



Global Scientific JOURNALS

GSI: Volume 10, Issue 4, April 2022, Online: ISSN 2320-9186

www.globalscientificjournal.com

**Material Management Skills Required of Brick/Block Laying and Concreting
Graduates in Building Construction Sites in Technical Colleges in Rivers State**

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March, 2022

ABSTRACT

The study aimed at assessing material management skills required of brick / block laying and concreting graduates in building construction sites in technical colleges in Rivers state. Three specific objectives, research questions and three corresponding hypotheses were posed, formulated and tested at 0.05 level of significance. Descriptive survey research design was adopted for the study. Area of the study was Rivers state and the population was 80 respondents comprising of 20 brick/block laying teachers and 60 construction site workers in the four technical colleges in Rivers state. Sample was the entire population of the 80 respondents and census was adopted as sample. Instrument used was a structured one tagged Material Management Skills Required of Brick/Block Laying and Concreting Graduates in Building Construction (MMSRBLCGBC) questionnaire. The instrument was structured in a likert of strongly Agreed to Strongly Disagreed. The validation was face and content validation by three (3) experts in vocational and Technology Education and a measurement and evaluation expert and reliability index of 0.77 was achieved through test re-test method. Findings from the study revealed that the respondents agreed that materials planning skills are required of brick/block laying and concreting graduates in building construction sites in technical colleges in Rivers state. Findings also revealed that the respondents agreed that material purchasing skills are required of brick/block laying and concreting graduates in building construction sites in technical colleges. Based on the findings, conclusion was made and recommendations made amongst others included that material supply should be optimum to avoid stock out while work in progress and organisation should always take into cognizance the cost of production or price of raw materials before arriving at selling price.

Introduction

In a developing country like Nigeria, the importance and relevance of technical and vocational education and training (TVET) cannot be over emphasized. This is because according to Imogie (2014), no nation can develop to its fullest and keep pace with trends in science and technology without effective and efficient technical and vocational educational and training (TVET) system. TVET equips people with a broad range of knowledge, skills and attitudes that are now recognized as indispensable for meaningful participation in work and life (Okwelle, 2013). TVET involves the acquisition of skills and competencies that can help individuals to function productively in industrial and commercial occupations (Wapmuk, 2011). The National Policy on Education (NPE) clearly states that, “technical and vocational education is used as a comprehensive term referring to those aspect of the educational process involving in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life” (FGN, 2013).

The main thrust of TVET is to develop skills in learner –skills that are practical in nature. Okoye and Okwelle (2013) posited that TVET is a system of education that prepares, develops and practically orientates the individual for the purpose of transforming ideas into reality. Idoko (2014) explained that acquisition of practical skills involves the development of new skills, practice and way of doing things or performing a task, usually gained through training or experience. From the foregoing, practical skills acquisition could be referred to as an organized process of training which eventually leads to effectiveness in a given trade. It is an ability to do a given job better and faster with enhanced output. In Nigerian educational system, technical colleges offer technical and vocational education programmes for the purpose of producing middle level skilled manpower required for the nation’s economic and technological development (Federal Republic of Nigeria (FRN, 2013). In the words of Avan (2007), a technical college is the “factory” for the production of needed technologists, technicians, and craftsmen as well as skilled artisans who are required to turn the nation’s economy positively.

A technical college is post primary technical institution established to offer vocational technical programmes. It is established to equip students with technical skills to earn a living. Olakotan (2010) said that technical college is equivalent to senior secondary but designed to prepare individuals to acquire practical skills, basic scientific knowledge and attitude required as craftsmen and technicians at sub-professional level. According to Oyenuga (2003), a technical college in Nigeria is established to prepare individual to acquire practical skills and basic scientific knowledge. It is charged with the production of skilled personnel in the area of mechanical technology, metal work, electrical/electronic technology, wood work and building technology for the needs of society.

Building technology is one of the courses offered in Nigeria technical colleges. Almost all the members of the society benefit from the products of building technology. Building technology programme at the technical college level is designed to produce skilled

builders for the building industry. Building technology as a course comprised of different components or operations which require skills to perform them. These components include designing of building plans, setting out of the building, execution, block work on the concrete foundation, leveling of the building, roofing pattern, plastering and rendering of walls. These areas of operation require that students of building technology should possess the necessary skills to carry them out. Building technology students should possess skills in designing building plans and be able to read and interpret them. Students of building technology should possess skills in setting out of buildings, form block walls on the concrete foundation, be able to level the building and also possess skills in designing good roofing pattern.

