AN INVESTIGATION ON THE AWARENESS OF SUSTAINABILITY CONCEPT IN CONSTRUCTION PROJECTS: A CASE OF NIGERIAN STUDENTS IN THE CONSTRUCTION FIELD.

By

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DEDICATION

I dedicate this work to my dear parents Alhaji Lawal Umaru Mayere and Hajiya Fatima Mayere for their unconditional love and support that keeps me. And to my husband Dr. Nuruddeen Mohammed Suleiman for his constant support and encouragement throughout the numerous challenges of this course and life at large, for without him this whole work would have never come near completion.

ABSTRACT

AN INVESTIGATION ON THE AWARENESS OF SUSTAINABILITY CONCEPT IN CONSTRUCTION PROJECTS: A CASE OF NIGERIAN STUDENTS IN THE CONSTRUCTION FIELD.

Sustainability is gaining prominence amongst practitioners in the recent time, thanks to the global campaign against the destruction of earth by the activities of man which are often avoidable. The construction industry across the globe significantly contributes to the degradation of the earth in so many respects; hence the concept of sustainability was coined and integrated into the industry in order to mitigate the menace. However, integrating the concept of sustainability into the construction industry is not enough; the concept must be digested and embraced by stakeholders in the field. The rudimentary stage at which the concept can be accepted and harnessed is from the embryonic stage of students in the field of construction industry. In the context of this research, which is situated in Nigeria, the observation was the dearth of research that aimed to understand the knowledge gained by students in construction field about the concept of sustainability in their various fields of study within the construction industry. As such, this study embarked to investigate the knowledge of students in construction industry at one of the Polytechnic institutions located in a suburb city in Kaduna State, Nigeria. This is particularly important, since a research by the National Bureau of statistics in Nigeria indicates that the construction industry in Nigeria has grown to the rate of 18.08 percent between 2010 and 2012 in the industry. The quantitative method was chosen for this study, and survey instrument were used to gather the data from 150 respondents, and the respondents included

students from multiple fields such as; Building Engineering, Architecture, Quantity survey, Estate Management and Urban and regional Planning. The education level of the students is either Higher National Diploma (HND) or National Diploma (ND). The findings of this study suggest that 98.90% of respondents from the HND and 78.20% of respondent from ND are aware and knowledgeable about sustainability concept. And positively, there is a general acceptance by the respondents on the applicability of the notion of sustainability in the Nigerian construction projects from the findings. However, the findings suggest that there are discrepancies as regards to the field of study of the respondents such as Environmental, Economic and Social factors that are well entrenched in the concept of sustainability. This is significant because each field of study of the respondents indicates where their interest is regarding the knowledge and implementation of sustainability concept. For instance, using the Kruskal-Wallis test, it showed that there is significant differences in the aspect of the use of products and material that can be recycled or are biodegradable (p=004), respondents from Architect got the Mean score of 3.24, from Building Engineering got 2.50, from Estate Management got 2.40, Quantity Survey got 2.28 and Urban and Regional Planning scored 2.93. Equally in the aspect of use of locally manufactured material (p=0.015), Architect got the Mean score of 2.34, from Building Engineering got 2.48, from Estate Management got 1.60, Quantity Survey got 2.24 and Urban and Regional Planning scored 2.13. Similarly, regarding the design to attract investors which has(p=0.028), Architect got the Mean score of 2.34, Building Engineering got 2.14, Estate Management scored

3.13, Quantity Survey got 2.28 and Urban and Regional Planning scored 1.87. Additionally, in the aspect of analyzing building density in areas (p=0.043). The Architects got the Mean score of 2.22, the Building Engineering respondents got 2.20, from Estate Management got 1.47, Quantity Survey respondents got 1.97, while respondents from the Urban and Regional Planning course scored 2.27.

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APPROVAL SHEET

This dissertation entitled "AN INVESTIGATION ON THE AWARENESS OF SUSTAINABILITY CONCEPT IN CONSTRUCTION PROJECTS: A CASE OF NIGERIAN STUDENTS IN THE CONSTRUCTION FIELD" was prepared by HADIZA LAWAL MAYERE and submitted as partial fulfillment of the requirements for the degree of Master of Project Management at Universiti Tunku Abdul Rahman.

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DECLARATION

I Hadiza Lawal Mayere hereby declare that the thesis/dissertation is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.

Name: Hadiza Lawal Mayere

Date: 3 September 2016

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LIST OF ABBREVIATIONS

Higher National Diploma	(HND)
National Bureau of Statistics	(NBS)
National Diploma	(ND)

CHAPTER 1

INTRODUCTION

1.1 Introduction

The construction industry is as old as mankind; from the provision of shelter, to the aspects of mobility, man has always strived hard to be sufficient in this respect. Nonetheless, the engagement of man and nature created a horizon of progress, and the birth of science and technology broadens the prospects of man's ingenuity. However, the intense pace of development created an unequal symbiotic relationship between man and nature; as nature was detrimentally affected by the acts of man. Mitcham (1995) observe that "the idea is that science and technology get better and better" in comparison with the past, but not necessarily closer and closer to some definable ideal." This observation is in relation to how science and technology have proffered ingenious solutions to the issues beclouding the contemporary era, yet due to lack of the effective application of measures to reciprocate the favor of nature, the same technology is creating more threats to the world, hence the concept of sustainable development. Although even before the concept of the notion of nation-state, lack of sustainability in regards to human endeavors has led to the collapse of many strong and mighty empires (Mebratu, 1998); as such the absence of sustainability in the contemporary world is an issue with catastrophic potentialities. In this regard, nature normally reacts through numerous ways such as the climate change that has currently become a huge task across the globe.

The concept of sustainability in the human realm is all about caring for the future while solving current issues, Fergus & Rowney (2005) also argue in line with this and assert that the concept of sustainable development can "stimulate discursive engagement with respect to the future development of society within an ethical framework based around the values of inclusivity, diversity, and integration". As such Labuschagne & Brent (2005) posit that "social equity, economic efficiency and environmental performance" are the key goals of sustainable development and all these must be adhered to in order to get the best out of both human and the environment. Nonetheless, the whole idea of sustainable development started to attract stakeholders in the 1970s and 1980s when the potentials of the detrimental effects of the activities man to the environment began to emerge. In 1987 the United Nations World Commission on Environment and Development (WCED) published a report with the theme Common Future, and this was a byproduct of the1972 Stockholm Conference on the Human Environment (Robert, Parris, & Leiserowitz, 2005).

Furthermore, application of sustainably in construction projects need skilled and knowledgeable project managers that will argue for, and implement the elements of sustainability the projects. According to Duncan (1996) "Project Management is the application of knowledge, skills, tools, and techniques to provide activities in order to meet or exceed stakeholder needs and expectations from a Project." Although project management have been in existence for time immemorial as the ancient times uses the science of project management in handling works, but the concept started to formally evolve in the contemporary

states during the 1950s (Chiu, 2010). Consequently, in the ever expanding science and technology in the globalized era, the strategic goals of project management must be combined with the concept of sustainability in other for people and the environment to continue toward achieving limitless reciprocal values.

1.2 Statement of the Problem

The construction industry is one of the focal point when it comes to the discourse of sustainable development; this is because the industry's foot print is virtually found in every aspect of human endeavor; from industries, to living homes and transportation of all kind. As such it serves as a point of departure in respect to the concept of sustainability. Furthermore, the knowledge and skills of those in charge of managing the activities in the industry is significantly important in actualization and the implementation of this concept. The construction industry in Nigeria is very huge, for instance, there was an average growth rate of 18.08 percent between 2010 and 2012 in the industry (NBS, 2015). As such, this couple with the growing population in the country calls for an urgent skill development and application of sustainability in the country's construction industry.

1.3 Objectives of the Study

This study aims at ascertaining the awareness and knowledge of students of a Polytechnic in Kaduna state, Nigeria about sustainability concept and its application in the Nigerian construction industry.

1.4. Research Questions

Furthermore, in line with the above aim, this study seeks to investigate the following questions.

- What is the understanding of sustainability notion in project management among students studying in the construction industry in Nigeria?
- Do they consider the sustainability notion is applicable in the Nigerian construction project?
- Do they hope to integrate the sustainability notion to projects after graduation?

1.5 Significance of Study

In the globalized era and the growing challenges it comes with, no nation want to be left behind in trying to solve those ever increasing challenges. As such this study would provide stakeholders with the first step of acknowledging the importance of awareness regarding sustainability in the construction industry in Nigeria. This can go further in helping law makers in the country to formulate sound policies toward mitigating any short comings, as well as the applicability of sustainable solutions in the construction industry. This can be particularly done from the grassroots where the skill and knowledge can be integrated to the mind of students who would become stakeholders in the construction industry in the country. Furthermore, there are huge construction going on in Nigeria, particularly, construction is skyrocketing in Abuja. Abuja is a cosmopolitan city, and the fastest growing municipality in the whole of Africa, in 2012, investors

both within and outside Nigeria promised to inject about US$2b for the development of more districts within the city (Zawya, 2012). As such, students are supposed to be taught extensively from the design to implementation stages of construction.

1.6 Scope of the Study

This study will focus on students studying in the construction field in Polytechnic Kaduna, Nigeria. The choice of this institution was because; the institution is one amongst few that groom technical experts in the construction field across the country.

1.7 Methodology

This is a quantitative study; as such an instrument was used in data collection. The researcher distributed the instruments to respondents in person; as such this gave the researcher to opportunity to explain any questions from respondent. However, the rate of questions from respondents regarding clarifications on the instruments was very minimal, and this was because the instrument was easy to understand. The information gathered was collated, and the findings using a statistical method in chapter 4 were arrived at.

1.8 Organization of Chapters

The report is organized in five chapters namely:

Chapter 1: Introduction

This very chapter synthesizes the problem of our current study. It also provides objective, scope, the problem statement as well as the methodology used toward getting the answers to the questions raised. The chapter presents the cardinal points of the overall research, hence its importance to the study.

Chapter 2: The Literature review

Chapter two started by introducing the concept of sustainable development in a broader perspective. The common definition of sustainable development was introduced. Furthermore, the chapter streamlined the issue of sustainable development to connect it with sustainable construction, which is the main issue that was addressed in the report. The related literature was appraised, and the gaps in the context of Nigeria and in relation to the research questions of this report were identified.

Chapter 3: Methodology

This chapter has provided the methodology used in carrying out the research, as well as the analysis procedure was spelt out. As mentioned in section 1.7 of chapter one, the study was carried out using questionnaires. SPSS computer statistical software was used to generate the result in the study.

Chapter 4: Result

This chapter essentially provided the findings of this report. Tables and graphs were used to illustrate these findings. The findings indicate that there is a sense of knowledge about the concept of sustainability within the students; however, the level of sustainability knowledge varies. Some students have high knowledge, while others just have a moderate knowledge. Nonetheless, the majority of the students know the concept, and which this study is particular about.

Chapter 5: Discussion.

This chapter went further to analyze each research question, as well as provide more detailed information as to how the respondents feel , noting their variances as regards their field of study.

Chapter 6: Conclusion.

This provided overview of the empirical findings of the study, while contextualizing the findings to the Nigerian situation.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Literature review is very important aspect of every research; it properly guides and keeps the researcher abreast of what have been done in the research area, as well as the areas likely to be explored. As such it helps the researcher create or identify gap areas in a field (Suresh, 2015), this is done by gathering information or published articles for analysis. More questions and themes normally evolve from the literature review for the researcher to comprehend and galvanize and integrate such to the study he is undergoing. Furthermore, a clear and wide reviews create a justification to the study a researcher is doing (Oliver, 2012). Nonetheless, in order to find a comprehensive gap in our current study, the review section has been divided several section in order to gain wide coverage, and to contextualize our studies to Nigeria which is our case. At the end of the review, a gap was identified, and this study was shaped to answer the identified questions.

2.2. Sustainable Development

Sustainable development is multidimensional in a broader sense; the World Commission on Environment and Development defines the concept as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." And in the context of the economy, scholars such as Goldin and Winters (1998 posits that "sustainable development refers to an economy in which future growth is not compromised by

that of the present." In essence, the concept of sustainable development suggest the meticulous maximum utilization of resources to get a best result, while not compromising its future usage that might be detrimental to nature.

2.3 The Themes within Sustainable Development

There are basically three aspects within the sustainable development concept that are commonly referred to, and they are social, economic and environmental (Kennedy, 2013). These dimensions are interrelated, thereby creating a symbiotic relationship. Fig 2.1 illustrates these relationships of the aspects.

Figure 2.1: The Themes within Sustainable Development

Source: Launching Sustainable Development to Improve lives post-2015 (UNDP, 2015)

2.4 Sustainable Construction: A Definition

Furthermore, in the context of construction industry, there is no central definition of sustainability; however, scholars have tried to inculcate the concept of sustainability in the field. For instance, Kirbert (2005) sees the concept as "the design and operation of a healthy built environment using ecological based principles," while Ding (2012) sees the concept as "creating and maintaining a healthy- built environment and at the same time focusing on minimizing resources and energy consumption, thereby reducing damage to the environment, encouraging resource and recycling, and maximizing protection of natural environment."

In this respect, this research will review related literature, and with the aim of contextualizing the concept in the Nigerian context.

2.5 The Studies

This section is divided into three, the first section deals with sustainability literature in the construction industry, while the section second deals with the knowledge and skill of stake holders about sustainability in the industry. The last section is about sustainability in construction industry within the case studies of the report.

2.5.1 Sustainable constructions

Ding (2008) postulates that the "construction has been accused of causing environmental problems ranging from excessive consumption of global resources both in terms of construction and building operation to the pollution of the surrounding environment." And for this perception to be eliminated, the stakeholders must inculcate the factors of sustainability to their projects, and the study further asserts that "generally, sustainable development concerns attitudes and judgment to help insure long-term ecological, social and economic growth in society. Applied to project development, it involves the efficient allocation of resources," minimum energy consumption, low embodied energy intensity in building materials, reuse and recycling, and other mechanisms to achieve effective and efficient short- and long-term use of natural resources. As only this can ensure the contentious implementation of sustainability concept in construction projects. As such the study concludes that "Construction is one of the largest end users of environmental resources and one of the largest polluters of manmade and natural environments. The improvement in the performance of buildings with regard to the environment will indeed encourage greater environmental responsibility and place greater value on the welfare of future generations. There is no doubt that environmental building assessment methods contribute significantly in achieving the goal of sustainable development within construction." Furthermore, in the quest to ensure sustainability in construction industry, more innovations are made, Pacheco-Torgal and Jalali (2012) found out that construction are moving to earth based ones. The study suggests that

"currently almost 50% of the world's population lives in earth based dwellings. The majority of earth construction is located in less developed countries, however, this kind of construction can also be found in Germany, France or even the UK that has an excess of 500,000 earth based dwellings. Earth construction has also increased substantially in US, Brazil and Australia largely due to the sustainable construction agenda in which the earth construction assumes a key role".

Tan, Shen, & Yao (2011) argue that the implementation of sustainability by any company in the construction industry would give it a competitive advantage amongst competitors in the industry. This is because the construction industry has the potentials of drastically reducing the negative impact of environmental hazards if the sustainability concept is implemented in construction models. The study concludes that by implementing sustainable construction practices, it can contribute to the improvement of contractors' sustainability performance. However, Fernández-Sánchez & Rodríguez-López (2010) posits that for green construction to be fully implemented there must be a method to "identify, classify and prioritize sustainability indicators based on risk management standards". This is also in line with the study of Ali & Al Nsairat, (2009) posit that the construction industry, particularly the developing world should entrench "sustainable development through developing an effective green building rating systems".

The result of the study of Robichaud & Anantatmula (2010) suggests that "greening project management practices can add significant value to a sustainable construction project while delivering it within acceptable cost constraints". This is because due to several factors, for example whenever there is course for redesign, it cost less to implement in green constructions that the traditional construction designs. However, this can only be achieved if the project manager is knowledgeable about the importance of implementing green construction, as well as advising client respectively in the course of design and planning. Burnett (2007) acknowledges that construction of buildings are important in economic and social development context of cities, however, there are numerous environmental impacts imbedded to it. While Campbell (1996) suggests that without a proper synergy within the stakeholders championing sustainability in the construction industry, there is bound to be so many contradictions in the application and implementation of the green concept. Furthermore, the issue of stakeholders towards the implementation of sustainability is very crucial, Tan et al. (2011) posit that "contractors play an important role in promoting sustainable development within the context of the construction industry by assuming the responsibility to minimize their negative impact on environment and society and maximize their economic contribution." Undeniably the contractors has a very important stake in the implementation of sustainability in construction, because if the cut corners, the implementation of sustainability would surely be jeopardized. Furthermore, other studies such as Daniel & Hunt (2014), Egenti, Khatib, & Oloke (2014) and Ogbazi (2013) have investigated the growing of interest in the

sustainability implementation in the industry, there is a lot that needs to be done considering manning factors such as the political will of the leaders in formulating polices geared toward achieving sustainability in the construction industry.

