and microorganisms like bacteria and viruses. Coexistence and interaction between humans, animals, plants, and inanimate objects exist within this environment. The biotic components can be observed engaging and interacting with the environment based on their respective roles.

Prioritizing environmental protection is paramount, given its fundamental significance to our way of life. Several principles rooted in ecocentrism theory and acknowledging the ecological crisis due to human behavior can be applied to instill a sense of responsibility towards the environment. These principles [7], [8] encompass the following key points:

Firstly, the principle of respect for nature entails valuing the cosmos and all its constituents in line with biocentrism and ecocentrism. Secondly, moral responsibility for nature arises from the understanding that humans are an integral part of cosmic solidarity and, therefore, hold a moral obligation to safeguard the environment and all life within it, recognizing their equal value to human life. Moreover, the principle of taking care of nature emphasizes the moral responsibility to care for others without expecting anything in return. The “no harm” principle underscores the importance of avoiding actions that threaten the environment or the existence of other life forms in the universe. Lastly, embracing the concepts of modesty and environmental friendliness is crucial. Adopting a lifestyle that eschews materialism, waste, and exploitation and embraces modest living is essential for the environment’s well-being. By adhering to these principles, individuals can contribute to the protection and preservation of the environment responsibly and sustainably.

According to the justification, environmental concern is a difficult condition resulting in environmental reactions. Different people are more or less concerned with their immediate environment. If there is environmental damage, someone who cares about the environment will respond. However, if they don’t care about the environment, they won’t care, even if environmental damage exists.

III. Blended Learning

Online distance education has existed in highly urbanized and developed countries for many years. Still, in the developing world, including Indonesia, various challenges have impeded the implementation of online learning innovations, such as blended learning. Despite a few universities in Indonesia offering blended learning experiences to their students, there is a lack of assessment regarding its effectiveness in improving learning outcomes and resource efficiency [9]. Therefore, one effective way to evaluate the success of the investment is to gauge the level of satisfaction among students engaging in blended learning courses. Assessing student satisfaction at this early stage is crucial in predicting the viability and success of blended learning as a modality in Indonesian universities.

Blended learning has been recognized as a favorable learning system providing students with diverse, diversified learning opportunities [10]. Scholars have found that the blended learning approach is meaningful, integrated, value-based, and challenging, surpassing traditional face-to-face instruction in promoting active student learning [11], [12]. Blended learning has the potential to address the weaknesses of offline face-to-face learning, which hinder students’ development of self-regulated learning [13], as well as the limitations of online learning in fostering social interactions [14]. This potential is given that blended learning provides a range of advantages, such as better content delivery, improved social interaction, chances for reflection, opportunities for higher-order thinking and problem-solving skills, collaborative learning, and more authentic assessment methods [15].

Due to its effectiveness, blended learning has gained traction in academic institutions and is frequently used in professional development and training settings [16]. Numerous studies have shown that the blended learning approach outperforms traditional modalities to improve student learning. According to research, students in blended learning environments performed about one-third of a standard deviation better in student achievement than in traditional learning environments [17]. A thorough review of evidence-based studies found that student

achievement was consistently higher in blended learning experiences than in fully online or face-to-face learning experiences [18].

Blended courses typically produce higher levels of achievement and satisfaction than conventional face-to-face and fully online courses [15]. Numerous studies conducted at the University of Central Florida over nearly two decades that consistently show higher student satisfaction, success, and lower withdrawal rates in blended courses provide substantial evidence to support this claim [19]. According to a survey on student satisfaction at the University of Central Florida, blended courses received the highest percentage (52%) of “excellent” responses, giving them a slight 4% advantage over online and face-to-face courses. In contrast, blended courses placed about 10% higher in student satisfaction than lecture capture formats [19]. Compared to other instructional modalities, blended courses create more hospitable learning environments from a policy perspective [15].

RESEARCH METHODOLOGY

The research and development (R&D) design, also known as research-based development, was employed in this study, following the framework proposed by Borg & Gall for educational research and development [20]. Educational research and development refers to the process used to create and validate educational products, whether by developing new ones or improving existing ones through research and development design.

In developing the Ecoliteracy E-Module based on the blended learning model in education, two main activities were undertaken: exploration (qualitative) and implementation (quantitative) [21], [22]. Qualitative inquiry is grounded in the belief that the world, reality, and phenomena related to human behavior and social phenomena should be explored from various perspectives and understood through a humanistic lens. Concurrently, the research aimed to enhance students’ environmental knowledge and implement the environmental care concept to foster their environmental competence.