Building technology is an aspect of vocational technical education. Vocational technical education is an education for work. According to Okadara (2014), vocational technical education is any form of education whose purpose is to prepare person(s) for employment in an occupation or group of occupations. Okafor (2016) stated that vocational technical education is the acquisition of skills and techniques in chosen occupation or profession to enable an individual earn a living. Osam (2013) viewed vocational technical education as an aspect of education which leads to the acquisition of practical and applied skills. Skills involve the ability to do something well. Skills according to Puyate (2014), are the learned capacities to carry out pre-determined results often with minimum outlay of time and energy. Skill according to Ugwu (2016) is a manual dexterity through repetitive performance of an operation. He further explained that skill is expertness, practised ability, dexterity of tact. It is well established habits of doing things by the people. Skills could be gained through experience and training on skill acquisition and development (Olanka, 2015).

Skill acquisition according to Onwuchekwa (2013), is the process by which individuals are expected to learn and continuous practice in particular task till the learner becomes

proficient in the operation and can perform them when required. Samuel and Kissi (2013) said that skills are acquired when procedural instructions are matched with performance activities. For skills to be acquired, there must be opportunities for participation and practice of such skills under real life situation. Skill acquisition is very necessary at this stage of Nigeria's economic and technological development. Attah (2008) opined that the acquisition of skills prepares students for vocational occupation and progressive development in it. Skill acquisition remains the major goal of vocational technical education and this helps to satisfy the personal work needs of both the individual and the society (Dada, 2012). To acquire skills in vocational technical education courses such as building technology at technical college level, opportunities must be provided for students to practice the skills they are taught in an environment that is relevant to the job skills learnt which include building construction sites. A construction site is an area or piece of land on which construction works are being carried out. The term 'building site' is often used interchangeably with construction site, although this tends to indicate that buildings (and sometimes, more specifically, housing) are being constructed, whereas the term 'construction site' can refer to all types of works, such as road construction, sewer construction, landscaping, and so on (Harris & McCaffer, 2013).

The CDM Regulations suggest that a construction site includes any place where construction work is being carried out or to which the workers have access, but does not include a workplace within the site which is set aside for purposes other than construction work.' Typically, land will become a construction site when it is handed over to a contractor to begin the construction works. Typically, a construction site will revert to being a non-construction site when it is handed back to the client on certification of practical completion. However, there may be ongoing minor work required to rectify any defects that become apparent using material management skills.

Material management is the procedure for planning, executing and controlling the field and office events in construction. The main objective of material management is to make sure that construction materials are always available at their point of use when required (Adafin, Daramola & Ayodele, 2010). Material management is the system for planning and overseeing all of the efforts that are mandatory to ensure that the precise quality and quantity of materials are correctly specified in a timely order, gotten at a reasonable price and most importantly, always available at the point of use when needed. A poor materials management can bring about increase in costs during construction (Adewuyi, 2012). Adeyinka, Jagboro, Ojo and Odediran (2014) viewed materials management as a notion which organizes the responsibility for deciding the manufacturing necessity that is scheduling the manufacturing procedure and purchasing, storing and dispensing materials. An integrated method to material management describes it as the function accountable for the coordination of planning, sourcing, purchasing, moving, storing and controlling materials in a best manner so as to afford a predetermined service to the customer at a lowest cost. These statements provide the scope of materials management which involves materials requirements planning (MRP), determination on purchasing, procurement of materials, inventory management, staffing, stores and warehousing management, production and supply of finished goods at lowest cost at due time. To manage materials is to manage the life of an organization. No organization can make it without proper management of materials. The bottom line and efficient flow of input material either procured from outside manufacturing or produced in house (Ajayi, Oyedele, Akinade, Bilal, Alaka & Owolabi, 2017).

Keeping of materials of lowest cost is a management function of planning, organizing and controlling all the events that contributes to materials cost management thus, includes the total process from a necessity, for material/or services or works rising, right across to the supply of works to the user and in numerous causes, the product being made available always to the final customer or consumer from the above, it important to carry out an

efficient control over materials by creating a separate function/department to be in custody of materials and this will be termed materials management department. This department should have planned duties of total cost control, elimination of materials waste and profit optimization. Materials management is now said to be the last limit for cost control and profit improvement, influencing to higher production and productivity and thus widely created for cost-effectiveness in any individual business management echelon must appreciate that it is not the materials manager's main prerogative, but in fact this laurel. Whatever and whenever realized, depends primarily on top management support and without its approval all his efforts are exercise in futility among which include material management skills.

