
**Evaluating Experiential Environmental Education for Underserved Youth in Lahore: A
Field-Based Assessment**

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Abstract

This research report evaluates the effectiveness of a five-session environmental education workshop designed to enhance knowledge, attitudes, and behaviours toward sustainability among underserved youth in Lahore. Conducted at Alkhidmat Foundation’s Child Protection Centre and a local government school in Wahdat Colony, the program employed a quasi-experimental pre/post-test design informed by the Knowledge-Attitude-Behaviour (KAB) framework and the Theory of Planned behaviour (TPB). Findings revealed modest improvements in environmental knowledge and stable, positive attitudes throughout the program, alongside clear behavioural gains, with 100% of participants reporting adoption of at least one sustainable practice. Qualitative reflections indicated an emerging sense of personal responsibility and community engagement among students who initially viewed environmental protection as beyond their influence. Despite logistical and temporal limitations, the project demonstrates the potential of participatory, action-based learning to cultivate environmental agency in marginalized communities. It offers a replicable model for integrating environmental education within Pakistan’s broader educational framework.

Introduction

The quality of human life is inseparably tied to the health of our environment. However, the relentless pursuit of modernisation, often driven by excessive consumption, has led to a steady decline in environmental health. This has disrupted Earth’s natural systems, resulting in critical issues such as global warming, widespread air and water pollution, ozone depletion, dwindling natural resources, and a significant increase in waste. This crisis is especially evident in Pakistan, which ranked third among the world’s most polluted countries in 2024; Lahore recorded an AQI exceeding 400 on several severe-smog days in 2024 (IQAir). Climate-related disasters cost the government over \$2 billion annually (“Lahore Air Quality”), yet the most critical demographic—its youth—remains largely unaware of these challenges. A UNICEF survey revealed that 73% of young people in Pakistan are unable to explain climate change or global warming (UNICEF 12). This disconnect between the real effects of climate change and young people’s understanding highlights the urgent need for environmental education that goes beyond abstract awareness. It is not merely an academic priority—it is a national necessity. Previous curriculum reforms in Punjab (2022) introduced environmental topics but have been critiqued for relying heavily on rote methods; empirical evidence for their effect on sustained behavioural change remains limited and mixed. These patterns are not unique to Pakistan. A study by Mahat et al. found that although Malaysian preschoolers scored highly on sustainability knowledge (4.1 out of 5), fewer than 30% consistently practiced recycling. The study concluded that high knowledge levels alone are

insufficient to drive sustainable behaviour, underscoring the persistence of the intention-action gap in environmental education (Mahat et al.). As A-Level students, we are no longer observing environmental issues from a distance — we are living through them. In recent years, hazardous smog has forced school closures, while intensifying urban heat has disrupted daily routines and academic schedules. We launched Ecorise in direct response to Pakistan’s environmental and educational crises, driven by the belief that meaningful change begins with informed action. The research question guiding this project is: *Can participatory workshops overcome apathy and drive sustainable behaviours?* Drawing on the Knowledge-Attitude-behaviour (KAB) framework—a model widely used in environmental education—we recognise that awareness alone does not guarantee action. Our initiative was therefore designed to go beyond the traditional knowledge-attitude pathway. It blends hands-on activities, creative expression, and contextual learning to foster environmental awareness and behaviour change. Each session addresses a key sustainability topic—ranging from pollution and water conservation to waste management and urban heat—with an emphasis on practical engagement over passive instruction. This report outlines the rationale, structure, and results, and offers data-driven insights into the effectiveness of participatory environmental education.

Literature Review

This literature review provides a critical foundation that has informed the design of this environmental education project. It draws on current research in behavioural science and participatory learning to examine how young learners understand and respond to sustainability issues, as well as the types of educational approaches that lead to meaningful change. It synthesises global and local literature to explore three core areas: (1) the Knowledge-Attitude-behaviour (KAB) model and its limitations, (2) the Theory of Planned behaviour (TPB), and (3) the impact of experiential learning and gamification.