The developing countries have huge roles to play in understanding and implementing the sustainability concept particularly in the construction industry, and Du Plessis (2002) argues that "creating a sustainable built environment in the developing world requires a different approach to that taken by the developed world and this is not often clearly understood and discussed. Not only are the priorities, capacity and skills levels often radically different, there are also certain cultural and worldview differences between the developed and developing world countries that impact on the understanding and implementation of sustainable development and construction." As such, several issues were identified to solve the issue of sustainable construction in developing countries. The paper highlights new model, education and innovation as areas that need to be understood. In the area of education, the paper posits that "Ignorance and a lack of information on sustainable construction issues and solutions is a major obstacle that needs to be overcome. To bridge this gap will require interventions at all three levels of education, continued education programs for professionals and technicians, education and awareness raising programs for government officials and politicians, and a concerted public education program". Education undeniably needs to be improved in the developing countries in order to appreciate the embrace the concept of sustainable development from all ramifications. Furthermore, within the aspect of innovation, the paper postulate that "Sustainable

construction can make a huge difference to global environmental sustainability, particularly through a drastic reduction in the use of natural resource consumption and energy intensive materials like cement, steel, aggregates and aluminum. Availability of conventional construction materials will fall considerably short of their demand despite improved productivity and it is necessary to develop alternatives for them. One area that is receiving much interest is the use of agricultural waste products and other biological materials as building products." Nonetheless, the paper concluded by advocating improvement in the realm of "capacity of the construction sector, an uncertain economic environment, lack of accurate data and poverty" in the developing country, and if this can be addressed, sustainable construction could be realized.

Hutchins and Sutherland (2008) stresses that "sustainability recognizes the interdependence of ecological, social, and economic systems," in essence, for continuity, each of these aspects depends on each other. However, in most of the developing countries, the economy is dependent on the natural resources of the particular country, and ironically, this study posit that the leaders of such countries are more concerned with the value of such natural resources. Thus in this regards, neglecting the social and environmental effects of natural recourses exploitation; at the heart of this is the issue of sustainable development. Nonetheless, this study concludes that "The relationship between business actions and social impacts must also be characterized. This includes identifying the critical variables, establishing the conditions under which the models are valid, and developing a process for weighting the indicators. Only through a better

understanding of the linkages between business and society can we make progress on the path to sustainability." Further, even within the business aspect, Labuschagne et al. (2005) argues that "incorporation of the objectives of sustainable development, namely social equity, economic efficiency and environmental performance, into a company's operational practices…Optimal decisions can only be made when the economic, social and environmental consequences are taken into consideration." As such, Krajnc and Glavič (2005) tried to develop a tool that may be used to understand the performance or adherence to the sustainability

In general the concept of sustainability in construction industry from the studies above signifies that the certain issues such as the ecological, social and economy of the society must be respected in order to fully harness the potentials of the concept.

2.5.2 Sustainability skills and knowledge in constructions

Hwang & Ng (2013) suggest that for every organization to remain in the competitive environment in the construction industry, its project managers must needs to have the skill and knowledge of developing ideas of sustainability that would go hand in gloves with project management. The study observed that the swift surge of technology necessitate, which raises concerns toward climate change has triggered concern on environmental protection globally. As such project managers with deficient knowledge of sustainability in their industry could inevitability be injurious to the overall concept of sustainability. The study

identified three approaches in a quest to address the issues. It suggest that it tends "to address the deficiency of knowledge of project managers in sustainability to identify the essential knowledge and skills required to be a competent project manager of green construction projects; to discover the challenges that project managers encounter in managing green Construction projects and determines critical knowledge areas and skills that can respond to the challenges; and finally, and to provide a comparison of critical knowledge areas and skills between traditional and green construction projects". The study identified some factors such as "higher costs for green construction practices and materials, Technical difficulty during the construction process, Lengthy approval process for new green technologies, and Unfamiliarity with green technologies" as the major challenges of implementing sustainability in construction project. The study concluded by suggesting that more knowledge is needed in the side of the project manager, noting that although the green technology is new, but is fast gaining recognition.

Edum-Fotwe and Price (2009) proposes a concept that will aid in understanding and articulating the issues of sustainability, the author suggest that "The proposed ontology can be combined with the environmental and economic aspects of projects to assist developers and others stakeholders gain a more comprehensive view of the sustainable issues that attend construction and urban developments." Characterizing the issue of sustainability in construction into social, economic and environmental construct will aid in the easy understanding of the concept of sustainability. The authors further propose that "this toolkit as a

comprehensive and transparent framework that encourages key decision-makers to systematically assess the sustainability of the urban environment by taking account of scale, life cycle, location, context and all stakeholder values."

Furthermore, Abidin (2010) tried to investigate the awareness and application of sustainable construction concept by Malaysian developers. The author believe that the Malaysian construction industry has "contributes to negative impacts upon the environment such as soil erosion and sedimentation, flash floods, destruction of vegetation and dust pollution, depletion of natural resources and the use of building materials harmful to human health." As such, investigating the grassroots might be the route to mitigating the problem. The developers in the construction industry in Malaysia in this regard are cardinal importance, because "for developers, their main personal value is that their projects must be commercially viable." Developers are very reluctant to embrace new way due lack of knowledge of what it entails to their business, the study finds out that "Overall, the respondents agreed that many developers are aware of sustainable construction, but implementation is a different matter. Many developers are not willing to push the boundary especially when it means they have to shift the conventional way of construction and venture into a new realm of technology which may incur more upfront costs." However, the study also found out that "Developers who have strong capital, good reputation, wide-range experience and expertise and whose targeting high income earners and foreign investors as potential buyers are interested in 'green' concepts as it is seen as better quality in design". Likewise, Zabihi et al. (2012) did a study on

sustainability assessment criteria for building systems in Iran. This study suggests that "applying sustainability assessment tool in building systems can be effective in optimized decision- making to use them." It is very essential to effectively input the concept of sustainability at the initial design process of a project. Thus, "good planning and decision making in application of any kind of construction systems, the assessment of construction systems provides optimized planning and decision making."

Applicability of the concept of sustainability in construction industry is always challenging, as those saddled with the responsibility are either less knowledgeable or not interested due to the financial implications. Opoku and Ahmed (2013 posits that "as a key sector in the delivery of a sustainable built environment, the construction industry needs to have a clear understanding of the sustainability concept in order to fully play such important role. However, intra-organizational leadership within construction organizations charged with the promotion of sustainability practices in the construction industry often describes the sustainability concept as an environmental issue only." This is often the key challenge in the industry, and particularly relating to implementation of sustainability, and the construction industry is very vital since the industry is interconnected with humanity in general, the study further suggest, "the construction industry has a major role to play towards the achievement of sustainable development, because the industry affects water, resources, land use, greenhouse gas emissions."

The literature indicates that knowledge about sustainability and its application in the construction industry is very significant, without which the whole idea would be abysmal in its application. As such, our study is significantly seeking to bridge the gap, particularly in a country like Nigeria where the economic potentials already exist.

2.5.3 The Nigerian Context

In the context of Africa, and particularly Sub-Saharan Africa, Ebohon and Rwelamila (2001) believes that "construction sector is very fragmented and underdeveloped, severely limiting it's potential to evolve into a functional industry (ILO, 1987). Aside from the highly fragmentary structure, the other most noticeable feature of sub-Saharan Africa's construction sector, which perhaps best explains its problems, is the lack of co-ordination in the industry." There have been acute deficiency on skilled professional that would champion the course of sustainable development in the region, and the dearth of indigenous professionals is detrimentally affecting the utilization and implementation of sustainable construction concept. Another aspect worsening the issue is "In the absence of domestic capacity to effect material supplies, the construction industry is forced to operate far below capacity each time the government suffers fluctuations in income. This helps perpetuate the informal approach to construction activities as seasonality of construction materials discourages long term strategic planning, which in turn hinders access to investment capital." Furthermore, the study suggest that implementing sustainable construction in sub-Saharan Africa will elicit more opportunities for the region, as "adopting a sustainable construction

process in sub-Saharan Africa, is its rapidly expanding population and the huge demands made on infrastructure. Given the limited resources in these countries and the constraints so placed on replicating infrastructure to areas of dis-amenities, possible savings through sustainable construction should facilitate further expansion in infrastructure and services. Similarly, the huge potential in employment opportunities associated with sustainable construction, provided sub-Saharan Africa is able to seize the initiative by better organizing and synchronizing its construction industry with the rest of the economy, affords social and economic sustainability."

The effort of researchers in educating and orienting stakeholders in the construction industry is gaining prominence. The study Egenti et al. (2014) of using compressed earth block for sustainable housing in Nigeria is a link to the sustainable construction. The study reveals that "the economy of the country, as most developing countries, is ailing with limited resources. Energy and infrastructures are inadequate, yet the use of cement dominated the construction industry. Earth construction is a sustainable option to housing with inherent characteristics that should be desirable in the ailing economy of hot tropical environment in Africa. However, most Nigerians are skeptical of taking a low cost option with less modern effects and uncertain durability. However, with more sensitization and improvement of the said technology, developers and contractor can fully embrace the sustainability concept in construction. Nonetheless, even with the absence of sustainable construction, the construction industry in Nigeria is chock-full with lack of professionalism, as Idoro, (2012) posits that "Nigeria is

bedeviled by numerous cases of building collapse and that the phenomenon is one of the major challenges facing the built environment in Nigeria. In the same vain, Nwokoro and Onukwube (2011) concisely reiterates the issues in the Nigeria construction industry, thus state that "construction is a major and primary sector of the Nigerian economy and its consideration of the issues of sustainability covers a huge spectrum of the sector. Thus, the role buildings play is fundamental to the realization of sustainable development. Public awareness of environmental issues has increased significantly in Nigeria. Property owners and clients are seeking commercial buildings that meet acceptable environmental and health levels. Unfortunately, there is lack of institutional structures promoting green buildings; awareness on the part of clients, tenants, professionals in the built environment and other stake holders; professional capacity to incorporate green building issues and opportunities and; financial resources to undertake green building construction and upgrades."

Furthermore, literature such as Otegbulu (2011) regarding the concept of sustainability in Nigeria has also highlighted the importance of inculcating sustainability in construction industry, particularly on the construction of homes and offices. Other studies such as Akanni, Oke, & Akpomiemie (2014) have illustrated the impact of environmental factors on building project performance in the country. Nonetheless there are also studies that specifically investigated green construction in the country. Anigbogu (2011) identified some significant factor that needs to be implemented for a successful green construction regime in Nigeria. It indicated that awareness, education and new environmental policies in

the context of green construction are really needed to aid the implementation of the concept. The study observe that though the Nigerian society have for long time used traditional and local materials in their construction due to the low economic cost, however with the rapid propagation of the concept of technology developers understood that those materials used in Nigeria are ecofriendly. Nonetheless, the study concludes that formal education in the context of sustainability needs to be aggressively championed within the construction industry stakeholders, as this would be helpful in the seamless implementation of green construction.

Babawale & Oyalowo (2011) investigated the perception of estate values in relation to sustainability. The study found out that although there "is already a growing awareness of the need to mainstream sustainability into real estate valuation practice though a respondent tended to define real estate sustainability in terms of its social, rather than economic or environmental features". This boils down to the understanding of the concept of sustainably in the industry general, as such awareness and education would eventually fill the gap.

Furthermore, Ogbazi (2013) argued that "conventional planning and management practices have proved ineffective in many cities of the global South. The challenges of the recent rate of urbanization are shown to have overwhelmed African cities' capacity to manage them using the inherited and unreformed planning system of the colonial era." And in the context of Nigeria, the author indicate that, "the unplanned rapid urban expansion of the past few decades in Nigeria pose sustainable development challenges evident in the proliferation of

slums, urban poverty, informality, unmet needs for infrastructure and basic services among others. As the rates of urbanization in Nigeria rose from 15 percent in 1950 to 43.3 percent in 2000 and projected to reach 60 percent by 2015."

There are several studies in relation to sustainability in construction industry in Nigeria as established from the above body of literature; however, our study seeks to investigate the knowledge of students which many studies have overlooked.

2.6 Literature Gap to Fill

There are researches that tried to comprehend and establish the growing interest of sustainability concept in construction industry across the globe. And other studies have also shown sustainability knowledge and skills of stakeholders and students in some particular countries. Nonetheless our research seeks to primarily investigate the awareness of sustainability concept within student of a higher learning institution in Nigeria. It is in this vain that this research seeks to investigate and add to the growing literatures on sustainability in the construction industry in relation to Nigeria, because the literature in this regard is minimal.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter crystalizes how the research was carried out; such as the research method used, place it was carried out, the population used, as well as the development of the instrument for data collection. A questionnaires survey was developed and data were collected from the stakeholders. Furthermore secondary sources of data in the form of news articles, journals and textbooks would also be incorporated in the research. Since it is a descriptive study, the mean have been used in presenting the statistical result from the questionnaires.

3.2 Quantitative Research

There are two types of research approaches, either quantitative or qualitative (Casley, Kumar, & Mundial, 1988). This study seeks to utilize the quantitative procedure. According to Muijs (2010) "quantitative research is essentially about collecting numerical data to explain a particular phenomenon." The descriptive approach was further used because, that type of "research is an effective way to obtain information used in devising hypotheses and proposing association" (Monsen and Van Horn, 2007), and descriptive research is normally done in order to describe the attitude or characteristic of a certain population (Guler, 2004). Consequently, since our studies are to explore the knowledge of students about sustainability, the descriptive approach was adapted.

3.3 Design of the Questionnaire.

The questionnaire was designed to explore the awareness of student in construction field in a polytechnic in Kaduna State about sustainability concept in construction. Nonetheless, a pilot study was conducted initially, As according to Van Teijlingen and Hundley (2010) pilot study is important because some of the "advantages of conducting a pilot study is that it might give advance warning about where the main research project could fail, where research protocols may not be followed, or whether proposed methods or instruments are inappropriate or too complicated". And Rattray and Jones (2007) also argue that "the questionnaire should be piloted on a smaller sample of intended respondents, but with a sample size sufficient to perform systematic appraisal of its performance." As such, the questionnaire was pre-tested with a small group of the students while some corrections were made by the supervisor. A final instrument was arrived at (see Appendix A).

3.4 Data Collection

Collection of data was by means of a structured questionnaire instrument. The questionnaires were handed out to the respondents to complete on their own and the researcher was available in case problems are encountered in order to explain to the respondents. The instruction sheet on how to complete the questionnaires was also given to the respondents. A total number of two hundred and thirty (230) questionnaires were distributed at random by the researcher to students of the construction industry field. Despite the time restraint and the unstable location of

students, 150 completed and returned the survey material. Furthermore, simple probability sampling was used whereby participants were randomly selected within the population of the study. The staff of the school was reluctant to give the researcher the number of the students due to internal politics of the school as well as decayed level of management of data. However, targets were identified with the help of other students. Incentives were given to respondents to encourage them in returning the survey, but respondents kept evading the researcher. As such only 150 were finally recorded.

3.5. Study Settings

The study was carried out in Polytechnic Kaduna; as such the students of the institution from some specific departments were selected to become the samples from the population. Polytechnic Kaduna has a long history of academic excellence participially when it comes to technical knowledge, in this case construction industry. As such it was suitable for our research, in order to explore the knowledge of students in constructions field, noting the importance of sustainability to Nigeria.

3.6 Data Analysis

In analyzing the finding based on the instrument (Appendix A), some statistical test were conducted based to the questions. Question 1 is a dichotomize variable. The statistical test chosen to determine if there were significant differences in awareness was the Fisher's Exact test. Initially, a Pearson Chi-Square Test was chosen but the expected frequency count was less than 5 for each categorical level

of education and course. Chi-Square compares the differences in the observed frequency counts to the expected frequency counts. The general rule for chi-square testing is the expected frequencies are 5 or more for all categories. The chi-square test statistic is approximated by the chi-square distribution. This approximation worsens with small expected frequencies. If the general rule is not met, the Fisher's Exact test should be used to test differences. For Q1, the rule was not met.

Question 2, 3, 4, and 5 were measured on a 5pt Likert Scale. Client initially asked to do an ANOVA, a parametric test. To determine if ANOVA was appropriate for this analysis, three assumptions had to be met. If one or more of the assumptions were not met, ANOVA should not be used.