Material management first step is planning in that case to measuring, ordering and scheduling, material planning is most important process to increase the productivity, profit and assisting the time to complete the construction project. In that construction the material process not implemented the total project will be damaged and the project will not complete with in the time (Albert, 2014). If maintain the proper planning in material to decrease the total project cost and the material waste also decreases. The materials planning process covers setting up and maintaining the records of each part used in each plant to determine target inventory levels, and delivery frequency (Ameh & Itodo, 2013). Effective management of the materials record will help the flow of materials at the site in order to avoid several problems such as materials out of stock and materials that have not been delivered. It also provides guides to all the subsequent activities and this could have a great impact on the project plan and purchasing.

Purchasing of material is involved in maintaining control over the ordering, in every construction project purchasing and receiving functions are important, purchasing department is one of main responsible part to ordering the best quality and right price at right time, in construction project purchasing department is procedure applies to purchase of all material related to construction, services, supplies, tools, equipment and equipment

rental for all development. Construction purchasing procedure activities are mainly: purchasing over review, requisition for material order, order placement, record keeping and matching, order and arrivals, purchase order follows up, material transfers and sundry purchases.

The objective of procurement in materials management is to provide quality materials at the right time and place, and at an agreed budget. Beamon (2008) stated that procurement is about organizing the purchasing of materials and issuing delivery schedules to suppliers and following-up, to make sure that suppliers deliver on time for storage. Stock control means to maintain proper technique to be cover and supply of all materials when they are required, it include the raw materials, processed materials, arrange all works, to maintained the materials and spares especially in handling materials (Bekr, 2014). Handling of materials means to maintains the perfect order to supply the materials for their movement and location, in material handling to give the rating to materials based on quality and it should be consider when designing a material handling system, to supply the effective operation of manpower, increase the output and advance to the system for more flexible.

Handling of materials is the flow component that provides for their movement and placement. The importance of appropriate handling of materials is highlighted by the fact that they are expensive and engage critical decisions. Due to the frequency of handling materials there are quality considerations when designing a material handling system. It is important to know the type of material handle system since it enhances the production process, provides effective utilisation of manpower, increases production and improves system flexibility and controlling them (Dania, Kehinde & Bala, 2007). However, without acquiring material management skills, graduates of building technology may be less functional in the society. Material management skills are teachable skills. They can only be acquired when relevant materials, tools and equipment are available for teaching.

Relevant tools and equipment enhance practical teaching and learning process. Quality of instructions offered to the students depends on the teaching strategies employed. The process of offering quality instructions to students involves the use of sophisticated tools, equipment and machines, delicate materials and complex methods of work. This now demands for skilled graduates to be involved in material management practices in the construction sites.

Technical college is an institution where students are taught skill acquisition, upon completion of their courses, they either gainfully employed or they choose further their education. Technical college according to Abdullahi (1998) is that institution which provides through training with the adequate knowledge, skills and attitudes for gainful employment under the guidance of a teacher, in a related occupation, using workshops as work places for practices. The technical colleges play vital roles in Nigeria. They train and produce technician for industry, impart vital technical skills in the youths, help towards the goal of self-employment and job creation and in the struggle towards technological advancement and acquisition. UNESCO (2001). Through the technical colleges, youths acquire such skills as skilled technicians, bricklayers, carpenters, painters, and auto-mechanics, laboratory and pharmacy technicians, electrical/electronic technicians and skilled vocational Nurses (N.B.T.E, 2001) defined technical education as that aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge. Technical education provides opportunities for the mastery skills and knowledge in selected occupations as well as for the development of personality for useful living. They essentially:

Brick/Block laying and concreting is one of the trade courses offered in technical colleges for the purpose of acquiring theoretical knowledge and practical skill in building construction. Technical education in technical college has course offerings for specialization which include and not limited to auto-mechanics, metal work, building construction, woodwork, Electrical/Electronics engineering (F.R.N, 2014). The N.P.E

further outlined general education theory and related courses, workshop practical and industrial training/ production education, theory and related components, which the curriculum of each technical training should consist of.

