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GREEN PEDAGOGY IN ACTION: ROLE OF GREEN BOOK IN FOSTERING ENVIRONMENTAL AWARENESS AMONG STUDENTS

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Abstract

This study sheds light on how the Green Book as an environmental education textbook by the Department of School Education South Punjab plays its role in creating environment awareness and in developing attitudes towards the environment. The study is conducted to examine the Green Book's effectiveness on the attitudes of students. For this, it utilized quantitative research method, using a structured, close-ended questionnaire to collect data from 200 students of different schools in Vehari. The findings of the study suggest that a high degree of agreement with statements indicating that the Green Book as an academic work, helps students to build environmental awareness, emotional attachment to nature, as well as pro-environmental behavior. Moreover, Green Book not only an educational tool but also a tool of green pedagogy and transformation. It is also a communication tool to substantiate the environmental knowledge, introduce ecological ethics, and develop responsible citizenship in school students.

Keywords: *Environmental Awareness, Environmental Education (EE), Green Book, Green Pedagogy, Student Attitudes.*

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1. Introduction

Human beings are inherently linked to nature (Indriyani, Atmazaki, & Ramadhan, 2024). Their excessive exploitation of natural resources leads to environmental degradation (Sukarjita et al., 2015), which threatens the balance of ecosystems (Alagoz & Akman, 2016) and impacts essential areas, including water, climate, economy, society, and food security (Lai & Gu, 2011). Climate change has become a critical issue, severely impacting biodiversity loss (Habibullah et al., 2022; Scherer et al., 2020). Meanwhile, biodiversity loss threatens other species of different taxonomic groups (Turney, Ausseil, & Broadhurst, 2020). Moreover, the exploitation of natural resources, such as the overuse of rangelands, forests, and water supplies, also threatens nature (Mousavi, Ghahfarokhi, & Koupaei, 2020), as these resources are depleted on a daily basis. Thus, the increasing level of these global environmental hazards (Abdullah & Sofyan, 2023) demands urgent preventive measures and efforts to overcome these challenges (Turney, Ausseil, & Broadhurst, 2020; Habibullah et al. 2022; Scherer et al. 2020) and need to foster environment-related education and awareness within communities (Abdullah & Sofyan, 2023). Environmental education and awareness are essential for recognizing the severe impacts of critical environmental issues on society and the environment. (Abdullah, 2023).

Like many other countries, Pakistan faces numerous environmental challenges, including climate change, air and water pollution, soil degradation, and deforestation. These issues are primarily the result of human activities, such as urbanization, industrialization, deforestation for timber, and the conversion of agricultural land into residential colonies and buildings. These activities contribute to extreme weather events, including rising temperatures, heavy rainfall, floods, droughts, and even earthquakes, which affect humans and other species. Punjab, the largest province of Pakistan by population, has experienced extreme heat waves, floods, and droughts. In 2022, Punjab suffered severe rainfall and flooding, which damaged 438,000 acres of crops and 733,000 livestock, and disrupted 50% of the water supply. Therefore, there is a need to find urgent solutions to address these current environmental problems (Indriyani, Atmazaki, & Ramadhan, 2024). Regardless of the measures taken in technological, political, legal, or economic areas, no global ecological challenge can be fully addressed unless individuals change their way of living significantly (Alagoz & Akman, 2016).

One way to address environmental challenges is by comprehensively understanding environmental factors (Alagoz & Akman, 2016). To effectively protect the environment, it is crucial to provide future generations with opportunities to expand their knowledge and beliefs about environmental issues through education (Dewaters et al.

2013). The most effective approach to achieving this is implementing a well-structured environmental education system that raises awareness, fosters responsibility, and provides students at all levels with information about environmental issues (Alagoz & Akman, 2016). Environmental education typically involves teaching sustainable practices through formal, informal, or non-formal methods (Sukarjita et al. 2015). Primary environmental education enables students to understand their environment, reevaluate the relationship between humans and nature, and reflect on environmental issues relevant to their daily lives (Indriyani, Atmazaki, & Ramadhan, 2024). It addresses environmental and social challenges and is essential for fostering future citizens with a strong sense of environmental responsibility, ethics, and ecological awareness (Fien, 2002). Environmental education aims to positively transform an individual's environmental ethics, knowledge, understanding, attitudes, and behavior (Yalmancı & Gozum, 2019), equipping them with values that enable them to manage and control behaviors contributing to environmental degradation (Mliless & Larouz, 2018).

