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GREEN SCHOOLS: A BRIEF REVIEW

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Abstract. Green schools represent an innovative educational model that seamlessly integrates environmental stewardship principles with teaching methods to create enriching learning environments. In addition to focusing on conserving resources, they prioritize student well-being and instill a deep environmental consciousness, shaping a generation dedicated to sustainability. This article explores the significance, objectives and advantages of green schools, emphasizing their critical role in fostering a sustainable future through comprehensive education and increased environmental awareness. The research specifically underscores the economic and environmental significance of green schools, highlighting their capacity to lower operational costs while simultaneously reducing environmental impact and promoting a more sustainable planet for future generations.

Keywords: *Green schools, green education, sustainability, green economics, pedagogical strategies, environmental consciousness.*

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1. Introduction

The Green Schools project was introduced in 2007, representing the outset of initiatives aimed at fostering sustainability within educational institutions (NRC, 2007). Various models and projects from diverse countries have been presented in several scientific compilations (Gough *et al*., 2020). The mission of Green Schools is to foster a global community of learners committed to promoting sustainability and environmental stewardship, thereby contributing to the enduring health and vitality of our planet (GS, 2020). The global Green School movement originated in 2008 with the establishment of Green School Bali by entrepreneurs John and Cynthia Hardy, who sought a school aligned with their values after homeschooling their daughters. Since its founding, Green School Bali has evolved into a pioneering model for educational innovation, fostering a diverse community that includes initiatives like Green Camp, the Green Educators Course and the expansion of Green School campuses internationally (TED, 2010). Numerous centers dedicated to green schools have also been established worldwide. The Center for Green Schools conceptualizes schools as sustainable centers fostering student well-being, readiness for environmentally conscious careers and environmental prosperity. The aim is to equip sustainability proponents within educational systems through thorough training, professional growth opportunities, peer connections, research

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endeavors and advocacy initiatives (CFGC, 2023). Furthermore, there exist several significant foundations renowned for their specialized initiatives. The Green School Foundation, a registered non-profit organization, was founded to provide sustainability-focused educational opportunities to local children. Its inception in 2008 through the Local Scholarship Program at Green School Bali has enabled over 70 Balinese students to access an innovative, international preK-12 education centered on sustainability and environmental activism. Presently, the foundation continues to expand its efforts to enhance learning opportunities for Indonesian learners by supporting sustainability-focused education, collaborating directly with local schools and students and engaging in partnerships with local government entities (GSF, 2024).

Figure 1. Green School in Bali
Source: https://360.greenschool.org/greenschool-bali/#/

Our planet is currently confronted with significant environmental challenges, necessitating a fundamental shift towards sustainability. Implementing green initiatives in public schools offers the opportunity to enhance both the health and educational environments for all students, while acknowledging and accommodating their diverse identities and needs (BGS, 2024).

2. Section snippets

2.1. Survey of Existing Research

There is a multifaceted exploration of the impact and implementation of green building certification programs and environmentally sustainable educational practices. Vakalis et al. (2021) investigate the influence of green building certification programs, such as LEED for Schools, on student academic performance, revealing significant associations between features commonly found in LEED-certified schools and academic outcomes. This underscores the importance of integrating environmental considerations, particularly indoor air quality and acoustic conditions, into the design of eco-friendly educational facilities to enhance student learning and achievement.

In a similar vein, Wu (2002) advocates for a paradigm shift in education, moving away from exam-centric approaches towards quality-focused education that facilitates greater integration of environmental education (EE) in Chinese schools. Emphasizing the

need for improved environmental teaching methods, enhanced teacher training and widespread adoption of Green Schools, Wu underscores the importance of holistic educational strategies in promoting environmental awareness and sustainability.

Gordon (2010) delves into the benefits of green schools, emphasizing their pivotal role in optimizing learning environments, promoting resource efficiency and mitigating environmental impact. The article explores various rating systems such as LEED, CHPS, Green Globes and Life Cycle Analysis, shedding light on the complexities and challenges encountered by stakeholders in the design and implementation of green school initiatives.

Furthermore, Kerret et al. (2014) present an innovative perspective by integrating positive psychology with environmental education to examine how green schools may enhance adolescents' environmental behavior and subjective well-being. Their study proposes a theoretical model suggesting that green schools can foster environmental hope among students, leading to increased environmental behavior and subjective well-being, with implications for research, practice and policy. Lastly, Ramli et al. (2012) undertake a comparative examination of green school guidelines, drawing insights from current literature to evaluate the suitability of international green school design elements for incorporation into Malaysian green school initiatives. Their study aims to inform the formulation of guidelines for green school design in Malaysia, with the overarching goal of promoting sustainable building practices and environmental consciousness within educational settings.