The Knowledge-Attitude-Behaviour (KAB) Model

The Knowledge-Attitude-behaviour (KAB) model is a foundational framework in environmental education and behavioural science. It assumes that individuals first gain knowledge about an issue, which then informs their attitudes or beliefs, ultimately guiding their behaviours. This sequence of knowledge to attitude to behaviour has long been used to structure environmental awareness campaigns and school curricula. However, this linear model has been widely criticised for oversimplifying the complex nature of human behaviour. Numerous studies have shown that individuals may possess substantial knowledge about environmental issues but fail to act accordingly. For instance, in a study conducted by Sağlam and Aydın, among 120 secondary school students in Turkey, it was found that although 78.33% reported using recycling bins, only 53.33% did so correctly (Betül Sena Sağlam and Nesli Aydın). The authors concluded that while students generally exhibited environmental awareness, there was a notable gap in their understanding of recycling processes. This discrepancy is referred to as the “intention-action gap,” a term popularised by Kollmuss and Agyeman, who argued that internal factors, such as values, habits, and perceived control, as well as external barriers like infrastructure or social norms, interfere with the linear progression assumed by the KAB model (Kollmuss and Agyeman). In the context of Pakistan, where public discourse on climate change remains limited and environmental behaviours are not strongly reinforced socially, this gap is particularly visible.

The Theory of Planned Behaviour (TPB)

To address the shortcomings of linear models like KAB, the Theory of Planned Behaviour (TPB), proposed by Ajzen (1991), offers a more comprehensive framework for understanding why

individuals might engage in certain behaviours (Ajzen). TPB suggests that three primary factors influence behavioural intention:

Attitude toward the behaviour: an individual's evaluation of the behaviour as good or bad.

Subjective norms: perceived social pressure from others to perform or avoid the behaviour.

Perceived behavioural control: the perceived ease or difficulty of performing the behaviour, often shaped by access to resources, knowledge, or support.

These variables together influence a person's intention to act, which is the strongest predictor of actual behaviour. In contrast to KAB, TPB acknowledges the influence of societal and structural context, making it particularly relevant in low-resource settings. In Pakistan, environmental behaviours are frequently shaped by social norms that either downplay sustainability or associate it with privilege. The act of separating waste, for instance, may be considered unnecessary or even burdensome if not practiced widely within the community. Several regional studies support the applicability of the Theory of Planned Behaviour (TPB) in environmental contexts. In a Karachi-based study using the Theory of Planned Behaviour, subjective norms were identified as a significant predictor of individuals' intentions to engage in recycling (Ahmed and Rashid). These findings underscore the importance of considering social and logistical barriers when designing behavioural interventions. TPB thus emphasises why knowledge and positive attitudes may not be sufficient. For environmental education to succeed, it must influence not only beliefs but also the social context and perceived feasibility of the action.

Experiential Learning and Gamification: From Awareness to Embodiment

Experiential learning, a model formalised by David Kolb (1984), is an educational philosophy that asserts learning occurs most effectively when individuals engage in direct experience, reflection, and application (Saul). In environmental education, experiential methods involve hands-on activities. Research consistently supports the effectiveness of experiential learning. Zoldosova and Prokop found that students engaged in science-based, hands-on activities showed greater retention of environmental concepts and were more likely to translate learning into behaviour (Zoldosova and Prokop). Gamification, or the use of game-based elements in educational contexts, further enhances this approach. It involves the use of design elements such as competition, achievement, and feedback to increase engagement in non-game contexts. In environmental education, gamified elements, such as team-based challenges, relay races, and role-plays, have been shown to enhance motivation and improve recall. Gamified learning approaches have been shown to increase recycling intention among students (Cheng et al.). Both experiential learning and gamification are particularly effective in under-resourced educational systems, where conventional instruction and rote learning lack interaction.

Conclusion

This review has outlined the empirical and theoretical groundwork for designing effective environmental education in Pakistan. While efforts such as textbook revisions and co-curricular programs have introduced sustainability topics into the national discourse, their impact has been limited by a lack of experiential engagement and social reinforcement. The reviewed literature demonstrates that behavioural change requires more than knowledge. The frameworks examined each highlight specific dimensions of environmental behaviour. Together, they point toward a multidimensional approach to educational design.