Furthermore, various teaching approaches within Environmental Education are employed in the classroom setting to help students become responsible citizens towards the environment. Therefore, Green Pedagogy is a relatively new area within the domain of environmental education (EE), representing an approach designed to raise awareness about the surrounding environment among individuals and their communities (Chatterjee & Gol). Green Pedagogy is an interdisciplinary approach that incorporates ecological and economic perspectives by connecting sustainable development knowledge with practical and process-oriented solutions (Chatterjee & Gol). Its primary goal is to transform teaching into an innovative and vibrant process involving teachers' and students' active participation in addressing ecological issues (Hossain, 2018). This teaching and learning approach emphasizes the need for education and sustainability in relation to the environment. It encourages students to learn how to protect the environment while incorporating environmental knowledge throughout the curriculum (Chatterjee & Gol).

In Pakistan, the Department of School Education in South Punjab has introduced numerous sustainable projects in government schools to combat environmental challenges and raise awareness among students about environmental issues, enabling them to become responsible citizens and contribute to saving the environment from these challenges. The department started a project called "Miyawaki Forest" in some government schools of South Punjab in 2022; the purpose of this project is to take action to reduce carbon footprints and educate students about forestation, How to plant trees, how to protect them, what are their advantages and what are the disadvantages of deforestation. The department has decided to introduce environmental education as a separate subject and has introduced the "Green Book" in the school curriculum. This book is specifically designed to educate

students about environmental hazards and their solutions, promoting environmental education and Green pedagogy at the school level. This book aims to educate students about the environmental crisis, motivate them to protect the environment, empower them to act wisely in the face of environmental challenges, and encourage them to become responsible citizens towards their surroundings.

1.1. Statement of the Problem

Nevertheless, the necessity of environmental education has become pressing in the face of the increasing global environmental problems, such as climate change, biodiversity loss, and resource depletion. Pakistan is experiencing ecological crises because of the high rate of urbanization, deforestation, pollution, and climate-related disasters. Even with rising technological and policy advancements, there is still a consensus that sustainable environmental solutions require a radical shift in the attitudes and behaviors of people, especially the younger generations. Education plays a very important role in molding citizens who are conscious of the environment. In this connection, the Department of School Education in South Punjab has made a necessary move to include the Green Book in the 7th-grade curriculum, introducing environmental awareness into the students' learning process. To implement green teaching techniques, this Green Book relies on telling stories, discussions, and practical tasks. It promotes a critical approach to ecological challenges in students and a sustainable way of living. However, despite the introduction of the Green Book by the School Education Department of South Punjab, Pakistan, in government schools, which aims to integrate environmental education into the curriculum, there is a lack of empirical evidence regarding its effectiveness among students. The existing literature indicates that there is no single study on this book, making it difficult to determine the specific effect of the Green Book among students.

1.2. Research Question

1. How does the Green Book affect students' attitudes toward the environment?

1.3. Research Objective

1. To examine the effectiveness of Green Book on students' attitudes toward the environment.

1.4. Significance of the Study

As Pakistan is a trendsetter in introducing the Green Book, specifically designed to raise awareness among future generations about environmental issues and encourage

responsible citizenship toward the environment, this is a great initiative. Other countries lack a curriculum specifically designed for environmental education in classroom settings. Furthermore, there is a greater emphasis on ecological education than on practical, problem-solving-based teaching approaches, such as green pedagogy, and limited research exists in this domain. Moreover, there is limited research on environmental awareness and green pedagogy in Pakistan, with no studies addressing the Green Book and its effectiveness among students. This study is significant because it evaluates the effectiveness of the Green Book in fostering environmental awareness among students.

Thus, this study examine the Green Book's effect on students' attitudes and its role in fostering environmental awareness among students. To measure the effect of the Green Book on students' attitudes, the researcher employs a quantitative method, using a questionnaire that will be administered to students.

2. Literature Review

A literature review is an analytical and methodical study of available scholarly works that are relevant to the particular study topic. It serves as the basis of any scholarly investigation because it demonstrates gaps in existing knowledge, reveals methodological tendencies, and defines the research issue within an extended scientific context. In this section, previous studies are examined to determine how educational tools have been utilized to influence the environmental attitudes and behaviors of students, especially within the school context.

