ASSESSING CURRENT STATUS, PILOTING, AND DEVELOPING A GUIDE FOR INTEGRATED EXTRACURRICULAR PROGRAM COMBINING ENVIRONMENTAL EDUCATION AND COMMUNICATION FOR PRIMARY SCHOOL STUDENTS

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Abstract. This study addresses the critical need for effective environmental education by developing extracurricular programs and environmental communication for primary school students. It evaluated the current state of EE implementation through a quantitative survey of 281 primary teachers and qualitative interviews with teachers and students. Three diverse communication activities—a school-wide waste exchange program, recycled materials art, and coffee grounds crafting—were piloted at two primary schools. Results showed exceptionally high student interest and satisfaction (98%-100%). Teachers expressed a strong demand (99.2%) for supporting materials, citing significant challenges including time constraints (M=4.36), heavy workload (M=4.30), and lack of appropriate training (M=4.31). While current activities are often basic, EE is highly valued for fostering knowledge, attitudes, and habits. In response, the study developed a guidebook containing 11 comprehensive extracurricular plans to provide a systematic framework. This initiative will foster sustainable environmental protection behaviors among young learners by bridging implementation gaps.

Keywords. Environmental communication, environmental education, extracurricular programs, primary school students, Vietnam environmental education

1 INTRODUCTION

Early environmental education (EE) is considered a strategic and sustainable approach to fostering long-term environmental protection [1]. In the crucial stages of cognitive, emotional, and behavioral development, primary school students are expected to become key agents of environmental improvement. Therefore, EE at the primary level not only provides foundational knowledge but also cultivates awareness and a sense of responsibility among young learners [2, 3]. It plays a vital role in shaping future generations who are environmentally conscious and socially responsible citizens.

In Vietnam, EE is typically integrated into core subjects through both traditional and modern teaching methods [2–5]. For instance, Science introduces ecosystems and pollution, and Biology covers biodiversity [4, 5]. Geography addresses local and global environmental issues, and even History and Civic Education incorporate lessons on natural disaster prevention and resource protection [2] The integration can be full, partial, or through related connections, employing techniques such as open-ended questions, role-playing, investigation activities, and project-based learning to foster curiosity and hands-on discovery [1].

Do Duc Lan et al. (2021) suggests incorporating design thinking into STEM education as an effective way to teach environmental topics. This method guides students through identifying problems, planning, prototyping, testing, and presenting solutions to real-life environmental issues [6]. Similarly, experiential learning emphasizes interaction with the environment directly [7] has been recognized as an age-appropriate approach for primary students, although its integration into the formal curriculum remains limited due to time constraints.

In response, many schools have turned to extracurricular activities as a form of experiential EE [8]. These include environmental clubs, recycling projects, school-wide campaigns, and thematic events such as art competitions, nature trips, and family-based environmental initiatives. For example, in Da Nang, the "Recycling Bus" project encourages students to collect and repurpose waste into educational and decorative items. At the same time, other schools promote hands-on activities, such as beach cleanups, tree planting, or visits to national parks [9, 10].

Within this context, Le Tran Thanh Liem (2018) examines the factors affecting the effectiveness of community-based extracurricular environmental education in rural primary schools in Hau Giang Province, Vietnam, with particular emphasis on facilities, learning materials, students' age, budget, and support from

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schools and parents [11]. Several international studies have underscored both the significance and the challenges of integrating EE through extracurricular and experiential activities. A comprehensive review conducted by Stanford University, synthesizing over 100 articles from 1994 to 2013. The findings revealed that 83% of students exhibited improved ecological behavior and 98% showed enhanced academic performance in subjects such as mathematics and science when EE was delivered through engaging, age-appropriate, and hands-on methods situated in real-life contexts like playgrounds or local parks [12, 13]. However, in Ethiopia, Gugssa (2023) found that despite teachers' favorable attitudes toward experiential learning, environmental lessons remained largely classroom-based and teacher-directed, with limited outdoor activities. The study highlighted an urgent need for teacher training and continuous support to improve EE delivery [14]. Similarly, in Italy, Piras et al. (2023) evaluated a short intervention on food waste and found that while the activity temporarily reduced self-reported food waste, sustained behavioral change was limited. Nevertheless, students' environmental concern increased significantly and persisted over time, with peer influence emerging as a stronger behavioral driver than parental or intrinsic motivation [15]. In South Africa, Damoah et al. (2022) identified policy-level shortcomings, including the absence of structured EE frameworks at the school level and unclear implementation guidelines, leading to weak educator engagement [16]. The study recommended using extracurricular activities as practical mechanisms to operationalize EE goals and foster student participation.

These findings underscore the importance of age-appropriate teaching methods that strike a balance between theory and practical, outdoor experiences. International research further emphasizes the importance of teacher training, sustained policy support, and the impact of peer networks in shaping long-term environmental awareness and behavior.

Building on the reviewed literature and contextual background, this study seeks to address critical gaps in the implementation of EE at the primary level, particularly the limited integration of experiential and extracurricular approaches in many schools across Vietnam. While the importance of combining theoretical knowledge with hands-on activities is well-supported by international evidence, actual implementation remains uneven due to constraints in time, teacher training, and institutional support. Furthermore, despite positive attitudes from educators, challenges such as limited student participation, underdeveloped program structures, and regional disparities continue to hinder the widespread adoption of effective EE models.

To respond to these issues, the present study is structured into three key components:
(1) Assessing the current state of EE by examining both in-class and extracurricular practices through quantitative teacher surveys and qualitative interviews with teachers and students;
(2) Designing and piloting extracurricular EE programs rooted in environmental communication strategies, implemented at two primary schools, and evaluating their impact on student engagement and learning outcomes;
(3) Developing a practical guide for extracurricular EE activities based on SWOT analysis of pilot results, with actionable recommendations to enhance implementation across diverse educational settings.

By combining assessment, experimentation, and development of replicable models, this research aims to contribute to the sustainable and equitable advancement of EE for primary students in Vietnam.

2 METHODOLOGY

2.1 Survey method

A quantitative survey assessed the current implementation of EE activities, particularly extracurricular initiatives, in primary schools. The survey development process involved: (1) defining research objectives, (2) identifying the target population and sample size, (3) choosing the online survey format, (4) designing the questionnaire, (5) pilot testing, (6) conducting the primary survey, and (7) collecting and processing the responses. The questionnaire included both closed-ended (Likert-scale) and open-ended questions. It was divided into two sections:

- **Part I: General Information** (4 questions) aimed to gather demographic and background data about the respondents.
- **Part II: Core Content** (40 questions) divided into four thematic sections:
  1. Current status and forms of extracurricular EE activities in primary schools.
  2. Evaluation of the effectiveness and limitations of EE efforts for primary school students.