The research was conducted with students from three State Primary Schools in Jakarta, utilizing participant observation, documentation study, interviews, and questionnaires as data collection methods. Both qualitative and quantitative data analyses were conducted. Analyzing qualitative data involves several steps, such as thoroughly examining all available data, condensing essential information through data reduction, organizing the data through coding, and validating the data [23]. A quantitative analysis of the questionnaire data was performed to assess the impact of the Eco-literacy E-Module on students’ environmental awareness. Descriptive statistics, percentages, and correlation-regression statistical analysis were employed to analyze the data [24].

RESULTS AND DISCUSSION

I. Factors Contributing to Student Littering

The following are some of the factors that have been identified as contributing to the low level of environmental awareness in society, particularly at the 3 State Primary School of Suntenjaya Village, Cibodas:

Inability to Access Certain Facilities or the Trash Dump

When individuals encounter obstacles in accessing specific facilities or a trash dump, it significantly impedes environmental preservation efforts. The difficulty in reaching facilities or trash dumps can hinder individuals, particularly students, inappropriately disposing of their waste. This limitation in accessibility significantly hampers the attainment of environmental preservation goals. Effective waste management is a pivotal element in maintaining environmental cleanliness, and restrictions in accessibility can obstruct these vital efforts. Consequently, due to limited accessibility, students may display reluctance in properly disposing of their trash in assigned areas. This hesitancy could stem from distance, inconvenience, or a lack of awareness regarding the importance of correct waste disposal. As a result of this behavior, trash is left unattended and lacks proper management. Over time, this leads to an uncontrolled accumulation of waste in the surrounding area. Unmanaged trash accumulation adversely affects environmental aesthetics, public health, and the local ecosystem. Hence, addressing accessibility constraints is crucial for achieving environmental preservation goals through initiatives

like education, infrastructure improvements, or other measures that actively promote participation in waste management.

The Absence of Assistance from the School And Parents

Insufficient support from both the school and parents can have detrimental effects on the educational landscape. The teaching-learning process and the provision of supportive facilities play integral roles in addressing challenges associated with facility availability. These components enhance the teaching-learning process and ensure that school facilities fulfill their duty to guide and encourage students to adhere to expected norms.

The negative repercussions extend to the very heart of the teaching-learning process. The absence of support from both the school and parents adversely impacts the quality of education. This factor undermines the effectiveness of teachers in delivering instructional material and, concurrently, hampers students' capacity to comprehend and engage with lessons effectively.

The significance of support becomes particularly pronounced when addressing challenges related to facility availability. Adequate facilities are pivotal for creating an optimal learning environment. The absence of such support substantially impedes educational progress and hinders comprehensive student development.

These supportive aspects facilitate the teaching-learning process and ensure that school facilities fulfill their role as guides and motivators for expected student behavior. It is imperative to have consistent support from the school and parents to cultivate a positive and supportive educational environment.

The Ignorance of Society and Students

Although most students come from well-regarded families, their parents' limited education level contributes to the emergence of undesirable behavior in the students. The lack of parental involvement in their children's education fails to foster the students' reliance on the learning process at school.

Based on the factors contributing to littering, an overall conclusion drawn from the analysis is that residents of Suntenjaya village predominantly come from affluent families, and their low educational attainment significantly affects various aspects of their quality of life. This includes their insufficient environmental awareness, limited abilities and skills, and lack of knowledge on maintaining cleanliness. Considering the societal context, our initiative was to develop a program to provide a broader perspective on the significance of health and education as indicators for improving overall well-being.

The School's Efforts to Stop Students from Littering

Based on the gathered information, it has been identified that the school has implemented certain measures to address the issue of littering despite encountering challenges associated with an unstable environmental factor that has led to students' unfamiliarity with maintaining a clean school environment. The steps taken by the school thus far include 1) employing cleaning staff, 2) supplying cleaning materials, and 3) establishing a nearby trash dump in the schoolyard.

These initiatives have proven effective in reducing the amount of littering. To further foster, develop, and encourage participation from the school community, the following suggestions should be considered:

- Implement a comprehensive program focusing on disseminating knowledge, raising awareness, strengthening attitudes, and shaping behaviors. This program should be carried out intensively and systematically to nurture and develop the participation of the school society.
- The program should be designed to help the school community understand the significance of environmental cleanliness and its impact on their daily lives.
- Emphasize the importance of systematic nurturing, development, and coaching of school society participation through program implementation.