2.1. Environmental Education

Environmental Education (EE) involves the propagation of sustainable environmental practices (Nwankwoala, 2015) in formal, informal, and non-formal learning environments (Sukarjita et al., 2015). The Pennsylvania Department of Environmental Protection (2008) defines ecological education as an ongoing process that examines the interconnection between natural systems and built environments, ultimately leading to responsible environmental stewardship (as cited by Al-Jamal & Al-Omari, 2014). As a critical part of environmental protection and management, EE influences the behaviors of societies and promotes the inclusion of environmental aspects into decision-making on all scales (Adela et al., 2018). It is a type of education that incorporates environmental subjects into the curriculum to increase awareness and understanding of environmental concerns at all levels of study (Erhabor & Don, 2016). It tries to instill in the learners the knowledge as well as practical skills in the care of the environment in a bid to foster the concerns of the environment (Hart, 2003). It involves themes revolving

around politics, culture, religion, philosophy, ethics, and socio-environmental issues (Steele, 2011). EE plays a significant role in forming positive environmental attitudes and enhancing students' understanding of the connection between themselves and nature, as well as the implications of their activities (Norris, 2016). Through such awareness, EE facilitates the development of good behavioral change and a willingness to adopt pro-environmental behaviors (Thathong, 2012).

UNESCO (1976) highlighted the role of ecological education in fostering students' awareness and concern about environmental issues (as cited by Al-Jamal & Al-Omari, 2014). It connects the roles of students in the environment and the acquisition of skills that will help them correct these situation (as cited by Al-Jamal, & Al-Omari, 2014). Elementary environmental education, therefore, enables students to learn more about their surroundings, re-examine the nature of human-environment interaction, and explore environmental issues that affect them in their daily lives (Indriyan et al., 2024). On the same note, the North American Association for Environmental Education (NAAEE), as quoted by Potter (2003), stresses that EE improves understanding of environmental processes and builds the ability to think critically. The NAAEE stated that environmental education ensures all citizens are equipped with 21st-century skills vital for making their communities healthier, more environmentally sound, and economically vibrant (as cited by Potter, 2003). Although there are varied notions of EE depending on the region, schools and individual educators, several conceptual frameworks and definitions have an impact on EE implementation (Monroe et al., 2008). Nevertheless, EE is considered a long-term educational process that is holistic and involves many aspects of human development, including physical, biological, emotional, intellectual, motor, and creative (Michalopoulou & Haniotaki, 2001).

2.2. Green Pedagogy

Green Pedagogy emerged as a new concept in the field of education, originating from the University College of Agrarian and Environmental Pedagogy (UCAEP) in Vienna. It was intended to develop the right sustainability attitude in learners by incorporating learning with agricultural, environmental, and pedagogical practices (Aithal & Rao, 2016). The primary goal of Green Pedagogy is to provide learning processes that enable people to develop sustainable solutions for environmental protection and the effective use of resources (Jorgenson, 2011). Nevertheless, its early growth and propagation were considerably impeded, as the world scientific literature until 2016 did not provide much attention to this approach of training and education. The term "green pedagogy" was first mentioned in most early literature as a general label relating to environmentally oriented education, rather than referring to the systematization process

introduced in Vienna (Alhussini, 2020). Although Green Pedagogy has not been adopted rapidly, it still finds a strong theoretical base in other well-established theories of education, such as constructivism, experiential learning, and conceptual change, which has enabled its progression to be based on a solid foundation of these educational theories. According to Vygotsky and Cole (1978) as well as Piaget (1972), constructivism relies on the process of collective construction of knowledge based on collaboration and discussions followed by reflection. This tenet Green Pedagogy shares since this practice aims to take learners out of the realm of familiar concepts and to new levels of knowledge structures centered on sustainability. On the same note, the aspect of concrete experiences and reflective observation, brought into focus in the experiential learning theory by Kolb (1984), is anchored within Green Pedagogy in problem-based learning, where learners experience deconstructing events, reconstruction, and reflection on issues concerning the environment (Kolb, 1984). The theory of conceptual change also lends more force to the Green Pedagogy by attempting to alter the initial ideas held by learners regarding environmental problems, thereby creating a better understanding of the same. According to Posner et al. (1982), confrontation and revision of misconceptions is a way to effective learning, and it is a same principle that Green Pedagogy employs in the first assessment of prior knowledge of students of the course, and proceed to present alternative views of sustainability (Posner, Strike, Hewson, & Gertzog, 1982). Aithal and Rao (2016) suggest that Green Pedagogy is more than just environmental education, which has a long history of focusing on teaching people an understanding and acceptance of knowledge and skills, but also emphasizes the importance of values and attitudes that can contribute to ecological sustainability. According to Jorgenson (2011), it is a transformative teaching practice that promotes critical literacy, enabling students to pursue active participation in environmental stewardship as it applies to their day-to-day lives.