3. Challenges in organizing extracurricular activities, integrating environmental communication.
4. Proposed solutions and support mechanisms to enhance the effectiveness of EE communication activities.

The online survey link through Google Forms was distributed through educational networks on Facebook and Zalo, and in collaboration with primary schools. The sample size was calculated using Cochran's formula (1977), given an unknown population size:

$$n = \frac{z^2 \times p \times (1-p)}{e^2}$$

Where:

- z = 1.65 for a 90% confidence level
- p = 0.5 (maximum variability)
- e = 0.05 (acceptable margin of error)

Substituting the values:

$$n = \frac{1.65^2 \times 0.5 \times (1-0.5)}{0.05^2} = 271 \approx 280$$

Accordingly, the required sample size was 280 primary school teachers. The recruitment method for teachers utilized convenience sampling, which was conducted by distributing an online survey link via educational networks (Facebook, Zalo) and through direct cooperation with participating primary schools. A total of 296 responses were collected. The exclusion criterion was responses not originating from primary school teachers. Three non-teacher responses were excluded, resulting in 293 reviewed responses. Ultimately, 281 valid responses were included in the analysis. The valid response rate was 94.9% (281/296). The valid sample size meets the minimum requirement of 280 calculated using Cochran's formula.

Following data collection through structured questionnaires, the responses were systematically reviewed, cleaned, and coded into categorical formats to facilitate statistical analysis. Data processing and reliability analysis were conducted using SPSS software. The study employed descriptive statistical methods, including mean values, standard deviations, and percentages, to summarize the dataset and provide an overview of key trends and patterns. These descriptive metrics measured respondents' levels of agreement and perceptions regarding various aspects of EE activities to evaluate the current situation and the perceived effectiveness of environmental communication activities in primary schools.

A reliability analysis was conducted for four thematic scales used in the questionnaire: (1) current status of environmental extracurricular activities (S), (2) effectiveness and limitations of EE (E), (3) challenges in organizing environmental communication activities (C), and (4) proposed solutions and support (So). Each scale was tested using Cronbach's Alpha to assess internal consistency.

These findings confirm that the measurement instruments used in the study meet the minimum reliability standards, thereby validating their appropriateness for further analysis.

2.2 Communication activity implementation

The study implemented age-appropriate environmental communication programs at the two participating schools. Activities included:

- Activity 1: *"Waste-for-Gifts"* school-wide campaign.
- Activity 2: *"Draw Creativity with Recycled Materials"* for Grades 1–3.
- Activity 3: *"Coffee Grounds Art"* for Grades 4–5.

For the pilot study, student participants were selected using convenience sampling, encompassing all students participating in the three activities across the two pilot schools: Linh Chieu Primary School (638 students) and Le Hong Phong Primary School (431 students). A rapid assessment was conducted using a simple sticker voting system (Happy – Neutral – Unhappy), allowing rapid, age-appropriate feedback collection. This method captures immediate emotional responses but may not fully reflect long-term behavioral changes (Objective 2) (See Appendix 1 for details).

2.3 Interview method

Semi-structured interviews were conducted at two primary schools—Linh Chieu (Thu Duc) and Le Hong Phong (Dong Nai)—to gain deeper insight into EE extracurricular implementation and its perceived effectiveness. Participants included three teachers (one per grade cluster) and five students (representing grades 1–5) from each school. Open-ended questions allowed interviewees to express their perspectives freely.

Interviews were conducted post-activity and recorded for subsequent analysis. Responses were categorized by theme and respondent type, then analyzed to identify patterns, compare with existing studies, and support conclusions. Summaries are presented in Appendices 2 and 3.

2.4 SWOT analysis

A SWOT matrix was developed based on data from all methods to summarize internal and external factors influencing EE implementation. Each component (Strengths, Weaknesses, Opportunities, Threats) was critically analyzed to propose strategic recommendations for improving EE practices.

Table 1. SWOT Analysis of EE Extracurricular Activities

Strengths (S)	**Weaknesses (W)**
- Current EE integration in academic and extracurricular settings (Objective 1) - Supporting legal and policy frameworks for EE	- Limited student awareness and inconsistent application of EE (Objective 2) - Implementation inconsistencies and lack of teacher training
Opportunities (O)	**Threats (T)**
- Leverage strong points to expand EE programs	- Weaknesses pose barriers to achieving educational goals

2.5 Ethics Statement

The study adhered strictly to ethical guidelines throughout the data collection and analysis phases. Participation was entirely voluntary, and informed consent was obtained from all participants. For the quantitative survey (teachers), consent was secured by requesting participants to click an affirmation statement before accessing the questionnaire (online informed consent). For qualitative interviews (teachers and students) and pilot activities (students), verbal consent was obtained prior to participation, and was secured from the school administration for student involvement. All responses and data collected were anonymized and maintained with strict confidentiality, and used solely for research purposes.

3 RESULTS AND DISCUSSION

3.1 General information about the survey sample

Following the administration of the online survey, 296 responses were collected. Three of these were excluded as they did not originate from primary school teachers. After screening and validating the data, 281 out of 293 responses were deemed valid and subsequently included in the analysis. This final sample size meets the minimum requirements initially set for statistical analysis. The respondents were primary school teachers currently employed at various institutions, predominantly in Southern Vietnam, with a particular concentration in the Southeast region, especially at schools participating in the project. Notably, teachers from 32 primary schools across 10 provinces and cities participated in the survey, with the highest number of respondents from Ho Chi Minh City (32%), Binh Duong (23.1%), and Dong Nai (18.5%). Additional responses were recorded from schools in Ba Ria–Vung Tau, Thua Thien–Hue, Ben Tre, Tay Ninh, Dong Thap, Bac Lieu, and Tien Giang, reflecting a diverse regional representation (26.3%).

The participants held diverse professional roles within their schools, including homeroom teachers, subject-specific educators, and youth union (team) leaders. Their teaching experience ranged from 1 to 31 years, reflecting a wide distribution of professional seniority. The largest group (37.7%) had 5 to 10 years of experience, indicating that many respondents were mid-career educators. Those with over 10 years of experience comprised 22.9% of the sample, while 21.6% had between 1 and 3 years, and 17.8% had between 3 and 5 years of experience. This balanced distribution across experience levels contributes to the

robustness of the dataset, capturing a broad spectrum of perspectives and enhancing the reliability and generalizability of the findings.

