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Modelling Skills Required For Self-Reliant of Building Technology Students in Polytechnics in Rivers State

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Keywords

Polytechnics, Building Technology, Structural Modeling Skills, Architectural Modeling skills, Construction Modeling Skills, Self-reliance.

The study rapt on modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The study had three objectives, three research questions and three hypotheses. The study adopts survey design. The population for the study was 76 respondents, comprising 47 Building Technology Lecturers and 29 Instructors in the two Polytechnics in Rivers State. The study was a census. The instrument for data collection was validated by three experts. The internal consistency of the instrument was determined by using Cronbach's Alpha reliability coefficient method and the instrument has an overall internal consistency of 0.82. The instrument for data collection was a structured questionnaire. Seventy six (76) copies of the questionnaire were administered to the respondents in the two Polytechnics in Rivers State with the help of a research assistant. The data gathered for the study was analysed using mean values to answer the research questions on a 5-point Likert scale. In testing the hypotheses, the t-cal value was compared with the t- critical at .05 level of significance. The study found out that the Building Technology Lecturers and Instructors agreed that structural modelling skills, architectural modelling skills and construction modelling skills are required for self-reliant of building technology students in Polytechnics in Rivers State. Based on the findings of the study it was recommended that the On-the-job training for lecturers in form of workshops should be organized on how to use Structural Modelling skills for better teaching of building technology to the students, There should be adequate provisions of facilities, tools and equipment, which are necessary for teaching concept and skills in architectural modelling effectively and Construction modelling learning technique should be encouraged by the building technology lecturers as it has the capacity to improve students' achievement in building

technology.

I. Introduction

Polytechnic training is the foundation of technical and industrial emancipation in Nigeria. The concept of Polytechnic education in Nigeria as non-university institutions of higher education is accredited to award diplomas in various fields of Sciences, Arts and Engineering. The courses offered among others include electrical and electronics technology, mechanical technology, wood work technology and building technology. Building technology is the study that equips people with skills to build, dismantle and renovate structures. The unique roles of Builders are preparing the build ability and maintainability report, the project quality management plan, the project health and safety plan, programming construction works, managing the construction process and specifying materials and workmanship (Federal Polytechnic, Nekede 2018). Preparing buildability and maintainability report ensures that the construction becomes easy and simple as possible, reduces waste, such as excessive cutting of components, maximum use of site plant leading to increased productivity. The programme of work preparation helps to establish the method to be used for construction on site (method statement) while the quality management plan provides information on operations and to serve as a reference manual for site personnel. The safety management plan details the procedures of establishing safety culture on the construction site and including a statement on the welfare provisions on site, the first aid facilities and how to attend to an accident in event of an occurrence (Australian Institute of Building Surveyors (AIBS, 2016). Managing the construction process is about dynamics of the construction in order to achieve specified quality standards, and this includes ensuring on-site, and/or off-site implementation of all the project monitoring and control documents. In essence, builder roles are important to construction site management. The material handling and specification ensure that specifications are met on the site. Most of these roles of Builders are site-based while the others are linked to sites in one way or another.

The wide range of the builder's responsibility means they have to be educated, trained and highly skilled (Ebele, 2014). The department of building technology offers a two tier two years National diploma and Higher National Diploma (HND) in the polytechnics with a wide range of subjects related to the construction management and services that support the core activities of any construction product. In addition to the knowledge imparted by way of lectures, the programme emphasizes on acquiring practical skills as well which will eventually lead to the award of an HND. The aim of this training is to educate and train the students of Building technology for sound technical, entrepreneurial, and managerial skills necessary for the control of the project construction process for the benefit and satisfaction of the clients and the society (Caplehorn, 2017). In pursuit of these, courses have been drawn out which will teach the students a step by step comprehensive knowledge they need in order to excel in the profession. During the academic training, students are to pass all compulsory and elective courses. Since the builders interact with a wide range of specialist

members of the construction team, these calls for a multidisciplinary knowledge of other related professions. The training of the building course will, therefore, embrace all facets of construction work and management if they are to function effectively as site engineers in the construction industry. While flexibility is allowed in the depth of the body of knowledge required in the course of Building training, it is essential that the student become quite conversant with the following major topic aspects which are: structural design and detailing, structural mechanics, construction technology, theory of structures, site management, building science and properties of materials, maintenance management and building production and project management (Dave, et al, 2013). However, the 21st century building construction works required experts with adequate building technology skills which include but limited to modelling skills.

