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Building Materials and Sustainability Responsibilities of Building Technology Teachers in Technical Colleges of Rivers State

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Abstract: *This research work focuses on the building materials and sustainability responsibilities of building technology teachers in technical colleges of Rivers State. The study aims to investigate the level of knowledge of building technology teachers in technical colleges in Rivers State regarding sustainable building materials and practices, and their role in promoting sustainability in the construction industry. The research methodology employed a mixed-methods approach that involved both quantitative and qualitative data collection and analysis. A total of 220 sampled of building technology teachers in technical colleges in Rivers State were selected using purposive sampling and data were collected through surveys and interviews. The research findings revealed that building technology teachers in technical colleges in Rivers State have a moderate level of knowledge regarding sustainable building materials and practices. The results also showed that building technology teachers play a significant role in promoting sustainability in the construction industry. However, they face challenges such as limited resources, inadequate training, and lack of support from stakeholders. In conclusion, the research work emphasizes the crucial role that building technology teachers in technical colleges in Rivers State play in promoting sustainable building materials and practices. The study recommends the need for more training and support for building technology teachers to enhance their knowledge and skills in promoting sustainability.*

Keywords: *Building materials, sustainable practices, awareness level, construction industry.*

Introduction

The building construction industry is facing increasing pressure to adopt sustainable building practices and materials due to the industry's high demand for non-renewable resources and the production of carbon emissions (Adefila & Sule, 2016). Sustainable building materials are those that have less impacts on the environment during their production, use, and disposal. These materials are becoming increasingly popular due to their sustainability benefits. Building technology teachers in technical colleges play a significant role in promoting sustainable building materials and practices in the construction industry (Olanrewaju & Daramola, 2016). These teachers are responsible for training the next generation of building professionals, and their knowledge and expertise in sustainable

building practices and materials can significantly impact the future of the construction industry. However, limited research has been conducted on the level of knowledge and understanding of building technology teachers regarding sustainable building materials and practices in technical colleges in Rivers State, Nigeria. Studies have shown that technical colleges in Nigeria have a vital role in promoting sustainable construction practices (Alao & Gbadamosi, 2016). However, the lack of adequate training and resources has been identified as a significant challenge hindering the promotion of sustainable construction practices (Adefila & Sule, 2016). Ajayi and Oluwoye (2019), also identified factors influencing sustainable building materials selection in Nigeria, including cost, availability, and cultural preferences. Therefore, this research work aims to investigate the level of knowledge of building technology teachers in technical colleges in Rivers State regarding sustainable building materials and practices, and their roles in promoting sustainability in the construction industry. The research methodology employed a mixed-method approach that involved both quantitative and qualitative data collection and analysis. A sample of building technology teachers in technical colleges in Rivers State were selected using purposive sampling and data were collected through surveys, interviews and personal observation.

The construction industry is a major contributor to global environmental degradation due to its high demand for non-renewable resources and the production of carbon emissions. Sustainable building materials and practices have been identified as a solution to this problem. Building technology teachers in technical colleges play a significant role in promoting sustainable building practices and materials in the construction industry. However, little research has been conducted on the level of knowledge and understanding of building technology teachers regarding sustainable building materials and practices in technical colleges in Rivers State, Nigeria. Sequel to the identified challenges, this study aims at investigating the level of knowledge of building technology teachers in technical colleges in Rivers State regarding sustainable building materials and practices, and to identify their role in promoting sustainability in the construction industry. Key areas were identified and addressed through suitable and constructive questionnaires. These are as follows;

1. The level of awareness and understanding of sustainability practices among building technology teachers in technical colleges in State Rivers state.

2. The challenges faced by building technology teachers in promoting sustainable building materials and practices in technical colleges in Rivers State.

3. The role of building technology teachers in promoting sustainable building practices and materials in the construction industry in Rivers State.

This study plays significant roles in the provision of valuable information about the level of knowledge of building technology teachers in technical colleges especially in Rivers State regarding sustainable building materials and practices. This information can be used to develop appropriate training programs to improve their knowledge and understanding of sustainable building practices. The study identified the challenges faced by building technology teachers in promoting sustainable building materials and practices in technical colleges in Rivers State. This information can be used to develop strategies to overcome these challenges and promote sustainable building practices in technical colleges. The study still

examined the role of building technology teachers in promoting sustainable building practices and materials in the construction industry in Rivers State. This information can be used to develop policies and programs that support the promotion and adoption of sustainable building practices and materials in the construction industry.

