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by Sanaul Haque

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Iarco Research Proposal

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Research Topic: Advancing Green Transitions: Understanding the Adaptation and Challenges of Green Building Initiatives in Educational Institutions in Dhaka, Bangladesh

Research Questions:

1. To what extent have educational institutions in Dhaka implemented green building initiatives for their campus?
2. What are the technical, financial, and policy challenges to adopting green building practices in educational institutions of Dhaka?
3. What are the factors that contribute to stakeholders (Admin, staff, students) implementing green building initiatives in Dhaka?

Introduction:

Bangladesh's infrastructural needs have grown due to the country's rapid urbanization and population expansion, which has increased energy consumption and led to environmental degradation. Green buildings are structures designed to lessen their impact on human and ecological health by adopting various green practices, such as using water, energy, and materials efficiently [1]. By implementing various green practices, such as efficient use of water, energy, and materials, green buildings aim to mitigate their negative impacts on both human and ecological health. They can lessen their impact on the environment and help use less energy than traditional buildings. Research has shown that green buildings can help substantially mitigate the negative environmental effects by drastically reducing energy consumption [2].

Educational institutions frequently host a substantial daily student population, which requires considerable energy, water, and resources, while also producing waste; however, they often lack effective, organized recycling or waste management systems. By implementing sustainable practices, including efficient water and energy utilization, as well as the adoption of renewable energy solutions. We can significantly decrease resource consumption, minimize waste, and also reduce costs. This research aims to understand the current adoption of green building practices within educational institutions in Bangladesh and to identify the challenges and obstacles to their implementation. Using this data, recommendations can be made to assist more institutions in their adoption of green practices, thereby fostering a positive impact on the world. The environmentally friendly nature of green buildings can provide benefits to occupants, including students, educators, and staff.

Literature review:

The green building concept has gained international recognition as a method to combat environmental degradation caused by the construction industry. Extensive research has demonstrated that green buildings have a significantly more positive impact on the environment compared to traditional buildings. Research on residential buildings has shown that a 58.46% reduction in energy costs is achievable over 30 years by adopting a green building model instead of a conventional one [3]. Another study indicated that a 28.85% reduction in carbon footprint is possible [4]. Additionally, a study on an educational building reveals that a Leadership in Energy and Environmental Design (LEED)-certified educational building is valued at 49.9% more than a non-LEED-certified one, while also incurring 25.6% lower maintenance and repair costs [5]. A feasibility study on an educational institution, Politeknik Sultan Azlan Shah (PSAS), found that installing a rooftop solar photovoltaic (PV) system could save at least 2,075,763 kWh of energy over the next four years. This energy saving would also cut CO2 emissions by 1,526,620 kg [6]. Although the impact of green

buildings has been examined, it is essential to understand the challenges encountered in their implementation and make policy recommendations to help more institutions make the switch to a greener campus.

A study highlighted several challenges that need to be overcome to develop a thriving green building market in the city. These include limited government initiatives, lack of financial incentives, hesitation from investors, and gaps in knowledge and awareness among stakeholders [7]. Bangladesh faces major environmental pollution, which harms human welfare. To combat this, effective environmental engineering must be supported and developed [8]. A study by Ribeiro et al. [9] shows that green campus initiatives can improve a student's understanding and awareness of sustainable development by 27.7% and improve their participation in green activities. While extensive research exists worldwide on the importance of green buildings, there remains a research gap in understanding the practical challenges faced when implementing these initiatives among educational institutions in Dhaka, Bangladesh.

Methodology:

This study will employ a mixed-method approach, integrating both quantitative and qualitative techniques. It aims to achieve a thorough evaluation of existing green practices, along with the obstacles and challenges encountered in their implementation, to facilitate the sustainability transition.

Quantitative component: A survey will be provided to a representative sample of stakeholders (n=250) from various educational institutions, encompassing various levels, including secondary, higher secondary, and universities. The survey will employ a 5-point Likert scale and ranking questions to gather data, concentrating on assessing current awareness levels regarding the importance of green practices and their environmental effects. The study will focus on trying to find the challenges and barriers perceived by the administration, staff, teachers, and students. To ensure a deep and insightful understanding, a purposive sampling method will be used to select institutions with varying levels of green practice and engagement.

Qualitative Component: To enhance the qualitative data, semi-structured interviews will be conducted with administrators, staff, teachers, and students (n=30) to further comprehend awareness levels, identify suggested strategies, and discern challenges perceived in the implementation of the green strategy. The study will seek to demonstrate how economic, financial, and infrastructural factors, and gaps in knowledge and awareness, affect policies regarding the green transition.

Data Analysis: The quantitative data collected through the survey will be analyzed using descriptive statistics. Cross-tabulations will be used to see how different groups responded. From the quantitative data collected from the interview, thematic analysis will be done to identify key themes. By using triangulation, the survey results will be cross-checked with qualitative insights to ensure accurate interpretation and findings. This will show a clear picture and help identify the key barriers to green transition.

Ethical Considerations: Anonymity of all participants will be ensured during data collection. All participants will be informed that their participation is completely voluntary

and they may withdraw at any time. Ethical approval will be obtained from a recognized institutional board.

Project Practicalities: Data collection and analysis will occur within a timeframe of one to two months. Approval to conduct the survey will be obtained from institutional authorities, and compliance with organizational policies and ethical standards will be ensured. Then the survey will be distributed to the targeted stakeholders either on-site or online, as preferred by the institution. One month will be reserved for data analysis and writing the paper.

Roadblocks and Limitations: The study may face a few challenges. These include getting permission from different institutions, which may extend the data collection time period. The study also needs to account for response bias; some respondents may provide more socially desirable answers. Time required to carry out the research might also be affected by any unforeseen institutional challenges or interview scheduling challenges with stakeholders.

Conclusion: Bangladesh suffers from severe environmental challenges, which cause harm to human life. The education sector has a great chance to lead by example; by transforming a campus into a green campus, it can help advance the use of green technologies and foster a positive outlook towards green initiatives among students. These students are the leaders of tomorrow, so it is essential to motivate them towards green practices. This research is also aligned with the national and international focus on sustainability, as it supports SDG 11 (Sustainable Cities and Communities) and SDG 12 (Responsible Consumption and Production). This research is expected to highlight the urgent need for financial incentives, policy support, and awareness required for implementing these initiatives. Through which we can highlight the barriers and make a pathway for advancing green transitions.

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