Assumptions for ANOVA

1) Observations must be independent
2) The response variable is normally distributed
3) The variance of the response variable is the same for each population

The assumption of normality was tested using Shapiro-Wilk. Shapiro-Wilk test of normality was used to test the assumption that the Dependent variable was normally distributed for each categorical level of education and course. This assumption failed ($p<.05$). Since the assumption failed, non-parametric tests, Mann-Whitney U Test (2 sample test) and Kruskal-Wallis Test were chosen to test differences across educational levels and across courses respectively.

The Mann-Whitney U Test was used to compare the distribution of two independent samples. Kruskal-Wallis Test was used to compare the distribution of two or more independent samples.

CHAPTER 4

RESULTS

4.1 Introduction

Quantitative research findings can be presented in tables and graphs (Stokes, 2013), and as such our findings have been presented in the same manner. The research was able to collected data through questionnaire from 150 students of Polytechnic, Kaduna state Nigeria from the construction field, i.e. quantity survey, architecture, estate management, building engineering and urban and regional planning. As such the result has been presented, courses or level of education of the respondents have been used to compare and analyze the result.

4.2 Frequency

The frequency present the profile of responded data was collected from. This is presented here both in tabula form and graphs. The respondents are either from the National diploma level (ND) or Higher National Diploma level(HND) (see Table 4.1 and Figure 4.1), and they are also from different course within the construction field.

Table 4.1:Respondent Level of Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	HND	95	63.3	63.3	63.3
	OND/ND	55	36.7	36.7	100.0
	Total	150	100.0	100.0	

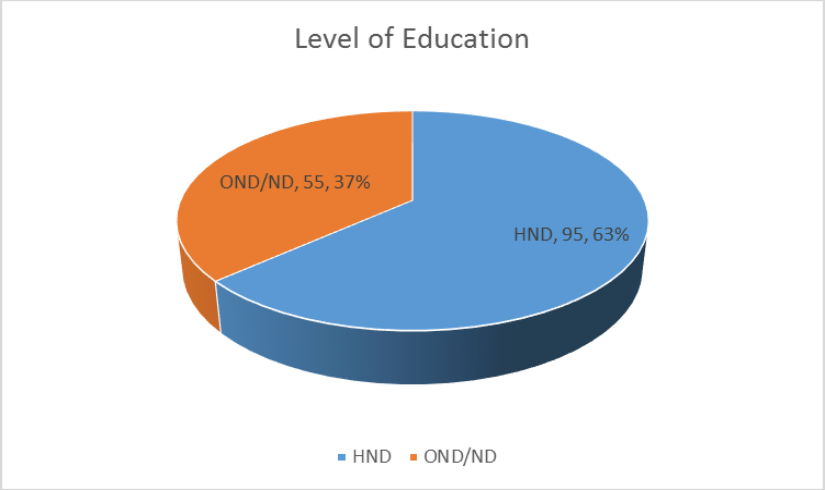


Figure 4.1: Respondents Level of Education

Of the 150 respondents, 63.3% (95) have a Higher National Diploma and 36.7% (55) have Ordinary National Diploma.

Table 4.2:Respondent By Courses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Architect	41	27.3	27.3	27.3
	Building Engineering	50	33.3	33.3	60.7
	Estate Management	15	10.0	10.0	70.7
	Quantity Survey	29	19.3	19.3	90.0
	Urban and Regional Planning	15	10.0	10.0	100.0
	Total	150	100.0	100.0	

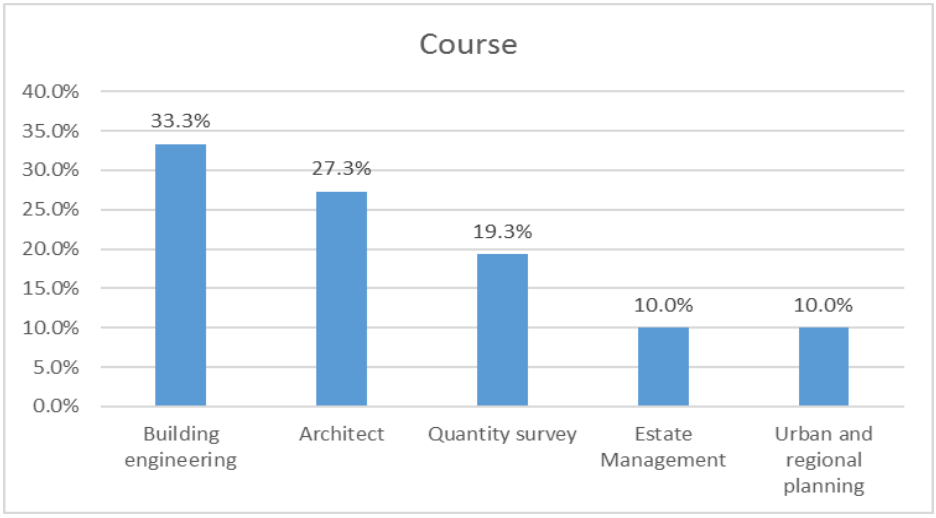


Figure 4.2: Respondents by Courses

4.3 Research Question 1: What is the understanding of sustainability notion in project management among students studying in the construction industry in Nigeria?

4.3.1 Statistical Test Chosen- Fisher's Exact Test for the first segment of the research question. Chi-Square Test was chosen originally, but the expected frequency count was less than 5 for each category. This is a general rule for chi-square testing. The chi-square test statistic is approximated by the chi-square distribution. This approximation worsens with small expected frequencies. As a general rule, the expected frequency count should be 5 or more for each category. This rule has been violated (see Table 4.3) Therefore, Fisher's exact test was used to determine significance.

4.3.2 Hypothesis No. 1a

- Ho: Awareness of sustainability issues in the construction industry and level of education are independent
- Ha: Awareness of sustainability issues in the construction industry and level of education are not independent

4.3.3 Hypothesis No. 1b

- Ho: Awareness of sustainability issues in the construction industry and course are independent
- Ha: Awareness of sustainability issues in the construction industry and course are not independent

4.3.4 Results

- There are significant differences in awareness of sustainability issues by level of education ($p < .05$). The level of awareness is significantly higher for HND.
- There are no significant differences in the awareness of sustainability issues in the constructions industry across courses (p value $> .05$).

Table 4.3:Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.986[a]	4	.137
Likelihood Ratio	9.090	4	.059
Linear-by-Linear Association	.083	1	.774
N of Valid Cases	150		

Table 4.4: Aware Of Sustainability By Level Of Education

		Level of education		Total
		HND	OND/ND	
Are you aware of sustainability issues in construction industry?	Yes	98.90%	78.20%	91.30%
	No	1.10%	21.80%	8.70%
Total		95	55	150
		100.00%	100.00%	100.00%

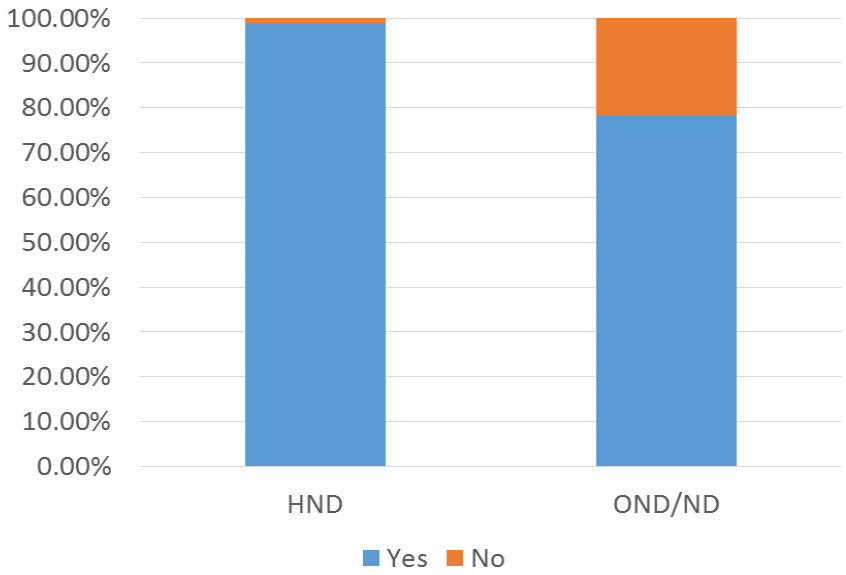


Figure 4.3: Awareness f Sustainability by Level of Education

Table 4.5: Awareness Of Sustainability by Courses

		Course					
		Architect	Building Engineering	Estate Management	Quantity Survey	Urban and Regional Planning	Total
Are you aware of sustainability issues in construction industry?	Yes	95.10%	88.00%	100.00%	82.80%	100.00%	91.30%
	No	4.90%	12.00%	0.00%	17.20%	0.00%	8.70%
Total		41 100.00%	50 100.00%	15 100.00%	29 100.00%	15 100.00%	150 100.00%

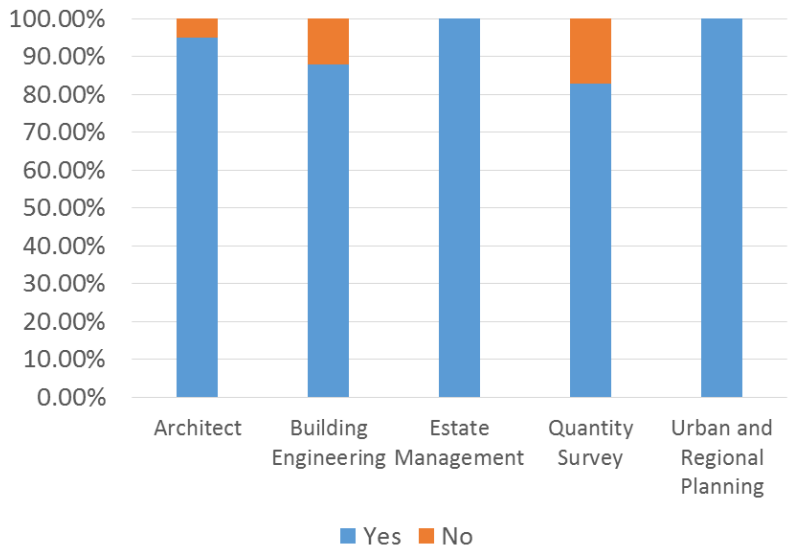


Figure 4.4: Awareness of Sustainability by Courses

There are no significant differences across courses (p= >.05)

4.3.5 Understanding of Sustainability across Different Levels of Education and Course

Furthermore, in the second segment of answering research question one, a Statistical Test Chosen, and Mann-Whitney U Test for was used. The Mann Whitney U Test, a non-parametric, was used to compare the distribution of two independent samples when the normality assumption failed.

4.3.6 Hypothesis No 2a

- Ho The level of understanding of sustainability is the same across different courses
- Ha: The level of understanding of sustainability is not the same across different courses

4.3.7 Hypothesis No 2b

- Ho The level of understanding of sustainability is the same across different levels of education
- Ha: The level of understanding of sustainability is not the same across different levels of education

4.3.8 Results

- There is no significant difference by level of education ($p > .05$)
- There are significant differences by course ($p = .001$). Mean Scores ranged from 1.20 to 2.34. The level of understanding is significantly higher for Urban and Regional Planning course.

Table 4.6: How Well Have You Received Information By Level Of Education

	HND	OND/ND	Mann-Whitney U Test
How well have you received information on sustainability in construction industry during your course?	1.86	2.29	0.053

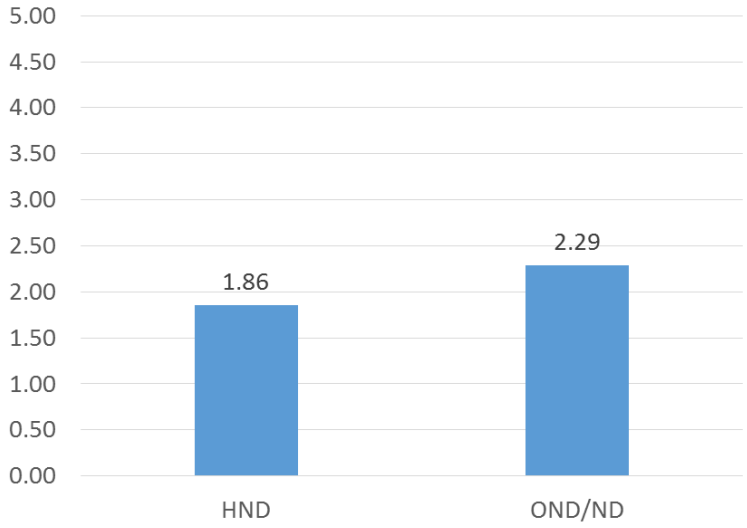


Figure 4.5: How Well Have You Received Information by Level of Education

Table 4.7: How Well Have You Received Information By Courses

	Architect	Building Engineering	Estate Management	Quantity Survey	Urban and Regional Planning	Kruskal-Wallis Test
How well have you received information on sustainability in construction industry during your course?	1.95	2.06	2.27	2.34	1.20	0.001

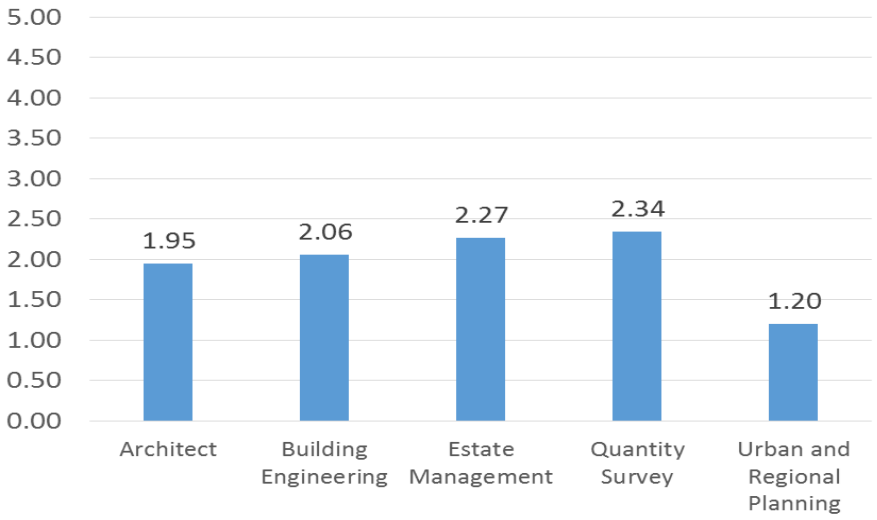


Figure 4.6 How Well Have You Received Information By Courses

4.4 Research Question 2: Do they consider the sustainability notion is applicable in the Nigerian construction project?

On average, respondents agree that the sustainability notion is applicable in the construction project. For Architect, there were two questions where the response on average was undecided. Statistical Test Chosen – Mann-Whitney U Test for 2 sample test (level of education) and Kruskal-Wallis for more than 2 sample test (by level of Courses). These non-parametric tests were chosen because the normality assumption failed (see appendix A Normality test.)