2.3. Green Pedagogy in Action

The green pedagogical model expands the scope of conventional textbook learning, engaging students to actively participate in environmental conservation while developing critical thinking and problem-solving skills. One of the vivid examples of green pedagogy being implemented is the Pakistani education system, where caring for the environment and ensuring its prosperity have been taught to students through projects such as the Miyawaki forest project and the Green Book. The Miyawaki method is a forest creation technique developed by the Japanese botanist Akira Miyawaki, which involves planting dense, fast-growing native forests on small urban plots. This technique has been applied in Pakistani schools to enable students to learn about concepts such as afforestation, biodiversity, and climate resilience. On the same note, there is the Green Book, an

environmental curriculum that incorporates ecological learning into daily lessons, as a way of ensuring that students learn the significance of sustainability at a young age (Ministry of Climate Change, Pakistan, 2021). Such efforts are a strong example of how green pedagogy fills the gap between theoretical knowledge and actual practice, enabling young learners to take their first steps as eco-conscious citizens.

Outside Pakistan, the concept of green pedagogy is gaining traction in the education systems of other countries. In Sweden, open-air living *(friluftsliv)* is so deeply embedded in the school culture that school children spend much of their time outdoors, learning in a natural environment in order to establish a lifelong relationship with the natural world (Sandell & Ohman, 2010). Swedish schools often include forest schools, where children learn to build shelters, identify plants and ecosystems, thereby developing a sense of responsibility towards nature. Likewise, in Costa Rica, which is a leader in biodiversity, environmental education is publicly required in the national curriculum (MINAE, 2019). They involve schools in local conservation initiatives, such as sea turtle conservation and reforestation, so students can see firsthand how their efforts directly affect the planet. This practical work method makes environmental education not merely theoretical but highly experiential, molding students into active ecology promoters. In Japan, *satoyama* education in schools involves students in traditional farming methods, preserving the harmony between humans and the natural environment (Kobori & Primack, 2003). Through this approach, children learn about the aspects of sustainable farming, water management, and the importance of protecting the rural landscape. Meanwhile, in Germany, the Waldkindergarten (forest kindergarten) trend has gained popularity, where preschools are held entirely outdoors, regardless of the weather (Knight, 2013). Through frequent contact with nature, the children enrolled in these programs acquire motor skills, creativity, and ecological awareness, demonstrating that green pedagogy can be applied even in kindergarten.

The Green Schools Program in India, implemented by the Centre for Science and Environment (CSE), educates teachers and students to review their schools' water, waste, and energy use, and makes the campuses living laboratories of sustainability (CSE, 2020). Similarly, in Kenya, the Green Belt Movement, established by 2004 Nobel Peace Prize laureate Wangari Maathai, engages school children in planting trees, thereby combining environmental protection with the social empowerment of women (Maathai, 2004). These projects demonstrate that green pedagogy is not limited to wealthier countries, but rather a global trend that can be adapted to diverse cultural and economic contexts.

In Brazil, with its Amazon rainforest, a significant ecological support to the world, schools have incorporated Indigenous knowledge systems into their environmental

education. Educational programs, such as *Projeto Amazoninha*, allow students to learn about rainforest conservation through the study of native species, sustainable harvesting, and the cultural importance of the forest to Indigenous groups (Brazilian Ministry of Education, 2018). In Canada, numerous schools are also working with First Nations elders to incorporate traditional ecological knowledge (TEK) into science programs, allowing students to learn about the connections between ecosystems in an Indigenous way (Bang et al., 2014). These cases point to the enrichment of green pedagogy with local wisdom, making sustainability education culturally inclusive and relevant. Green pedagogy has not only environmental advantages; it also promotes empathy, collaboration and leadership in students. When kids plant trees, track local animals, or reduce waste in their schools, they feel a sense of agency, as they understand that their contribution is part of the global effort to combat climate change. Green pedagogy achieves this by integrating sustainability into education, thus preparing future generations who will not only be knowledgeable about environmental issues but will also possess the skills and the will to act upon them. Whether in Pakistan, Miyawaki forests, or Sweden, outdoor classrooms, *satoyama* farms in Japan, or tree-planting movements in Kenya, green pedagogy in practice is transforming education. As the adage goes, the best way to teach about the planet is to get students directly, passionately, and sustainably connected to it.