2.2. Main Characteristics, Economic and Environmental Benefits of Green Schools

Green schools play a crucial role in facilitating this transition through several key mechanisms:

- Addressing the Climate Change Crisis: Green schools implement strategies aimed at reducing energy and resource consumption within urban and local contexts, thereby mitigating the emission of greenhouse gases.
- Responsible Utilization and Preservation of Natural Resources: By advocating for the conservation of flora and fauna, efficient water management, afforestation initiatives, waste reduction and promoting responsible recycling practices, green schools contribute to fostering a more sustainable approach to resource management.
- Promoting Public Health: Green schools prioritize the use of healthy building materials, strive to enhance indoor air quality and maximize access to natural light, thereby fostering a healthier learning environment for both students and faculty. A deficiency in fresh air can hamper student focus. Studies have revealed that student performance in tests can rise by as much as 20% when they are educated in green classrooms featuring increased daylight, better classroom acoustics and the use of healthier materials like non-toxic paints and carpets that do not release harmful chemicals (BPS, 2024a).
- Cultivating a Green Cultural Shift: Within green school environments, students are instilled with a profound understanding of environmental stewardship from an early age, fostering a sense of responsibility towards safeguarding the ecological well-being of the planet from childhood onwards.

Ensuring that education is directed towards sustainable development is essential for providing individuals with the necessary knowledge and abilities to effectively address current global challenges (Hasanova & Safarli, 2024). Green schools embed

sustainability principles into their foundational ethos, with the objective of fostering environmental awareness and promoting sustainable conduct among students. By nurturing collaboration and involvement within the school community, they foster a mutual dedication to sustainability. The adoption of green supply chain management methodologies guarantees that green schools procure environmentally friendly materials and resources, furthering their dedication to environmental stewardship and sustainability. In this regard, the study of the green supply chain system is of particular importance, both in the construction of green schools and in the teaching process. Green supply chain management has a special role in a number of specific areas of the sustainable management system (Hasanov, 2023; Hasanov & Safarli, 2023).

Assessing green schools from both an ecological and economic standpoint is important. The economic and ecological benefits of Green Schools are diverse:

- Cost Reduction: Implementing energy-efficient methods and responsible resource management can lead to significant financial savings for schools. Additionally, Green Schools located in warmer climates experience minimized heating expenses, while their utilization of renewable energy sources for electricity generation further enhances financial efficiency. By adopting sustainable practices, green schools can achieve a notable decrease in energy and water operating costs, typically ranging from 20% to 40%. This cost savings enables the redirection of funds towards essential educational resources such as teacher salaries, textbooks and computer equipment (BPS, 2024b).
- Reduction in CO_2 emissions: Green schools play a significant role in decreasing carbon dioxide emissions. The construction of 34 new green schools in Los Angeles would lead to a reduction of 94,000 tons of CO_2 annually, which is comparable to removing more than 15,000 cars from the road each year or planting over 280,000 trees (BPS, 2024c).
- Advancement of the Sustainable Education System: Studies indicate that Green Schools hold the potential to enhance student academic performance by offering a more interactive and healthier learning environment.
- Promotion of Student Well-being: Improved indoor air quality, enhanced access to natural light and opportunities for students to interact with nature can have a positive impact on student health and overall well-being.
- Psychological Encouragement for Students and Educators: The innovative atmosphere and teaching methodologies present in Green Schools can inspire a sense of psychological motivation among students, fostering increased enthusiasm for learning. Furthermore, educators may experience a heightened sense of purpose and motivation in their esteemed profession within such settings.

Table 1 succinctly outlines the economic and environmental benefits derived from green schools.

Table 1. Economical and ecological benefits of Green Schools (per school)

Energy and water operating costs	20-40% decrease
CO_2 emissions	2, 764 tons reduction
Water usage	34% reduction

Source: Boston Public Schools (BPS). https://bostongreenschools.org/what-is-a-green-school/

In addition to our study, we can consider Taiwan as another case. Despite the Taiwanese government's vigorous pursuit of sustainability goals through initiatives like the Green School Partnership Project in Taiwan (GPPT), there is a notable dearth of empirical research on its effectiveness. To address this gap, Olsson et al. (2019) conducted a nationwide comparison between GPPT-affiliated and non-affiliated schools, revealing that participation in GPPT does not substantially enhance student sustainability consciousness (SC). Furthermore, their investigation illuminates a widening gender disparity in SC and a decline in SC during adolescence, highlighting the ongoing need for refining the GPPT to foster environmental and sustainability behaviors among Taiwanese students.

3. Conclusion

Green Schools represent a groundbreaking shift in education, emphasizing environmental stewardship and sustainability principles, along with their associated economic and environmental benefits. These institutions seamlessly integrate sustainability into their curriculum and infrastructure, aiming to cultivate environmentally conscious individuals. Pioneering initiatives such as the Green School project in Bali and advocacy efforts by organizations like the Center for Green Schools highlight the increasing prevalence of Green Schools since 2007. Existing academic research emphasizes the positive impact of Green Schools on student academic performance, stressing the significance of integrating environmental education and fostering environmental responsibility. Through the promotion of resource-reduction strategies, responsible waste management and the utilization of healthy building materials, Green Schools actively contribute to a more sustainable future while simultaneously enhancing student well-being and fostering a culture of sustainability.

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