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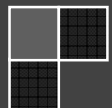
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Building Practice in the New Millennium: is Building Education Ready to Meet the Challenges

Ayodeji. O. OGUNDE

Department of Building,

Covenant University, Canaanland,

Ota, Ogun State, Nigeria.

ayodeji.ogunde@covenantuniversity.edu.ng

Timothy. O. MOSAKU

Olabosipo .I. FAGBENLE

Dele OWOLABI

Opeyemi JOSHUA

Adefolake. O. OGUNDE

Abisola OGUNDE

Olufunke OGUNDE

ABSTRACT

The study aimed at assessing the building practice in the new millennium and evaluated the readiness of building education in meeting these challenges. The objectives of this research are to evaluate building education and practices in the new millennium, identify the challenges building practices face in the new millennium and evaluate the readiness of building education in meeting these challenges. Secondary and primary data were obtained. Data was obtained by the administration of questionnaires, and interviews of students studying Building Technology in Covenant University and construction practitioners. A sample size of 150 students comprising of students from the 5 levels of the programme partook of the survey. Purposeful sampling technique was used and the data obtained was analyzed using a 5-point Likert scale. The factors affecting the readiness of building education in meeting the challenges of Building Practice in the New Millennium in varying degrees include Poor Educational Background, Poor curriculum, Poor Relationship Between Educational System and The Construction Industry. Lack of Prospect To Take Risk, Insufficient Building Practice, Corruption, Financial Inadequacy and Economic Recession. It was also observed that that the education sector and public lack awareness of what building millennium entails and do not have the pre requisites building education that can meet up with the rapidly evolving standards of the millennium. The study therefore concluded that the building education is not ready to face the challenges of the new millennium; it recommended that the curriculum should be assessed and restructured to be able to meet up the requirements of the new millennium building construction.

Key words: Building Education, Building Practice, Construction, Curriculum New Millennium:

1.0: INTRODUCTION

Nigeria faces many challenges in the years ahead with recent developments taking place attracting attention of the countries unstable economy which could lead to national conflict management practitioners over the next few years. Building education be described as the introduction to building in new ways of which are beneficial to both the economy and the practitioner. It is done to give enlightening insights of how the construction industry would change from time to time whilst being unique and serving satisfaction to occupants.

The new millennium is an age in which the development of construction practices would be advanced with basic principles of building made easy with the use of modern devices and facilities. New Millennium Building Systems should be encouraged to attain cheap and reliable building components for use primarily in low-rise non-residential buildings – including commercial, industrial, and government construction.

This research was done to evaluate possible challenges the building industry of Nigeria would be facing in the new millennium and proffering solutions of what to do to reduce the negative impacts that might be experienced in the

nearest future. Building education seems to be developing at a fast rate and it is from this perspective that the study examined if the Nigerian building education is prepared for the new millennium of building. The construction industry has historically been linked with the process of industrialization and urbanization, particularly since the advent of the Industrial Revolution. Transport infrastructures facilitated trade and co-operation between countries and also the diffusion of technical innovations from the most advanced to the less advanced areas of the globe. The construction industry played a key role in the reconstruction of the war-ravaged Europe.

The heavy program of construction improvement of housing and social infrastructure, beside its contribution to the national output, was also a reflex of a better re-distributive economic policy in Europe post World War II. The importance of the construction industry has also been recognized in the context of countries affected by natural hazards (Ruddock et al, 2010; Amaratunga and Haigh, 2010). Besides its multiplier effect on other sectors of the economy, a well-devised reconstruction program of building and community service infrastructure can contribute to sustainable development and protect the natural and built environments.

With regard to the relationship between construction and economic development, Turin (1973), using cross-country comparisons, found an association between construction investment and economic growth. That finding was consistent with the classical approach in growth theory in which physical capital formation is the main engine of economic growth and development. Turin's argument about the pattern of the construction industry contrasts with the argument advanced by Bon (1992; 2000).

Nigeria faces a lot of developing crisis such as economical degradation, rise and fall of currency, recession and the corruption rate we have in our economy. The construction industry is presently experiencing a huge record of construction failure, building collapse and most of the time leads to poor foundation design and construction therefore it will be of utmost interest to initiate ways of facing such challenges and proffering solutions especially in our economy which has forced the building industry to adapt to new changes triggered by an ever sophisticated society characterized by an increasing demand for customized modern buildings. The major problem facing the growth of the building industry in a depressed economy like Nigeria is poverty, unemployment, poor economy, and corruption which would eventually lead to non-compliance of the building codes as well as building laws.