4.4.1 Hypothesis No 3a

- Ho: The level of agreement is the same across different courses
- Ha: The level of agreement is not the same across different courses

4.4.2 Hypothesis No 3b

- Ho: The level of agreement is the same across different levels of education
- Ha: The level of agreement is the same across different levels of education

4.4.3 Results

- The Mann-Whitney U test showed no significant differences by level of education (p >.05)
- The Kruskal-Wallis test showed significant differences in the following:
    - Belief that use of products and material than can be recycled or are biodegradable is applicable(p =.004),
    - Belief that Use of locally manufactured material is applicable (p=0.015),
    - Belief that Design to attract investors is applicable (p =0.028),
    - Belief that Analyze building density in the area is applicable (p=0.043)

Table 4.8: Belief in the Applicability in the Nigeria by Level of Education

	HND			OND/ND			Mann-Whitney U Test
	Mean	Std. Deviation	N	Mean	Std. Deviation	N	Sig.
Belief that Develop on environmentally appropriate area is applicable	1.75	.699	95	1.56	.714	55	0.075
Belief that Maintain biodiversity and ecology of the site is applicable	1.96	.728	95	1.78	.567	55	0.166
Belief that Conserve building water and cooling power consumption is applicable	2.59	1.096	95	2.80	1.161	55	0.246

Belief that Use energy source with low environmental effects is applicable	2.00	.851	95	1.85	.780	55	0.310
Belief that Provide clean and healthy environment is applicable	1.92	.942	95	1.98	.913	55	0.537
Belief that Use products and material than can be recycled or are biodegradable is applicable	2.66	1.182	95	2.75	1.265	55	0.788
Belief that Use materials from recycled sources is applicable	2.20	1.068	95	2.04	1.088	55	0.287
Belief that Use locally manufactured material is applicable	2.18	.899	95	2.44	.996	55	0.103
Belief that Use durable material is applicable	2.25	1.130	95	2.40	1.065	55	0.346
Belief that Implement cost effective measures is applicable	2.19	.992	95	2.25	1.058	55	0.767
Belief that Design to attract investors is applicable	2.20	1.088	95	2.45	1.152	55	0.180
Belief that Design for less material usage is applicable	2.14	.918	95	2.31	1.034	55	0.380
Belief that Respect people and local environment is applicable	2.34	1.006	95	2.15	.970	55	0.252
Belief that Consider occupant health and safety is applicable	2.26	.948	95	2.42	1.150	55	0.628
Belief that Consider quality of life of the occupant is applicable	2.40	1.124	95	2.40	1.099	55	0.889
Belief that Analyze building density in the area is applicable	2.05	1.025	95	2.16	.918	55	0.337
Belief that Minimize pollution is applicable	2.56	1.079	95	2.82	1.172	55	0.171

On average, respondents agree that the sustainability notion is applicable in the construction industry in Nigeria project. However, there is no significant difference by level of education (p >.05)

Table 4.9: Belief in the Applicability in the Nigeria Respondent by Courses

	Architect	Building Engineering	Estate Management	Quantity Survey	Urban and Regional Planning	Kruskal-Wallis Test
	Mean	Mean	Mean	Mean	Mean	Sig.
Belief that Develop on environmentally appropriate area is applicable	1.80	1.58	1.80	1.66	1.60	0.632
Belief that Maintain biodiversity and ecology of the site is applicable	1.88	1.92	1.67	1.86	2.13	0.397
Belief that Conserve building water and cooling power consumption is applicable	2.78	2.86	2.40	2.34	2.60	0.240
Belief that Use energy source with low environmental effects is applicable	1.90	2.00	1.93	1.97	1.87	0.977
Belief that Provide clean and healthy environment is applicable	1.90	2.02	1.73	2.10	1.67	0.709
Belief that Use products and material than can be recycled or are biodegradable is applicable*	3.24	2.50	2.40	2.28	2.93	0.004

Belief that Use materials from recycled sources is applicable	1.95	2.30	1.93	2.45	1.73	0.117
Belief that Use locally manufactured material is applicable*	2.34	2.48	1.60	2.24	2.13	0.015
Belief that Use durable material is applicable	2.37	2.46	2.53	1.97	2.07	0.264
Belief that Implement cost effective measures is applicable	2.17	2.16	2.67	2.17	2.13	0.473
Belief that Design to attract investors is applicable*	2.34	2.14	3.13	2.28	1.87	0.028
Belief that Design for less material usage is applicable	2.27	2.18	2.33	2.17	2.00	0.813
Belief that Respect people and local environment is applicable	2.22	2.24	2.53	2.17	2.40	0.684
Belief that Consider occupant health and safety is applicable	2.46	2.26	2.53	2.10	2.33	0.396
Belief that Consider quality of life of the occupant is applicable	2.15	2.58	2.27	2.66	2.13	0.242
Belief that Analyze building density in the area is applicable*	2.22	2.20	1.47	1.97	2.27	0.043
Belief that Minimize pollution is applicable	3.00	2.48	2.67	2.45	2.67	0.178

The Kruskal-Wallis, a non-parametric test, was used to test if there are significant differences across different courses. This test was chosen because the assumption of normality was not met. The test showed significant differences in the "Belief that Use of products and material than can be recycled or are biodegradable is applicable (p =.004)", "Belief that Use of locally manufactured material is applicable (p=0.015)", "Belief that Design to attract investors is applicable (p =0.028)", and "Belief that Analyze building density in the area is applicable (p=0.043)" across different courses.

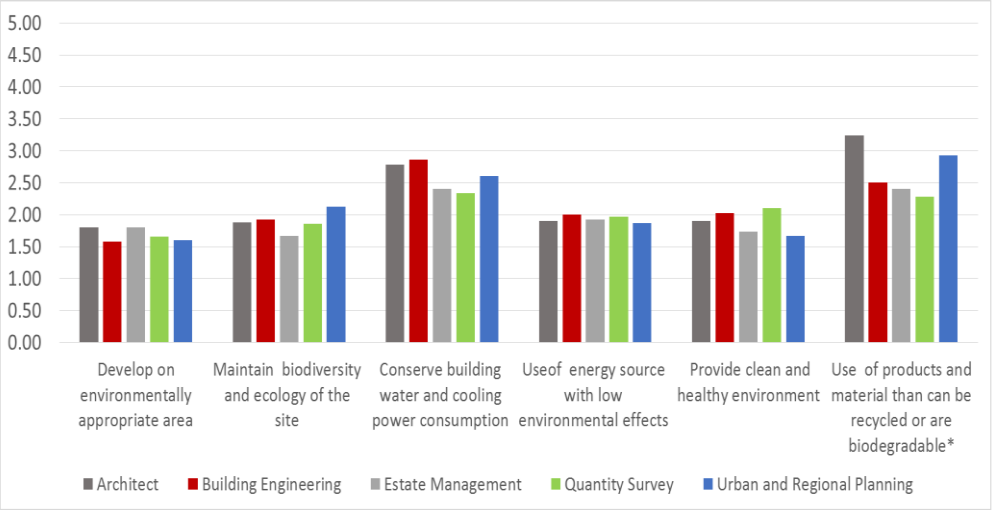


Figure: 4.7. Environmental Aspects: Mean Scores by Courses for Research question No. 2

In figure 4.7 which is the Environmental aspects by courses, Architecture respondents have the highest mean score of over 3.24 point in the aspect of the use of products and materials that can be recycled or biodegradable, while respondents from quantity survey field scored the lowest at 2.28 points in the

same aspect. Ironically, Architecture respondents scored 1.90 in the aspect of use of energy source with low environmental effects, while respondents from quantity survey field scored 1.97 points in the same aspect. Meaning the quantity survey field mean is higher than the Architecture respondents in this aspect.

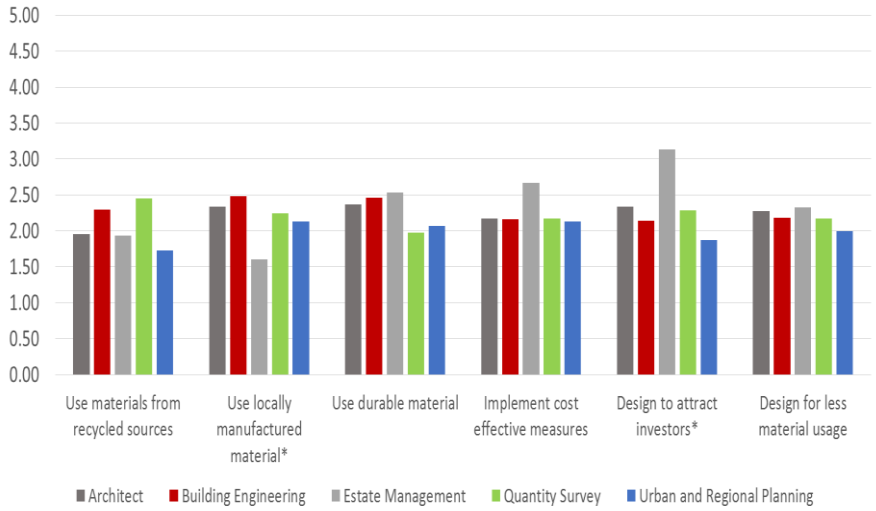


Figure 4.8 Economic Aspects: Mean Scores by Courses for Research question No. 2

In figure 4.8 which is the economic aspects by courses, Estate Management respondents have the highest mean score of 3.13 point in the issue of "design to attract investor", while respondents from Urban and regional planning got the mean score of 1.87. However, in the use of "locally manufactured material" the respondent from Urban and regional planning got 2.13, while Estate Management respondents got 1.60 mean score.

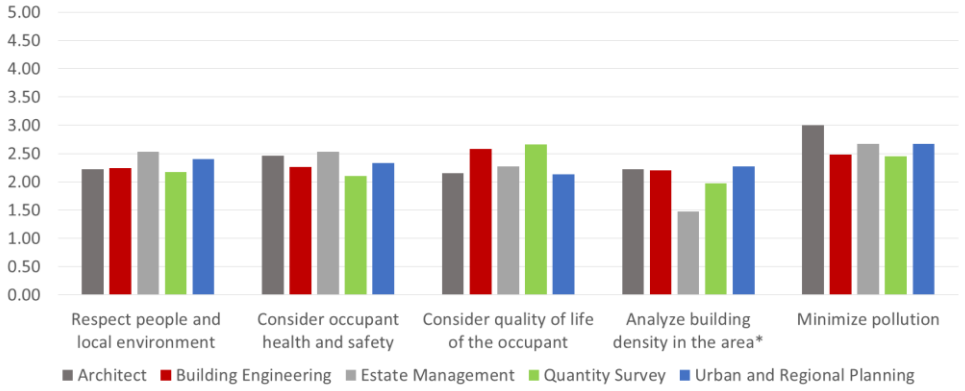


Figure 4.9: Social Aspects: Mean Scores by Courses for Research question No. 2

In figure 4.9 which is the social aspects by courses, respondents from architecture got the highest mean score of 3.00 in the issue of "minimizing pollution", while respondent from quantity survey got the lowest mean score of 2.45. However, in the issue of the "quality of life of the occupant", the respondent from quantity survey got a mean score of 2.66, while respondent from architecture got 2.15 mean score.

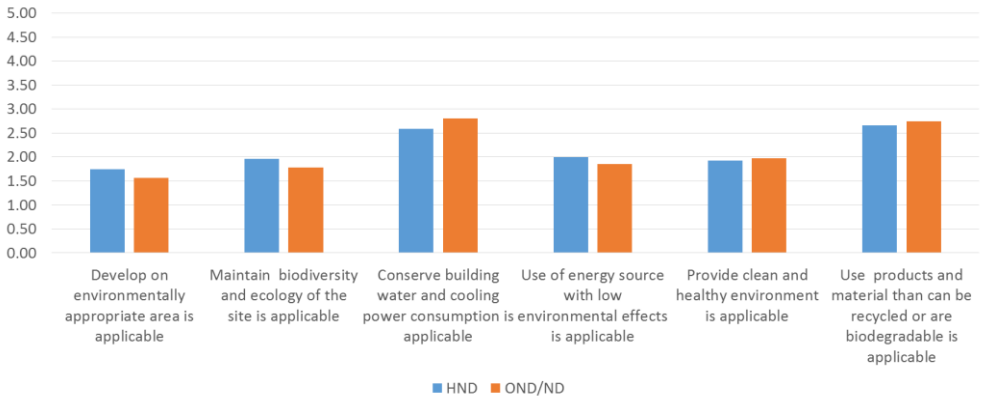


Figure 4.10: Environmental Aspects: Mean Scores by level of education for Research Question No. 2

In figure 4.10 which is the environmental aspects by level of education, respondents from the ND on the issue of "conserve building water and cooling power consumption" got the highest mean score of 2.80, while respondents from HND got the mean score of 2.59. In the same aspect, the respondents from HND got the mean score of 1.96 in the issue of "Maintain biodiversity and ecology of the site", but the respondents from the ND on the same issue got a mean score of 1.78. However, on the issue of "use products and material than can be recycled or are biodegradable", the mean score of both levels are almost similar, the HND got 2.66, while the ND got 2.75 mean score.

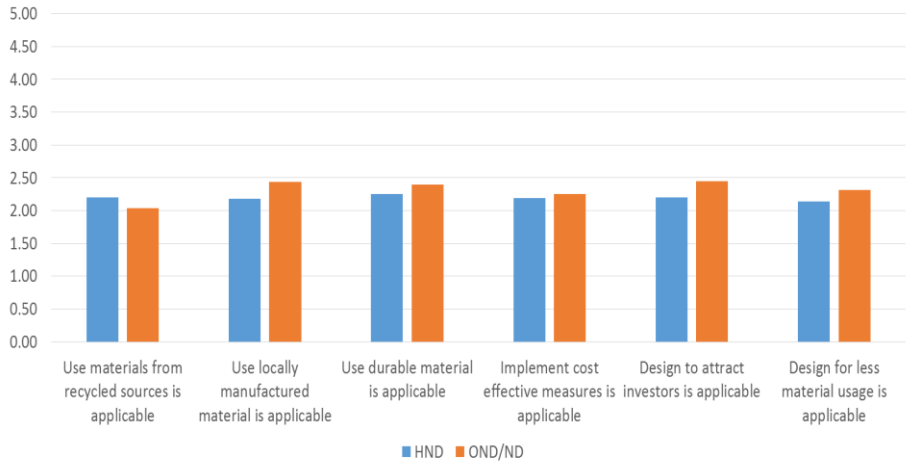


Figure 4.11: Economic Aspects: Mean Scores by level of education for Research question No. 2

In figure 4.11 which is the economic aspects by level of education, the ND respondent got 2.44 in the issue of "Use locally manufactured material", while the respondents from HND got a mean score of 2.18 in the same issue. But in the issue of the "use materials from recycled sources" the respondents from HND got

a mean score of 2.20, while respondents from ND got 2.04 mean score in the same issue.

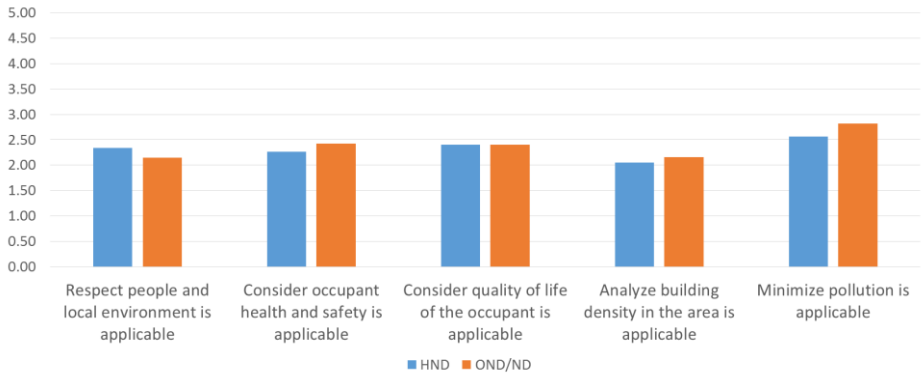


Figure 4.12: Social Aspects: Mean Scores by level of education for Research question No.2

In figure 4.12 which is the Social aspects by level of education, respondents from the HND got a mean score of 2.34 in the issue of "Respect people and local environment", while respondents from ND got mean score of 2.15 in the same issue. Nonetheless, in the issue of "Consider quality of life of the occupant" respondents from both HND and ND got a mean score of 2.40

4.5. Research Question 3: To what extent do they hope to integrate the sustainability notion to projects after graduation?