Material management can be defined as a process that coordinates planning, assessing the requirement, sourcing, purchasing, transporting, storing and controlling of materials, minimizing the wastage and optimizing the profitability by reducing cost of material. Abdul and Alidrisyi (1994) noted that Materials management is a process for planning, executing and controlling field and office activities in construction. While Adafin, Daramola and Ayodele (2010) viewed Materials management as the system for planning and controlling all of the efforts necessary to ensure that the correct quality and quantity of materials are properly specified in a timely manner, are obtained at a reasonable cost and most importantly are available at the point of use when required.

The process of planning construction methods has been defined as "understanding what has to be built, then establishing the right method, in the most economical way to meet the client's requirements" (Donyani & Flanagan, 2009). This is a detailed scheme for achieving an objective for certain work tasks. In the case of materials, there is a need for an appropriate planning, which must be done concurrently with engineering, construction, and other project plans. Hafez, (2010) also mentioned, thus, material planning will provide guides for all the subsequent activities and can have a great impact on the project plan. The materials planning process covers setting up and maintaining the records of each part used in each plant to determine target inventory levels, and delivery frequency. As a result, an excellent management of the materials record will help the flow of materials at the site in order to avoid several problems such as materials out of stock and materials that have not been delivered.

The term procurement encompasses a wide range of activities that includes purchasing of equipment, materials, labour and services required for construction and implementation of

a project (Krejcie & Morgan, 1970). The objective of procurement in materials management is to provide quality materials at the right time and place, and at an agreed budget. Morenikeji (2006) stated that procurement is about organizing the purchasing of materials and issuing delivery schedules to suppliers and following-up, to make sure that suppliers deliver on time. A failure in the purchasing process or in overseeing and organizing the buying functions as listed by Patel and Vyas (2011) could result in:

- i. Over-ordering of materials (wastage problems)
- ii. Over-payments for materials (inadequate administrative procedures)
- iii. Loss of benefits (lack of skilled negotiating procedures)
- iv. Lack of knowledge (when and where the best service/source might be available at any particular time).

According to Saidu and Shakantu (2016) material storage can be defined as merely keeping material(s) in safe place until it is required or requested for use in a manufacturing process. Manufacturing process also includes construction process. To obtain good material storage, a system whereby material are systematically organized by administratively keeping them safely and providing for the best means of flowing in and out of them is adopted. Storage of materials is the direct responsibility of site management and has a strong influence of material. Sheriff, Remon and Hala (2015) advanced that attitude taken to newly delivered materials and components will be carried through their subsequent handling and usage. A careless regard for the value and utility of the materials on part of the management could lead to a progressive deterioration in the operatives' regard for the materials. The system adopted for the storage of materials will therefore depends wholly on the co-operation of the site team. He stressed further that areas on site allocated for the storage of materials should be determined after considering the under listed questions: -

1. Will construction take place in that area?
2. Is the storage for a long- or short-term relative to the contract time?

3. Can delivery transit vehicles safely and easily reach the areas?
4. Can on site movement storage area to point of use be safely and economically carried out?
5. Are the materials as near t their point of use as practically possible?
6. Is the materials have considered value are they in a security area?
7. Will the storage area create problems in routine site transport and personnel?

Statement of the Problem

Building technology is one of the vocational programmes offered in technical colleges. It is designed to produce building technicians for the construction/building industry. In building technology according to Daramola (2013), students are expected to work with materials, tools, equipment and machines to mould blocks, carry out preliminary site operations, concreting, block wall construction and finishing in the building industry. In building technology according to Faga (2005) students learn building construction, brick/block laying, technical drawing, building drawing, construction management, surveying and quantity surveying.

The aim of this initiative is to increase the technological growth of the country and to allow students to acquire more technical skills. In spite of Federal Government's emphasis on improving technology, building technology students still find it difficult to acquire building skills that can make them functional in the society after graduation. Students of building technology graduate with little or no building skills at all to enable them work in building industries or firms or to be self-employed. These graduates need necessary building skills in order to take up job in building industries that are now springing up here and there (Onwuchekwa, 2013). Skills are needed to service the sophisticated technical equipment that are now being imported into the country. Acquisition of saleable skills is the answer to the unemployment among the youths. Samuel and Kissi (2013) explained that the level of unemployment in a state is indicative of the quality and quantity of manpower available. Obi (2015) also said that the main cause of unemployment among

school leavers is lack of training and skills. In order to reduce unemployment among building technology students after graduation and for them to contribute their quota to the development of the state, building skills need to be taught by technical teachers, modern building technology tools and equipment for teaching relevant skills in building must be readily available, also good teaching strategies must be used to teach building skills to the students and correct evaluation strategies are to be applied to evaluate students' performance both with and outside school.