Modelling is the process of creating a representation of a system, object, or concept to understand, analyse, and predict its behaviour. As stated by Azhar, (2011), modelling in building technology refers to the use of mathematical, statistical, and computational methods to represent and analyse aspects of building design, construction, and operation. It is also the method of creating digital symbols of constructions, structure, and other physical systems to analyse, simulate, and predict their behaviour, performance, and interactions (Kerzner, 2017). Modelling involves constructing an abstract representation often called a model of a real-world phenomenon (Giere, 2014). As noted by Toomey (2020), the primary purpose of modelling is to simplify complex systems. Modelling includes using various software tools and techniques to create digital models that can be used for Design, Analysis, Optimization, Simulation and Construction among others. As asserted by Eastman (2011) modelling skills include, structural modelling skills, Architectural modelling skills, construction modelling skills, CAD modelling skills, cost estimation modelling skills, project information modelling skills, and so on. For the purpose of this study, the researcher treated only three of the modelling skills which are; Architectural modelling skills, construction modelling skills and structural modelling skills.

Structural modelling skills involve the ability to create, analyse, and interpret models that represent the behaviour of structures under various conditions. As noted by Maier (2019), these skills are essential for professionals in civil engineering, architecture, and construction management. Structural modelling skills ensure that structures can withstand loads, resist environmental forces, and comply with safety standards (Eastman et al, 20 11). Another building modelling skills that is also need for self-reliance of students is architectural modelling skills, they are techniques and methods used to create physical or digital representations of architectural designs (Kollnig & Schmitt, 2019). Through architectural modelling, students encounter real-world design challenges that require innovative solutions. As noted by Friedman, (2014), architectural modelling is more than just a skill; it is a catalyst for developing self-reliance among students. However, by developing models, students can visualize their ideas and better understand the implications of their designs (Oxman, 2015). This hands-on experience allows for experimentation, leading to more

innovative outcomes with the use of Construction modelling skills. Construction modelling skills refer to the abilities and techniques used to visualize, create, and analyse building designs and construction processes (Eastman et al., 2011). Construction modelling skills play a vital role in shaping students' abilities to navigate the intricacies of construction design and management. Learning construction modelling helps students grasp the complexities of construction processes and project management. Finally, Project Information Modelling (PIM) embodies a transformative approach in managing and executing projects across several fields of studies, predominantly in construction and engineering. Project Information Modelling skills as noted by Kymmell, (2018), comprises the use of digital tools and methodologies to create a comprehensive model that integrates various parts of a project, such as estimation, design, time management, cost, and operations. According to career Sullivan (2017), project information modelling skills are acquired through repetitive and effective training in organised institutions.

Training is the acquisition of skills, knowledge and competencies as a result of the teaching of vocational or practical skills. It is also an organized activity aimed at imparting information to improve the recipient knowledge and skills (Alfieri, et al, 2011). The construction industry is a unique industry that constitutes a large number of professionals whereby these professionals have to undergo a level of academic training at one point or another. It is of a high point that the academic knowledge that has been received by the professionals has always had a great impact on their competency in the construction world. The professionals in the construction industry are the Architects, Civil Engineers, Quantity Surveyors, Builders among others are trained in university, polytechnic, technical colleges.

However, many factors may be responsible for lack of required skills in Building Technology students; the lecturers of Building Technology could be implicated as one of the factors but requires a proof of evidence for confirmation. This evidence requires the assessment of the teachers for the level of quality possessed. Assessment according to Arthurs (2017) is the process of determining the worth of something or performance of individuals on a skill based on measurement. Assessment will also provide information on the level of skill needed for an acceptable or target standard. The difference between the standard or performance needed and the level of performance possessed by the teachers will indicate a capacity gap which needs to be acquired through capacity building efforts. Olatunji et al (2015) opined that need may arise anytime an actual condition differs from a desired condition in the human or people or aspect of organization performance. Therefore, for the students to be well trained in Building Technology, their teachers must have possessed the needed relevant skills improvement for teaching the course in higher institutions in Nigeria.