- The program planning should aim to increase the awareness and appreciation of environmental cleanliness among the school community.

II. Eco-literacy E-module as the Material for Learning and Blended Learning

Learning Material

The materials used for socialization on environmental awareness encompass a range of perspectives, including persuasive delivery alongside descriptive or narrative presentations. However, these materials sometimes appear rigid and dogmatic, leading to difficulties for students in comprehending the content being taught. In response, the eco-literacy e-module material has been specifically designed to cater to student's unique circumstances and psychological characteristics, particularly considering their varying education levels. The implementation of the e-module in disseminating environmental awareness includes the development of tailored materials. These materials are carefully crafted to effectively convey the message of environmental care to a diverse student population.

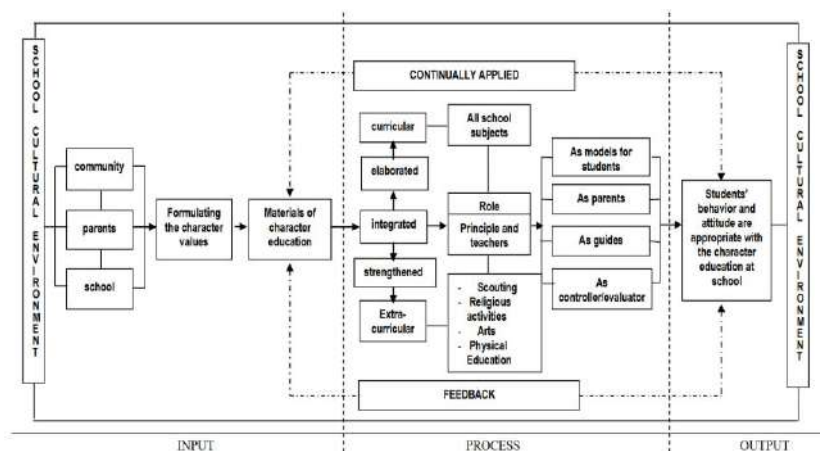


Figure 1: The Process of E-Module Materials Development

The information delivery described above was developed based on the research's environmental analyses conducted through surveys. The researchers' earlier socialization process observational work helped to facilitate these analyses. Legal, psychological, and environmental considerations were considered when developing the materials. To ensure the effectiveness of the materials, focus group discussions (FGDs) were held with professionals in the relevant fields. The primary objective of the FGDs was to achieve environmental awareness development, so they assisted in organizing and designing the materials. Acquiring knowledge and developing a conscientious attitude toward environmental issues are components of environmental awareness.

Integrated Strategies for Environmental Awareness

To enhance environmental awareness, using a campaign method incorporating both direct and indirect strategies has been a carefully planned choice. In the indirect approach, facilitators opt to utilize intermediaries or media to convey messages, such as through posters or leaflets. This decision aims to reach the audience without direct interaction, leveraging the visual impact and understanding that can be conveyed through written media.

As an integral component of this campaign, participants receive environmental awareness stickers. The distribution of these stickers serves as a visual response to the campaign information and creates a tangible form of engagement that participants can carry into their daily activities.

Furthermore, the campaign messages are strategically positioned through posters and leaflets in key locations frequented by participants. This strategy is designed to create an environment where environmental awareness messages are received and instill a motivation to take action. Carefully selecting locations to place posters and leaflets can enhance the campaign's visibility and increase the likelihood of the messages reaching the target audience.

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Beyond merely increasing knowledge about environmental issues, this campaign also aspires to stimulate positive behavioral changes related to the environment. Through the combination of direct and indirect approaches, it is anticipated that the campaign will comprehensively achieve its goals, elevating the awareness and engagement of participants with environmental issues to a higher level.

Eco-Literacy Procedure

The eco-literacy model has found use in several industries and fields, including socialization programs, agriculture, medicine, and industry. This model aids in the socialization process by raising client awareness of their problems, with the legal communicator playing a crucial part in doing so. Short films with environmental awareness themes were made available to increase this awareness, utilizing the audio-visual component to encourage better comprehension and simpler recall among students. As part of an outreach effort, the communicator visited school societies in different schools within Suntenjaya village, further extending the program's reach.

