EMERGING TECHNOLOGY SKILLS IN BUILDING CONSTRUCTION REQUIRED BY LECTURERS OF COLLEGES OF EDUCATION (TECHNICAL) IN NIGERIA.

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Abstract

The purpose of the study was to determine the emerging technology skills in Building Construction required by lecturers of Colleges of Education (Technical) in Nigeria. Two specific purposes and two research questions guided the study. The area of the study is South Eastern Nigeria. The population for the study was 134 which comprised of all the 20 building technology teachers in 3 colleges of education technical and 114 building industry personnel from reputable building construction companies in South East Nigeria. A descriptive survey research design was adopted for the study, whereas structured questionnaire was used for data collection. The research questions were answered with descriptive statistical tools of Mean. While two null hypotheses were tested using t-test at 0.05 level of significance. It was found that Building Technology is experiencing a paradigm shift today in Nigeria, gap exist in the College of Education (Technical) curriculum. Emerging technologies have changed the designs/concepts development, building materials, building construction methods and building policy issues. That Building Technology teachers need training on Pop- wall/ceiling screeding, wall tiling amongst others. Based on the findings, it was concluded that some emerging technologies like modern design concepts, plaster of Paris wall and ceiling screeding and wall tiling need to be integrated into building technology programme of colleges of education (technical) in order to close lapses in the curriculum, and teachers trained on the new technologies to balance the revolution effect. It was recommended that NCCE should integrate the identified emerging technologies and training institutions should retrain the building technology teachers on the new technological trends.

Keywords: *Technology, emerging technology, building, colleges of education, technical education.*

Introduction

With the advent of technology, man is able to deal with his biological and physical environment. Technology can build bridges in the sea, build sky scrapers, change the landscape/topography of an environment, and fly airplanes. Global experience according to Kvochko, 2013; Umar, Yaduma, and Onuh, 2014; and Eaton, 2017 has shown that

Technology plays vital roles in the advancement of World economy. Technology has advanced in computer, road construction, communication, health issues and Building Technology.

Building Technology as a course of study is offered at tertiary institutions. According to National Commission for Colleges of Education (NCCE, 2012) NCE (Technical) Programme in Building Technology consists of the following contents; Introduction to

Building Construction, Building Science and Materials Technology, Construction Methods I and II, Elementary Structural Design, Land Surveying, Practical Projects, Building Drawing, Building Maintenance and Repairs, School Workshop Management, Construction Management, and

Mechanical Engineering Drawing. In Nigeria, new designs/concepts, building materials, building methods, procedures and techniques are replacing old ones, and new occupations and skills are also springing up fast, all as a result of Emerging Technologies (ETs) in Building Technology.

Valetsianos (2010) described ETs in terms of tools, concepts, innovations, and advancements utilized in diverse educational settings to serve varied education-related purposes which may include instructional, social, and organizational purposes and further declared that the following characteristics can be used to identify ET. ETs may or may not be new technologies, exist in a state of —coming into being, undergo through stages, satisfy the —not yet‖ criteria, are potentially disruptive but their potential is mostly unfulfilled. Gangwar (2017) was of the view that the various ETs in building technology clearly indicate the new modern construction practices and materials are not only cost effective but also having sustainable properties. According to The Government of Western Australia (2014), ET in construction may require the attainment of new skills or trades with the consequence of establishing new or redesigned training programs, new training methodology, and upskilling of the work force. ETs in Building technology are likely to revolutionize the building industry and enhance living standard in developing countries like Nigeria (United Nations Industrial Development Organization (UNIDO), 2015).

Some of the emerging construction methods include dry construction technology, moladi building technology, modular building system, plaster of Paris (POP) - wall and ceiling Screeding, wall tiling etc. Ashkin, (2013); Atul, (2017) opined that Dry Construction Technology (DCT) as one of the latest in green building technology involves the use of innovation to reduce the use of water and project impact on the environment. Real House

Communications (2013) opined that because of the fine finish of Plaster of Paris (POP) screeding given to your walls, the application has become increasingly popular in Nigeria. For these emerging technologies to be well taught, the Building Technology teachers need some training. Training or retraining of Building Technology Teacher has to be in tandem with the operations of the employees in the building industry.

Several studies including those of; Onyeka, (2012); Baba (2011), Okoro and Anaele (2010) and Agishi (2010) has been done on Integration of skills in Emerging technologies in Building industry into Technical College Building programmes. But none of the studies majored on emerging technologies in building technology that need to be integrated into the programme of Colleges of Education (Technical). This study therefore determined the Emerging Technology skills in Building Construction required by Lecturers of Colleges of Education (Technical) in South Eastern Nigeria. Specifically, the study sought to:

1. identify the emerging technology skills in Building Construction required by lecturers of Colleges of Education Technical in Nigeria
2. determine the emerging technology skills in Building Construction that could be integrated into the curriculum of Building Technology Programme of Colleges of Education Technical

The study was guided by the following research questions:

1. What are the emerging technology skills in Building Construction required by lecturers of Colleges of Education Technical in Nigeria?
2. What are the emerging technology skills in Building Construction that could be integrated into the curriculum of Building Technology Programme of Colleges of Education
   Technical?