4.5.1 Statistical Test Chosen - Mann-Whitney U Test for 2 sample test (for level of education) and Kruskal-Wallis for more than 2 sample test (for Courses). These non-parametric tests were chosen because the normality assumption failed (see Appendix B Normality Test)

4.5.2 Hypothesis No. 4a

- Ho: The distribution is the same across different courses
- Ha: The distribution is not the same across different courses

4.5.3 Hypothesis No. 4b

- Ho: The distribution is the same across different levels of education
- Ha: The distribution is not the same across different levels of education

4.5.4 Results

- The Mann-Whitney U test showed no significant differences by level of education (p >.05)
- The Kruskal-Wallis test showed significant differences in the following:
    - Integration of maintain biodiversity and ecology of the site (p =.0.018),
    - Integration of use durable material (p=0.006),
    - Integration of respect people and local environment (p =0.032),
    - Integration of minimize pollution (p=0.046)

On average, respondents are very probable of integrating the sustainability notion to projects after graduation. There is no significant difference by level of education (p >.05)

Table 4.10: Integrating the Sustainability by Level of Education

	HND			OND/ND			Mann-Whitney U Test
	Mean	Std. Deviation	N	Mean	Std. Deviation	N	Sig.
Integration of Develop on environmentally appropriate area	2.28	1.007	95	2.40	1.065	55	0.566
Integration of Maintain biodiversity and ecology of the site	2.04	.978	95	2.04	.769	55	0.686
Integration of Conserve building water and cooling power consumption	2.46	1.128	95	2.35	1.109	55	0.521
Integration of Use energy source with low environmental effects	2.13	.789	95	2.07	.716	55	0.791
Integration of Provide clean and healthy environment	1.94	.741	95	1.89	.737	55	0.617
Integration of Use products and material than can be recycled or are biodegradable	2.38	.970	95	2.44	1.067	55	0.906
Integration of Use materials from recycled sources	1.85	.812	95	1.87	.944	55	0.837
Integration of Use locally manufactured material	2.19	.982	95	2.04	.881	55	0.430
Integration of Use durable material	2.15	.771	95	2.25	.775	55	0.428
Integration of Implement cost effective measures	2.64	1.100	95	2.38	.933	55	0.206
Integration of Design to attract investors	2.12	.810	95	1.87	.795	55	0.085
Integration of Design for less material usage	2.15	1.010	95	2.15	.891	55	0.858
Integration of Respect people and local environment	2.06	1.029	95	1.98	.850	55	0.915
Integration of Consider occupant health and safety	1.91	.813	95	1.89	.762	55	0.891
Integration of Consider quality of life of the occupant	2.28	.895	95	2.04	.769	55	0.132
Integration of Analyze building density in the area	2.20	1.048	95	2.38	.972	55	0.159
Integration of Minimize pollution	2.21	.837	95	2.24	.922	55	0.917

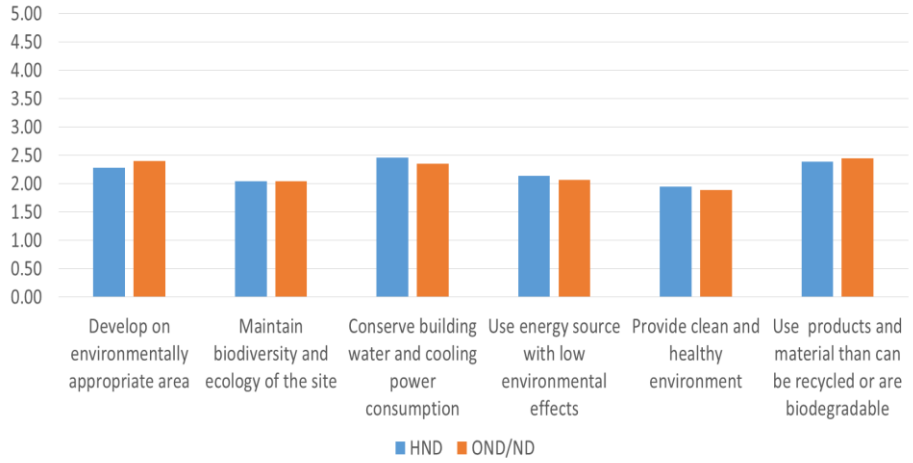


Figure 4.13: Environmental Aspects: Mean Scores By Level Of Education For Research Question No. 3

In Figure 4.13 which is the environmental aspects by level of education, respondent from both HND and ND got a mean score of 2.04 on the issue of "Maintain biodiversity and ecology of the site." Likewise in the issue of "Provide clean and healthy environment", the score are similar, the HND got 1.94, while the ND got 1.89 mean score. The mean score on environmental aspects by level of education are all similar without much difference on the mean score in all issues.

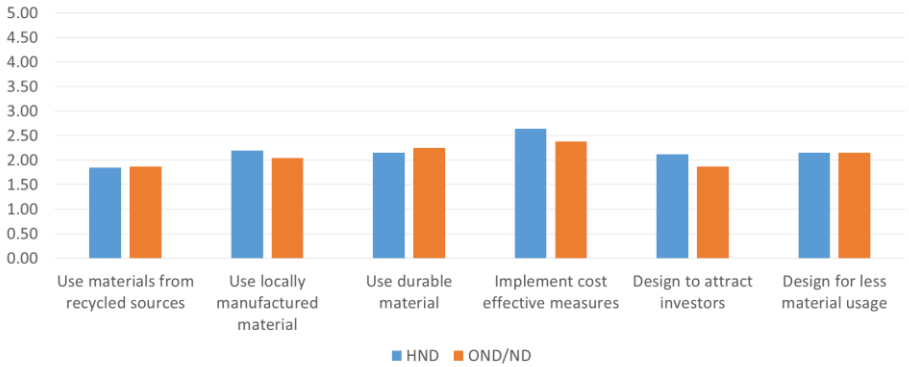


Figure: 4.14: Economic Aspects: Mean Scores by Level of Education for Research Question No.3

In figure 4.14 which is the economic aspects by level of education, the respondents from HND got a mean score of 2.64 on the issue of "Implement cost effective measures", while respondents from ND got a mean score of 2.38 on the same issue. However, in the issue of "Design for less material usage" both the HND and ND got 2.15 mean score. There is a little difference in the issue of "Use materials from recycled sources" as the HND got a mean score of 1.85, while the ND got 1.87 on the same issue.

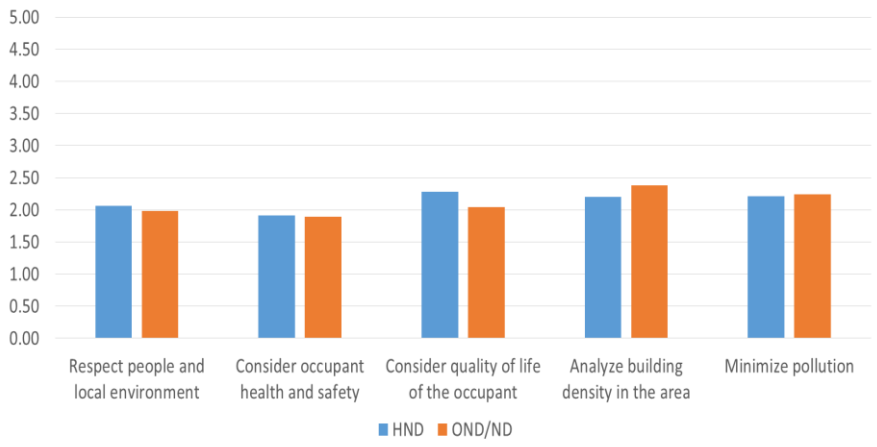


Figure 4.15: Social Aspects: Mean Scores by Level of Education for Research Question No. 3

In figure 4.15: which are the social aspects by level of education, the HND got a mean score of 2.28 in the issue of "Consider quality of life of the occupant", while respondents from the ND got a mean score of 2.04 in the same issue. On the issue of "Consider occupant health and safety", the HND got a mean score of 1.91, while the respondents from ND got a mean score of 1.89. Similarly, on the

issue of "Respect people and local environment", the HND got a mean score of 2.06, while the respondents from ND got a mean score of 1.98.

Generally, analyzing the aspects of environment, economic and social in the context of integrating the sustainability notion to projects after graduation by respondents using their level of education, on average, respondents are very probable of integrating the sustainability notion to projects after graduation. Hence, there is no significant differences by level of education (p= >.05)

Table 4.11: Integrating The Sustainability By Courses

	Architect	Building Engineering	Estate Management	Quantity Survey	Urban and Regional Planning	Kruskal-Wallis Test
	Mean	Mean	Mean	Mean	Mean	Sig.
Integration of Develop on environmentally appropriate area	2.05	2.36	2.73	2.59	2.07	0.160
Integration of Maintain biodiversity and ecology of the site*	2.12	1.92	2.80	1.90	1.73	0.018
Integration of Conserve building water and cooling power consumption	2.61	2.36	1.87	2.66	2.20	0.121
Integration of Use energy source with low environmental effects	2.27	2.18	1.93	1.86	2.07	0.199
Integration of Provide clean and healthy environment	1.85	1.90	1.80	1.90	2.33	0.155
Integration of Use products and material than can be recycled or are biodegradable	2.49	2.12	3.00	2.59	2.13	0.057

Integration of Use materials from recycled sources	1.63	1.82	2.40	2.00	1.80	0.054
Integration of Use locally manufactured material	2.00	2.18	2.40	1.97	2.40	0.254
Integration of Use durable material*	2.02	2.10	1.87	2.62	2.40	0.006
Integration of Implement cost effective measures	2.44	2.26	2.93	2.83	2.87	0.074
Integration of Design to attract investors	2.05	2.00	1.93	1.97	2.27	0.728
Integration of Design for less material usage	2.07	1.90	2.27	2.45	2.47	0.268
Integration of Respect people and local environment*	2.10	2.06	2.67	1.69	1.80	0.032
Integration of Consider occupant health and safety	1.95	1.98	1.40	1.86	2.07	0.116
Integration of Consider quality of life of the occupant	2.07	2.22	2.33	2.28	2.13	0.748
Integration of Analyze building density in the area	2.17	2.60	2.07	2.00	2.13	0.147
Integration of Minimize pollution*	2.20	2.48	2.20	1.86	2.13	0.046

The Kruskal-Wallis, a non-parametric test, was used to test if significant differences across different courses. This test was chosen because the assumption of normality was not met. The test showed significant differences in the "integration of, maintain biodiversity and ecology of the site (p =.0.018)", "integration of use durable material (p=0.006)", "integration of respect people and

local environment (p =0.032)", and "Integration of minimize pollution (p=0.046)" across different courses.

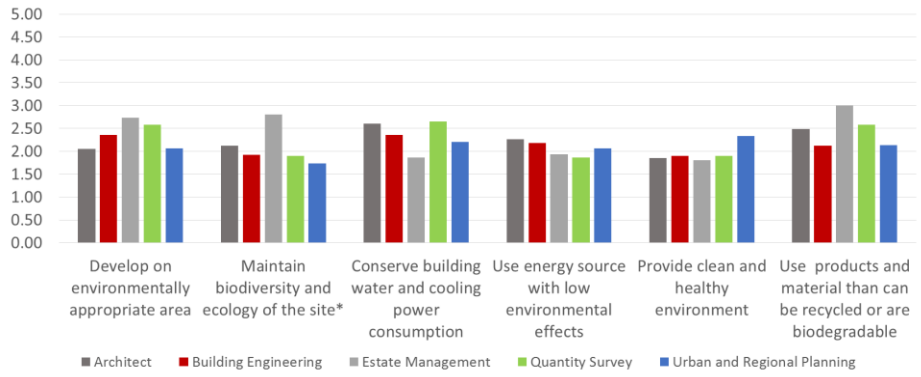


Figure 4.16: Environmental Aspects: Mean Scores For Research Question No. 3 By Courses.

In figure 4.16 which is the environmental aspects by courses, respondents from Estate management scored the highest mean score in the issues of "Develop on environmentally appropriate area" with a mean score of 2.73, in the issue of "Maintain biodiversity and ecology of the site" with a mean score of 2.80, and the issue of "use products and material than can be recycled or are biodegradable" with a mean score of 3.00. However, in the issues of "Conserve building water and cooling power consumption" respondents from Estate management scored the lowest mean with 1.87, and also in the issue of "Provide clean and healthy environment" with a mean score of 1.80.

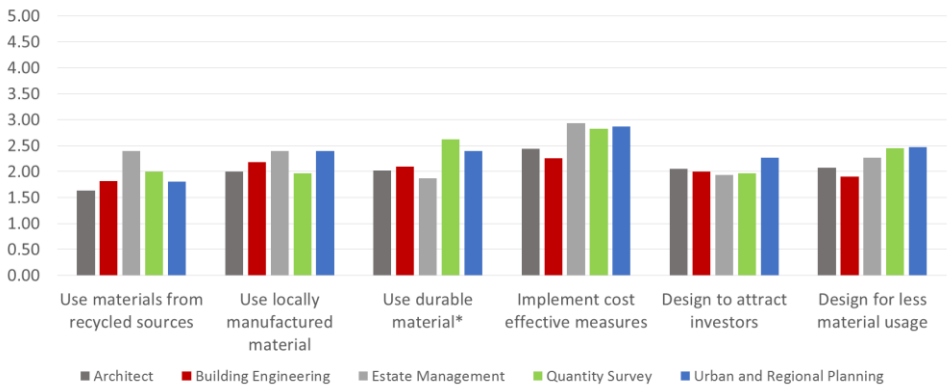


Figure 4.17: Economic Aspects: Mean Scores For Research Question No. 3 By Courses.

In figure 4.17 which if the economic aspects by courses, the respondents from quantity Survey got the highest mean score of 2.62 on the issue of "Use durable material", while respondents from Estate management got the lowest mean score of 1.87 on the same issue. While on the issue of "Implement cost effective measures," Estate management respondents got the highest mean score of 2.93, and respondents from Building engineering got the lowest mean score of 2.26 on the same issue.

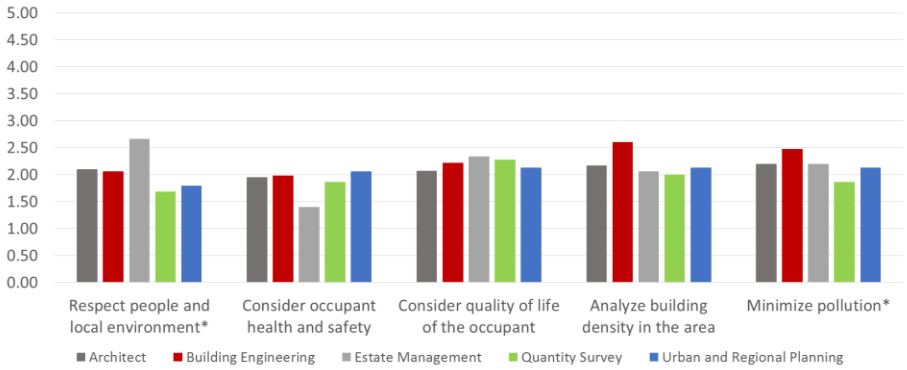


Figure 4.18: Social Aspects: Mean Scores For Research Question No3 By Courses.

In figure 4.18 which are the social aspects by courses, respondents from Building engineering got the highest mean score of 2.60 in the issue of "analyze building density in the area," while respondents from quantity survey got the lowest mean score of 2.00. On the issue of "Consider quality of life of the occupant" the respondent across the courses were almost equal in their response, the highest is estate management respondents with 2.33, while the lowest is 2.07 from the Architects.

CHAPTER 5

DISCUSSION

5.1 Introduction

One of the cardinal objectives of a research is to present a worthwhile result/findings connected to the questions raise at the initial stage of the research planning. This chapter explains the findings of this research, the findings of our research as it reflect the objectives of the study. The findings are presented in 3 sections. The first Section 1 deals with the demography of the respondents, Section 2 is meant to have a direct answer on the students' knowledge about the concept of sustainability, and this question was designed using the Yes or No response types leaving the respondent to either one of the options. In section 3, several questions were asked from the themes of Economy, Social and Environmental factors of sustainability. As such students were asked how improving sustainability in the construction industry, its applicability to the Nigerian Construction Industry and how could they integrate the items in their projects after graduation, noting the Economy, Social and Environmental themes. The students are grouped into the level of their education, Higher National Diploma (HND) and National Diploma (ND). The HND students are in their third and fourth year of study, while the ND students are in their first or second year of study. These students are from across disciplines within the construction industry (see section 5.2); as such there are variances in their response regarding the

questions. Furthermore, the Mean ratings of respondents have been properly presented in chapter 4 of this research.

5.2 Section I - Demography

Demographic information in research is important, as often this influences the perception of individual in a context of a study. See figure 5.1 and 5.2 about the demographics of respondents used.