A lecturer is a person that has been trained pedagogically and in the subject matter, equipped with skills and competencies which can be used to teach effectively. Philip and Matthew (2014) stated that a lecturer is someone who has undergone the necessary and recommended training in a teacher preparatory programme and is charged with the full

responsibility of managing the classroom in such a way as to enhance the learning behaviour of the students. A lecturer of Building Technology is someone who has undergone the necessary and recommended training in Building Technology and has the responsibility of teaching the content of Building Technology effectively in the higher institutions. However, as it is the responsibility of teachers of Building Technology to teach the new course outline, there is need for competency. Competence is the ability to do something well. In the view of Gilakjani (2012), to be competent means that a person has the ability or power, to demonstrate knowledge, skills and attitudes that are sufficiently required to perform a given job or task. Shaw (2020), explained that competency is a functional ability to apply to practical situation the essential principles and techniques of a particular subject matter or field. Functional ability of Teachers of Building Technology to demonstrate knowledge, skills and attitudes required in teaching Building Technology indicates competence. If on the other hand, one could not satisfactorily demonstrate knowledge, skills and attitudes required in the teaching, then the individual has a gap for self-reliant which shows lack of competence.

Self-reliance is the autonomy of decision- making and full mobilization of a society's own resources. It also means self-confidence, reliance primarily on one's resource, human and natural, and the capacity for autonomous goal-setting. A self-reliant person is an individual who relies on oneself or on one's own powers and resources, depending less on other people in the management of human and material resources. According to Agnes and Aluko (2021), individuals will be self-reliant when they have possible cause to access and utilize the essentials of life which includes good food, clothing, shelter, medication, transportation and functional education.

II. Statement of the Problem

Vocational technical education is a programme planned to impact employable skills, but its inability to impart the necessary skills to students has contributed to the high level of unemployment in the country. This is evidenced in a World Bank report (2016) cited by Adams (2018), it estimated that about million Nigerians are unemployed and that employers find it difficult to absorb young graduates because they do not possess the modern skills needed in the 21st century economy. Also, World Bank survey which was reported by Akande et al (2018), revealed that most graduates are weak in problem solving, business understanding, computer use, teamwork, and communication skills. The products of Building Technology are not left out of this problem. The above gave rise to the assessment of modeling skills required for self-reliance of building technology students in Polytechnics in Rivers State.

III. Aim and Objectives of the Study

The aim of the study was to determine the modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. Specifically, the study determined the:

Structural Modeling skills required for self-reliant of building technology students in

Polytechnics in Rivers State.
Architectural Modeling skills required self-reliant of building technology students in Polytechnics in Rivers State.
Construction modeling skills required for self-reliant of building technology students in Polytechnics in Rivers State.

Research Questions

The following research question guided the study;

What is the structural modeling skills required for self-reliant of building technology students in Polytechnics in Rivers State?
What is the architectural modeling skills required for self-reliant of building technology students in Polytechnics in Rivers State?
What is the construction modeling skills required for self-reliant of building technology students in Polytechnics in Rivers State?

Hypotheses

The following hypotheses were formulated and tested at.05levelofsignificance;

HO1: There is no significant difference between the mean responses of lecturers and instructors on the structural modelling skills required for self-reliance of building technology students in Polytechnics in Rivers State.
HO2: There is no significant difference between the mean responses of lecturers and instructors on the architectural modelling skills required for self-reliance of building technology students in Polytechnics in Rivers State.
HO3: There is no significant difference between the mean responses of lecturers and instructors on the construction modelling skills required for self-reliance of building technology students in Polytechnics in Rivers State.

IV. Methodology

The study employed descriptive survey research design. The design was considered appropriate since it permits the investigator to obtain direct information from the respondents so as to formulate rational, sound inference, and recommendations for the study. The study was carried out in two Polytechnics in Rivers State, comprising of Ken Sarowiwa Polytechnic and Captain Elechi Polytechnic. The population for the study was 76 respondents, comprising of 76 respondents, comprised 47 Building Technology Lecturers and 29 Instructors in the two Polytechnics in Rivers State, The study was a census as the entire population was studied, This is in consonance with Maduabum (2007) who stated that, a survey in which the entire population is studied is referred to as census. The data used in the study were collected through questionnaires. The research instrument was designed on the bases of 5 Likert scales of Strongly Agree (SA-5), Agree (A-4), Undecided (UD-3), Disagree (D-2) and Strongly Disagree (SD-1). The instrument was face-validated by three experts, two from The instrument was subjected to face-validation by three experts; one from the Department of Civil Engineering, Rivers State University, Nkpolu, one from the Department of Industrial Technology Education, Ignatius Ajuru University of Education, Rumuolumini and one from Department of Building Technology, Captain Elechi Polytechnic,