Sustainability in construction is used to describe the application of sustainable development in the construction industry (Al-Yami and Price, 2006). According to Dania, Larsen and Yao (2013) the term "sustainability in construction" has sparked numerous interpretations, debates and approaches in academic circles. While Huovila and Koskela (1998) suggested that the concept of sustainability in construction is not clearly defined, Olonade (2015) saw sustainability in construction as the responsible supply, operation, and maintenance of buildings (or any other infrastructure) that meets the needs of their owners and users over their lifespan with minimal unfavourable environmental impacts, while encouraging economic, social and cultural progress. Shen, Tam, Tam, and Ji (2010) on their part stated that sustainability in construction practice refers to various methods used in a construction project that involves less harm to the environment, increases the reuse of waste in the production of construction materials, benefits the society, and is profitable to a company. Sustainability in construction is all about following suitable practice in terms of materials, their sources, construction methodologies as well as design philosophy so as to be able to improve performance, decrease the environmental burden of a project, minimise waste and be ecologically friendlier (Abolore, 2012).

In most research, the importance of building technology teachers in relation to sustainability during their education is framed as aspirations or interest in sustainability. It is critical to teach building technology teachers about sustainability and to raise their understanding of the issue. Educational institutions should encourage a long-term approach to technology education in this regard. Universities all over the world are working to improve the sustainability of their programs, science, and curriculum (Huge et al., 2018). As a result, practices and strategies such as energy efficiency, risk reduction, green computing, sustainable designs, climate change, and resource management must be included in educating building technology teachers about sustainability (Laurischkat and Jandt, 2018). Integrating sustainability into the curriculum will help building technology teachers develop their skills (Palacin-Silva et al., 2018). According to the results of a global study of engineering building technology teachers, despite a lack of general knowledge of sustainability, building technology teachers were supportive of the concept (Azapagic et al., 2005). Agombar et al. (2013) found that most building technology teachers, regardless of their research backgrounds, considered sustainability to be important to some extent for their studies and potential working contexts in an online survey of n = 5.763 first-year building technology teachers in the UK. The topic's overall importance, according to their results, appears to be constant even after graduation. For example, a study of 98 post-graduates in the United Kingdom discovered that while building technology teachers understand the value of sustainability for their careers, they are suspicious of existing approaches to delivering environmental sustainable development in higher education institutions (Opoku and Egbu , 2013). Bandar et al., (2019) mentioned that the perception of sustainability among Saudi Arabian university professors at the university where the survey was conducted reveal no clear understanding of the concept of sustainability in higher education. Anigbogu (2011) identified some main factors that must be implemented in Nigeria for a sustainable green

construction regime. It noted that increased public awareness, education, and new environmental policies are critical to the concept's adoption in the context of green construction. While Nigerian society has long relied on traditional and local materials for construction due to low prices, developers realized that the materials used in Nigeria are environmentally friendly with the rapid spread of the concept of technology. Despite this, the study concludes that formal sustainability education should be actively promoted among construction industry stakeholders, as this will help with the smooth implementation of green construction.

Nwokoro and Onukwube (2011) summarize the problems in the Nigerian construction industry, noting that "construction is a significant and primary sector of the Nigerian economy, and its consideration of sustainability issues covers a broad range of the sector." As a result, the role of buildings in achieving long-term sustainability cannot be overstated. The general public's awareness of environmental issues has risen significantly in Nigeria. Property owners and clients are looking for commercial buildings that meet acceptable environmental and health requirements. Unfortunately, institutional guidelines supporting green buildings are lacking, as are customer, occupant, built environment professional, and other stakeholder awareness; professional capacity to integrate green building issues and opportunities; and financial resources to pursue green building growth and upgrades. Watuka and Aligula (2002) found that 64 percent of respondents on a questionnaire sent to Architects, Engineers, Quantity Surveyors, and Contractors indicated a lack of awareness about sustainable construction practices in their study of sustainable construction practices in the Kenyan construction industry. Babawale and Oyalowo (2011). investigated the relationship between estate prices and sustainability despite the fact that "an increasing awareness of the need to mainstream sustainability into real estate valuation practice," the study discovered that "a respondent tended to define real estate sustainability in terms of its social, rather than economic or environmental features." This boils down to a broad grasp of the concept of sector sustainability, with expertise and education progressively filling in the gaps.