Figure 5.1 Respondents by Courses

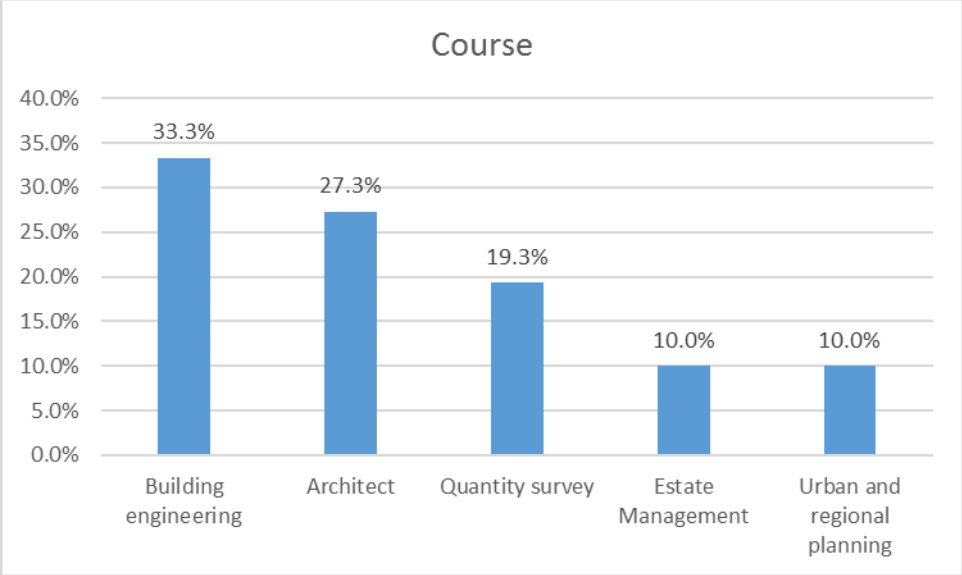
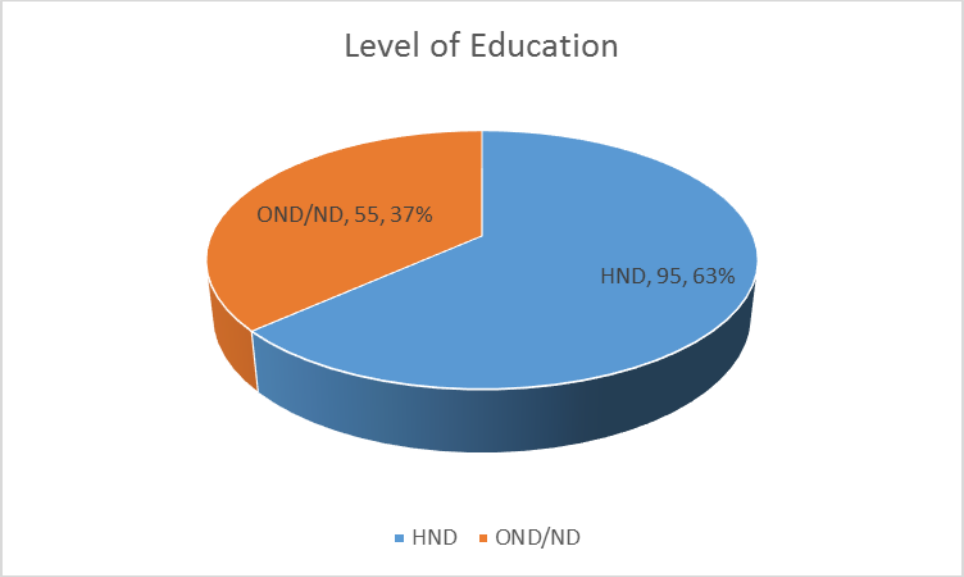


Figure 5.2 Respondents level of Education



5.3 Research question 1: What is the understanding of sustainability notion among students studying in the construction industry in Nigeria**?**

This question came in two segments, the first asked how students are aware of sustainability issues in construction industry, and it was designed using the Yes or No response types leaving the respondent to either one of the options. It was revealed that, 98.90% of respondents from the HND fell under the Yes option and 1.10% was on No option (see Table 4.4).While 78.20% of respondent from ND answered YES and 21.80% said NO. Therefore, there are significant differences in awareness of sustainability issues by level of education ($p<.05$). The level of awareness is significantly higher for the HND, this shows that student at this level are acquainted with the issues of sustainability in construction industry. The

awareness of the HND respondents has to basically do with their period of stay in school; they are more experienced and knowledgeable with the notion of sustainability. Furthermore, in the realm of awareness by courses, there are no significant differences, because it is only students from quantity Survey field that scored 82.80% which is the lowest (see table 4.5).

Furthermore, in the second segment of this section, another question was asked in order to amplify the first question. Students were asked their understanding of the concept of sustainability notion from the information they received in their study. In this respect, the result indicates that there is no significant differences by level of education ($p>.05$). When the Mann-Whitney U Test was used, it indicates that students from the HND scored 1.86 while the ND students scored 2.29. However, there are significant differences by courses in this regards. As the mean scores ranged from 1.20 to 2.34 and it showed that the level of understanding is significantly higher for student in the quantity survey course (see table 4.7). Nonetheless, this is not surprising, because, in recent years there have been concerted effort by the Nigerian government as well as Non-governmental organization in putting Nigeria within comity of nations buying to the idea of sustainability. For instance, a report by the (CREDC, 2007) suggest that "the specific objectives to create awareness on renewable energy and energy efficiency in Nigeria; and to develop policies and enhance civil society participation in the development of these policies to foster the development." As such students in the construction field seems to be gaining and learning about the concept of sustainability in the industry, importantly to note is the fact that the

institution the study was carried out is a technical polytechnic that has been saddled with the responsibility of impacting scientific and technical knowledge.

5.4. Research question 2: Do you consider sustainability notion is applicable in the Nigeria construction projects?

The responses from respondents (students) revealed a general acceptance on the applicability of the notion of sustainability in the Nigerian construction projects. However, using the Mann-Whitney U Test, it indicates that there is no significant differences by level of Education ($p>.05$), nonetheless, the Kruskal-Wallis test showed that there is significant differences in the aspect of the use of products and material that can be recycled or are biodegradable($p=004$), respondents from Architect got the Mean score of 3.24, from Building Engineering got 2.50, from Estate Management got 2.40, Quantity Survey got 2.28 and Urban and Regional Planning scored 2.93. Equally in the aspect of use of locally manufactured material ($p=0.015$), Architect got the Mean score of 2.34, from Building Engineering got 2.48, from Estate Management got 1.60, Quantity Survey got 2.24 and Urban and Regional Planning scored 2.13. Similarly, regarding the design to attract investors which has($p=0.028$), Architect got the Mean score of 2.34, Building Engineering got 2.14, Estate Management scored 3.13, Quantity Survey got 2.28 and Urban and Regional Planning scored 1.87. Additionally, in the aspect of analyzing building density in areas ($p=0.043$). The Architects got the Mean score of 2.22, the Building Engineering respondents got 2.20, from Estate Management got 1.47, Quantity Survey respondents got 1.97, while respondents from the Urban and Regional Planning course scored 2.27.

The significant differences were recorded in some aspects across the courses of the respondents. There are significant differences in the "Belief that Use of products and material than can be recycled or are biodegradable is applicable (p =.004)", "Belief that Use of locally manufactured material is applicable (p=0.015)", "Belief that Design to attract investors is applicable (p =0.028)", and "Belief that Analyze building density in the area is applicable (p=0.043)" across different courses (see Table 4.9)

In the aspect of use of products and material that can be recycled or are biodegradable and the aspect of use of locally manufactured material, this findings is important, because it is for obvious reasons, Nigeria heavily relies on the importation of building materials. This also reflects the report in the oxford business group journal, in one of the interviews, the respondents posit that "Nigeria suffers from of the highest construction cost in the world…need to import a high percentage of quality building material…a lack of skilled professionals(Lambert, 2013)."

5.5 Research question 3: To what extent do they hope to integrate the sustainability notion to projects after graduation?

The findings show an overwhelming acceptance by respondents that they are very probable of integrating the sustainability notion to projects after graduation. But there is no significant difference by level of education (p >.05) This suggest that, with the right empowerment and resource availability, students hope to inculcate their learning, particularly as regards to sustainability in the future jobs and

projects after graduation. The Mann-Whitney U test showed no significant differences by level of education (p >.05).

However, the Kruskal-Wallis test showed significant differences as regards the respondents' courses. In respect to the maintain of biodiversity and ecology of the site (p =.0.018), the Architects respondents got the Mean score of 2.12, the Building Engineering respondents got 1.92, and the Estate Management respondent got 2.80, the Quantity Survey respondents got 1.90, while respondents from the Urban and Regional Planning course scored 1.73. As well, regarding the issue of the use of durable material (p=0.006), The Architects got the Mean score of 2.02, the Building Engineering respondents got 2.10, from Estate Management got 1.87, Quantity Survey respondents got 262, while respondents from the Urban and Regional Planning course scored 2.40. Similarly, the issue of respect for people and local environment (p =0.032), the Architects got the Mean score of 2.10, the Building Engineering respondents got 2.06, from Estate Management got 2.67, Quantity Survey respondents got 1.69, while respondents from the Urban and Regional Planning course scored 1.80. Lastly, on the issue to minimize pollution (p=0.046), the Architects got the Mean score of 2.20, the Building Engineering respondents got 2.48, Estate Management respondents got 2.20, Quantity Survey respondents got 1.86, while respondents from the Urban and Regional Planning course scored 2.13.

The content and curriculum of the respondent's courses shaped their thinking of integrating sustainability. Respondents from Architect and building

engineering seems to have an upper hand, as such the envisage integrating sustainability as a cardinal point.

CHAPTER 6

CONCLUSION

6.1 Introduction

This research was to investigation the awareness of sustainability concept of Nigerian Students in the construction field. Sustainability in construction industry is a concept that is gaining popularity amongst practitioners across the globe, and this is apparently because of the importance it hold for our living and the universe at large. The Lafarge Holcim Foundation observe that "the concept of sustainability embraces the preservation of the environment as well as critical development-related issues such as the efficient use of resources, continual social progress, stable economic growth, and the eradication of poverty."As such in the Nigeria context, a developing country with over 170 million people, the country is in need of sustainability in all ramifications as regards to construction projects. This is because; it is only with sustainability that a country can project its continuity and progress in developments. Looking at the argument of the OECD, and reechoed by Lafarge Holcim Foundation, that even in developed countries buildings "account for more than forty percent of energy consumption over their lifetime(incorporating raw material production, construction, operation, maintenance and decommissioning)."As such a developing country like Nigeria that has chronic Energy shortage, could make a fundamental move if sustainability concept is fully embraced in it construction projects across the country. As this would positively have a positive impact to the economy by way

of gaining more employment as well as self sufficiency in production of materials related to sustainability.

6.2 Conclusion

Nonetheless, the concept of sustainability can only be embraced with the right skills and knowledge. As such this study made a case to investigate the knowledge of students who would became the future stakeholders in the construction field in Nigeria. The construction field in this context was defined to include students from multiple fields such as; Building Engineering, Architecture, Quantity survey, Estate Management and Urban and regional Planning students. The purpose of the analysis was to determine if students understand and comprehends the concept of sustainability, as well as if significant differences exist by educational level and by field of study for the following research questions:

I. Level of understanding of sustainability notion in project management among students studying in the construction industry in Nigeria

II. Level of Agreement that the sustainability notion is applicable in the Nigerian construction project

III. The probability of integrating the sustainability notion to projects after graduation

Furthermore, the integration of Environmental, Economic and Social aspects as factors in the concept of sustainability gave a consolidated view about the knowledge of the respondents. For instance the questions that asked do they

consider the sustainability notion are applicable in the Nigerian construction project. There was differences by courses, which the Kruskal-Wallis test showed significant differences in the following Environmental, Economic and Social aspects as factors the Use of products and material than can be recycled or are biodegradable (p=.004), the Use of locally manufactured material is applicable (p=0.015), Design to attract investors is applicable (p=0.028), Analyze building density in the area is applicable (p=0.043). Likewise in the To what extent do they hope to integrate the sustainability notion to projects after graduation, there are significant differences according to course of the respondents in the context of Environmental, Economic and Social aspects as factors. The Kruskal-Wallis test showed significant differences in the Integration of Maintain biodiversity and ecology of the site (p=.0.018), Integration of Use durable material (p=0.006), Integration of Respect people and local environment (p=0.032), Integration of Minimize pollution (p=0.046). These differences are obviously due to the kind of interpretation respondents give to issues by virtue of their study area or expertise. Furthermore, There are significant differences in awareness of sustainability issues by level of education ($p<.05$). The level of awareness is significantly higher for HND, while There are no significant differences in the awareness of sustainability issues in the constructions industry across courses ($p >.05$).

The findings of this study suggest that 98.90% of respondents from the HND and 78.20% of respondent from ND are aware and knowledgeable about sustainability concept. And positively, there is a general acceptance by the respondents on the applicability of the notion of sustainability in the Nigerian

construction projects from the findings. However, several factor such as lack of policy implementation in the country has flooded the construction industry with amateur in the construction field, hence making it difficult for graduate students to implement what they have learned while in school. In many cases project owners/clients would employ the services of unprofessional in order to cut professional fees. Some factor identified by Olagunju, Aremu, and Ogundele, (2013) as the factor responsible for building collapse in Nigeria are Bad design Faulty construction, Poor quality of materials, construction methods and Foundation failure. These factors are basically associated with the whole issue of sustainability, and their recurrences in Nigeria are the shortage of professionals that are engaged by clients. This to a large extend destroys the attempts to entrench modern concepts in the construction industry in the country.

6.3 Implication of Research

Every worthwhile research is targeted at solving a specific problem or numerous problems arising from interaction of people with their environment or the general populace**.** Contextualizing the importance of these findings to Nigeria, the research has highlighted some important aspects relating to the significance:

(a) To The Industry

The Nigerian economy is currently the largest in Africa, and one of such industries contributing to this is the construction industry. The report by KPMG (2014) states that Nigeria "has the fifth-largest infrastructure stock on the continent, with capital stock seeing a real average growth rate of

nearly 12% p.a. since 2000." As such having capable and skilled labor to oversee the industry is very vital to its sustainable growth. This research would help the stakeholder understand the importance of sustainability as well as the local skills that are ready to be harnessed and integrated to the practical construction field. This would increase profit to the industry as well as provide employment to the teaming population of the country. And in the global settings, this study may interest stakeholders about the importance of how sustainability is gaining prominence even in the developing world.

(b) To The Academic/Researchers

The academics are the bastion of learning that yields positive researches that sustains the universe, and this research is a little contribution to that quest. This research is a direct trust that hopes to trigger constructive embrace into the field of sustainability in construction industry in Nigeria. The dearth of researches that features sustainability in construction industry in Nigeria is alarming, as nations across the globe are embracing the concept. As such this research hopes to generate debates across the academics in Nigeria as to enlighten policy makers to embrace the concept fully.

(c) To The Regulator

This research hope to provide to the Nigerian regulators of construction industry the highlight of sustainability, as well as the importance of the knowledge and skills required. As there have been many incidences in the construction industry across the country such as the collapse of construction sites which the concept of sustainability could have solved. To this regard, effective policy framework by the Nigerian government that would harmonize and strengthens the knowledge and skills of the students towards the implementation of sustainability is highly required. As this would not only proffer solutions to unabated level of quacks in the field of construction, it would also provide further professional employment for students in the field. And if this is achieved, the construction industry in the country would be in line with sustainable development which nations are enthusiastic to meet up within the 21 century.

6.4 Limitation of study

This research was targeted at investigating the knowledge of awareness about sustainability concept amongst the student of specific institution of Higher learning in Nigeria; as such it would be very hard to generalize the findings to the entire students of construction field Nigeria. This researcher believes that there might be variance in the knowledge of the respondents of this research and other students of different institutions and the study sample can be drawn from there. Factors such as the quality and skills of the lecturers in the institutions, as well as the quality of the intuitions itself could determine these variations.

The study sample population included mostly male respondents; this is unavoidably, because the location of the institution was a factor. The courses of our subject are mostly perceived to be course only made for men, as such there is a low enrollment of female in such courses. However, this is a different case in other locations within the country, and there would be more enrolment of female in the courses. The future research can also look towards this dimension.

6.5 Further Research

Research is continues process aiming at perfection of solutions. In this regard, and in the context of this research, other future researches may expand this current research by critically looking at the whole institutions in Nigeria that have students in the construction field. Furthermore a comparative analysis could be made amongst Nigerian students and other students across the African continent. Other researches can also produce more interesting results if the students across the continent could be studied in a longitudinal study in order to record the progress, quality and implementation of the student from their first year to graduation and to embarking on project. By tracking the students, this may ensure adherence to the code of sustainability in the construction industry. Although this might be a very expensive research, governments might embark on it, as it would be profitable. These future researches can be done using mix method approaches of qualitative and quantitative, as the qualitative data can produce a lot of insights and paradigms

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Appendix A

An Investigation on the Awareness of Sustainability concept in construction projects: A Case of Nigerian Students in the Construction Field

This is a questionnaire to investigate the awareness of sustainability concept of Nigerian students in construction projects

Q1. Are you aware of sustainability issues in construction industry?

No ☐ Yes ☐

Q2. How well have you received information on sustainability in construction industry during your course?

Very High ☐ High ☐ Medium ☐ Low ☐ Very Low ☐

Q.3 To what extent do you agree that implementing of the following can help in improving sustainability in the construction industry?

Note: Very High=1, High=2, Medium=3, Low =4, Very Low=5

	1	2	3	4	5
a) Environmental Aspects					
i. Develop on environmentally appropriate area					
ii. Maintain biodiversity and ecology of the site					
iii. Conserve building water and cooling power consumption					
iv. Use energy source with low environmental effects					
v. Provide clean and healthy environment					
vi. Use products and material than can be recycled or are biodegradable					
b) Economic Aspects					
i. Use materials from recycled sources					
ii. Use locally manufactured material					
iii. Use durable material					

iv.	Implement cost effective measures					
v.	Design to attract investors					
vi.	Design for less material usage					
c)	**Social Aspects**					
i.	Respect people and local environment					
ii.	Consider occupant health and safety					
iii.	Consider quality of life of the occupant					
iv.	Analyze building density in the area					
v.	Minimize pollution					

Q4. To what extent do you belief the following are applicable in the [Nigerian] [Construction Industry]?

Note: Strongly Agree =1, Agree =2, Undecided =3, Disagree =4, Strongly Disagree=5.