Port Harcourt. The experts were requested to read through the questionnaire item by item for clarity and appropriateness based on the research questions under investigation. The experts' comments and suggestions were utilized to structure the new questionnaire instrument that was used for the study. Cronbach Alpha reliability method was adopted to determine the internal consistency of the questionnaire items. The reliability coefficient obtained from questionnaires was 0.82. Seventy six (76) copies of the questionnaire were administered to the respondents with the help of three research assistants. The 70 copies which represent 94% of the administered questionnaires were retrieved and analyzed. The calculation of the mean, standard deviation and t-test was carried out with Statistical Package for Social Science version 23.10 (SPSS). To answer research questions 1 2 and 3, questionnaire items within mean scores of 3.50 and above was uphold and questionnaire items within mean scores of 3.49 and below was rejected. the decision for null hypotheses was as follows: if the calculated value of the (t- cal) was less than the critical value of (t-crit), accept the null hypothesis but if the calculated value of the (t- cal) is greater than or equal to the critical value of (t-crit) at .05 level of significance, then reject the null hypothesis.

V. Results and Findings

Research Question 1: What are the structural modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State?

Table 1: Mean and standard deviation on Structural Modelling Skills Required for Self-reliant of Building Technology Students

		Lecturers			Instructors		
	Ability to:	X	SD	RMK	X	SD	RMK
1	Create detailed three-dimensional structural models using software like AutoCAD or Revit.	4.60	.49	Agree	4.59	.50	Agree
2	produce accurate structural drawings and details from models	4.70	1.89	Agree	4.38	.49	Agree
3	calculate and apply different types of loads on structures	4.50	.52	Agree	4.56	.50	Agree
4	Know the principles and methods for analyzing structural integrity and behavior	4.42	.50	Agree	4.35	.49	Agree
5	Have proficiency in specialized structural modelling software	4.54	.48	Agree	4.65	.66	Agree
6	Be Familiar with local and international building codes and standards relevant to structural design	4.70	.60	Agree	4.79	.60	Agree

7	Understand the properties and specifications of various construction materials	4.70	.46	Agree	4.79	.41	Agree
8	Understand geometry and spatial relationships in structural design.	4.79	.46	Agree	4.76	.43	Agree
9	Use Scheduling software	4.76	.41	Agree	4.85	.36	Agree
10	Collaborate effectively with architects and engineers to integrate structural elements	4.50	.45	Agree	4.79	.41	Agree
11	Make Detailed existing conditions site plan	4.47	.50	Agree	4.35	.49	Agree
12	Ability to detailing reinforcement for concrete structures and understanding of rebar placement	4.46	.52	Agree	4.62	.49	Agree
13	Produce and managing comprehensive documentation related to structural designs.	4.57	.54	Agree	4.79	.49	Agree
14	to troubleshoot and resolve design issues	4.63	.54	Agree	4.53	.41	Agree
15	use parametric design tools to create adaptable structural models	4.75	.49	Agree	4.76	.51	Agree
	GRAND MEAN/SD	4.09	0.65	Agree	4.07	0.43	Agree

Data in Table 1 is the result of the mean responses of Building Technology Lecturers and Instructors on the Structural Modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The table revealed that Lecturers had a mean range of 4.42-4.79 and standard deviation of .49 - 1.89. While Instructors had a mean range of 4.35-4.85 and standard deviation of .36-.66. The closeness of the standard deviation showed the homogeneity of the respondent's opinions. The respondents agreed that Structural Modelling skills are required for self-reliant of building technology students in Polytechnics in Rivers State.

Research Question2: What is the architectural modeling skills required for self-reliant of building technology students in Polytechnics in Rivers State?