The sample primarily consists of young to mid-career teachers, whose responses provide valuable insights into current practices and challenges in EE at the primary school level.

3.2 Current status of extracurricular EE activities

Table 2 presents the descriptive statistics and reliability indicators for ten observed variables assessing the current implementation of extracurricular EE activities in primary schools. Overall, respondents reported positive perceptions, with mean scores indicating moderate to high levels of agreement across most items. The highest agreement was recorded for S1 (*"My school currently organizes extracurricular activities on EE and communication"*) with a mean score of 4.37, suggesting that such activities are widely implemented and institutionally supported. In contrast, the lowest score was observed for S7 (*"The school has sufficient resources to implement these activities"*, M = 3.41), indicating that resource constraints—such as limited funding, materials, or personnel—remain a significant barrier to the sustained delivery of EE programs. Although schools are willing to undertake EE programs, there is a severe lack of "fuel" for these initiatives, such as funds, instructional materials, and specialist staff, as seen by the substantial gap between institutional intent (S1) and resource availability (S7). As a result, the low S7 score reveals a crucial implementation gap where a lack of concrete financial and structural support frequently impedes teacher passion and school policy. The overwhelming demand for supporting materials (99.2%) and the ongoing resource gap (S7) highlight the need for the suggested 11-activity guidebook, which acts as a useful intervention to lessen the lack of specialized resources and streamline the planning process for overworked educators.

Several items—S4 (*school leadership involvement*, M = 4.14), S5 (*homeroom teacher participation*, M = 4.22), and S6 (*Youth Union/Team leader involvement*, M = 4.13)—also received consistently high ratings. These results reflect a strong internal commitment to environmental initiatives, with broad engagement among key school personnel in the planning and managing extracurricular EE activities.

However, moderate ratings for S8 (*"Integration with communication efforts"*, M = 3.95) and S9 (*"Participation of external organizations"*, M = 3.87) suggest that collaboration with outside stakeholders and cross-cutting communication strategies remain underdeveloped. These areas may represent opportunities for strategic improvement.

The instrument demonstrated strong internal consistency regarding scale reliability, with a Cronbach's Alpha coefficient of 0.83, surpassing the recommended threshold of 0.70 for exploratory research (Nunnally & Bernstein, 1994). Corrected item-total correlation values ranged from 0.470 (S9) to 0.596 (S3), indicating that all items contribute meaningfully to the underlying construct. Notably, no item significantly improved reliability if removed, supporting the retention of all items in the scale.

Table 2: Current status of extracurricular EE activities

Observed Variable	Description	Mean	Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Agreement Level
S1	My school currently organizes extracurricular activities on EE and communication.	4.37	0.83	0.590	0.827	High
S2	Extracurricular EE activities are held regularly.	3.93	0.96	0.503	0.835	Moderate to High
S3	The activities are organized with clear purposes and content focused on environmental protection.	4.10	0.92	0.596	0.827	High
S4	The school leadership and administration plan and manage EE activities.	4.14	0.91	0.593	0.827	High
S5	Homeroom teachers plan and manage EE activities.	4.22	0.85	0.540	0.832	High

Observed Variable	Description	Mean	Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Agreement Level
S6	Youth Union and Team leaders plan and manage EE activities.	4.13	0.88	0.536	0.832	High
S7	The school has sufficient resources (staff, materials, funding) to implement these activities.	3.41	1.05	0.516	0.834	Moderate
S8	These activities are effectively integrated with communication efforts.	3.95	0.92	0.561	0.830	Moderate to High
S9	External organizations (e.g., unions, companies) participate in these activities.	3.87	1.00	0.470	0.838	Moderate
S10	I am involved in the planning and organization of these extracurricular activities.	4.02	0.90	0.528	0.833	High

Table 3 presents the descriptive statistics and reliability indicators for ten observed variables (F1–F10) measuring the diversity and implementation of extracurricular EE activities in primary schools. Mean scores ranged from 3.84 to 4.45, indicating overall positive perceptions among respondents. The highest levels of agreement were observed for F4 (*environmental sanitation activities*, M = 4.45) and F10 (*waste sorting systems on campus*, M = 4.40), suggesting that practical, routine-based EE interventions are well institutionalized. In contrast, F6–F8, which reflect more resource-intensive or organizationally complex activities (e.g., field trips, exhibitions, clubs), received lower average scores (M = 3.84–3.85), indicating moderate implementation.

The scale's internal consistency was strong, with a Cronbach's Alpha of 0.870, exceeding the acceptable threshold of 0.7. Corrected item-total correlations ranged from 0.469 (F2) to 0.674 (F10), confirming that all items contribute meaningfully to the underlying construct. Furthermore, none of the items would significantly improve the scale's reliability if deleted, with "Cronbach's Alpha if Item Deleted" values ranging from 0.852 to 0.868.

These results indicate that the scale is reliable and valid for assessing the variety and quality of EE activities. While implementation appears generally positive, the findings highlight an imbalance favoring in-school, low-cost activities over experiential or externally supported formats, pointing to a potential area for policy and resource development.

Table 3: Descriptive Statistics and Reliability of Observed Variables – Forms of EE Activities (F1–F10)

Observed Variable	Description	Mean	Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Agreement Level
F1	The school includes EE content in weekly flag-raising sessions.	4.20	0.89	0.577	0.859	High
F2	The school organizes environmental knowledge through thematic talks.	4.10	0.92	0.645	0.854	High
F3	The school educates students through environmental competitions (e.g., quizzes, drawings, recycled crafts).	4.21	0.87	0.576	0.860	High
F4	The school promotes EE through cleaning and sanitation activities.	4.45	0.79	0.495	0.866	Very high
F5	The school implements tree planting and gardening activities on campus.	4.20	0.90	0.649	0.854	High

F6	The school organizes field trips and experiential activities on environmental topics.	3.85	1.01	0.674	0.852	Moderate
F7	The school hosts exhibitions, visual media, or screenings related to the environment.	3.84	0.97	0.577	0.859	Moderate
F8	The school provides EE through environmental clubs.	3.84	1.03	0.645	0.854	Moderate
F9	The school regularly promotes electricity and water conservation among students.	4.20	0.85	0.576	0.860	High
F10	The school has a designated system for waste sorting and collection on campus.	4.40	0.80	0.495	0.866	Very high

Semi-structured interviews with seven teachers from Linh Chieu and Le Hong Phong primary schools revealed strong support for extracurricular EE activities. Most teachers agreed these activities fostered students' environmental awareness and desired more frequent and diverse initiatives. At Linh Chieu primary school, Mr. Nguyễn Hoàng Tuấn highlighted the success of the school's "Small Plan" campaign and the practice of "See litter, pick it up immediately," citing them as impactful but straightforward actions. Ms. Lê Mỹ Hoa emphasized the meaningful impact of EE activities, noting their role in helping students understand environmental issues and calling for greater parental involvement to reinforce these values at home.