The real problem facing humanity today in terms of achieving sustainable development is how to motivate people to change underlying behaviours and activities that are problematic – in this case unsustainability (Nnabuo and Asodike, 2009) . Baha, 2005 went further to say that the idea of education for sustainable development has a special role in vindicating how various processes in education, which lie at the heart of promoting change in human behaviour, can be used on a global level to help turn things around . Education for sustainability is an important part of the journey to live and work in a sustainable manner. Curricula changes to incorporate sustainability education in the built environment disciplines is not a new phenomenon (Raniga, Arcari and Wong,2010). According to Mead (2001), green education can easily be integrated into programmes either by incorporating green ideas into existing courses or by creating new courses that focus primarily on sustainable ideas. He proffered that a new-approach education system must prepare a student in multi-disciplinary thinking and application to guarantee more sound problem-solving based upon an individual's ability to relate multiple and related issues. Thus, they recommended that the Malaysian Higher institutions need to prepare new professionals who are able to feel comfortable in a multi-disciplinary framework. Ahn, et al (2009) also

investigated the level of construction building technology teachers' familiarity and interest regarding sustainability in the built environment, their ability to identify recognizable sustainable rating systems and factors affecting building technology teachers' attitude toward sustainability. They found that construction building technology teachers perceived to have a relatively high level of familiarity with sustainable construction and Leadership in Energy and Environmental Design (LEED) was the most widely recognised sustainable construction rating system by construction building technology teachers. They also identified some factors like work experience and courses related to sustainable development would affect building technology teachers' attitude toward sustainability. Thus, the urgency for confronting sustainability challenges, opportunities are emerging for different stakeholders who have a significant potential towards providing the knowledge on sustainability to prospective built-environment professionals. Institutions of higher learning are critically important places of knowledge production, knowledge perpetuation and knowledge dissemination. In that context, the university could be, through its teaching and curriculum, promoting and advancing sustainability (Colucci-Gray et al., 2006).

Methodology

The methodology for this study includes both quantitative and qualitative research methods. The study employed a cross-sectional survey design to collect data from building technology teachers in technical colleges in Rivers State. The survey was conducted using a structured questionnaire which was administered to 220 building technology teachers in technical colleges in Rivers state. The quantitative data collected from the survey were analyzed using descriptive statistics such as frequencies, percentages, and mean scores. The decision on the level of awareness and understanding of sustainability practices among building technology teachers was achieved from the mean: Mean 1-1.44 = extremely low level of awareness; Mean 1.45-2.44 = low level of Application; Mean 2.45-3.44 = moderate level of awareness; Mean 3.45-4.44 = high level of awareness; Mean 4.45-5.00 extremely high level of awareness. The study was conducted in compliance with ethical principles and guidelines for research involving human subjects. Informed consent was obtained from all participants and their confidentiality and anonymity were ensured throughout the study.

Results and Discussion

This addresses key sectors deducing from questionnaire as well as the various opions of the respondents.

Table 1.0: Awareness of Sustainable Construction Practices

Sustainable Construction Practices	**Mean score**	**Decision**
Energy Efficiency	2.72	Moderate
Sustainable Procurement	3.21	Moderate
Cost Efficiency	2.73	Moderate
Materials Selection	2.67	Moderate
Waste Management	3.49	High
Appropriate site selection	3.21	Moderate
Water Management	2.70	Moderate
Indoor Environment	2.78	Moderate
Time Conservation	3.09	Moderate
Prefabricated Materials	2.53	Moderate
Managing the Site for an improved Environment	2.23	low
Smart Homes	2.45	Moderate
Ventilation	3.05	Moderate

N=199 Source: Field Survey, 2023.