Methodology

Design and Workshop Structure

This study used a quasi-experimental, pre/post-test design to evaluate the effects of a five-session environmental education intervention on children's knowledge, attitudes, and behaviours related

to sustainability. Such a design allowed each participant group at various venues to serve as its comparison point, thus excluding the need for a control group. The absence of a randomised control group was due to the ethical and logistical limitations: it was not practical or fair to exclude any students from the sessions, and attendance and session time varied. The intervention was delivered at Alkhidmat Foundation's Child Protection Centre (CPCs) and a local government school in Wahdat Colony, Lahore. Child Protection Centres offer part-time education to children engaged in child labour, with parental consent and financial compensation provided to ensure their participation. The CPC model creates a flexible, non-traditional learning environment that caters to underserved communities, making it a high-need and high-relevance site for environmental education programming. Parents were informed of the conduction of the workshop prior. The program was implemented over five distinct sessions, with two sessions conducted each week, led by a team of six A-Level student facilitators. Each session lasted approximately 120 minutes and included interactive teaching, hands-on activities, and guided reflection. While cohort size varied slightly, the number was 50 participants between the ages of six and thirteen years old. The five-session model was designed to build progressively across four key environmental themes: pollution, water conservation, waste management, and urban greening, with a final session focused on reflection and commitment. While thematically sequential, individual sessions were self-contained to accommodate fluctuating attendance; students who missed earlier workshops could still participate fully in later ones.

Each session followed a consistent structure:

- A warm-up activity or icebreaker to introduce the topic
- A short interactive lecture grounded in local environmental issues
- A core task or group activity (e.g., tree planting, up-cycling, role-play)
- A reflection component, including drawings, pledges, or discussion
- Pre/post assessment or behavioural observation

This format allowed for active engagement regardless of prior knowledge and enabled facilitators to gather both qualitative and quantitative data in real-time.

Instruments

This study used a mixed-methods approach to assess changes in students' environmental knowledge, attitudes, and behaviours over the course of the five-session program. Data collection tools were adapted to suit the language and literacy levels of participating students. Quantitative data was gathered through structured surveys and observation rubrics, while qualitative insights were recorded through facilitator notes and the session outputs created by students.

Knowledge Measurement

Changes in environmental knowledge were measured using simple pre- and post-session surveys. These included multiple-choice and true/false questions tailored to younger students. Visuals and oral delivery were used for those with limited reading ability. Student responses from Sessions 1, 3, and 5 were compared to identify learning gains. This helped assess how well the students had understood key concepts such as pollution, waste, climate, and conservation.

Attitude and Perception Measurement

To track shifts in environmental values and concerns, scaled survey items were used. These included simplified Likert scales to help students express how they felt about environmental issues. In line with TPB, items were designed to explore:

- Subjective norms: whether students felt that people around them (like parents or teachers) supported sustainable behaviour

- Perceived behavioural control: whether students believed they could take meaningful action, even in small ways

Behaviour Measurement

Behavioural change was evaluated using a mix of facilitator observation, student-created materials, and self-reported actions.

- Facilitator Observation Rubric
- Artifacts: Each session included a product, like a reused plastic craft, a planted tree, or a poster, that served as visible evidence of students' efforts.
- Behaviour Self-Reports: In the final session, students reflected on what they had done differently in their daily lives.

Facilitator Logs and Observation Notes

Each facilitator maintained a simple observation sheet for every session. These logs are recorded:

- How engaged the students were during activities
- Whether students demonstrated independent understanding or responsibility
- Any disruptions, material issues, or differences across groups

To reduce recording bias during oral survey administration, facilitators followed a standard question script and were trained to use neutral tone and wording. Nevertheless, because responses were recorded by facilitators on behalf of non-literate children, we acknowledge the possibility of inadvertent influence and record this as a limitation.