The following literature review studies examine how researchers employed various methods to evaluate the impact of different tools that promote environmental awareness and assess their effectiveness. Hnatyuk et al. (2024) examined the role of education in promoting environmental awareness and fostering sustainable development among students. The researcher selected 453 students as research participants from various fields, including electrical engineering, mechanics, and economics, and utilized the Likert scale to assess their ecological perceptions and behaviors. The findings revealed that students in academic programs participated more in environmental activities. Further, the study did not reveal any significant differences in awareness about the importance of environmental education. Wangid (2018) used sainsmatika-based storybooks in his study to examine their effectiveness on students. The 4th-grade students served as the study participants, and the researcher divided them into two groups, a control and an experimental group, using an experimental design. The study checked the effectiveness of storybooks through pre-test and post-test methods. The findings revealed that students in the experimental group displayed greater improvement and higher environmental awareness than those in the control group; thus, the storybooks had a positive impact on the students. Another similar study was conducted by Aurélio et al. (2023); they measured the effectiveness of a children's book about river basin ecological issues and used it to promote environmental awareness among elementary school students. The study was conducted on 176 students

from urban and beach areas, and the results were then compared between public and private schools. The research employed a sequential explanatory mixed-methods approach, incorporating pre-test and post-test designs, as well as focus group interviews, to enhance the understanding of river biodiversity and anthropogenic threats to these ecosystems among students. The findings revealed that students from private schools and urban areas exhibited more eco-friendly behaviors in their post-test results, suggesting that including this book within the curriculum can enhance eco-friendly behaviors among children. Moreover, Telešienė et al. (2024) evaluated an educational approach that promotes environmental citizenship among undergraduate students at a technological university. The study employed a random pre-test/post-test quasi-experimental design, along with a questionnaire, to assess variations in students' environmental citizenship attitudes. The findings revealed that students who participated in the course, 'Sustainable Development,' established a significant positive change in their environmental citizenship compared to those enrolled in a control course, 'Media Philosophy.' Indriyani et al. (2023) studied the incorporation of environmental education into the language learning process, examining students' views and attitudes toward the ecological crisis. The research instrument used in this study was a questionnaire administered to 251 students. The study's findings revealed that students strongly supported the idea of integrating environmental education into the language learning process, and that this integration fostered environmental awareness and multi-literacy skills in students, enabling them to take action against ecological crises.

The discussed literature reports an increased attention to assessing the effectiveness of various educational tools in promoting environmental awareness among pupils. For example, Hnatyuk et al. (2024) utilized quantitative indicators to examine ecological perceptions among college students from diverse academic backgrounds, whereas Wangid (2018) employed an experimental approach to enhance environmental knowledge among younger learners through the use of science-based storybooks. Likewise, Aurélio et al. (2023) employed both qualitative and quantitative methods to assess the effects of a children's book on river basin problems, while Telešienė et al. (2024) focused on a sustainable development course as a factor influencing environmental citizenship at the university. In addition, Indriyani et al. (2023) exposed learners to environmental content during the language learning process and measured their attitudes using a questionnaire.

Although these studies are adequate in conveying the effectiveness of particular tools —story books, educational courses, and subject integration —in increasing awareness of the environment, a number of gaps exist. On the one hand, the majority of studies concentrate on early age or university, which leaves a significant gap in the middle- and secondary-school categories, where there is an initial development of critical and

reflective thinkers. Second, environmental textbooks published by governments, intended for use in school education, have been scarce, and little has been done to evaluate them in this context, particularly in developing nations. The Green Book, launched by the South Punjab School Education Department, is a local initiative that is unique in that it seeks to instill environmental awareness among school students. Nonetheless, minimal empirical-based studies have evaluated its real effect in classrooms.

Also, although mixed-methods and experimental types of research are commonly adopted, there is limited research that is designed with a pure quantitative, questionnaire-based approach to evaluate the effectiveness of the curriculum. This forms a research gap both in the demographic grounds and methodological aspects. This study, therefore, fills this gap by conducting a quantitative assessment of the Green Book's effectiveness in influencing the environmental attitudes of students in an organized school environment.