The question is, would building skills such as material management skills enhance brick/block laying and concreting students' performance in construction sites? Would their performance be sustainable? Will it encourage the completion of building projects on sites? Answers to this question gave rise to the study.

Purpose of the Study

The aim of the study was to assess material management skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State. Specifically, the study sought to assess the following:

1. Material planning skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.
2. Material purchasing skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.
3. Material storage skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.

Research Questions

The following research questions were formulated to guide the study

1. What are the material planning skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State?

2. What are the material purchasing skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State?
3. What are the material storage skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State?

Hypotheses

The following hypotheses were structured to guide the study and was tested at .05 level of significance

1. There is no significant difference between the mean responses of teachers and expert on the material planning skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.
2. There is no significant difference between the mean responses of teachers and expert on the material purchasing skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.
3. There is no significant difference between the mean responses of teachers and expert on the material storage skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.

Method

This study adopted a descriptive survey research design. The descriptive survey research design was considered suitable because the study elicited data or information from respondents on material management skills required of brick/block laying and concreting graduates in building construction sites in technical colleges in Rivers State. The area of the study was Rivers State and it was carried out in Technical Colleges in Rivers State. The population of the study was 80 respondents, comprising 20 brick/block laying teachers and 60 construction site workers in the four Government Technical Colleges 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 choice of census is due to the relatively small size of the population. The instrument for data collection was a structured questionnaire titled "Material Management Skills Questionnaire".

The instrument was developed by the researcher after the review of relevant literature on material management skills required of brick/block laying and concreting graduates in building construction sites in technical colleges in Rivers State. The instrument contained three sections A-C. The instrument was structured on five-point likert rating scale of Strongly Agreed (SA), Agreed (A), Undecided (U), Disagreed (D) and Strongly Disagreed (SD). A corresponding numerical value of 5, 4, 3, 2 and 1 was assigned to the response scale for each item as represented below with real limits. The instrument was subjected to face and content validation by three experts. 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 will be used for the study. The internal consistency of the instrument was established using test-retest reliability method. Twenty (20) copies of the instrument were administered to twenty teachers and building experts in Government Technical Colleges in Bayelsa State, which is outside the area of the study

but possessed similar characteristics with the area of study, in terms of curriculum. Their responses were scored and computed using the statistical package for social science (SPSS). This gave a reliability coefficient of 0.77.

The copies of the questionnaire were administered to the respondents with the help of three research assistants. Several visits were made by the researcher and the research assistants to the respondents. The researcher informed the research assistants on the procedures required in administering the questionnaire instruments. The questionnaire was administered and retrieved by the researcher and the three research assistants from the designated technical colleges for analysis. A total of 80 questionnaire were distributed but 78 questionnaire were retrieved which showed 98 percent returns. Data collected from the respondents were analyzed using mean and standard deviation to answer the research questions and t-test statistics were used to test the null hypotheses at 0.05 level of significance. The decision for hypothesis was; if the calculated value of t (t-cal) is less than or equal to the critical value of (t-crit), accept the null hypothesis, otherwise rejected null hypothesis. The computation of the mean, standard deviation and t-test was carried out with statistical package for social sciences (SPSS).

Results and Analysis

The results were presented in tables as thus;

Research Question 1: What are the material planning skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State?

Table 1: Mean and Standard Deviation on Material Planning Skills Required of Brick/Block Laying and Concreting Graduates

S/N	Item	Teachers			Building Experts		
		\bar{X}	SD	REMARK	\bar{X}	SD	REMARK
1	Providing a list of materials in project and recording/inventory of materials during construction	3.57	.692	SA	3.81	1.039	A
2	Adequate pre-construction	3.56	.732	SA	4.11	.859	A

	survey on material						
3	Providing material cards at site store that contain for example (input-output balance).	4.28	.750	A	4.35	.719	A
4	Providing materials purchase order including for example (order number-material description required quantity-price)	4.93	1.004	A	3.95	.932	A
5	Planning the access route and site lay out before delivering materials to site	4.16	.941	A	4.42	.844	A
6	Employment of security personnel on site	4.95	.875	A	4.09	.860	A
7	Employment of store keeper	4.25	.931	A	4.32	.736	A
8	Providing lighting systems at vintage points	4.99	1.088	A	4.31	.790	A
9	Using basic technology like mobile telephony or laptop or internet for knowing the new materials and their prices and for tracking materials	4.05	.990	A	4.42	.625	A
	Grand Mean	4.30	0.89	A	4.19	0.82	