Adaptations for Local Context

Instruments were adjusted to make them accessible and appropriate for all participants. Key considerations included:

- Language: Delivery in Urdu
- Literacy level: Use of pictures, verbal prompts, and facilitator support
- Cultural relevance: Examples and questions reflected familiar settings (e.g., local waste habits, water issues)
- Age-appropriateness: All tools were simplified
- Gender inclusion: Both boys and girls were included in all sessions and evaluations

Given the limited literacy skills of many participants, surveys were administered orally by the facilitators. All questions were translated into Urdu, and responses were recorded directly by the facilitators on behalf of the children. To maintain the integrity of the data, facilitators adhered to a neutral delivery and took care not to prompt, guide, or influence any responses. This approach ensured inclusivity while preserving the objectivity of the findings.



Figure 1. Session Roadmap

Data Analysis and Findings

This section presents the quantitative and qualitative findings collected through the session surveys, observation rubrics, and participant reflections across the five-session workshop series.

The data was analysed to assess three dimensions of change:

- Knowledge acquisition
- Attitude development
- Behavioural adoption of sustainable practices

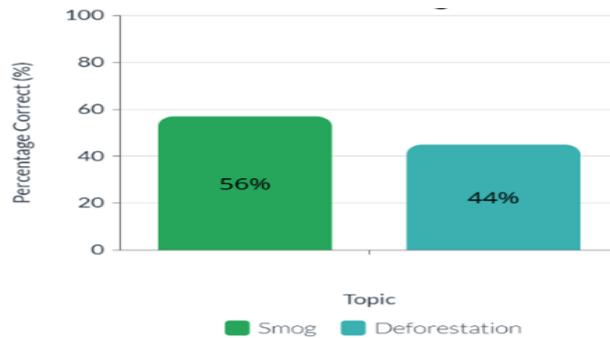


Figure 2. Baseline Knowledge of Participants

Quantitative Analysis

Knowledge Outcomes (Session 1)

At the start of the program, students' understanding of local environmental issues was mixed. Only 56 percent correctly identified smog as being caused by vehicular and industrial emissions, waste burning, and poor air regulation, while 44 percent accurately linked deforestation to loss of shade and higher heat levels. These findings suggest partial conceptual awareness; students are familiar with visible problems such as smoke or heat, but less capable of explaining their underlying causes.

Attitudinal Change (Sessions 1, 3, and 5)

Average environmental attitude scores across the three measured sessions revealed minimal but steady improvement in participants' environmental outlook. Overall, this represents a less than 1% increase, indicating that while large-scale attitude shifts did not occur, participants maintained a consistently positive orientation toward environmental care throughout the intervention.

This pattern suggests that the workshops effectively reinforced existing pro-environmental attitudes, rather than radically transforming them. The slight mid-program decline may be attributed to cognitive fatigue or topic complexity, as waste management discussions in Session 3 required more abstract understanding and less immediate emotional resonance. By Session 5, the closing reflective activities appeared to restore motivation and confidence, though not to a statistically significant degree.

In line with Mahat et al., and Sağlam and Aydın, these findings underscore that short-term educational interventions are often more effective at consolidating awareness than at producing major attitudinal transformation.

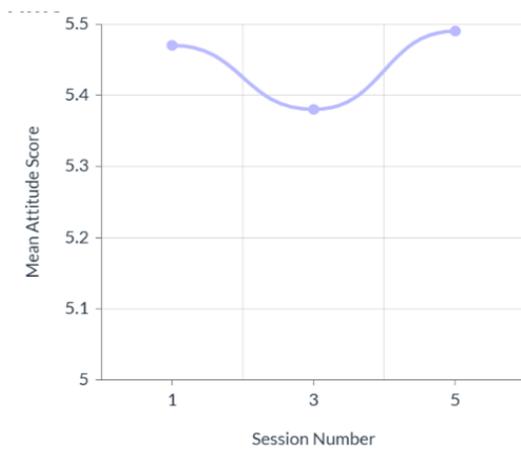


Figure 3. Change in Environmental Attitudes Over Time

Intended behavioural Outcomes (Session 3)