However, some concerns were raised. At Le Hong Phong primary school, Mr. Trần Minh Hiếu observed that existing activities were repetitive and lacked variety. He recommended developing resource materials and activity guides to support more creative programming and emphasized the need for increased time allocation for environmental initiatives within the school schedule.

Similarly, interviews with eight students across both schools reflected high enjoyment and enthusiasm for the environmental activities. Most students expressed a strong interest in seeing such activities organized more frequently, indicating that they found the events engaging and valuable for learning. However, some students noted repetition and a lack of novelty. Nguyễn Lê Minh Quân (Linh Chieu primary school) shared that while the school held environmental activities, they were limited in variety, mostly involving cleaning, tree planting, and waste sorting. Likewise, Lê Thanh Minh Tâm (Le Hong Phong primary school) stated that although she appreciated activities like litter picking and indoor greening, the recent programs organized by external facilitators felt more exciting and educational than the school's regular offerings (See Appendix 2 and 3).

These insights suggest that while environmental activities are generally well-received by both teachers and students, there is an apparent demand for innovation, increased variety, and more structured support in planning and implementing EE extracurriculars

3.3 Impacts and challenges in implementing extracurricular EE activities in primary schools

Quantitative findings (Table 4) indicate that primary school teachers perceive extracurricular EE activities as highly effective, with mean scores for observed variables (E1–E10) ranging from 3.93 to 4.15. The highest-rated items include the perceived necessity of EE (E6), its role in knowledge acquisition (E7), and its contribution to habit and skill development (E10)—each scoring M = 4.15, reflecting widespread agreement on the importance and impact of these programs. Other aspects, such as student enthusiasm (E5), age-appropriateness (E4), and content preparation (E2), also received high ratings. However, time allocation for implementation (E3, M = 3.93) emerged as the most limiting factor, despite being above the effectiveness threshold. The scale's internal consistency was confirmed, with Cronbach's Alpha values ranging from 0.827 to 0.845 and corrected item-total correlations exceeding 0.40, indicating the scale's reliability for assessing perceived EE impacts.

Table 4: Perceived effectiveness of extracurricular EE activities

Observed Variable	Description	Mean Value	Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Agreement Level
E1	EE for primary students at school is practical, thorough, and consistent.	4.01	0.914	0.519	0.834	High
E2	Extracurricular activities for EE are diverse and well-prepared.	3.95	0.897	0.515	0.834	High
E3	There is ample time allocated for extracurricular activities aimed at EE.	3.93	0.977	0.409	0.845	High
E4	Current activity formats are suitable for the primary students' age group.	4.04	0.946	0.595	0.827	High
E5	Students are enthusiastic about extracurricular environmental activities.	4.10	0.895	0.598	0.827	High
E6	EE through extracurricular activities is necessary and important.	4.15	0.925	0.577	0.828	Very high
E7	Extracurricular activities help students gain specific environmental knowledge.	4.15	0.932	0.554	0.831	Very high
E8	Extracurricular activities foster positive attitudes and awareness toward environmental protection.	4.10	0.919	0.545	0.831	High
E9	Extracurricular activities help students develop proper behaviors to protect the environment.	4.02	0.876	0.548	0.831	High
E10	Regular extracurricular activities help students build skills and habits for environmental protection.	4.15	0.886	0.584	0.828	Very high

Table 5 presents results regarding the challenges faced in organizing EE communication activities (C1–C6). All items yielded very high mean values (M = 4.15 to 4.36), reflecting teachers' consensus on substantial barriers. The most critical challenges were insufficient time in school schedules (C4, M = 4.36), overloaded teacher workload (C5, M = 4.30), and lack of appropriate training (C6, M = 4.31). These issues point to systemic institutional constraints. Reliability analysis confirmed high internal consistency, with corrected item-total correlations between 0.662 and 0.800, and Cronbach's Alpha exceeding the acceptable threshold ($\alpha > 0.8$).

These quantitative insights align with qualitative findings from teacher interviews. Ms. Hiếu, of Le Hong Phong Primary School, noted that EE activities often lack diversity and are repetitive, thereby reducing student engagement. Similarly, Mr. Tuấn, a youth union leader at Linh Chieu Primary school, identified limited human resources as a barrier, particularly in schools with large student populations and insufficient support from teachers and parents. These findings align with international studies, such as Gugssa (2023), which noted the lack of teacher training and structured guidelines as impediments to effective EE delivery in Ethiopia[14] .

In summary, while EE activities are acknowledged as educationally impactful, their implementation is hindered by logistical, organizational, and structural limitations. Addressing these challenges, through increased time allocation, teacher support, and resource investment, is crucial to enhancing the sustainability and effectiveness of environmental communication efforts in primary education.

Table 5. Challenges in organizing environmental communication activities

Observed Variable	Description	Mean Value	Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Agreement Level
C1	I face difficulties planning and organizing extracurricular environmental activities due to a lack of funding.	4.26	0.718	0.681	0.877	Very high
C2	Lack of attention from the school management is a difficulty in implementing extracurricular environmental activities.	4.21	0.960	0.712	0.874	Very high
C3	There is a lack of collaboration from colleagues in organizing these activities.	4.15	0.904	0.800	0.856	Very high
C4	There is not enough time in the school schedule for environmental extracurricular activities.	4.36	0.762	0.662	0.879	Very high
C5	Teachers are overloaded with other teaching and administrative duties, making it difficult to implement activities.	4.30	0.719	0.698	0.874	Very high
C6	There is a lack of appropriate training and guidance on implementing environmental communication activities.	4.31	0.752	0.734	0.868	Very high

3.4 Evaluation of integrated environmental communication activities at two primary schools

Three communication-integrated programs were implemented at two pilot schools—Le Hong Phong Primary school (September 23, 2024) and Linh Chieu Primary school (October 4, 2024) to assess the feasibility and student engagement with extracurricular EE activities. The activities were intentionally designed to be age-appropriate, participatory, and aligned with key environmental learning objectives. They included: (1) *Waste-for-Gifts* – a school-wide waste collection campaign, (2) *Draw Creativity with Recycled Materials* **–** an art competition for grades 1–3, and (3) *Coffee Grounds Art* – a sustainable crafting activity for grades 4–5. While the pilot activities have been described in terms of their procedures and engagement methods, a more explicit analysis of how environmental communication is embedded in each activity is essential to understand their educational value and behavioral impact fully. These activities function as experiential learning opportunities and strategic communication channels that convey environmental messages in vivid, participatory, and effective ways.