Table 2: Mean and standard deviation on Architectural Modelling Skills required for Self-reliant of Building Technology Students

	Lecturers			Instructors		
Ability to:	X	SD	RMK	X	SD	RMK

1	Know the fundamental design concepts, aesthetics, and functional aspects of buildings	4.42	.50	Agree	4.53	.50	Agree
2	Create detailed 3D architectural models using software	4.53	.52	Agree	4.62	.56	Agree
3	Create realistic renderings and visualizations for presentations using tools like V-Ray or Lumion	4.74	.44	Agree	4.82	.39	Agree
4	Generate comprehensive construction documents and specifications from architectural models	4.71	.46	Agree	4.71	.46	Agree
5	Know sustainable design principles and green building certifications	4.65	.54	Agree	4.76	.50	Agree
6	produce accurate architectural drawings and details from models	4.69	.47	Agree	4.65	.49	Agree
7	Skills in planning and organizing spaces for functionality and flow within architectural designs	4.53	.60	Agree	4.41	.70	Agree
8	communicate and work with multidisciplinary teams, including engineers and landscape architects.	4.48	.50	Agree	4.47	.51	Agree
9	Use Design Authoring Software	4.53	.50	Agree	4.62	.49	Agree
10	Use Model Review Software	4.76	.45	Agree	4.71	.58	Agree
11	Ability to incorporate user needs and preferences into architectural designs	4.72	.45	Agree	4.71	.46	Agree
12	Know parametric design tools	4.64	.48	Agree	4.68	.47	Agree
13	Skills in evaluating site conditions and constraints for informed design decisions	4.47	.86	Agree	4.62	.60	Agree
14	Understand properties and applications of various architectural materials	4.62	.60	Agree	4.32	.73	Agree
	GRAND MEAN/SD	4.02	0.07	Agree	4.15	0.23	Agree

Data in Table 2 is the result of the mean responses of Building Technology Lecturers and Instructors on the architectural modelling skills required for self-reliant of building

technology students in Polytechnics in Rivers State. The table revealed that Lecturers had a mean range of 4.42-4.76 and standard deviation of .44 - .86. While Instructors had a mean range of 4.32-4.82 and standard deviation of .39-.73. The closeness of the standard deviation showed the homogeneity of the respondent's opinions. The respondents agreed that architectural modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State.

Research Question 3: What are the construction modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State?

Table 3: Mean and standard deviation on Construction Modelling Skills required for self-reliant of Building Technology Students

		Lecturers			Instructors		
	Ability to:	X	SD	RMK	X	SD	RMK
1	Produce detailed construction drawings and blueprints	4.45	.87	Agree	4.56	.99	Agree
2	Plan, execute, and monitor construction projects	4.77	.42	Agree	4.82	.39	Agree
3	Know different construction materials and their appropriate applications	4.50	.71	Agree	4.44	.79	Agree
4	Work effectively with architects, engineers, and contractors	4.70	.46	Agree	4.85	.36	Agree
5	Create realistic renderings and visualizations for presentations	4.72	.57	Agree	4.62	.55	Agree
6	Use industry-standard AutoCAD	4.78	.55	Agree	4.71	.52	Agree
7	Use industry-standard SketchUp	4.59	.61	Agree	4.50	.56	Agree
8	Use industry-standard Revit	4.52	.61	Agree	4.24	.50	Agree
9	Ability to evaluate land for construction suitability and environmental impact	4.58	.61	Agree	4.44	.56	Agree
10	Skills in calculating and predicting project costs and budgets	4.46	.61	Agree	4.41	.56	Agree
11	Proficiency in creating three-dimensional representations of structures	4.77	.42	Agree	4.79	.41	Agree

12	Understand building codes and regulations to ensure legal compliance	4.78	.42	Agree	4.85	.36	Agree
13	Use BIM software to integrate all aspects of a construction project.	4.71	.46	Agree	4.85	.36	Agree
	GRAND MEAN/SD	4.64	0.56	Agree	4.75	0.45	Agree

Data in Table 3 is the result of the mean responses of Building Technology Lecturers and Instructors on the construction modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The table revealed that Lecturers had a mean range of 4.45-4.78 and standard deviation of .42- .87. While Instructors had a mean range of 4.24-4.85 and standard deviation of .36-.99. The closeness of the standard deviation showed the homogeneity of the respondent's opinions. The respondents agreed that construction modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State.

Test of Hypotheses

HO1: There is no significant difference between the mean responses of lecturers and instructors on the structural modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State.