The aim of this research is to design, critically identify, examine and investigate if the building education is ready to meet the challenges in the new millennium. The objectives are given below:

- To evaluate building education and practices in the new millennium
- To identify the challenges building practices faces in the new millennium.
- To evaluate the readiness of building education in meeting these challenges

This research covers the building practices in the new millennium; it also covers an investigation if the building education is ready to meet the challenges of how the new millennium works. The limitation of the study is Nigeria. The findings of this study will be beneficial to Ministry of Housing and Urban Development, lecturers, teachers, and students, Nigeria Research Council, Nigeria Institute of Building (NIOB), Council of Register Builders of Nigeria (CORBON), construction consultants, contractors and real estate surveyors/value. It will also help the building construction companies and high institution on recruiting, training and retraining of staff in the new millennium, as the information generated would serve as a database for them. The result findings would help building clients, the governments, builders, professional bodies and building team of specialists to jointly improve working conditions of building professional members in organizing seminars, workshops and conferences.

2.0: RELATED STUDIES

2.1: What is new millennium?

New millennium can be referred to as an age where building technology or construction has gone into the jet age where laborers are no longer needed and technicians are essentially welcome on site with the introduction of new machines and equipment which would make jobs or construction a lot easier to accomplish. Modern marvels would arise in the construction industry in a millennium from now that would lead to better efficiency and sophisticated complex programs giving rise to structures that can only lead to structures that have only been fantasized on. The future of the construction industry seems brighter than ever. Aside from providing various jobs to those seeking

careers in this field, evolving techniques have enabled different living options for people to better suit their styles and preferences.

Condos in key cities, for example, have provided people with an alternative way of living, aside from the standard residences that people are more accustomed to. As more and more buildings and condominiums in major cities are being built, the industry is also keeping in track with the latest technologies to better improve the quality of said buildings, geared towards the future of man's day-to-day living through sustainable construction practices. So what are the different technologies available to the construction market to advance the industry beyond conventional builds into ones that represent the standards of the future? What are the innovations and materials that will build the high-rise buildings of tomorrow in the world's largest cities?

2.2 Future construction technology

When it comes to construction technologies, the possibilities are endless, and the current rapid innovation and technology of construction will shape the appearance of future buildings. In terms of building construction, the construction workers of the future could be robots. The Harvard School of Engineering and Applied Sciences and the Wyss Institute for Biologically Inspired Engineering have designed termite-inspired robots which can already perform construction tasks.

They can build structures without supervision and even without pre-determined roles. Four years have been allotted by the researchers to develop TERMES, the team of small robots that can build 3D structures from foam bricks. They plan to use similar robotic systems such as these for construction projects that may be too risky for humans. Italian robotics engineer Enrico Dini has said: "We might print not only buildings, but entire urban sections." This may well hold true, with architects already producing the first 3D-printed houses. Last January 2013, Universe Architecture had designs of a two-storey house that looks like a Möbius Strip and designer's plan that it will be concretely printed on site. Universe will be collaborating with Dini with his D-shape machine, which is considered the largest 3D printer in the world. In 2010, it built a single-room structure resembling a mountain hut with two windows; an interior that has a workspace, platform bed and a sink.

These kinds of printed buildings might offer a glimpse of the future of building construction, but because of its fragile parts, the buildings must be printed with supporting structures to prevent them from collapsing while under construction. The support can be removed once the concrete filling has been added. At present, the whole process has been estimated to cost around €5 million: rather prohibitive, but constantly falling as the technology is refined. (www.constructionglobal.com/equipment-and-it/future)

2.3 Building materials of the future: Greener, more intelligent

Future building materials will take their cue from current scientific technologies. As reported by BBC News, a self-healing concrete developed by microbiologist Henk Jonkers and Eric Schlangen, a concrete technologist, involves the genus *Bacillus*' mixed bacteria spores. Its nutrients, when activated by water, will feed on calcium lactate to produce a primary component of limestone, which is lactate. This self-healing concrete may be available within the next few years if tests are successful. Once proven, it could eliminate concrete cracks and expensive concrete maintenance. Alongside and influencing these technologies is a greater awareness and need to build greener, with sustainable materials used at the construction phase. Malama Composites has started manufacturing foam material from plant materials like hemp, kelp, and bamboo that will be used in turbine blades, insulation, and furniture. The foam can provide high moisture and high resistance to heat, and when used can also give protection against molds and pests. It even improves the quality of living, thanks to its better insulating properties and higher thermal resistance. Plus, it can also give your living spaces the right kind of acoustics.