(1) *Waste-for-Gifts* campaign: Communication through action and incentive

In this school-wide waste collection campaign, three collection stations were strategically set up at convenient locations within each school campus. Students were encouraged to bring recyclable waste items—such as paper, plastic bottles, and aluminum cans—to the designated collection points. In exchange, they received a small gift as an incentive. A supervising team was present at each station to guide students in sorting their waste correctly, reinforcing practical waste classification skills. The activity was designed to promote environmental awareness and integrate behavioral change through immediate and tangible incentives. At the end of the campaign, the total volume of recyclables collected was recorded. At Le Hong Phong Primary school, students contributed 50 kg of paper, 10 kg of plastic bottles, and 6 kg of aluminum cans. Meanwhile, the campaign collected 112 kg of paper, 17 kg of plastic bottles, and 10 kg of aluminum cans at Linh Chieu Primary school. The revenue generated from selling these materials was returned to each school's environmental fund to support future green initiatives.

Several interactive educational games were organized in parallel with the exchange activity, including *Which Bin for Which Waste?*, *Green Journey*, and *The Waste Wheel*. These games provided students with

hands-on experience in proper waste sorting, reinforcing environmental knowledge through play-based learning.

This campaign exemplifies a behavior-centered communication model in which students directly experience the environmental and personal value of waste sorting and recycling. Exchanging recyclable items for tangible rewards is an immediate and motivating communication, reinforcing a "green action–positive outcome" cycle. Interactive games like "*Which Bin for Which Waste?*" enhance retention through playful repetition, turning waste classification into an engaging learning process. Moreover, publicizing the total amount of waste collected and explaining its contribution to the school's environmental fund conveys broader messages about collective impact and circular economy in an accessible, school-level context.

(2) *Draw creativity with recycled materials* contest*:* Communication through creative expression

In this activity, students were organized into small groups to participate in a drawing competition using recycled cardboard as the primary medium. Each group was tasked with creating an artwork under the theme of environmental protection. Most of the students demonstrated a clear understanding of the topic, and the resulting drawings were thematically appropriate and creatively and aesthetically presented. Upon completion, all artworks were submitted for evaluation by a panel of judges consisting of teachers. The assessment was based on predefined criteria: theme relevance, creativity, visual impact, and teamwork. The most outstanding entries were selected and awarded to encourage student engagement and recognize their effort. This activity fostered artistic expression and teamwork and reinforced students' awareness of environmental issues through hands-on creative practice using recyclable materials.

(3) *Coffee grounds art* workshop*:* Communication through product-based learning

For Activity 3, this hands-on activity introduced students in grades 4 and 5 to creative reuse by crafting odor-absorbing tablets made from used coffee grounds. Under the guidance of the environmental communication team, students learned to mix dried coffee grounds with natural binding agents and mold the mixture using small shape-forming tools. The process emphasized sustainability by transforming what is typically considered waste into a functional and eco-friendly product. After the tablets were shaped and dried, students placed them into small fabric bags to take home and use as natural deodorizers in closets, shoe cabinets, or schoolbags. Through this activity, students developed awareness of waste reuse and material cycles and gained practical skills in sustainable crafting. The activity bridges EE with tangible outcomes, reinforcing that small actions can contribute to greener living.

This hands-on activity transforms used coffee grounds into usable deodorizer tablets, illustrating the practical application of circular economy principles. By converting waste into a useful product, students are exposed to the message that "waste is a resource in disguise." Bringing the product home extends the communication impact beyond the classroom, turning the deodorizer into a tangible and ongoing reminder of the environmental lesson. This form of product-based communication empowers students, reinforcing that small, personal actions can contribute meaningfully to sustainability. Moreover, it promotes a green lifestyle by encouraging using safe, natural, and reused materials.

Various media-based strategies were applied to strengthen the impact of the pilot activities' communication. In the *Waste-for-Gifts* campaign, visual tools such as posters and banners were placed at collection stations to convey key messages about waste sorting and the campaign's goals. These stations became communication points where students received rewards and environmental knowledge. Event outcomes were also shared on school bulletin boards and social media (Facebook), extending the campaign's visibility and inspiring wider participation.

For the "Creative Drawing" and "Coffee Grounds" activities, student-created artworks and eco-products were displayed in small school exhibitions or shared online. These outputs served as effective message carriers, communicating environmental ideas to the broader school community, including parents and peers. This public display reinforced environmental messaging through indirect, peer-based communication.

A quick post-activity survey was conducted with 431 Le Hong Phong Primary school students, focusing on three simple questions. For the first question, *"Did you enjoy the activities you just participated in?"*, 93.3% (403 students) responded positively, expressing enjoyment. Only 2.7% (12 students) reported neutral feelings, while 1.3% expressed dissatisfaction, primarily due to the large number of participants leading to a shortage of gifts. The other two questions, *"Would you like to participate in more activities?"* and *"Would you like to take part in environmental protection activities in the future?"* received 100% positive responses, highlighting a strong interest and engagement among students toward continued EE initiatives.

At Linh Chieu primary school, 638 students were surveyed with the same three questions. Remarkably, 100% of students expressed enjoyment of the activities and enthusiasm for future participation. These results indicate that these activities were intentionally designed to be age-appropriate, participatory, aligned with key environmental learning objectives, and explicitly rooted in environmental communication strategies.

Ms. Hồng (Linh Chieu school) affirmed that the activities were "meaningful and contribute to raising students' awareness of environmental protection." In contrast, Ms. Duyên (Le Hong Phong school) noted they "offered students valuable experiences and exposure to new, exciting formats that captured their interest".

From the student perspective, Le Minh Hoang (Class 4A3, Linh Chieu school) shared, "These activities help make the environment cleaner and teach me how to classify waste." Similarly, Le Minh Tam (Class 4A1, Le Hong Phong school) commented, "I enjoyed all three activities because I received gifts and learned a lot about the environment. I found the coffee grounds activity interesting—it taught me how to recycle coffee waste into effective deodorizing tablets". The successful implementation of these communication-integrated activities demonstrated the potential to foster environmental awareness and behaviors.



Figure 1: From left to right: Activity (1) *Waste-for-Gifts*, (2) *Draw Creativity with Recycled Materials* and (3) *Coffee Grounds Art* at Linh Chieu Primary school, Thu Duc.