Table 4.: t-Test Analysis on Structural Modeling skills required for self-reliant of Building Technology Students

Respondents	N	Mean	SD	Df	p-V	Sig. (2-tailed)	Decision
Lecturers	47	3.94	1.03				
				74	0.25	1.96	Accept
Instructors	29	4.05	0.90				

Table 4. is the result of an independent sample t-test comparing the mean responses between the mean response of lecturers and instructors on the structural modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The data revealed that the mean of lecturers is 3.94 and a standard deviation. 1.03. For instructors the mean of 4.05 and a standard deviation of 0.90 were obtained. The table revealed that P-value of .25 is less than 2-tailed significant level of 1.96. This indicated that the stated hypothesis was accepted thus there is no significant difference between the mean responses of lecturers and instructors on the structural modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The two groups did not differ in their opinions.

HO2: There is no significant difference between the mean responses of lecturers and

instructors on the architectural modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State.

Table 5: t-Test Analysis on Architectural Modeling skills required for Self-reliant of Building Technology Students

Respondents	N	Mean	SD	Df	p-V	Sig. (2-tailed)	Decision
Lecturers	47	4.07	0.94	74	-0.44	1.96	Accept
Instructors	29	3.99	1.03				

Table 5 is the result of an independent sample t-test comparing the mean responses between the mean response of lecturers and instructors on the architectural modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The data revealed that the mean of lecturers is 4.07 and a standard deviation. 0.94. For instructors the mean of 3.99 and a standard deviation of 1.03 was obtained. It shown that P-valu of -0.44 is less than 2-tailed significant level of 1.96. This indicated that the stated hypothesis was accepted thus there is no significant difference between the mean responses of lecturers and instructors on the architectural modeling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The two groups did not differ in their opinions.

HO3: There is no significant difference between the mean responses of lecturers and instructors on the construction modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State.

Table 6: t-Test Analysis on Construction Modeling skills required for Self-reliant of Building Technology Students

Respondents	N	Mean	SD	Df	p-V	Sig. (2-tailed)	Decision
Lecturers	47	4.20	0.91	74	-0.32	1.96	Accept
Instructors	29	4.11	0.87				

Table 6 is the result of an independent sample t-test comparing the mean responses between the mean response of lecturers and instructors on the construction modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The data revealed that the mean of lecturers is 4.20 and a standard deviation. 0.91. For instructors the mean of 4.11 and a standard deviation of 0.87 were obtained. It revealed that P-value of -0.432 is less than 2-tailed significant level of 1.96. This indicated that the stated

hypothesis was accepted thus there is no significant difference between the mean responses of lecturers and instructors on the construction modeling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The two groups did not differ in their opinions.

VI. Summary of Finding

The findings of research questions revealed that structural modelling skills, architectural modelling skills and construction modelling skills are required for self-reliant of building technology students in Polytechnics in Rivers State. This sustained with the findings of the hypotheses.

Discussion of Findings

The findings of objective one revealed that Structural Modelling skills are required for self-reliant of building technology students in Polytechnics in Rivers State. The findings of the hypothesis revealed that P-value of .25 is less than 2-tailed significant level of 1.96. This indicated that the stated hypothesis was accepted thus there is no significant difference between the mean responses of lecturers and instructors on the structural modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The two groups did not differ in their opinions. The findings of the study is in agreement with Abanda et al., (2015), who highlighted the use of BIM to manage project information management in construction projects and stressed that the adoption of BIM in the construction industry has helped bring solutions to the sector's problems. Antón, et al. (2018) explained that dated the utilization of Information Technology (IT) in the United Kingdom to early 1970s and further opined that the globalization of construction works such as the pre-fabrication and assembly of building components will greatly increase the usefulness of IT in construction projects.

The findings of objective two revealed that architectural modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The findings of the hypothesis revealed that P-value of -0.44 is less than 2-tailed significant level of 1.96. This indicated that the stated hypothesis was accepted thus there is no significant difference between the mean responses of lecturers and instructors on the Architectural Modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. The two groups did not differ in their opinions. The findings of the study is in line with Beshr, et al. (2011) noted that the development of BIM framework is significant in the overall process of integrating BIM in construction process to improve the various project activities and processes.

The findings of objective three revealed that construction modeling skills required self-reliant of building technology students in Polytechnics in Rivers State. The findings of the hypothesis revealed that P-value of -0.432 is less than 2-tailed significant level of 1.96. This indicated that the stated hypothesis was accepted thus there is no significant difference between the mean responses of lecturers and instructors on the construction modeling skills required for self-reliant of building technology students in Polytechnics in Rivers State.