2.4 Re-defining future design

While it may be easier to stick to familiar construction methods, the industry is changing and the new, innovative greener techniques, while challenging to develop to the point that they become standard, can be highly beneficial to the quality of the urban environment, and often ingenious.

In Indonesia, Skidmore, Owings & Mills has revealed its design for a 99-story PERTAMINA Skyscraper that is shaped like a budding flower's petals. What's interesting to note here is that to harness wind energy, the said

skyscraper will slightly open its peak to allow its wind funnel to convert high speed winds into energy sources. The design team, as part of its green architectural design plan, also took steps to minimize the solar heat, adding solar panels to the façade of the skyscraper to take advantage of the natural daylight coming from the sun, thus decreasing carbon dioxide emissions.

Elsewhere, to decrease construction costs and at the same time reduce waste, VS-A and Chartier-Corbasson unveiled their skyscraper design made from the tenants' trash. Dubbed as "The Organic London Skyscraper", it will be made of durable panels made out of plastic waste and discarded paper. The said building will grow as its initial residents produce more trash for the construction materials. The plastic casting can be completed in a year, and to be able to generate its own electricity, the hollow tubes in the embedded scaffolding will be provided with wind turbines. Recycled materials will be converted to durable panels installed across the building.

2.5 Seeing beyond the tall buildings

Considering the future of construction development can give us a wider perspective and fresh ideas when it comes to designing the living spaces such as condos, skyscrapers, skylines and office spaces being built in major cities around the world. (www.constructionglobal.com/equipment-and-it/future)

Architects and designers have given us exciting ideas that will define the way we live, and the kind of living that the next generation will experience. More importantly, as these buildings are constructed, experts should ensure that every material and every action taken in the construction process will minimise environmental damage, ensuring the world outside these future buildings is as pleasant as it is inside.



2.6 What are the new construction techniques?

Modern methods of construction the Office of the Deputy Prime Minister defines modern methods of construction as a process to produce more, better quality homes in less time. For the purpose of awarding grants, the Office of the Deputy Prime Minister uses a definition in terms of products.

- Panelized units are produced in a factory and assembled on-site to produce a three dimensional structure. Open panels consist of a skeletal structure only, whereas more advanced panels may include lining material, insulation services, windows, doors, internal wall finishes and external claddings.
- Volumetric construction involves the production of three-dimensional modular units in controlled factory conditions prior to transport to site. In Hybrid techniques combine both panelized and volumetric approaches. Typically,

volumetric units (sometimes referred to as pods) are used for the highly serviced and more repeatable areas such as kitchens and bathrooms, with the remainder of the dwelling or building constructed using panels.

- Other modern methods of construction may use floor or roof cassettes, pre-cast concrete foundation assemblies, pre-formed wiring looms, and mechanical engineering composites. They can also include innovative techniques such as tunnel form or thin-joint block work.

Modern methods of construction are about better products and processes. They aim to improve business efficiency, quality, customer satisfaction, environmental performance, sustainability and the predictability of delivery timescales. Modern methods of construction are, therefore, more broadly based than a particular focus on product. They engage people and process to seek improvement in the delivery and performance of construction

2.7 Reasons and challenges why we are not meeting the standards

The global economic crisis would pose challenges to building construction in Nigeria in the following ways;

Inadequate or non-availability of building construction engineers

According to Thanni (1998) building construction details which the contribution of a team of specialist such as the engineers, architects, builder, quantity surveyors structural engineers electrical engineer and mechanical engineers whose knowledge and skill are utilized on large building projects.

According to Obiegbu (2004) building construction can no longer be the total responsibility of one person.

According to Nakashima (2010), building Contractors, site workers also are handing their hats on public work.

According to Prock (2010) other challenges was keeping key personnel gainfully employed. He says “while were got a large backlog, many of our projects are starting slow, until we got key people waiting to go to work.

According to Kobatake (2010), a constant challenge is employing experienced project and field personnel and Good Follow Bros (2010) stated that the best employees right now but they have a lot of potential demands especially if members of our families have been laid off. According to Skelton (2010), our challenge is helping them keep focused on safety we don’t want to lose sight of the overall goal, which is to work safe and be able to go back home to our “families” Skelton adds that in thought economies times, ‘people change industries just to survive and they don’t always come back. The industry loses quality people who could take it to the next level’.