3. Methodology

This section presents the methodology used to research the role of the Green Book in promoting environmental awareness among students. The study aims to investigate the impact of the Green Book on students' attitudes towards environmental issues and their perceptions of what constitutes appropriate and inappropriate environmental practices.

3.1. Research Design

This research employs a quantitative design, assessing the effectiveness of the Green Book on students through questionnaires directed to 200 students from government schools.

3.2. Data Collection Method

The sample size consisted of 200 students from government schools of Vehari who responded to questionnaires that included closed-ended questions based on quantitative data.

3.3. Data Sampling

The sampling is conducted through stratified random sampling, selecting 200 students (120 girls and 80 boys) from government schools in Vehari. Such a gender-balanced sample covers a wide range of the student population. The criteria of selection are:

- Seventh and eighth-grade enrolment (the target level of the Green Book).

- Voluntary willingness to fill out the questionnaire.
- Availability of the government schools where Green Book is adopted.

3.4. Research Instrument

The research instrument include a close-ended questionnaire. The questionnaire used in this research was previously employed in Indriyani et al. (2023) article, "Promoting Environmental Awareness through Language Learning: A Study on the Integration of Environmental Education in the Classroom." Adjustments were made to guide the questions in accordance with the study's objectives.

3.5. Data Analysis

The data is analyzed through SPSS.

3.6. Limitations of the Study

This study is limited to government schools in Vehari South Punjab, as the Green Book is specifically designed and part of the government school curriculum.

4. Data Analysis

This section presents the outcomes of a student survey conducted among 200 students from government schools, with the statistics (SPSS) captured to examine the shifts in attitudes resulting from participants' acquaintance with the Green Book. The section helps evaluate the book's impact on students' attitudes. Below are the results of the survey;

Table 4.1. *Effectiveness of Green Book on Students' Attitudes*

NO.	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	Green Book is a useful source of environmental education.	—	—	**0.5%**	**35.3%**	**64%**
2.	Green Book has connected me with the nature.	**0.5%**	**0.5%**	**2%**	**43%**	**54%**
3.	Green Book has developed my understanding about environment.	**0.5%**	**2%**	**3.5%**	**45.5%**	**48.5%**

4.	My understanding of the environment has helped me overcome environmental problems.	**4.5%**	**2%**	**2%**	**45%**	**46.5%**
5.	My understanding of the environment has changed my attitude towards the environment.	**1%**	**3%**	**3%**	**63%**	**33%**
6.	My understanding of the environment has helped me in learning about environmental issues and their effect on nature.	**0.5%**	**2.5%**	**1.5%**	**58.5%**	**37%**
7.	I appreciate the environmental lessons and activities presented in the Green Book.	—	**1%**	**0.5%**	**27%**	**71.5%**
8.	Green Book has encouraged me to participate in environmental activities.	**1.5%**	**1.5%**	**1.5%**	**47%**	**48.5%**
9.	I am more aware of the importance of conserving natural resources after reading the Green Book.	**1.5%**	**2%**	**7.5%**	**48.5%**	**40.5%**
10.	Green Book has helped me understand the impact of human actions on the environment.	**3%**	**1%**	**1.5%**	**44.5%**	**50%**
11.	Climate change is a current environmental issue that is the result of human actions.	**0.5%**	**5.5%**	**9.5%**	**49.5%**	**35%**
12.	Green Book has helped me understand the causes and effects of climate change.	**2%**	**6.5%**	—	**35.5%**	**56%**
13.	I am concerned about the impact of deforestation on the environment.	**0.5%**	—	**8%**	**35%**	**56.5%**
14.	I am an active participant in plantation campaigns of my school.	**0.5%**	**5%**	**14.5%**	**48%**	**32%**