Figure 4. Intended Actions Following Session 3

Session 3 focused on waste management, emphasizing small, actionable steps suitable for children’s daily routines. After the session, participants selected which environmentally responsible actions they intended to take moving forward. The responses were distributed fairly evenly across the four options, indicating a balanced level of motivation toward different sustainable practices. Most favoured direct, individual behaviours that could be easily incorporated into daily routines—such as reducing litter and reusing plastic—over socially dependent actions like advocacy or collective waste management. This aligns with earlier findings in environmental behaviour studies (e.g., Sağlam and Aydın; Mahat et al.), which show

that young learners typically engage first in low effort, personally controllable behaviours before progressing toward more community-oriented change.

Observed Participation and behaviour (Session 5)

By the final session, participants were asked to indicate which sustainable actions they had personally undertaken since the program began. The resulting participation frequencies illustrate a clear shift from intention to observable behaviour.

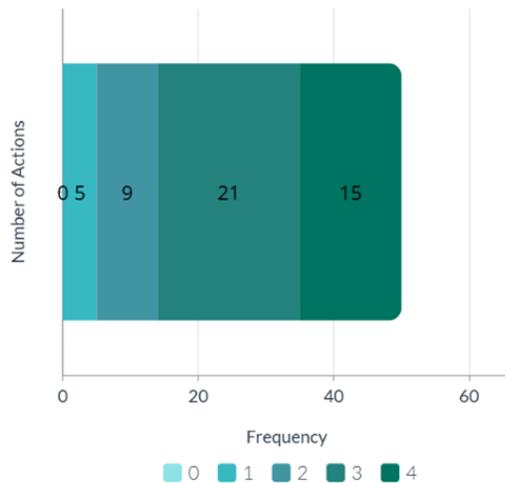


Figure 5. Participation in Pro-Environmental Actions

- 100 percent of the students reported completing at least one pro-environmental action.
- 85 percent claimed to plant a tree or water greenery, followed by 79 percent practicing water conservation and 59 percent engaging in environmental discussions.
- A small subset (16 students) engaged in three or more distinct actions, demonstrating deep internalisation of workshop themes.

This progression from expressed intent (Session 3) to self-reported and observed practice (Session 5) underscores the potential of experiential learning models. These results are consistent with Sağlam and Aydın’s findings that although students often display high recycling awareness, correct recycling behaviour and understanding of processes can lag behind, particularly in educational settings where hands-on systems (e.g., bin placement, waste separation) are not fully integrated (Sağlam and Aydın). Together, these

results demonstrate measurable gains across cognitive, affective, and behavioural domains. Knowledge growth was modest but meaningful; attitudinal shifts were sustained; and most importantly, a clear subset of participants translated learning into daily practices.

Qualitative Analysis Participant Reflections



Figure 6. Long-Term Intended Actions (Session 5)

Qualitative responses collected from the open-ended sections of the sessions 1, 3, and 5 surveys revealed valuable insight into participants’ evolving understanding of environmental issues and

their sense of agency in addressing them. In Session 1, early responses indicated basic awareness of cleanliness but limited understanding. Students frequently mentioned learning about *removing trash from water, keeping surroundings clean*, and the belief that *smog is caused by littering*. These statements highlight initial misconceptions about environmental causality. When prompted to share actions they wanted to try, students commonly responded with “*clean Pakistan*” or “*plant trees and take care of them*.” By Session 3, reflections displayed improved conceptual understanding. Students increasingly associated pollution with specific human behaviours, particularly *throwing trash in rivers* and *causing sickness*. Several noted that “*Pakistan is very polluted*,” or “*people throw trash everywhere*,” indicating that they could now link pollution to collective patterns rather than isolated acts. Finally, by Session 5, participants’ pledges reflected more concrete behavioural intentions such as *watering and planting trees, saving water, and spreading awareness*. This transition from vague moral obligation to specific actions signals a meaningful internalisation of environmental values.

Facilitator Observations

Facilitator rubrics provided complementary qualitative evidence of behavioural and attitudinal progress.