		1	2	3	4	5
a)	**Environmental Aspects**					
i.	Direct development to environmentally appropriate area					
ii.	Maintain biodiversity and ecology of the site					
iii.	Conserve building water and cooling power consumption					
iv.	Use energy source with low environmental effects					
v.	Provide clean and healthy environment					
vi.	Use products and material than can be recycled or are biodegradable					
b)	**Economic Aspects**					
i.	Use materials from recycled Sources					
ii.	Use locally manufactured material					

iii.	Use durable Material					
iv.	Implement cost effective measures					
v.	Design to attract investors					
vi.	Design for less material use					
c)	**Social Aspects**					
i.	Respect people and local environment					
ii.	Consider occupant health and safety					
iii.	Consider quality of life of the occupant					
iv.	Analyze building density in the area					
v.	Minimize pollution					

Q5. To what extent do you think you might integrate the following in your projects after graduation?

Note: Definitely=1, Very Probably=2, Possibly=3, Probably Not=4, Very Probably Not=5

		1	2	3	4	5
a)	**Environmental Aspects**					
i.	Direct development to environmentally appropriate area					
ii.	Maintain biodiversity and ecology of the site					
iii.	Conserve building water and cooling power consumption					
iv.	Use energy source with low environmental effects					
v.	Provide clean and healthy environment					
vi.	Use products and material than can be recycled or are biodegradable					
b)	**Economic Aspects**					
c)	Use materials from recycled sources					
d)	Use locally manufactured material					

e) Use durable material					
f) Implement cost effective measures					
g) Design to attract investors					
h) Design for less material use					
i) **Social Aspects**					
j) Respect people and local environment					
k) Consider occupant health and safety					
l) Consider quality of life of the occupant					
m) Analyze building density in the area					
n) Minimize pollution					

Q6. What are the main reasons you believe sustainability should be implement in the Nigerian construction industry?

(i)
_____
_____

(ii)
_____
_____

(iii)
_____
_____

Q.7. Demography

1. Age……..
2. Gender ……
3. Level of Education…….
4. Course:

APPENDIX B

TESTS OF NORMALITY

Assumptions for ANOVA

1) Observations must be independent
2) The response variable is normally distributed
3) The variance of the response variable is the same for each population

If one or more of the assumptions are not met, the results may be unreliable. As shown in the next few tables, the normality assumption has failed (pvalue < .05).

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Develop on environmentally appropriate area can help in improving sustainability in the construction industry	.283	150	.000	.853	150	.000
Maintain biodiversity and ecology of the site can help in improving sustainability in the construction industry	.224	150	.000	.883	150	.000
Conserve building water and cooling power consumption can help in improving sustainability in the construction industry	.274	150	.000	.813	150	.000
Use energy source with low environmental effects can help in improving sustainability in the construction industry	.301	150	.000	.824	150	.000

Provide clean and healthy environment can help in improving sustainability in the construction industry	.269	150	.000	.861	150	.000
Use products and material than can be recycled or are biodegradable can help in improving sustainability in the construction industry	.276	150	.000	.868	150	.000
Use materials from recycled sources can help in improving sustainability in the construction industry	.264	150	.000	.873	150	.000
Use locally manufactured material can help in improving sustainability in the construction industry	.301	150	.000	.842	150	.000
Use durable material can help in improving sustainability in the construction industry	.287	150	.000	.840	150	.000
Implement cost effective measures can help in improving sustainability in the construction industry	.241	150	.000	.862	150	.000
Design to attract investors can help in improving sustainability in the construction industry	.226	150	.000	.890	150	.000

Design for less material usage can help in improving sustainability in the construction industry	.239	150	.000	.887	150	.000
Respect people and local environment can help in improving sustainability in the construction industry	.267	150	.000	.844	150	.000
Consider occupant health and safety can help in improving sustainability in the construction industry	.250	150	.000	.883	150	.000
Consider quality of life of the occupant can help in improving sustainability in the construction industry	.249	150	.000	.856	150	.000
Analyze building density in the area can help in improving sustainability in the construction industry	.264	150	.000	.860	150	.000
Minimize pollution can help in improving sustainability in the construction industry	.277	150	.000	.843	150	.000
Belief that Develop on environmentally appropriate area is applicable	.272	150	.000	.769	150	.000
Belief that Maintain biodiversity and ecology of the site is applicable	.283	150	.000	.805	150	.000

Belief that Conserve building water and cooling power consumption is applicable	.197	150	.000	.909	150	.000
Belief that Use energy source with low environmental effects is applicable	.261	150	.000	.832	150	.000
Belief that Provide clean and healthy environment is applicable	.294	150	.000	.784	150	.000
Belief that Use products and material than can be recycled or are biodegradable is applicable	.203	150	.000	.904	150	.000
Belief that Use materials from recycled sources is applicable	.258	150	.000	.848	150	.000
Belief that Use locally manufactured material is applicable	.268	150	.000	.865	150	.000
Belief that Use durable material is applicable	.209	150	.000	.877	150	.000
Belief that Implement cost effective measures is applicable	.210	150	.000	.861	150	.000
Belief that Design to attract investors is applicable	.257	150	.000	.867	150	.000

Belief that Design for less material usage is applicable	.269	150	.000	.865	150	.000
Belief that Respect people and local environment is applicable	.272	150	.000	.868	150	.000
Belief that Consider occupant health and safety is applicable	.263	150	.000	.871	150	.000
Belief that Consider quality of life of the occupant is applicable	.207	150	.000	.890	150	.000
Belief that Analyze building density in the area is applicable	.224	150	.000	.858	150	.000
Belief that Minimize pollution is applicable	.207	150	.000	.907	150	.000
Integration of Develop on environmentally appropriate area	.258	150	.000	.873	150	.000
Integration of Maintain biodiversity and ecology of the site	.264	150	.000	.845	150	.000
Integration of Conserve building water and cooling power consumption	.246	150	.000	.883	150	.000
Integration of Use energy source with low environmental effects	.289	150	.000	.839	150	.000

Integration of Provide clean and healthy environment	.303	150	.000	.795	150	.000
Integration of Use products and material than can be recycled or are biodegradable	.228	150	.000	.888	150	.000
Integration of Use materials from recycled sources	.242	150	.000	.816	150	.000
Integration of Use locally manufactured material	.263	150	.000	.850	150	.000
Integration of Use durable material	.309	150	.000	.835	150	.000
Integration of Implement cost effective measures	.273	150	.000	.878	150	.000
Integration of Design to attract investors	.286	150	.000	.834	150	.000
Integration of Design for less material usage	.247	150	.000	.863	150	.000
Integration of Respect people and local environment	.280	150	.000	.819	150	.000
Integration of Consider occupant health and safety	.250	150	.000	.827	150	.000
Integration of Consider quality of life of the occupant	.263	150	.000	.865	150	.000
Integration of Analyze building density in the area	.263	150	.000	.864	150	.000

Integration of Minimize pollution	.254	150	.000	.866	150	.000

a. Lilliefors Significance Correction

Shapiro-Wilk test of normality was used to test the assumption that the Dependent variable is normally distributed for each categorical level of education and course. This assumption failed ($p<.05$) thus the data is not normally distributed.

Tests of Normality[b,c]

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Course	Statistic	df	Sig.	Statistic	df	Sig.
Are you aware of sustainability issues in construction industry?	Architect	.540	41	.000	.226	41	.000
	Building Engineering	.523	50	.000	.380	50	.000
	Quantity Survey	.501	29	.000	.460	29	.000
How well have you received information on sustainability in construction industry during your course?	Architect	.259	41	.000	.821	41	.000
	Building Engineering	.282	50	.000	.805	50	.000
	Estate Management	.251	15	.012	.798	15	.003
	Quantity Survey	.225	29	.001	.880	29	.003
	Urban and Regional Planning	.485	15	.000	.499	15	.000
Develop on environmentally appropriate area can help in improving sustainability in the construction industry	Architect	.292	41	.000	.846	41	.000
	Building Engineering	.275	50	.000	.868	50	.000
	Estate Management	.284	15	.002	.866	15	.029
	Quantity Survey	.263	29	.000	.807	29	.000
	Urban and Regional Planning	.240	15	.020	.875	15	.040
Maintain biodiversity and ecology of the site can help in improving sustainability in the construction industry	Architect	.236	41	.000	.876	41	.000
	Building Engineering	.224	50	.000	.869	50	.000
	Estate Management	.288	15	.002	.783	15	.002
	Quantity Survey	.238	29	.000	.878	29	.003
	Urban and Regional Planning	.257	15	.009	.884	15	.055

Conserve building water and cooling power consumption can help in improving sustainability in the construction industry	Architect	.305	41	.000	.814	41	.000
	Building Engineering	.295	50	.000	.789	50	.000
	Estate Management	.225	15	.040	.881	15	.050
	Quantity Survey	.276	29	.000	.766	29	.000
	Urban and Regional Planning	.287	15	.002	.783	15	.002
Use energy source with low environmental effects can help in improving sustainability in the construction industry	Architect	.312	41	.000	.821	41	.000
	Building Engineering	.279	50	.000	.841	50	.000
	Estate Management	.373	15	.000	.734	15	.001
	Quantity Survey	.293	29	.000	.831	29	.000
	Urban and Regional Planning	.335	15	.000	.832	15	.010
Provide clean and healthy environment can help in improving sustainability in the construction industry	Architect	.282	41	.000	.865	41	.000
	Building Engineering	.212	50	.000	.845	50	.000
	Estate Management	.317	15	.000	.838	15	.012
	Quantity Survey	.290	29	.000	.872	29	.002
	Urban and Regional Planning	.340	15	.000	.758	15	.001
Use products and material than can be recycled or are biodegradable can help in improving sustainability in the construction industry	Architect	.310	41	.000	.835	41	.000
	Building Engineering	.267	50	.000	.871	50	.000
	Estate Management	.283	15	.002	.801	15	.004
	Quantity Survey	.257	29	.000	.874	29	.003
	Urban and Regional Planning	.195	15	.128	.896	15	.082
Use materials from recycled sources can help in improving sustainability in the construction industry	Architect	.275	41	.000	.859	41	.000
	Building Engineering	.192	50	.000	.914	50	.001
	Estate Management	.283	15	.002	.801	15	.004
	Quantity Survey	.335	29	.000	.800	29	.000
	Urban and Regional Planning	.316	15	.000	.790	15	.003
Use locally manufactured	Architect	.305	41	.000	.815	41	.000
	Building Engineering	.254	50	.000	.880	50	.000

material can help in improving sustainability in the construction industry	Estate Management	.367	15	.000	.754	15	.001
	Quantity Survey	.308	29	.000	.830	29	.000
	Urban and Regional Planning	.329	15	.000	.825	15	.008
Use durable material can help in improving sustainability in the construction industry	Architect	.274	41	.000	.801	41	.000
	Building Engineering	.288	50	.000	.854	50	.000
	Estate Management	.297	15	.001	.860	15	.024
	Quantity Survey	.285	29	.000	.798	29	.000
	Urban and Regional Planning	.297	15	.001	.860	15	.024
Implement cost effective measures can help in improving sustainability in the construction industry	Architect	.234	41	.000	.869	41	.000
	Building Engineering	.243	50	.000	.876	50	.000
	Estate Management	.271	15	.004	.815	15	.006
	Quantity Survey	.222	29	.001	.807	29	.000
	Urban and Regional Planning	.238	15	.022	.817	15	.006
Design to attract investors can help in improving sustainability in the construction industry	Architect	.222	41	.000	.888	41	.001
	Building Engineering	.190	50	.000	.881	50	.000
	Estate Management	.228	15	.035	.904	15	.110
	Quantity Survey	.223	29	.001	.906	29	.014
	Urban and Regional Planning	.333	15	.000	.819	15	.006
Design for less material usage can help in improving sustainability in the construction industry	Architect	.275	41	.000	.856	41	.000
	Building Engineering	.234	50	.000	.885	50	.000
	Estate Management	.253	15	.011	.899	15	.091
	Quantity Survey	.193	29	.007	.914	29	.021
	Urban and Regional Planning	.168	15	.200*	.924	15	.218
Respect people and local environment can help in improving	Architect	.256	41	.000	.843	41	.000
	Building Engineering	.290	50	.000	.831	50	.000
	Estate Management	.258	15	.008	.882	15	.050
	Quantity Survey	.221	29	.001	.860	29	.001

sustainability in the construction industry	Urban and Regional Planning	.316	15	.000	.790	15	.003
Consider occupant health and safety can help in improving sustainability in the construction industry	Architect	.262	41	.000	.883	41	.001
	Building Engineering	.191	50	.000	.862	50	.000
	Estate Management	.402	15	.000	.694	15	.000
	Quantity Survey	.306	29	.000	.856	29	.001
	Urban and Regional Planning	.238	15	.022	.887	15	.061
Consider quality of life of the occupant can help in improving sustainability in the construction industry	Architect	.255	41	.000	.874	41	.000
	Building Engineering	.251	50	.000	.837	50	.000
	Estate Management	.300	15	.001	.837	15	.011
	Quantity Survey	.230	29	.000	.842	29	.001
	Urban and Regional Planning	.263	15	.006	.868	15	.031
Analyze building density in the area can help in improving sustainability in the construction industry	Architect	.245	41	.000	.845	41	.000
	Building Engineering	.278	50	.000	.851	50	.000
	Estate Management	.297	15	.001	.865	15	.028
	Quantity Survey	.238	29	.000	.878	29	.003
	Urban and Regional Planning	.288	15	.002	.783	15	.002
Minimize pollution can help in improving sustainability in the construction industry	Architect	.296	41	.000	.841	41	.000
	Building Engineering	.262	50	.000	.855	50	.000
	Estate Management	.316	15	.000	.790	15	.003
	Quantity Survey	.259	29	.000	.878	29	.003
	Urban and Regional Planning	.278	15	.003	.766	15	.001
Belief that Develop on environmentally appropriate area is applicable	Architect	.279	41	.000	.779	41	.000
	Building Engineering	.306	50	.000	.728	50	.000
	Estate Management	.249	15	.013	.806	15	.004
	Quantity Survey	.284	29	.000	.770	29	.000
	Urban and Regional Planning	.295	15	.001	.761	15	.001
Belief that Maintain biodiversity and	Architect	.242	41	.000	.826	41	.000
	Building Engineering	.333	50	.000	.762	50	.000

ecology of the site is applicable	Estate Management	.305	15	.001	.766	15	.001
	Quantity Survey	.352	29	.000	.748	29	.000
	Urban and Regional Planning	.316	15	.000	.790	15	.003
Belief that Conserve building water and cooling power consumption is applicable	Architect	.232	41	.000	.894	41	.001
	Building Engineering	.173	50	.001	.907	50	.001
	Estate Management	.288	15	.002	.858	15	.022
	Quantity Survey	.220	29	.001	.890	29	.006
	Urban and Regional Planning	.248	15	.014	.876	15	.041
Belief that Use energy source with low environmental effects is applicable	Architect	.236	41	.000	.808	41	.000
	Building Engineering	.260	50	.000	.842	50	.000
	Estate Management	.341	15	.000	.727	15	.000
	Quantity Survey	.311	29	.000	.804	29	.000
	Urban and Regional Planning	.251	15	.012	.799	15	.004
Belief that Provide clean and healthy environment is applicable	Architect	.232	41	.000	.834	41	.000
	Building Engineering	.328	50	.000	.759	50	.000
	Estate Management	.251	15	.012	.798	15	.003
	Quantity Survey	.365	29	.000	.749	29	.000
	Urban and Regional Planning	.288	15	.002	.783	15	.002
Belief that Use products and material than can be recycled or are biodegradable is applicable	Architect	.207	41	.000	.903	41	.002
	Building Engineering	.231	50	.000	.882	50	.000
	Estate Management	.173	15	.200*	.897	15	.086
	Quantity Survey	.277	29	.000	.842	29	.001
	Urban and Regional Planning	.258	15	.008	.910	15	.137
Belief that Use materials from recycled sources is applicable	Architect	.284	41	.000	.806	41	.000
	Building Engineering	.268	50	.000	.869	50	.000
	Estate Management	.322	15	.000	.768	15	.001
	Quantity Survey	.230	29	.000	.889	29	.005