15.	Green Book has made me more aware of the importance of reducing pollution.	**1%**	**1%**	**3.5%**	**28%**	**66.5%**
16.	Smog is a type of pollution and every year Pakistan is affected by it.	**3%**	**1%**	**1.5%**	**50.5%**	**44%**
17.	I take precautions against smog.	**2.5%**	**3%**	**4%**	**37%**	**53.5%**
18.	Recycling is an important practice for protecting the environment.	**1.5%**	**1%**	**0.5%**	**31%**	**66%**
19.	I prefer recycling the things instead of wasting them out.	**3.5%**	**2.5%**	**2.5%**	**58.5%**	**33%**
20.	I am worried about global environmental problems such as climate change, deforestation, pollution, global warming, and floods.	**1%**	**0.5%**	**10%**	**29%**	**59%**
21.	I feel guilty when I destroy the environment.	**1.5%**	**3%**	**2.5%**	**33%**	**60%**
22.	I plan to start a home garden, kitchen garden, or indoor plantation to contribute to environmental conservation.	**5%**	**1.5%**	**16%**	**49%**	**28.5%**
23.	I believe that keeping parks and public spaces clean is important to save the environment.	—	—	**3%**	**29.5%**	**67.5%**
24.	It is my responsibility as a citizen to help to protect the environment.	**1.5%**	—	**3%**	**45%**	**50.5%**
25.	Green Book has changed my behavior and made me a responsible citizen towards environment.	—	—	**1.5%**	**29%**	**69.5%**

The data analysis provides valuable insight into the use of the Green Book to shape students' attitudes towards the environment. The quantitative data show that the trend consistently moves in a positive direction, with the mark of agreement in all 25 questions of the questionnaire being high, implying that the Green Book indeed aligns well with environmental awareness-building, pro-environmental behavior, and instilling a sense of responsibility in students. The analysis confirms that the Green Book is not only a teaching tool but also a revolutionary instrument that helps shape environmentally conscious and responsible citizens nationwide.

5. Findings & Discussion

In this section, the responses to the 25 questionnaire items used to evaluate the influence of the Green Book on students' environmental attitudes, knowledge, and behavior are analyzed in detail. The Likert scale of the items is assessed along a 5-point range, with the end points representing the quantities of disagreement and agreement, respectively. The findings show the effectiveness of the green book in creating environmental consciousness. The fact that 200 student subjects were surveyed yielded strong evidence that the Green Book had a positive impact on the students' outlook towards the environment. Upon closer examination of the 25 items in the questionnaire, a high rate of concurrence was observed with statements that emphasized environmental responsibility.

A majority of the students admitted that the Green Book is a practical resource of environmental learning (Mean: 4.63; Strongly Agree: 64%). This reaction portrays the perceived usefulness of the book in delivering environmental content. Such a robust response was also evident in the assertion that the Green Book has made the students acquainted with nature (Mean: 4.50), indicating that the material has resulted in the development of both cognitive and emotional connections to nature. The educational capacity of the Green Book was additionally certified by the fact that students confirmed that it built their environmental knowledge (Mean: 4.40). This theoretical development did not solely exist in the theoretical plane; most people were convinced that the knowledge about environment had assisted them in surmounting environmental issues in their life (Mean: 4.27). Moreover, the students admitted that their attitudes towards the environment had improved positively because of their advanced interpretation (Mean: 4.18), which proved the reforming role of the Green Book. There is also an improvement in critical thinking, as students indicated that the Green Book helped them learn more about the environment and its impact on nature (Mean: 4.29). The highest scored aspect was the

environmental lessons and activities (Mean: 4.69; Strongly Agree: 71.5%), with the significance of interactive learning and experiential learning being emphasized.

A change in behavior was observed as students indicated that the Green Book sparked their interest in engaging in environmental activities (Mean: 4.40) and influenced them to realize the significance of conserving natural resources (Mean: 4.25). A further reached insight into how human beings affect the environment was evident at a high percentage, as indicated by statements such as the one in the Green Book, which helped me understand the impact of human actions on the environment (Mean: 4.38). Students reported that they realized climate change was an issue caused by humans (Mean: 4.13). In their conversations about understanding climate change, they also reported that the Green Book had already enabled them to grasp the causes and effects of climate change (Mean: 4.37). The strong interest in the issue of deforestation (Mean: 4.47) and the readiness to take action to change that situation (Mean: 4.06) revealed the emotional and moral foundation levels. Another important learning outcome was increased awareness of pollution, with strong agreement that the Green Book made them more aware of pollution reduction (Mean: 4.58). Local relevance was established through students identifying smog as a significant annual issue in Pakistan (Mean: 4.31) and reporting that they take measures against it (Mean: 4.35). Regarding recycling, students demonstrated an understanding and ability to apply it. They concurred that recycling is essential (Mean: 4.59) and reported a preference for recycling over wastefulness (Mean: 4.15), which is a sign of behavioral change. They did not ignore global environmental concerns either, as the major concern and worry was expressed against the threats of climate change, pollution, and deforestation (Mean: 4.45).