The following hypotheses were formulated for the study and were tested at 0.05 level of significance:

1. **$H0_1$;** There is no significant difference between the mean responses of the Building Technology lecturers and building industry personnel on the emerging technology skills in Building Construction required by Lecturers of Colleges of Education (Technical)
2. **$H0_2$;** There is no significant difference in the mean responses of Building Technology lecturers and building industry personnel on the emerging technology skills in Building Construction that could be integrated into the curriculum of Building Technology Programme of Colleges of Education Technical.

Methodology

The study adopted a descriptive survey research design. The area of the study was South East Nigeria which comprised of Abia, Anambra, Ebonyi, Enugu and Imo states. The population for the study was 134 which comprised of all the 20 Building Technology Lecturers and instructors from three Colleges of Education (Technical) and 114 Building industry personnel in the 42 reputable construction companies within the South Eastern Nigeria. The entire population was studied because it is manageable. The instrument for data collection was structured questionnaire. A five-point Likert's scale with numerical values of 5,4,3,2, and 1 for Section B and

C with response options: Very Highly Required (VHR) 4.50-5.00, Highly Required (HR) 3.50-4.49, Moderately Required (MR)2.50-3.49, Not Required (NR)1.50-2.49, Highly Not Required (HNR) 1.00-1.49 was used. The instrument was face validated by three experts and internal consistency was determined with Cronbach Alpha formula which gave a reliability coefficient of 0.94.Data collected was analyzed using Statistical Package for Social Sciences (SPSS Version 22.0). Mean was used to answer the two research questions while, t-test of independent sample was used to test the null hypotheses at 0.05 level of significance. Decision based on real limit of number was used. Any item with mean rating of 4.50-

5.00 was regarded as Very Highly Required, 3.504.49 as Highly Required, 2.50-3.49 as Moderately Required, 1.50-2.49 as Not Required, and 1.00-1.49 as Highly Not Required and in the hypotheses, any item whose calculated sig. (2-tailed) value is greater than 0.05, at 121 degree of freedom (df), hypotheses of no significant difference was upheld, but where the calculated sig.(2-tailed) value was equal to 0.05 or less, Hypotheses of no significant difference was rejected.

Results

The data for answering research question 1 are presented in Table 1.

Research Question 1

What are the emerging technologies skills in Building construction that are required by Lecturers of Colleges of Education (Technical) in Nigeria?

Table 1: Mean Rating and t-test Analysis of the Responses of Building Technology Lecturers and Building Industry Personnel on the Emerging Technology skills in Building Construction Required by Lecturers of Colleges of Education (Technical) in Nigeria.

N=123	SN	Item Statements	$\bar{X}$	Decision	$\bar{X}$	SD_1	$\bar{X}$	SD_2	Sig.(2-tailed)	Remark
					1		2			
	1.	Interpret and supervise work on modern architectural designs	3.35	Moderately Required	4.45	0.60	3.14	1.68	0.00	S
	2.	Apply/develop landscape designs- flowers and Kerbs	3.18	Moderately Required	4.45	0.60	2.94	1.53	0.00	S
	3.	Supervise work on modern artistic motifs/reliefs and designs	3.26	Moderately Required	4.25	0.85	3.07	1.56	0.00	S
	4.	Understand and apply modern tile designs/types in wall finishing works	3.41	Moderately Required	4.40	0.75	3.22	1.29	0.00	S
	5.	Apply modern interior designs	3.81	Highly Required	4.30	0.80	3.72	4.16	0.53	NS
	6.	Produce and make use of green alternative –fly ash and rice husk as binder in construction	3.74	Highly Required	4.20	0.69	3.65	0.83	0.00	S
	7.	Prepare laterite earth before molding/Compressing	4.12	Highly Required	4.20	0.55	4.10	0.60	0.29	NS
	8.	Mix the prepared laterite soil with 5% Portland cement and water as recommended	4.23	Highly Required	4.40	0.60	4.18	0.57	0.06	NS
	9.	Dry-stack compressed laterite interlock bricks to form all sorts of structure	4.15	Highly Needed	4.25	0.71	4.14	0.57	0.44	NS
	10.	Stack wall corner accordingly	4.21	Highly Required	4.35	0.58	4.18	0.51	0.20	NS
	11.	Interlock the various courses of Compressed interlock brick without mortar	4.30	0.80	4.20	0.49	0.47	NS		
			4.22	Highly Required laterite						
	12.	Form the modern frame work upon which to lay double Roman roofing tiles	4.15	0.58	4.16	0.48	0.96	NS		
			4.15	Highly Required						
	13.	Set the pitch angle	4.15	Highly Required	4.35	0.81	4.12	0.47	0.07	NS
	14.	Fix the centre batten	4.08	Highly Required	4.25	0.55	4.05	0.56	0.14	NS
	15.	Lay the roof tiles straight bonded with its	4.40	0.59	4.08	0.57	0.02	S		
			4.13	Highly Required interlock intact						
	16.	Finish the roof perimeter and abutment and roof around window work devoid of leakage and	4.12	Highly Required falling off	4.35	0.58	4.08	0.63	0.07	NS
	17.	Select the correct wall paper material/design	4.21	Highly Required	4.15	0.98	4.22	0.48	0.61	NS
	18.	Know the paper sizes, designs and patterns in vogue	4.00	1.12	4.12	0.49	0.45	NS		
			4.10	Highly Required						
	19.	Prepare the wall surface to be decorated	4.25	Highly Required	4.20	0.95	4.26	0.52	0.67	NS
	20.	Cut the paper into sizes and arrange the pattern	4.25	0.78	4.13	0.47	0.34	NS		
			4.15	Highly Required desired						
	21.	Paste the wall paper materials without squeezing or damaging	4.15	0.74	4.17	0.46	0.90	NS		
			4.16	Highly Required						
	22.	Apply Synthetic Solution Tile on well laid block wall surface	4.15	0.67	4.17	0.47	0.84	NS		
			4.17	Highly Required						
	23.	Measure and cut to required size of Synthetic	4.10	0.19	4.05	0.55	0.67	NS		
			4.06	Highly Required						