	Urban and Regional Planning	.263	15	.006	.775	15	.002
Belief that Use locally manufactured material is applicable	Architect	.231	41	.000	.884	41	.001
	Building Engineering	.276	50	.000	.858	50	.000
	Estate Management	.295	15	.001	.761	15	.001
	Quantity Survey	.255	29	.000	.863	29	.001
	Urban and Regional Planning	.371	15	.000	.780	15	.002
Belief that Use durable material is applicable	Architect	.244	41	.000	.888	41	.001
	Building Engineering	.187	50	.000	.885	50	.000
	Estate Management	.337	15	.000	.800	15	.004
	Quantity Survey	.246	29	.000	.799	29	.000
	Urban and Regional Planning	.263	15	.006	.868	15	.031
Belief that Implement cost effective measures is applicable	Architect	.246	41	.000	.837	41	.000
	Building Engineering	.221	50	.000	.851	50	.000
	Estate Management	.234	15	.027	.891	15	.070
	Quantity Survey	.216	29	.001	.851	29	.001
	Urban and Regional Planning	.238	15	.022	.817	15	.006
Belief that Design to attract investors is applicable	Architect	.287	41	.000	.867	41	.000
	Building Engineering	.256	50	.000	.862	50	.000
	Estate Management	.167	15	.200*	.931	15	.279
	Quantity Survey	.210	29	.002	.838	29	.000
	Urban and Regional Planning	.303	15	.001	.794	15	.003
Belief that Design for less material usage is applicable	Architect	.249	41	.000	.872	41	.000
	Building Engineering	.228	50	.000	.871	50	.000
	Estate Management	.292	15	.001	.849	15	.017
	Quantity Survey	.339	29	.000	.809	29	.000
	Urban and Regional Planning	.300	15	.001	.806	15	.004
Belief that Respect people and local	Architect	.357	41	.000	.789	41	.000
	Building Engineering	.241	50	.000	.859	50	.000

environment is applicable	Estate Management	.238	15	.022	.887	15	.061
	Quantity Survey	.292	29	.000	.847	29	.001
	Urban and Regional Planning	.173	15	.200*	.876	15	.042
Belief that Consider occupant health and safety is applicable	Architect	.313	41	.000	.837	41	.000
	Building Engineering	.258	50	.000	.868	50	.000
	Estate Management	.226	15	.038	.897	15	.086
	Quantity Survey	.228	29	.001	.855	29	.001
	Urban and Regional Planning	.273	15	.004	.871	15	.035
Belief that Consider quality of life of the occupant is applicable	Architect	.249	41	.000	.864	41	.000
	Building Engineering	.186	50	.000	.880	50	.000
	Estate Management	.202	15	.101	.885	15	.056
	Quantity Survey	.230	29	.000	.896	29	.008
	Urban and Regional Planning	.217	15	.056	.862	15	.026
Belief that Analyze building density in the area is applicable	Architect	.249	41	.000	.865	41	.000
	Building Engineering	.197	50	.000	.875	50	.000
	Estate Management	.428	15	.000	.596	15	.000
	Quantity Survey	.277	29	.000	.829	29	.000
	Urban and Regional Planning	.202	15	.101	.885	15	.056
Belief that Minimize pollution is applicable	Architect	.196	41	.000	.908	41	.003
	Building Engineering	.216	50	.000	.900	50	.000
	Estate Management	.223	15	.043	.899	15	.093
	Quantity Survey	.262	29	.000	.886	29	.005
	Urban and Regional Planning	.192	15	.141	.926	15	.235
Integration of Develop on environmentally appropriate area	Architect	.334	41	.000	.794	41	.000
	Building Engineering	.206	50	.000	.890	50	.000
	Estate Management	.289	15	.001	.846	15	.015
	Quantity Survey	.215	29	.001	.902	29	.011
	Urban and Regional Planning	.263	15	.006	.868	15	.031

Integration of Maintain biodiversity and ecology of the site	Architect	.245	41	.000	.850	41	.000
	Building Engineering	.258	50	.000	.829	50	.000
	Estate Management	.291	15	.001	.869	15	.032
	Quantity Survey	.255	29	.000	.787	29	.000
	Urban and Regional Planning	.251	15	.012	.798	15	.003
Integration of Conserve building water and cooling power consumption	Architect	.206	41	.000	.904	41	.002
	Building Engineering	.255	50	.000	.881	50	.000
	Estate Management	.317	15	.000	.727	15	.000
	Quantity Survey	.303	29	.000	.859	29	.001
	Urban and Regional Planning	.252	15	.011	.842	15	.014
Integration of Use energy source with low environmental effects	Architect	.331	41	.000	.816	41	.000
	Building Engineering	.200	50	.000	.864	50	.000
	Estate Management	.345	15	.000	.763	15	.001
	Quantity Survey	.352	29	.000	.748	29	.000
	Urban and Regional Planning	.333	15	.000	.819	15	.006
Integration of Provide clean and healthy environment	Architect	.259	41	.000	.812	41	.000
	Building Engineering	.368	50	.000	.695	50	.000
	Estate Management	.275	15	.003	.790	15	.003
	Quantity Survey	.274	29	.000	.822	29	.000
	Urban and Regional Planning	.344	15	.000	.817	15	.006
Integration of Use products and material than can be recycled or are biodegradable	Architect	.199	41	.000	.903	41	.002
	Building Engineering	.256	50	.000	.859	50	.000
	Estate Management	.168	15	.200*	.910	15	.138
	Quantity Survey	.258	29	.000	.874	29	.002
	Urban and Regional Planning	.209	15	.076	.861	15	.025
Integration of Use materials from recycled sources	Architect	.306	41	.000	.761	41	.000
	Building Engineering	.251	50	.000	.807	50	.000
	Estate Management	.232	15	.029	.883	15	.052
	Quantity Survey	.259	29	.000	.809	29	.000

	Urban and Regional Planning	.283	15	.002	.801	15	.004
Integration of Use locally manufactured material	Architect	.207	41	.000	.809	41	.000
	Building Engineering	.278	50	.000	.858	50	.000
	Estate Management	.232	15	.029	.883	15	.052
	Quantity Survey	.349	29	.000	.722	29	.000
	Urban and Regional Planning	.226	15	.037	.896	15	.082
Integration of Use durable material	Architect	.343	41	.000	.782	41	.000
	Building Engineering	.319	50	.000	.811	50	.000
	Estate Management	.316	15	.000	.790	15	.003
	Quantity Survey	.228	29	.000	.877	29	.003
	Urban and Regional Planning	.295	15	.001	.761	15	.001
Integration of Implement cost effective measures	Architect	.312	41	.000	.831	41	.000
	Building Engineering	.297	50	.000	.851	50	.000
	Estate Management	.210	15	.073	.910	15	.134
	Quantity Survey	.228	29	.000	.902	29	.011
	Urban and Regional Planning	.198	15	.119	.900	15	.096
Integration of Design to attract investors	Architect	.252	41	.000	.847	41	.000
	Building Engineering	.300	50	.000	.822	50	.000
	Estate Management	.270	15	.004	.839	15	.012
	Quantity Survey	.279	29	.000	.802	29	.000
	Urban and Regional Planning	.381	15	.000	.771	15	.002
Integration of Design for less material usage	Architect	.222	41	.000	.804	41	.000
	Building Engineering	.230	50	.000	.832	50	.000
	Estate Management	.297	15	.001	.865	15	.028
	Quantity Survey	.219	29	.001	.868	29	.002
	Urban and Regional Planning	.327	15	.000	.846	15	.015
Integration of	Architect	.338	41	.000	.750	41	.000

Respect people and local environment	Building Engineering	.251	50	.000	.843	50	.000
	Estate Management	.248	15	.014	.910	15	.133
	Quantity Survey	.266	29	.000	.769	29	.000
	Urban and Regional Planning	.249	15	.013	.806	15	.004
Integration of Consider occupant health and safety	Architect	.302	41	.000	.809	41	.000
	Building Engineering	.218	50	.000	.842	50	.000
	Estate Management	.385	15	.000	.630	15	.000
	Quantity Survey	.269	29	.000	.802	29	.000
	Urban and Regional Planning	.263	15	.006	.868	15	.031
Integration of Consider quality of life of the occupant	Architect	.289	41	.000	.829	41	.000
	Building Engineering	.273	50	.000	.850	50	.000
	Estate Management	.234	15	.027	.891	15	.070
	Quantity Survey	.238	29	.000	.878	29	.003
	Urban and Regional Planning	.225	15	.040	.881	15	.050
Integration of Analyze building density in the area	Architect	.202	41	.000	.869	41	.000
	Building Engineering	.215	50	.000	.900	50	.000
	Estate Management	.333	15	.000	.819	15	.006
	Quantity Survey	.293	29	.000	.831	29	.000
	Urban and Regional Planning	.354	15	.000	.755	15	.001
Integration of Minimize pollution	Architect	.274	41	.000	.860	41	.000
	Building Engineering	.231	50	.000	.876	50	.000
	Estate Management	.202	15	.100	.880	15	.048
	Quantity Survey	.269	29	.000	.802	29	.000
	Urban and Regional Planning	.287	15	.002	.847	15	.016

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

b. Are you aware of sustainability issues in construction industry? is constant when Course = Estate Management. It has been omitted.

c. Are you aware of sustainability issues in construction industry? is constant when Course = Urban and Regional Planning. It has been omitted.

sTests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Level of education	Statistic	df	Sig.	Statistic	df	Sig.
How well have you received information on sustainability in construction industry during your course?	HND	.237	95	.000	.823	95	.000
	OND/ND	.270	55	.000	.850	s55	.000
Develop on environmentally appropriate area can help in improving sustainability in the construction industry	HND	.262	95	.000	.866	95	.000
	OND/ND	.321	55	.000	.826	55	.000
Maintain biodiversity and ecology of the site can help in improving sustainability in the construction industry	HND	.239	95	.000	.880	95	.000
	OND/ND	.217	55	.000	.878	55	.000
Conserve building water and cooling power consumption can help in improving sustainability in the construction industry	HND	.264	95	.000	.827	95	.000
	OND/ND	.277	55	.000	.789	55	.000
Use energy source with low environmental effects can help in improving sustainability in the construction industry	HND	.296	95	.000	.831	95	.000
	OND/ND	.310	55	.000	.815	55	.000

Provide clean and healthy environment can help in improving sustainability in the construction industry	HND	.272	95	.000	.857	95	.000
	OND/ND	.261	55	.000	.871	55	.000
Use products and material than can be recycled or are biodegradable can help in improving sustainability in the construction industry	HND	.241	95	.000	.873	95	.000
	OND/ND	.335	55	.000	.803	55	.000
Use materials from recycled sources can help in improving sustainability in the construction industry	HND	.263	95	.000	.871	95	.000
	OND/ND	.261	55	.000	.879	55	.000
Use locally manufactured material can help in improving sustainability in the construction industry	HND	.296	95	.000	.848	95	.000
	OND/ND	.312	55	.000	.831	55	.000
Use durable material can help in improving sustainability in the construction industry	HND	.242	95	.000	.851	95	.000
	OND/ND	.365	55	.000	.754	55	.000
Implement cost	HND	.225	95	.000	.848	95	.000

effective measures can help in improving sustainability in the construction industry	OND/ND	.291	55	.000	.838	55	.000
Design to attract investors can help in improving sustainability in the construction industry	HND	.234	95	.000	.888	95	.000
	OND/ND	.208	55	.000	.886	55	.000
Design for less material usage can help in improving sustainability in the construction industry	HND	.243	95	.000	.875	95	.000
	OND/ND	.234	55	.000	.895	55	.000
Respect people and local environment can help in improving sustainability in the construction industry	HND	.274	95	.000	.845	95	.000
	OND/ND	.255	55	.000	.842	55	.000
Consider occupant health and safety can help in improving sustainability in the construction industry	HND	.242	95	.000	.881	95	.000
	OND/ND	.264	55	.000	.864	55	.000
Consider quality of	HND	.261	95	.000	.847	95	.000

life of the occupant can help in improving sustainability in the construction industry	OND/ND	.227	55	.000	.867	55	.000
Analyze building density in the area can help in improving sustainability in the construction industry	HND	.268	95	.000	.859	95	.000
	OND/ND	.256	55	.000	.864	55	.000
Minimize pollution can help in improving sustainability in the construction industry	HND	.285	95	.000	.831	95	.000
	OND/ND	.264	55	.000	.851	55	.000
Belief that Develop on environmentally appropriate area is applicable	HND	.262	95	.000	.779	95	.000
	OND/ND	.331	55	.000	.734	55	.000
Belief that Maintain biodiversity and ecology of the site is applicable	HND	.256	95	.000	.826	95	.000
	OND/ND	.359	55	.000	.734	55	.000
Belief that Conserve building water and cooling power consumption is applicable	HND	.231	95	.000	.899	95	.000
	OND/ND	.187	55	.000	.913	55	.001
Belief that Use	HND	.258	95	.000	.841	95	.000

energy source with low environmental effects is applicable	OND/ND	.262	55	.000	.812	55	.000
Belief that Provide clean and healthy environment is applicable	HND	.285	95	.000	.786	95	.000
	OND/ND	.310	55	.000	.780	55	.000
Belief that Use products and material than can be recycled or are biodegradable is applicable	HND	.207	95	.000	.904	95	.000
	OND/ND	.195	55	.000	.889	55	.000
Belief that Use materials from recycled sources is applicable	HND	.237	95	.000	.860	95	.000
	OND/ND	.295	55	.000	.796	55	.000
Belief that Use locally manufactured material is applicable	HND	.284	95	.000	.850	95	.000
	OND/ND	.233	55	.000	.889	55	.000
Belief that Use durable material is applicable	HND	.210	95	.000	.871	95	.000
	OND/ND	.210	55	.000	.867	55	.000
Belief that Implement cost effective measures is applicable	HND	.207	95	.000	.863	95	.000
	OND/ND	.213	55	.000	.858	55	.000
Belief that Design to	HND	.247	95	.000	.860	95	.000

attract investors is applicable	OND/ND	.272	55	.000	.857	55	.000
Belief that Design for less material usage is applicable	HND	.265	95	.000	.861	95	.000
	OND/ND	.272	55	.000	.871	55	.000
Belief that Respect people and local environment is applicable	HND	.273	95	.000	.872	95	.000
	OND/ND	.269	55	.000	.845	55	.000
Belief that Consider occupant health and safety is applicable	HND	.251	95	.000	.875	95	.000
	OND/ND	.278	55	.000	.863	55	.000
Belief that Consider quality of life of the occupant is applicable	HND	.218	95	.000	.882	95	.000
	OND/ND	.188	55	.000	.890	55	.000
Belief that Analyze building density in the area is applicable	HND	.236	95	.000	.843	95	.000
	OND/ND	.207	55	.000	.866	55	.000
Belief that Minimize pollution is applicable	HND	.234	95	.000	.898	95	.000
	OND/ND	.166	55	.001	.916	55	.001
Integration of Develop on environmentally appropriate area	HND	.253	95	.000	.874	95	.000
	OND/ND	.265	55	.000	.872	55	.000
Integration of	HND	.254	95	.000	.843	95	.000

Maintain biodiversity and ecology of the site	OND/ND	.282	55	.000	.838	55	.000
Integration of Conserve building water and cooling power consumption	HND	.238	95	.000	.887	95	.000
	OND/ND	.259	55	.000	.876	55	.000
Integration of Use energy source with low environmental effects	HND	.290	95	.000	.843	95	.000
	OND/ND	.286	55	.000	.830	55	.000
Integration of Provide clean and healthy environment	HND	.287	95	.000	.815	95	.000
	OND/ND	.332	55	.000	.746	55	.000
Integration of Use products and material than can be recycled or are biodegradable	HND	.220	95	.000	.891	95	.000
	OND/ND	.240	55	.000	.884	55	.000
Integration of Use materials from recycled sources	HND	.232	95	.000	.821	95	.000
	OND/ND	.265	55	.000	.797	55	.000
Integration of Use locally manufactured material	HND	.271	95	.000	.855	95	.000
	OND/ND	.244	55	.000	.843	55	.000
Integration of Use durable material	HND	.302	95	.000	.837	95	.000
	OND/ND	.320	55	.000	.830	55	.000
Integration of Implement cost effective measures	HND	.268	95	.000	.881	95	.000
	OND/ND	.277	55	.000	.875	55	.000

Integration of Design to attract investors	HND	.325	95	.000	.816	95	.000
	OND/ND	.228	55	.000	.826	55	.000
Integration of Design for less material usage	HND	.232	95	.000	.859	95	.000
	OND/ND	.274	55	.000	.853	55	.000
Integration of Respect people and local environment	HND	.293	95	.000	.803	95	.000
	OND/ND	.255	55	.000	.841	55	.000
Integration of Consider occupant health and safety	HND	.225	95	.000	.830	95	.000
	OND/ND	.316	55	.000	.771	55	.000
Integration of Consider quality of life of the occupant	HND	.267	95	.000	.873	95	.000
	OND/ND	.246	55	.000	.842	55	.000
Integration of Analyze building density in the area	HND	.281	95	.000	.838	95	.000
	OND/ND	.235	55	.000	.892	55	.000
Integration of Minimize pollution	HND	.231	95	.000	.863	95	.000
	OND/ND	.292	55	.000	.847	55	.000

a. Lilliefors Significance Correction