According to Anaele (2000) the acquisition of building construction skill in technical colleges and other colleges depends more on the teachers. Building constructing teachers should be professionally qualified and occupationally competent as to impart the required skill to the students.



2.4 What are we taught in building education?

In Covenant University and Nigeria as a whole, building education can be said to not be ready for the new change or innovations in building construction given the fact that we are not adequately exposed to any form of innovative or creative building experiences. We do not want to advance in the construction industry because we still use conventional methods of building and are unwilling to research or input ways into which to develop our building. Moreover, we do not all have free access to the internet or connected people in high places that grant us access to relevant information with which we could improve ourselves in this field.

3.0 RESEARCH METHODOLOGY

Extensive literature review was carried out through the use of relevant textbooks, professional magazines and internet as a secondary data collection sources. The primary sources are interview and the use of questionnaires. The use of questionnaires and interview were the methodology approach use for this research. This research is based on the case study which is Covenant University. Field data was obtained by the administration of questionnaire, and interviews of students studying building technology in Covenant University. The population of Building Technology students from 100 to 5001 studying building technology in Covenant University was a total of 283. A sample size of 150 students comprising of students from the 5 levels of the programme partook of the survey. Purposeful sampling technique was used. The data was analyzed using tables and a 5-point Likert scale.

4. 0: ANALYSIS OF DATA

The survey was carried out on the Building technology students in Covenant University. A total of One hundred and fifty (150) questionnaires were distributed. One hundred and ten (110) was retrieve out of which ten were not properly filled. The males that participated were 102 in number while females were 48. Analysis of data was done using the Likert scale. The scores were obtained by assigning weights to the 5 – point Likert scale, that is, from strongly Agree = 5 points to Strongly Disagree = 1 point, then summing the scores for each item and them dividing by the number of respondents to each item. The mean score was then grouped as follows to arrive at consensus opinion about each item:. Strongly agree= 5.0-4.50, Agree =4.49-3.0, Neutral= 2.99-2.50, Disagree= 2.49-1.5 strongly Agree=1.49-1.0.

Memos and visual demonstrations of ideas provide an insight into how the final grounded theory categories were developed. The discussion on the results of the two phases of data collection and comparison of those findings with the relevant academic literature are provided as follows: The questionnaires were analyzed with the help of a content analytic summary table. The following questions for the questionnaires are as follows:

Table1: Is our Nigeria education system meeting the international standard?

	Frequency	Percentage
Yes	13	13%
No	75	75%
Probably	12	12%

Majority of the students (75%) believe our education system is not meeting the international standards

Table2: Are we restricted to information in building education?

	Frequency	Percentage
Yes	44	44%
No	37	37%
Probably	19	19%

Majority of the students (44%) emphasised that they are restricted to information in building education

Table3: Do you know what millennium building means?

	Frequency	Percentage
Yes	62	62%
No	13	13%
Probably	25	25%

Majority of the students (62%) do know what millennium buildings mean through internet.

Table 4: Are we aware of millennium practice in Nigeria?

	Frequency	Percentage
Yes	25	25%
No	63	63%
Probably	12	12%

Majority of the students (63%) are not aware of millennium practice in Nigeria

Table 5: Do we implement millennium practices in Nigeria?

	Frequency	Percentage
Yes	13	13%
No	56	56%
Probably	31	31%

Majority of the students (56%) are of the opinion that we do not 56% implement millennium practices in Nigeria

Table 6: Are Nigerian professionals involved in millennium practices?

	Frequency	Percentage
Yes	44	44%
No	44	44%
Probably	22	22%

The students are of divided opinion that Nigerian professionals involved in millennium practices

Table 7: Are their knowledge gotten from their education or personal experience?

	Frequency	Percentage
Yes	31	31%
No	69	69%
Probably	0	0

Majority of the students (69%) stated that their knowledge were not gotten from their education or personal experience

Table 8: Is the education system meeting up with the standard of the requirements needed for construction?

	Frequency	Percentage
Yes	14	14%
No	75	75%
Probably	11	11%

Majority of the students (75%) emphasised that the education system is not meeting up with the standard of the requirements needed for construction?

From the various summary tables it can be concluded and supported by the larger percentage of our respondents that the Nigerian building education is not ready to meet the challenges of the building practices in the new millennium.