Figure 2: From left to right: Activity (1) *Waste-for-Gifts*, (2) *Draw Creativity with Recycled Materials* and (3) *Coffee Grounds Art* at Le Hong Phong Primary school, Dong Nai.

Overall, by embedding environmental communication into both the process and presentation of activities, the program ensured that messages were taught and amplified across multiple channels. This multi-layered approach creates a school-wide environmental culture and encourages sustained student behavior change.

3.5 Strategic and policy-oriented solutions for advancing extracurricular EE

The survey and reliability analysis results provide clear evidence of both the demand and potential for improving extracurricular EE in primary schools. Table 6 demonstrates that the proposed solutions, centered around institutional support, collaboration, and participatory design, received very high agreement levels among teachers, with mean scores ranging from 4.28 to 4.34. These findings reflect a shared perception that the successful implementation of EE activities cannot be achieved in isolation, but instead requires structured support mechanisms across multiple levels. Based on survey data and interview findings,

a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis was conducted to identify internal and external factors influencing the implementation of extracurricular EE activities in primary schools (Figure 3).

Notably, the highest-rated item was the need for specific instructional materials (So1), highlighting educators' urgent call for accessible and practical tools to guide activity planning. Despite widespread recognition of the value of EE, many teachers report feeling ill-equipped to translate curricular intentions into practice, especially in the context of extracurricular programming. This aligns with the identified weaknesses (W) in the SWOT analysis, such as the absence of concrete guidelines and materials (reported by 98.5% of respondents).

The strong endorsement of collaborative approaches, including school-parent partnerships (So2) and student involvement (So3), underscores the importance of multi-stakeholder engagement in EE. These solutions tap into the broader opportunity (O) space identified in the SWOT matrix, wherein parents and students are not merely beneficiaries but active participants in shaping and sustaining educational programs. This participatory model is especially vital given that the lack of human resources and limited teacher availability (98.5% and 98.9% of responses) remain key operational barriers.

In terms of policy, the proposal for school-level policy support (So4) was also highly rated, reflecting the belief that institutional backing is essential for sustained teacher engagement. EE activities are often perceived as peripheral or unsustainable without supportive school policies, such as official time allocation, recognition, or funding. This is consistent with the threats (T) identified, particularly the difficulty balancing academic demands with extracurricular initiatives and ensuring long-term program continuity.

These findings emphasize that while individual teacher efforts are commendable, systemic change is required to institutionalize and scale EE efforts. The strong internal reliability of the proposed solutions scale (Cronbach's Alpha = 0.85) further affirms that these measures form a cohesive and reliable foundation for strategic planning.

Table 6. Proposed solutions and support mechanisms for implementing extracurricular EE activities

Observed Variable	Description	Mean	Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Agreement Level
So1	I would like to have specific guidebooks for organizing environmental extracurricular activities.	4.34	0.790	0.754	0.847	Very High
So2	There should be collaboration between schools and parents in organizing these activities.	4.28	0.839	0.751	0.849	Very High
So3	Students should be involved in planning and organizing environmental activities.	4.32	0.774	0.741	0.852	Very High
So4	Schools should implement policies encouraging and supporting teachers in organizing environmental extracurricular activities.	4.33	0.770	0.740	0.853	Very High

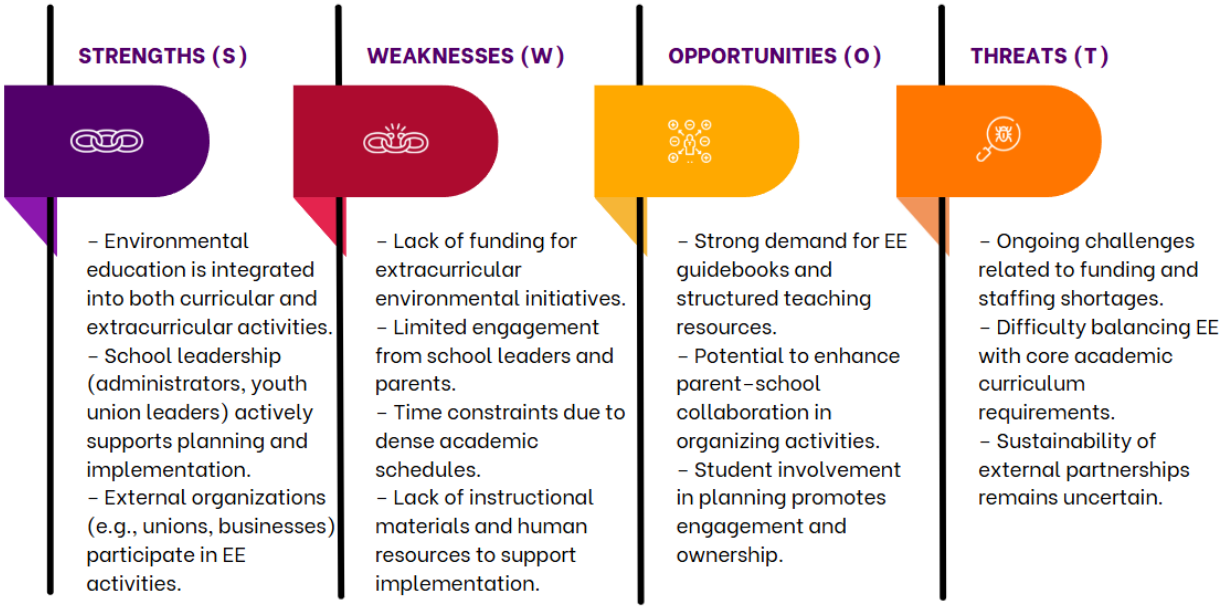


Figure 3. SWOT analysis of extracurricular EE in primary schools

The findings from this study underscore the need for comprehensive and multi-level policy interventions to enhance the implementation of extracurricular EE in primary schools. The following implications are proposed to address the identified systemic, institutional, and pedagogical gaps.

- Development of guidebooks and resource toolkits

There is a clear demand among educators for structured instructional support. Therefore, it is essential that national or provincial education authorities provide standardized EE guidebooks that include lesson plans, adaptable activity templates, and contextual implementation guidelines. These materials should be flexible enough to accommodate the diverse conditions of urban, rural, and under-resourced school settings.

- Institutional support and incentivization for teachers

Teachers require professional recognition and enabling conditions to sustain their involvement in EE. Educational institutions should embed EE into teacher appraisal systems and offer tangible incentives such as reduced workload, professional development credits, or public acknowledgment. These measures are critical to enhancing teacher motivation and EE programs' long-term viability.