The two groups did not differ in their opinions. The findings of the study is in line with Leśniak, et al (2021) who explained that the main trend of the construction industry in the 21st century is the creation of different spaces to improve the quality of human life and in forms that were previously unavailable to meet various user needs. These needs have increasingly decided that the buildings be massive and the shapes be more complex; thus, the design of free-form and complex elements, manufacture of building components, and construction technology at the site must be supported to meet these needs.

VII. Conclusion

Statistically, meaningful results from the analyses of the research data were rare. Few quantitatively meaningful results were produced by the quest for patterns and predictors. However, the analyses identified areas of interest for each of the three research issues, and on the other hand will encourage researchers and others to design additional studies to delve deeper into those areas uncovered in the extensive body of the subject matter. The quality of learning about modelling skills required for self-reliant of building technology students in Polytechnics in Rivers State. By identifying the specific modeling skills that are mostly in demand within the building technology industry, the study can provide valuable insights for educational institutions, job seekers, and employers. Understanding which modeling skills s are highly sought after can help universities and technical institutes tailor their curriculum to meet the current industry needs, ensuring that graduates are equipped with the right skills to secure employment in the field. The findings can also shed light on potential skill gaps that may exist among recent graduates in building technology. By identifying areas where graduates may be lacking in terms of modelling skills know-how, educational institutions and training programs can adjust their courses to address these shortages, ultimately better preparing students for the workforce.

VIII. Recommendation

On-the-job training for lecturers in form of workshops should be organized on how to use Structural modelling skills for better teaching of building technology to the students.

There should be adequate provisions of facilities, tools and equipment, which are necessary for teaching concept and skills in architectural modelling effectively.

Construction modelling learning technique should be encouraged by the building technology lecturers as it has the capacity to improve students' achievement in building technology.

Reference

Afeti, G. A. (2015). A decade of polytechnic education in Ghana. Daily Graphic. April 13, 15 & 18, p. 10.

Agnes L O & Aluko O. F (2021). Vocational Business Education for Self-Reliance and Employability in Contemporary Nigeria - A Tool for Curbing Corruption 17-28-26.

Azhar, S. (2011). "Building Information Modeling (BIM): An Emerging Technology for Enhanced Project Delivery." In *Construction Research Congress, 293-302.

Barrett, N. (2011). The rise of a profession within a profession: the development of the architectural technology discipline within the profession of architecture. PhD thesis, Robert Gordon University.

Caplehorn, P. L. (2017). The challenges facing the architectural technologist profession. Journal of Building Survey, Appraisal & Valuation, 5(4), 302-308.

Dave B. Lauri J. K., Arto K & Patrícia T (2013). Implementing lean in construction: lean construction and BIM t: https://www.researchgate.net

Eastman, C., Teicholz, P., Sacks, R., & Liston, K. (2011). BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors. Wiley educational supervision.

Giere, R. N. (2004). "A New Introduction to Modeling in Science." In "Models and Representations," edited by Michael M. Siegel. Oxford University Press.

Ibrahim J., Gideon O & Monisola O (2019). Significance of Employee Engagement and Individual Well-Being on Organisational Performance in Nigeria. International Journal of Science and Management Studies (IJSMS) DOI:10.51386/25815946/ijsms-v2i5p104

Kerzner, H. (2017). "Project Management: A Systems Approach to Planning, Scheduling, and Controlling." Wiley.

Kollnig, S., & Schmitt, G. (2019). Architectural Modeling: A Guide to Practical Architectural Design. Springer.

Kymmell, W., (2018). Building Information Modelling: Planning and Managing Construction Projects with 4D CAD and Simulations. McGraw Hill Construction, New York.

Maier (2019). Principles of Neurorehabilitation After Stroke Based on Motor Learning and Brain Plasticity Mechanisms.

Oxman, R. (2008). Digital Architecture as a Challenge for Design Pedagogy: Theory, Knowledge, and Skills.

Philip O. P., oduola O. D. & Matthew O I (2014). Relationships between ICT competence and attitude among some Nigerian tertiary institution lecturers. International journal of scientific research in education 7(1)91-104.

Shaw C. W (2020). Competency Definitions, Development and Assessment: A Brief Review. International Journal of Academic Research in Progressive Education and Development 9(3):95-114.

Sullivan, J. (2017). Lifelong learning: Empowering yourself and others through knowledge. Journal of Learning Development in Higher Education.

Toomey, J. (2020). "Introduction to Modeling and Simulation." Wiley.