During the first session, facilitators reported that participants were “*very distracted and mischievous*,” with some joking about environmental issues and claiming that “*it’s the cleaner’s job to clean the city*.” This reflected both a lack of ownership and a detachment from civic responsibility, commonly observed in underserved settings. As sessions progressed, however, facilitators consistently noted improvement in attention, creativity, and engagement. Activities involving art and hands-on interaction (e.g., waste sorting and up-cycling) saw enthusiastic participation, with even previously disengaged students contributing actively. By the final session, facilitators described “*major improvements over time*,” as students took greater initiative in sharing ideas for environmental care. While logistical issues (such as material shortages and occasional disruptions) required improvisation, these did not appear to diminish learning outcomes. On the contrary, they reinforced the adaptive nature of education in resource-limited contexts.

Reflection Wall

The *Reflection Wall* served as a participatory tool for visualizing the group’s collective learning journey.

Some statements included:

- “*Use vegetable and fruit peels to make fertiliser.*”
- “*Use empty bottles as plant pots.*”
- “*Make toys from boxes instead of throwing them away.*”

These reflections demonstrate that students were able to transfer environmental principles into locally meaningful, actionable ideas. The emphasis on reuse and up-cycling also indicates growing comprehension of sustainability as a creative, achievable process.

Emerging Patterns and Interpretation

Cross-analysis of reflections, facilitator notes, and creative outputs suggests three key patterns:

- **Knowledge Expansion:** Early misconceptions about pollution sources evolved into more accurate understandings of human-environment interaction.
- **behavioural Intent:** Although measured attitude shifts were numerically small, qualitative evidence points to genuine intention and increased confidence in personal efficacy.
- **Ownership and Responsibility:** The belief that environmental care is “someone else’s job” gradually diminished, replaced by expressions of responsibility.

These qualitative findings complement the quantitative results by highlighting the subtler dimensions of learning not easily captured through surveys alone. They indicate that while the numerical change in knowledge and attitude scores may appear modest, the quality of behavioural intention was markedly higher.

Conclusion

This study set out to examine whether participatory workshops could enhance environmental understanding and promote sustainable behaviours among children from underserved communities in Lahore. Guided by the Knowledge-Attitude-behaviour (KAB) framework and the Theory of Planned behaviour (TPB), the intervention aimed to foster actionable change. The five-session program demonstrated that while knowledge and attitudinal growth were modest, behavioural engagement was significant. Quantitative data from pre- and post-surveys revealed partial but measurable improvement in students' understanding of key environmental issues such as smog, deforestation, and waste management. Although overall attitudinal scores showed less than a one percent increase, participants consistently maintained positive environmental orientations, suggesting that the workshops reinforced and sustained pre-existing pro-environmental values rather than transforming them entirely. The most notable outcomes emerged in the behavioural domain. Observation notes and end-line surveys indicated that nearly all participants adopted at least one sustainable practice. This pattern supports existing research asserting that experiential learning, particularly when paired with visible, achievable tasks, can bridge the gap between environmental knowledge and real-world behaviour. The progression from passive observation to active participation highlighted the potential of inclusive environmental education, even within resource-limited settings. Qualitative reflections further strengthened these findings. Students who initially viewed environmental issues as "someone else's responsibility" began to articulate personal agency. However, several limitations must be acknowledged. Variability in attendance and learning conditions between sessions, particularly at the Child Protection Centres, limited data consistency. The short duration of the program also constrained the assessment of long-term behavioural retention. Additionally, the absence of a control group restricted comparative analysis. Despite these constraints, the project successfully established an adaptable model that can be scaled and replicated. In conclusion, this initiative illustrates that environmental education in Pakistan must prioritise action-oriented learning over traditional rote methods. The study reaffirms that children, when engaged through accessible and participatory frameworks, can become active contributors to sustainability, regardless of their socioeconomic background. As global environmental challenges intensify, empowering youth with not just awareness, but also the capacity and confidence to act, remains both a moral and educational imperative.

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