Once clients' awareness was raised, the subsequent step involved stimulating their interest and desire. The communicator achieved this by presenting a compelling example and inspiring individuals to lead in promoting environmental awareness. The outcome was a positive desire and willingness among society to change their problematic behavior. Consequently, the communicator promptly imparted understanding to the students, enabling them to actively contribute to maintaining a clean environment.

Having raised clients' awareness, interest, and passion for the idea, the next step was to inspire them to make collective decisions and take action. The communicator and the Suntenjaya school's society entered into a mutual commitment to addressing the issues at hand. Additionally, they extended invitations to actively participate in and lead environmental awareness movements to accomplish the predefined goals.

Media and Source

The media employed two distinct methods or approaches to facilitate socialization and disseminate environmental awareness, using the AIDA (Awareness, Interest, Desire, and Action) model as a framework. The first method, legal socialization, employed multimedia tools such as PowerPoint slides, short movies or clips, and an LCD/projector to deliver the environmental message. This method aimed to guide participants through the sequential stages of the AIDA model, fostering awareness, generating interest, creating a desire for action, facilitating decision-making, and ultimately encouraging concrete actions.

On the other hand, the second approach, known as the indirect legal socialization method, took a different route by utilizing a diverse array of media tools. These included stickers, leaflets, posters, banners, and the integration of pictures and photographs. This indirect method aimed to convey the environmental awareness message through tangible and visual means, creating a multi-faceted campaign to engage participants. By employing this combination of methods, the campaign sought to appeal to different learning preferences and ensure a more comprehensive and impactful environmental socialization process.

Evaluation

Evaluation is a foundational element within legal socialization, comprising two crucial dimensions: program evaluation and management evaluation. Program evaluation is a meticulous examination, scrutinizing the effectiveness of the planned program's implementation in alignment with predefined objectives. This thorough assessment encompasses the execution of planned initiatives, the attainment of desired outcomes, and the overall impact on the target audience. This critical analysis shows areas of success and opportunities for improvement within the socialization efforts.

Simultaneously, management evaluation plays a pivotal role in assessing the overarching progress of the legal socialization process. It delves into the management and coordination of various elements within the socialization initiative, actively seeking to identify challenges or obstacles that may have surfaced during implementation. This aspect of evaluation provides a valuable opportunity to promptly address and rectify issues, contributing to the refinement and optimization of the socialization process.

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Recognizing the paramount importance of evaluation and understanding the factors that facilitate the initiation of a socialization process within established guidelines is imperative for the success of any legal socialization initiative. Routine and comprehensive evaluations ensure adherence to objectives and lay the groundwork for continuous improvement and adaptation.

The insights derived from the evaluation process serve as an integral compass for the program's ongoing success, holding equal significance in shaping the trajectory of future socialization initiatives. By assimilating lessons from past experiences and adapting strategies based on evaluation findings, legal socialization programs can dynamically evolve to meet the needs of their target audience better, ensuring sustained effectiveness in the long run.

III. The influence of implementing the AIDA socialization model on establishing environmental awareness is significant

The relationship between the AIDA socialization model and the enhancement of students' environmental awareness was examined in classes 1-6 at 3 State Primary School of Cibodas, involving 120 students. From each class, 20 samples were selected for the study. Correlation and regression analyses were conducted using two instruments to assess variables X and Y and categorize the results.

Based on the correlation testing of variables and its impact on students' environmental awareness through the implementation of the AIDA socialization model (X), the following conclusions can be drawn:

Table 1: Findings on Correlational Analysis

		Ethnopedology (Pre-Test)	Character development (Pre-Test)
Variable X	Pearson Correlation	1	,556**
	Sig. (2-tailed)		,001
	N	120	120
Variable Y	Pearson Correlation	,556**	1
	Sig. (2-tailed)	,001	
	N	120	120

** . Correlation is significant at the 0.01 level (2-tailed).

The environmental awareness socialization implemented through project-based blended learning shows a strong positive relationship with students' environmental awareness, as indicated by a correlation coefficient of 0.556. This correlation falls within the range of 0.60-0.799, considered a strong correlation [24]. Therefore, it can be concluded that there is a significant correlation between the X variable (creation of environmental awareness-related content for the E-module) and the Y variable (students' environmental awareness).

The following table shows the findings of the regression test run after data processing.