Source: Field Survey 2021

Data in Table 1 revealed that teachers had a mean range of 3.56-4.99 and standard deviation range of 0.69 - 1.08. While the Building Experts had a mean range of 3.81-4.42 and standard deviation range of 0.62 - 1.03. The standard deviation shows the homogeneity of the respondents. The mean shows that the respondents agreed that material planning skills are required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.

Research Question 2: What are the material purchasing skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State?

Table 2: Mean and Standard Deviation on Material Purchasing Skills Required of Brick/Block Laying and Concreting Graduates

S/N	Item	Teachers			Building Experts		
		\bar{X}	SD	REMARK	\bar{X}	SD	REMARK
1	Recognition of need	4.23	.834	A	4.07	.838	A
2	Description of need	4.40	.821	A	4.09	.808	A
3	Selection of suppliers	4.09	.722	A	4.04	.947	A
4	Determination of prices	4.18	.658	A	4.19	.766	A
5	Preparation of purchase order	4.05	.924	A	4.12	.982	A
6	Placing the order with a selected supplier	4.19	.953	A	4.39	.774	A
7	Monitoring and follow up the order	3.99	.881	A	4.19	.860	A
8	Receiving the ordered materials	3.95	.990	A	4.26	.856	A
9	Checking and approving for payment to supplier	3.98	1.03	A	4.32	.776	SA
	Grand Mean	4.12	0.87	A	4.19	0.85	

Source: Field Survey 2021

Data in Table 2 revealed that teachers had a mean range of 3.15-4.40 and standard deviation range of 0.82 - 1.03. While the Building Experts had a mean range of 4.04-4.39 and standard deviation range of 0.76 - 0.94. The standard deviation shows the homogeneity of the respondents. The mean shows that the respondents agreed that material purchasing skills are required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.

Research Question 3: What are the material storage skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State?

Table 3: Mean and Standard Deviation on Material Storage Skills Required of Brick/Block Laying and Concreting Graduates

S/N	Item	Teachers			Building Experts		
		\bar{X}	SD	RMK	\bar{X}	SD	RMK

1	Delivery of good to the site	4.23	.881	A	4.34	.797	A
2	Offloading	4.44	.926	A	4.16	.902	A
3	Stacking	4.11	.858	A	3.70	1.059	A
4	Protection against deterioration	4.26	.897	A	3.86	1.025	A
5	Identification for future reference	4.09	.989	A	4.17	.891	A
6	Accounting procedures	4.18	.889	A	4.25	.830	A
7	Issue of materials to operatives for use on site	3.97	.954	A	4.26	.809	A
8	Loading for transfer to construction areas	4.04	1.017	A	4.32	.827	A
	Grand Mean	4.17	0.93	A	4.13	0.89	

Source: Field Survey 2021

Data in Table 3 revealed that teachers had a mean range of 3.97-4.44 and standard deviation range of 0.85 - 1.01. While the Building Experts had a mean range of 3.70-4.34 and standard deviation range of 0.79 - 1.05. The standard deviation shows the homogeneity of the respondents. The mean shows that the respondents agreed that material storage skills are required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.

Hypotheses 1: There is no significant difference between the mean responses of teachers and expert on the material planning skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.

Table 4: t-test Analysis on Material Planning Skills Required of Brick/Block Laying and Concreting Graduates

Respondents	N	\bar{X}	SD	α	d.f	t-Cal	t-Crit	Decision
Teachers	20	4.30	.89	0.05	78	1.46	1.69	No Sig

Building Experts	60	4.19	.82
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Source: Field Survey 2021

Result in Table 4 revealed that t-cal (1.46) is less than t-crit (1.69) which indicates that the null hypothesis stated was accepted. Therefore, there is no significant difference between the mean responses of teachers and expert on the material planning skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.

1. There is no significant difference between the mean responses of teachers and expert on the material purchasing skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.