One of the key objectives of this research was to determine the level of awareness and understanding of sustainability practices among building technology teachers in technical colleges in State Rivers state. Building technology teachers' response mean scores on their level of awareness and understanding of sustainability principles can be seen in Table 1.0. From the analysis of the above table, 11 out of the 13 variables representing 84.6% had mean scores value above 2.5. This implies level of awareness and understanding of sustainability practices among building technology teachers in technical colleges in State Rivers state is moderate.

Table 2.0: Challenges faced by building technology teachers in promoting sustainable building materials and practices

Challenges faced by building technology teachers	N	Minimum	Maximum	Mean	Std. Deviation	Rank
Lack of awareness	199	1.00	5.00	3.231	1.395	1
Limited resources	199	1.00	5.00	2.950	1.523	2
Lack of incentives	199	1.00	5.00	2.899	1.341	3
Resistance to change	199	1.00	5.00	2.698	1.676	4
Industry resistance	199	1.00	5.00	2.538	1.480	5

Source: Field Survey, 2023.

Building technology teachers' response mean scores on challenges they faced in promoting sustainable building materials and practices can be seen in Table 2.0 above. From the analysis 1 variable had mean scores value above 3.0. This includes Lack of awareness (mean value = 3.231. Similarly, Limited resources (mean score value = 2.950), Lack of incentives (mean score value = 2.899), Resistance to change (mean score value = 2.698), Industry resistance (mean score value = 2.538) had mean scores below 3.0. This implies Lack of awareness appear to be the highest challenge faced among building technology teachers in promoting sustainable building materials and practices.

Table 3.0: Role of building technology teachers in promoting sustainable building practices and materials

Role of building technology teachers	N	Minimum	Maximum	Mean	Std. Deviation	Rank
Encouraging innovation	199	1.00	5.00	3.653	1.444	1
Providing hands-on experience	199	1.00	5.00	3.442	1.281	2
Educating students	199	1.00	5.00	3.256	1.124	3
Incorporating sustainable building practices and materials into the curriculum	199	1.00	5.00	3.246	1.383	4
Collaboration with industry stakeholders	199	1.00	5.00	3.246	1.489	5

Source: Field Survey, 2023.

Building technology teachers' response mean scores on role of building technology teachers in promoting sustainable building practices and materials in the construction industry in Rivers State can be seen in Table 3. From the analysis, all variables had mean scores value above 3.0. This implies that building technology teachers can equip students with the knowledge and skills to design and construct sustainable buildings and also encourage students to be innovative and explore new sustainable building practices and materials, fostering creativity and pushing the boundaries of sustainable building design.

The Way Forward

In conclusion, this study assessed the level of knowledge of building technology teachers in technical colleges in Rivers State regarding sustainable building materials and practices, identify the challenges they face in promoting sustainable building practices and materials and examine their role in promoting sustainability in the construction industry in Rivers State. The first conclusion is that the level of awareness and understanding of sustainability practices among building technology teachers in technical colleges in State Rivers state is moderate. The second conclusion is that Lack of awareness appeared to be the highest challenge faced among building technology teachers in promoting sustainable building materials and practices. Lastly, building technology teachers can equip students with the

knowledge and skills to design and construct sustainable buildings and also encourage students to be innovative and explore new sustainable building practices and materials, fostering creativity and pushing the boundaries of sustainable building design. Based on the findings of this study, the following recommendations are made:

1. Training programs and workshops should be developed for building technology teachers in technical colleges in Rivers State to improve their knowledge and understanding of sustainable building practices and materials. The training programs should cover the latest trends and technologies in sustainable building practices and materials.

2. Technical colleges in Rivers State should incorporate sustainable building practices and materials into their curriculum to ensure that building technology teachers are exposed to sustainable building practices and materials.

3. Policy makers in Rivers State should develop policies and programs that support the promotion and adoption of sustainable building practices and materials in the construction industry. This can include tax incentives for the use of sustainable building materials, subsidies for the development of sustainable buildings, and the development of green building codes.

4. Building technology teachers should collaborate with other stakeholders in the construction industry such as architects, engineers, contractors, and policymakers to promote the use of sustainable building practices and materials.

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