For further information, the second phrase using oral interview used to ask the respondents to state the challenges that are contributing to the educational system in building. Some of the challenges highlighted are:

- Educational background of institutions

Nigeria has been plagued by frequent political unrest. This political instability has generated negative effects on the education system. Although education had been in crisis for many years, the situation has recently been made worse by frequent strikes staged by students, faculty and teachers. Much of the difficulty lies in the fact that the sector is poorly funded. These results in shortages of material and human resources for education: lack of qualified teachers; a brain drain from the public sector; few instructional inputs, shortage of classrooms, and a host of other problems.

These difficulties have been most pronounced at the foundation levels of education both Primary and secondary school levels have been negatively affected. In 1997 the Federal Minister of Education, following a nationwide tour of the schools, stated that the basic Infrastructure in schools such as classrooms, laboratories, workshops, sporting facilities, Equipment, libraries were in a state of total decay. The physical condition of most schools is reported to be pathetic.

Nigeria as a reconstituted democracy has to address issues of a dual transformation. The country needs to re-examine its past and focus on development plans that will meet the challenges of the future. The need to work out a

new developmental plan puts pressure on the political, social and economic sectors of the country. The new government has declared education as one of its priorities. The goal is to have a reformed system of education that will provide access at all levels of education and to improve the quality and efficiency of the entire education system. While these are lofty goals, the real challenge will lie in the successful implementation of them

The education sector of Nigeria does not fit a vivid representation of building education due to the lack of building practices in the institutions as well as the dire need for individuals with the understanding of the field to share valuable information that would improve the standards of practitioners in the field

- **Poor relationship between educational system and construction industry**
The revaluation of standard in Nigeria needs to be accomplished by leaving our comfort zones and taking breaks or excursions to more developed areas or zones to determine the differences in economic stand and how we could build up to those standards so that we could attain a good relationship while trying to gain more knowledge.
- **Corruption**
Corruption takes a great toll in the building industry due to the leadership and high ranking officials which civilians do not trust, brings a complex discussion on how we can eradicate corruption from the economy.
- **Poor curriculum**
Poor curriculum causes a huge mess in the building sector because of economic recession as well as the industry causing us to put into consideration the integrity of our building codes.
- **Financial recession**
Financial recession or inadequacy has led to a great toll in the construction industry due to embezzlement in the economy of the nation, fall in the value of currency as well as embezzlement of money on site which creates a brink in the downfall of the economy.
- **Insufficient practical practices in institutions**
In Nigeria today practical practices have been rapidly declining as more theory works are being taught instead of practical practices especially in courses like engineering and building technology except from the internship programme which is conducted by all institutions and mandated by the government. However, this internship programme is not really controlled as students face a lot of challenges on sites that hinder knowledge but as discussed in class the internship programme should be taken more seriously by the school to curb the challenges on site and increase the knowledge gained by the students.
- **Lack of Risk taking**
Taking of risk in building technology as a course and innovation has been very difficult in Nigeria because firstly from our research we found out that our building education in Nigeria is not meeting up with educational standard and also our Nigerian professionals have not been taking part in a new millennium projects which suggest that we are not fully innovative in Nigeria and come up with innovative ideas
- **Independence**
Lack of confidence in ourselves as well as our means of construction because of conventional use of building materials using self instincts on site or being creative is unavoidably too low thus the institution is not able to grow into the new millennium.

5.0: CONCLUSION AND RECOMMENDATION

5.1 Conclusion

It is concluded that the building education is not ready to face the challenges of the new millennium according to the data analysis, literature review carried out on different perspective at which people saw the growth of buildings construction in a new millennium in Nigeria, mainly because it is not so practiced in Nigeria. It was also observed that that the public lack awareness of what building millennium entails and do not feel like that the building education can meet up with the required standard of the millennium.

5.2 Recommendations

Generally, the curriculum should be accessed and restructured to be able to meet up the requirements of the new millennium building construction, what it entails, what is required of new members or recruit entering the construction sector. The leaders in charge or the higher bodies in charge of coordinating works and construction in the industry should either be sanctioned why we not meeting up with the new millennium requirements. Concerning financial adequacy, the industry needs to be more attractive for stakeholders and investors to be interested in for us to be able to solve our financial inadequacy. Nigeria needs to be full of individuals who are ready to take risks to see how far we could go and leave our comfort zone of conventional practices in Nigeria.

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