- Promotion of structured parent–school collaboration

Limited parental engagement remains a notable barrier. Schools should institutionalize mechanisms that actively involve parents, such as environmental family days, co-organized sustainability workshops, and take-home activities that reinforce learning. Such approaches help extend EE beyond the classroom and foster a broader culture of environmental responsibility.

- Curricular integration and timetable adaptation

Time constraints present a persistent challenge. To address this, EE content can be embedded into existing subjects—such as science, arts, or civic education—thus allowing schools to maintain curricular coherence while promoting interdisciplinary learning. Additionally, flag-raising ceremonies or homeroom periods may be appropriate platforms for brief but regular EE interventions.

- Strengthening partnerships with external stakeholders

Although collaboration with community organizations and businesses is already present in some schools, sustaining these partnerships remains difficult. Establishing formal agreements with environmental NGOs, green enterprises, or public agencies could facilitate access to technical expertise, co-organized events, and material or financial resources, improving program consistency and scale.

- Fostering student participation and leadership

Empowering students to take an active role in EE initiatives supports the principles of participatory and learner-centered education. Schools should consider establishing student-led environmental clubs or green committees, which enhance student engagement and nurture early environmental stewardship and a sense of ownership over sustainability efforts.

By adopting a multi-tiered support system—spanning policy development, stakeholder engagement, and curricular integration—schools can transition from sporadic environmental activities to well-supported, meaningful programs that influence both cognition and behavior. Ultimately, these changes hold promise for embedding environmental responsibility into the ethos of primary education, ensuring that the next generation grows up equipped to meet the environmental challenges of the future.

3.6 A guide for an integrated extracurricular program combining EE and communication for primary school students

While extracurricular EE activities have demonstrated strong potential to raise awareness and shape pro-environmental behaviors, their effectiveness is currently constrained by institutional, operational, and resource-related limitations. The SWOT analysis identifies systemic weaknesses—such as lack of funding, guidance, and teacher support—that require policy intervention rather than isolated efforts. The proposed strategies serve as solutions to these issues and as a roadmap for creating scalable, inclusive, and sustainable EE programming.

Developing a structured extracurricular EE program is essential based on the observed challenges and gaps outlined in previous sections. Many teachers expressed confusion and difficulty organizing consistent, impactful activities without a unified framework. In response, the proposed annual program, aligned with significant environmental events and holidays, addresses these challenges by offering a structured, year-long plan that integrates creative communication methods and hands-on activities to foster sustainable environmental behaviors among primary school students.

The extracurricular program outlined in Table 7 is designed to span the academic year, integrating 11 distinct activities tied to national and international environmental events, such as Vietnam Environment Day (October 10), World Environment Day (June 5), and Earth Hour (March). Each activity is tailored to be age-appropriate, participatory, and rooted in environmental communication strategies, addressing the need for diverse and engaging formats identified in teacher and student feedback. The activities employ various communication methods, including social media (e.g., school Facebook pages), posters, exhibitions, and interactive games, to maximize outreach and impact.

Table 7. A year-round EE activity module for primary schools

No.	Month	Theme/Event	Key Activities	Communication Methods	Expected EE Outcomes
1	August	Green Opening Ceremony	Trash-for-gift exchange, Mini planting game, Waste collection race	School event, posters, Facebook	Raise awareness of waste sorting; promote clean, green learning spaces
2	September	Recycled Mid-Autumn Festival	Lantern-making contest with recycled materials	Posters, social media, and in-school exhibition	Increase awareness of recycling and eco-friendly product use
3	October	Vietnam Environment Day (Oct 10)	Environmental talk, Compost-making workshop	Fanpage articles	Promote organic waste reuse; deepen students' environmental knowledge
4	November	Vietnamese Teachers' Day (Nov 20)	Nature-themed thank-you card and gift making	Art exhibition, fanpage showcase	Encourage environmental reuse and a gratitude culture
5	December	World Wildlife Conservation Day (Dec 4)	Nature clue hunt, Wildlife ID quiz	On-site activities	Raise awareness of wildlife protection and reduce harmful consumption habits
6	January	International EE Day (Jan 26)	Nature reserve field trip, Photo–essay contest	Web publication, blog	Provide experiential learning on biodiversity and endangered species
7	February	Eco-Friendly New Year	Write letters to Earth	Handwritten notes	Encourage personal environmental reflection and advocacy

No.	Month	Theme/Event	Key Activities	Communication Methods	Expected EE Outcomes
8	March	Earth Hour	Energy-saving talks, "One-Hour Lights Out" event	Before–and–after photos	Foster energy-saving habits at home and school
9	April	Earth Day (Apr 22)	Coffee grounds upcycling workshop	Demonstrations, product sharing	Promote sustainable living through creative organic waste reuse
10	May	National Clean Water and Sanitation Week	Water knowledge quiz and environmental games	Quiz games, mini-competitions	Reinforce water conservation and hygiene knowledge
11	June	World Environment Day (Jun 5)	Green summer camp, Traditional environmental games	Posters, banners, photography, reflection essays	Promote eco-creativity and instill environmental values through experiential and cultural engagement

The extracurricular program outlined in Table 7 is designed to span the academic year, integrating 11 distinct activities tied to national and international environmental events, such as Vietnam Environment Day (October 10), World Environment Day (June 5), and Earth Hour (March). Each activity is tailored to be age-appropriate, participatory, and rooted in environmental communication strategies, addressing the need for diverse and engaging formats identified in teacher and student feedback. The activities employ various communication methods, including social media (e.g., school Facebook pages), posters, exhibitions, and interactive games, to maximize outreach and impact.

For instance, the "Green opening ceremony" in August includes a *Waste-for-Gifts* campaign, mini-tree-planting games, and a waste collection race, leveraging event-based communication and social media to raise awareness about waste classification and foster a green school environment. Similarly, the "Recycled Mid-Autumn Festival" in September engages students in creating lanterns from recycled materials, with outcomes displayed in school exhibitions and shared online, encouraging creativity and environmental consciousness. These activities align with the high student satisfaction rates (98%–100%) observed in the pilot programs (Section 3.4), confirming their effectiveness in engaging young learners.

More resource-intensive activities, such as field trips to nature reserves (January) and composting workshops (October), address the identified gap in experiential learning opportunities (F6). By incorporating hands-on tasks like crafting deodorizing tablets from coffee grounds (April) or creating art from natural materials (November), the program bridges theoretical knowledge with practical application, fostering skills and habits for sustainable living (E10). Creative communication channels, such as student-authored letters (February) and photo contests (March), further amplify student voice and community engagement, aligning with the participatory model advocated in the above SWOT analysis. Initiatives tied to biodiversity, such as "Wildlife Conservation Day" (December) and nature reserve visits (January), provide practical knowledge about ecosystems and endangered species, responding to the need for a deeper understanding of the environment (E7). Meanwhile, events like Earth Hour and World Water Day promote energy and water conservation habits, contributing to sustainable behaviors at school and home.