Table 2: Result of the Regression Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,556a	,310	,288	8,65024

a. Predictors: (Constant), Y

Based on the descriptive static data analysis and hypothesis test, it is suggested that the socialization of environmental awareness can be enhanced by focusing on developing E-modules (Awareness, Interest, Desire, and Action). The correlation test results demonstrate a significant positive impact (31%) between using the E-module in legal socialization and the effectiveness of socialization in influencing environmental awareness. However, it is important to note that the remaining 69% of the impact is attributed to unrelated factors. Thus, developing the E-module in legal socialization plays a crucial role in improving the quality of socialization and increasing society's environmental awareness.

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In the study conducted by Venkataraman [25], Omoogun et al. [26], and Bergman [27], akin to our research, a comparable correlation was identified between environmental education programs and heightened awareness, specifically among secondary school students. The consistency of these results across different educational levels implies the potential transferability of positive outcomes from one educational context to another.

The outcomes of our hypothesis testing reinforce that students exposed to E-module socialization exhibit heightened environmental awareness, evident in their behaviors and responses to their surroundings. This aligns with the findings of various studies [28]–[30], suggesting that individuals exhibit varying levels of environmental awareness and sensitivity. This observation underscores the need for tailored educational interventions to address individuals' diverse responses and attitudes toward environmental degradation.

Moreover, a meta-analysis conducted by Lin et al. [31] and Toncheva-Zlatkova [32] emphasized the significance of interactive and project-based learning methods, mirroring our study's project-based blended learning approach. The positive correlation identified aligns seamlessly with the meta-analysis's overarching conclusion, emphasizing the substantial contribution of interactive and project-based methods to environmental awareness.

In contrast, the studies [33]–[35] shed light on the importance of community involvement in augmenting the impact of environmental education. While our research predominantly focused on classroom-based interventions, incorporating community engagement strategies, as highlighted by Greenfield et al., may offer an avenue for further amplifying the effectiveness of legal socialization in fostering environmental consciousness [36]. This underlines the potential synergies between classroom-based and community-driven initiatives.

The consistent theme across studies, including ours, regarding the percentage of variability explained by educational modules underscores the enduring impact of such interventions on environmental awareness. Studies [37], [38] found similar percentages of variability explained in the context of environmental education interventions, reinforcing the recurrent theme that educational modules play a pivotal role in shaping environmental consciousness.

To cultivate environmental responsibility, principles related to biodiversity, such as respect for nature, moral responsibility, caring for nature, and the principle of modest and environmentally friendly living, are identified as helpful. Rooted in ecocentrism and motivated by our ecological crisis, these principles serve as guiding lights. These principles can positively influence students' behavioral patterns through legal socialization efforts, encouraging traits such as refraining from littering and adopting more environmentally responsible behaviors. This aligns with the broader literature on the transformative potential of ecocentric principles in shaping sustainable behaviors and attitudes toward the environment [39], [40].

CONCLUSION

The researchers have designed an environmental awareness socialization activity encompassing materials, methods, sources/media, and assessment. This activity addresses the central issues students face in their engagement with blended learning courses. Indonesian universities face significant challenges in developing a more appealing design for Learning Management Systems (LMS) and blended learning courses to attract more students. The challenges include providing students with diverse, engaging, and stimulating materials and supporting faculty members in enhancing their professional skills and competencies. To ensure student engagement in blended learning courses, universities must address two major issues. Firstly, they should focus on developing a user-friendly website utilizing the latest platforms, which may involve hiring experienced professionals to optimize time and cost. Secondly, building institutional capacity within Indonesian universities is crucial to establish a sustainable mechanism for professional development. This system would enable faculty members to learn and grow continuously in a supportive and professional environment. By addressing these challenges, universities can enhance the quality of blended learning courses, satisfying students' engagement and promoting effective environmental awareness socialization. It is essential for Indonesian universities to continuously strive towards improvement to meet the evolving needs of students and foster a culture of lifelong learning within their institutions.

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Not Applicable.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper. No financial, personal, or professional relationships with organizations or individuals that could influence the work's content have been reported. In the spirit of transparency and integrity, the authors affirm that this research was conducted without any external influences that could compromise its objectivity.

Institutional Review Board Statement

This research involving human participants was conducted following ethical principles and guidelines. All participants provided informed consent before participating in the study, and their rights and welfare were protected throughout the research process.

Data Availability Statement

Any additional data or materials related to this study are available from the corresponding author upon reasonable request.

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