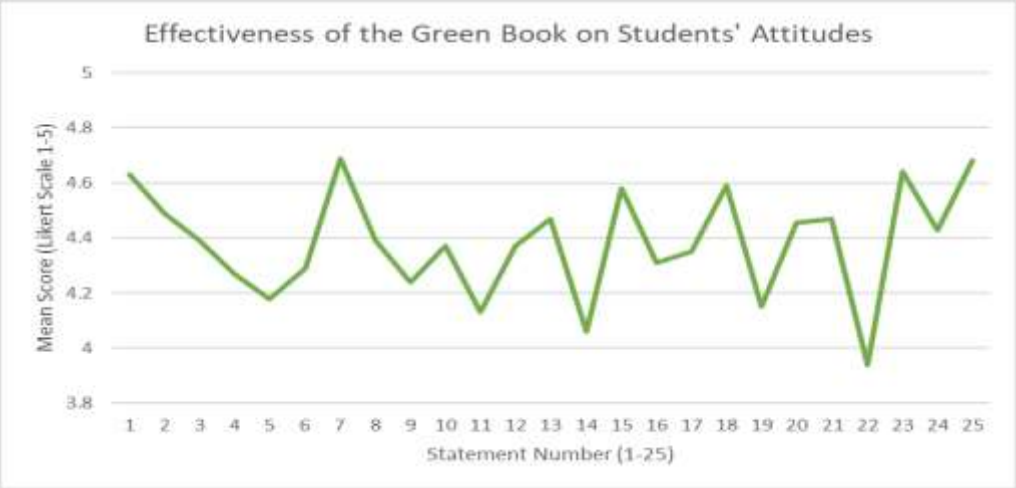

Fig 5.1

There was also an emotional reaction among the students, i.e., students feel guilty when they destroy the environment (Mean: 4.47), and an inclination towards personal action, such as growing home or kitchen gardens (Mean: 3.95), reflecting a change in lifestyle. Civic consciousness manifested itself in a profound faith that it is necessary to clean up the public places (Mean: 4.65), and that environmental protection is a matter of civil duty (Mean: 4.43).

The mean scores of the 25 statements from the questionnaire used to calculate the effectiveness of the Green Book in shaping environmental attitudes, knowledge, and behaviors, as well as their mean scores, are displayed in the above line chart. The continuously positive indicators, with a score of mostly over 4.0 on a 5-point Likert scale, show an overall high positive reaction. The appreciation of the lessons and activities as an environmental learning experience by the students appears to have captured the highest mean score (4.69) in Statement 7 and recorded the lowest (3.95) in Statement 22, which identifies home-based environmental actions. On the whole, these results support the idea that the Green Book is a good means of developing environmental knowledge, building emotional and moral relationships with nature, and encouraging environmentally friendly actions among students.

6.Conclusion

A central research question related to the effectiveness of the Green Book led to the development of this study, which aimed to examine the importance of the Green Book in terms of environmental awareness creation and establishing attitudes toward the environment among students. Utilizing the quantitative method, based on questionnaires given to 200 students, the paper provides both empirical evidence and rich interpretation about the effectiveness of the Green Book as an educational tool. The results showed that in the case of the Green Book, the students' environmental knowledge was elevated, and their emotional attachment to nature was aroused, promoting pro-environmental action. The positive mean scores of the 25 statements on the Likert scale indicated that students not only admire the content but also absorb the ecological messages, which are manifested through plantation drives, curbing pollution, recycling, and demonstrating moral sense towards environmental degradation. The study establishes that the Green Book serves not only as a textbook but also as a revolutionary device of green pedagogy.

In conclusion, the study is relevant in the emerging discipline of environmental education because it offers a demonstration of how a curriculum developed within the context of the natural world and values within it helps change the attitudes and behavior of learners. The Green Book is in itself a promising example of how environmental

literacy, emotional investment, and civic engagement can be fostered through coordinated and deliberate curricular discourse. It serves the potential to inspire young citizens who will take care of the environment. When properly developed and promoted, it can become the model to follow for green curriculum transformations on a national level.

6.1. Recommendations

While this study focused on the effectiveness of the Green Book in shaping students' attitudes toward the environment, future research can be conducted by conducting interviews with teachers and parents to explore how they support and influence students' environmental learning. Moreover, a comparative study can also be conducted to discover changes in students' behaviors before and after exposure to the Green Book, using different research designs such as experimental designs, classroom observations, or surveys.

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