Integrating traditional and modern communication methods—such as posters, social media, and exhibitions—ensures broad accessibility and engagement, addressing the moderate integration of communication efforts (S8). By linking activities to cultural and educational events (e.g., Teachers' Day, Tet holiday), the program embeds EE within familiar contexts, enhancing its relevance and appeal to students, parents, and teachers. Collaboration with parents and external organizations, emphasized in activities like the "Green Teachers' Day" and "Green Summer Camp," addresses the lack of human resources (C3) by fostering multi-stakeholder involvement. Time constraints (C4) are addressed by embedding EE activities within existing school events, such as flag-raising ceremonies or holiday celebrations, ensuring minimal disruption to academic schedules. The program's flexibility also allows adaptation to diverse school contexts, including rural settings, where resource limitations are more pronounced. The program supports systemic integration of EE into school curricula and culture by aligning with policy recommendations (So4), such as institutional support and teacher incentives.

The success of the pilot activities (Section 3.4), coupled with the structured program in Table 3.9, demonstrates the potential for scalable and sustainable EE initiatives. The high student engagement

(93.3%–100% positive feedback) and teacher support for structured resources suggest that this model can be replicated across diverse educational settings. The program's alignment with international best practices, such as experiential learning and peer-driven engagement [12]This further validates its potential to foster long-term environmental awareness and behavior change.

Schools should leverage the proposed policy solutions (Section 3.5) to ensure sustainability, including official guidebooks, teacher training, and partnerships with environmental NGOs. By institutionalizing EE through student-led clubs and parent-school collaborations, the program can create a culture of environmental stewardship, addressing the threats of inconsistent implementation and limited resources identified in the SWOT analysis.

This guide aligns with meaningful environmental commemorative dates and introduces an engaging, age-appropriate variety of activities integrating art, science, and action. Effective communication strategies, including social media campaigns, on-campus exhibitions, and experiential learning outings, ensure visibility and participation while fostering lasting behavioral change among students.

The holistic approach contributes to:

- Curriculum integration: Complementing formal learning with thematic, action-based activities.
- Skill development: Enhancing teamwork, creativity, and environmental literacy.
- Behavioral change: Encouraging long-term sustainable habits from early education stages.
- Community engagement: Bridging school–home–community through shared environmental responsibility.

Implementing such a program may serve as a scalable model for primary schools nationwide, especially when accompanied by supporting policy frameworks, resources, and training, highlighted in the policy recommendations section. Thus, the structured extracurricular program outlined in Table 7 offers a practical and impactful solution to the challenges of implementing EE in primary schools. Integrating creative communication, hands-on activities, and stakeholder collaboration fosters environmental awareness, skills, and behaviors among students, paving the way for a greener and more sustainable future.

4 CONCLUSIONS

This study affirms the important role of extracurricular programs in promoting EE for primary school students in Vietnam. The pilot activities—including waste-for-gifts, art made from recycled materials, and products created from coffee grounds—have demonstrated practical effectiveness in attracting participation and enhancing students' awareness and attitudes. However, the results also indicate that the widespread implementation of this model is facing significant systemic barriers, including time pressure in the curriculum (M = 4.36), teachers' overloaded workloads (M = 4.30), and a lack of financial resources as well as appropriate professional training.

The development of a guidebook with 11 detailed extracurricular plans is expected to be a practical tool to help teachers overcome difficulties in designing environmental communication content. Nevertheless, to achieve sustainable impact and long-term behavioral change, the study emphasizes that it cannot rely solely on individual efforts. Schools need to prioritize building institutional support mechanisms, integrating EE into educational policies, and strengthening close coordination between parents and external organizations. Although the study provides a scalable guidance framework, long-term success still depends on thoroughly addressing limitations in human resources and the ongoing commitment of stakeholders. Future studies should focus on measuring students' behavioral changes over a long period (longitudinal study) to more accurately evaluate the effectiveness of these integrated environmental communication strategies.

APPENDIX

EE: environmental education
SWOT: Strengths, Weaknesses, Opportunities, và Threats

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ĐÁNH GIÁ THỰC TRẠNG, THỬ NGHIỆM VÀ PHÁT TRIỂN HƯỚNG DẪN CHƯƠNG TRÌNH NGOẠI KHÓA KẾT HỢP TRUYỀN THÔNG GIÁO DỤC MÔI TRƯỜNG CHO HỌC SINH TIỂU HỌC

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Tóm tắt. Nghiên cứu này tập trung vào việc phát triển các chương trình ngoại khóa kết hợp truyền thông giáo dục môi trường (GDMT) cho học sinh tiểu học nhằm đáp ứng nhu cầu cấp thiết hiện nay. Để đánh giá thực trạng GDMT, khảo sát định lượng đã được tiến hành với 281 giáo viên tiểu học và phỏng vấn sâu với giáo viên, học sinh. Ba hoạt động truyền thông đa dạng—chương trình đổi rác lấy quà, vẽ sáng tạo từ vật liệu tái chế, và làm sản phẩm từ bã cà phê—đã được thử nghiệm thí điểm tại hai trường tiểu học. Kết quả cho thấy mức độ hứng thú và hài lòng của học sinh đạt rất cao (98%-100%). Giáo viên bày tỏ nhu cầu cấp thiết (99,2%) về tài liệu hỗ trợ, đồng thời chỉ ra các thách thức lớn như thiếu thời gian (M=4.36), khối lượng công việc quá tải (M=4.30), và thiếu đào tạo phù hợp (M=4.31). Mặc dù các hoạt động hiện tại còn đơn điệu, GDMT được đánh giá cao trong việc trang bị kiến thức, thái độ và thói quen bảo vệ môi trường. Nghiên cứu đã xây dựng tài liệu hướng dẫn với 11 kế hoạch ngoại khóa toàn diện, kỳ vọng cung cấp một khung nhìn hệ thống. Tài liệu này được mong đợi sẽ góp phần hình thành hành vi bảo vệ môi trường bền vững cho học sinh tiểu học.

Từ khóa. Truyền thông môi trường, giáo dục môi trường, chương trình ngoại khóa, học sinh tiểu học**,** giáo dục môi trường Việt Nam

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