Table 5: t-test Analysis on Material Purchasing Skills Required of Brick/Block Laying and Concreting Graduates

Respondents	N	\bar{X}	SD	α	d.f	t-Cal	t-Crit	Decision
Teachers	20	4.12	.87					
				0.05	78	1.21	1.69	No Sig
Building Experts	60	4.19	.85					

Source: Field Survey 2021

Result in Table 5 revealed that t-cal (1.46) is less than t-crit (1.69) which indicates that the null hypothesis stated was accepted. Therefore, there is no significant difference between the mean responses of teachers and expert on the material purchasing skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.

2. There is no significant difference between the mean responses of teachers and expert on the material storage skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.

Table 6: t-test Analysis on Material Storage Skills Required of Brick/Block Laying and Concreting Graduates

Respondents	N	\bar{X}	SD	A	d.f	t-Cal	t-Crit	Decision
Teachers	20	4.17	.93					
				0.05	78	1.23	1.69	No Sig
Building Experts	60	4.13	.89					

Source: Field Survey 2021

Result in Table 6 revealed that t-cal (1.46) is less than t-crit (1.69) which indicates that the null hypothesis stated was accepted. Therefore, there is no significant difference between the mean responses of teachers and expert on the material storage skills required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State.

Discussion of Findings

Findings of the study on research question one showed that the respondents agreed that material planning skills are required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State. The findings of the study is in line with Adegbile (2012) who explained that material planning will provide guides for all the subsequent activities and can have a great impact on the project plan. The materials planning process covers setting up and maintaining the records of each part used in each plant to determine target inventory levels, and delivery frequency (Bal, Bryde, Fearon & Ochieng, 2013). As a result, an excellent management of the materials record will help the flow of materials at the site in order to avoid several problems such as materials out of stock and materials that have not been delivered. Brandenburg, Govindan, Sarkis and Seuring (2014) mentioned that material planning would provide guides to all the Subsequent activities and that this could have a great impact on the project plan.

Findings of the study on research question two showed that the respondents agreed that material purchasing skills are required of brick/block laying and concreting graduates in

building construction sites in Technical colleges in Rivers State. The findings of the study is in line with Ding (2008) who stated that the term procurement encompasses a wide range of activities that includes purchasing of equipment, materials, labour and services required for construction and implementation of a project (Dixit, Srivastava & Chaudhuri, 2015). The objective of procurement in materials management is to provide quality materials at the right time and place, and at an agreed budget. Donyavi and Flanagan (2009) stated that procurement is about organizing the purchasing of materials and issuing delivery schedules to suppliers and following-up, to make sure that suppliers deliver on time. A failure in the purchasing process or in overseeing and organizing the buying functions as listed by Fischer and Amekudzi (2011) could result in: Over-ordering of materials (wastage problems); Over-payments for materials (inadequate administration procedures); Loss of benefits (lack of skilled negotiating procedures).

Findings of the study on research question three showed that the respondents agreed that material storage skills are required of brick/block laying and concreting graduates in building construction sites in Technical colleges in Rivers State. The findings of the study is in line with Kibert (2016) who asserted that before the material ordered arrives adequate preparation should be pounded for storage and its handing storage of nation and successful coordination are vital so as to prevent dissipation to site prevent dissipation to site procedures and wastage to material caused by disregard and disorganize operatives. Also, good storage enhances proper management of materials aid it minimizes concerned. The rate at which materials are being used and the working order should provide a guide as to the quantity of materials to be ordered.

Conclusion

This research has examined the impacts of materials management practices in the Nigerian building construction industry. This paper describes the impacts of materials management as three categories; environmental impact, economics impact and performance impact.

Based on the findings from this research, the following conclusions are drawn. The study shows the impact of materials management practices improves the overall in handling of materials for more efficiency and effectiveness on the construction site. This is because poor handling of construction materials affects the overall performance of construction projects in terms of cost, time, quality and productivity. Materials management practices improve the success rate of project planning and execution thus lowering the project cost. More so, the minimization of materials wastage during the construction phases is important in order to avoid loss of profits. There should be proper planning of material management practices right from the inception of project execution and should also be practiced on all sites and by all categories of construction industry, whether large, medium or small so as to ensure timely project execution and standard work delivery within reasonable cost, time and quality

Recommendations

From the findings made in this study, the following recommendations are put forward:

1. Material supply should be optimum to avoid "stock outs" while work in process.
2. Organizations should always take into cognizance the cost of production or price of raw materials before arriving at selling price
3. There should be good record system of materials for the operations of the organization particularly as it affects production.

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