	Solution Tile.								
24.	Produce fly ash and rice husk as an alternative binder	4.20	0.61	4.08	0.49	0.33	NS		
25.	Apply fly ash and rice husk as a substitute binder	4.10	Highly Required	4.25	0.55	4.11	0.50	0.25	NS
26.	Assemble Cement board, Gypsum board, Plaster board, Fiber board or Kalsi board in wall and floor construction	4.13	Highly Required	4.20	0.76	4.15	0.58	0.71	NS
27.	Supervise work on modern fabricated board for wall, floor construction	4.15	Highly Required	4.15	0.81	4.23	0.52	0.56	NS
28.	Assemble pre-fabricated panel for roofing and ceiling construction	4.22	Highly Required	4.15	0.58	4.15	0.58	0.97	NS
29.	Apply dry wall components like stone, light steel and aluminum materials as an alternative to block and mortar construction	4.15	Highly Required	4.10	0.78	1.19	0.52	0.50	NS
30.	Erect Molad plastic formwork on already laid foundation	4.18	Highly Required	3.75	0.71	4.11	0.54	0.01	S
31.	Clip together Molad plastic formwork accordingly	4.05	Highly Required	3.85	0.74	4.09	0.54	0.09	NS
32.	Reinforce in-situ the set-up formwork in Molad construction	4.05	Highly Required	4.00	0.72	4.20	0.51	0.13	NS
33.	Mix aerated concrete (stone less concrete) accordingly	4.17	Highly Required	4.05	0.68	4.15	0.60	0.52	NS
34.	Compact the poured concrete to form durable and one piece reinforced walling system	4.13	Highly Required	4.35	0.58	4.28	0.49	0.58	NS
35.	Dismantle the plastic formwork after curing have taken place and to re-use subsequently	4.29	Highly Required	4.15	0.74	4.22	0.50	0.58	NS
36.	Apply Modular building components like precast concrete, light weight steel, suspended steel chassis, wood panel, and aluminum panel in alternative to traditional method of construction to save time and cost	4.21	Highly Required	4.25	0.71	4.16	0.51	0.48	NS
37.	Assemble modular components	4.17	Highly Required	4.00	0.64	4.13	0.49	0.32	NS
38.	Supervise work on modular construction	4.11	Highly Required	4.30	0.57	4.20	0.47	0.42	NS
39.	Apply safety precaution in Modular construction	4.22	Highly Required	4.50	0.51	4.30	4.50	0.10	NS
40.	Prepare the surface to be screened and designed	4.33	Highly Required	4.35	0.67	4.35	0.49	0.99	NS
41.	Mix gypsum powder with water to form paste	4.35	Highly Required	4.25	0.55	4.26	0.59	0.93	NS
42.	Apply the paste with the right tool without waste	4.26	Highly Required	4.55	0.60	4.27	0.52	0.03	S
43.	Handle the tools used in POP work like corner bead	4.32	Highly Required	4.35	2.74	4.28	0.19	0.60	NS
44.	Design art work with the POP paste on ceiling and walls	4.29	Highly Required	4.40	0.68	4.25	0.66	0.36	NS
45.	Apply precautionary measure during POP mixing, screeding and leveling	4.28	Highly Required	4.55	0.60	4.36	0.55	0.17	NS
46.	Handle and maintain tiling tools	4.39	Highly Required	4.30	0.57	4.18	0.53	0.38	NS
47.	Measure and know the number of tiles needed for a certain wall surfaces	4.20	Highly Required	4.10	0.71	4.31	0.52	0.12	NS
48.	Prepare the surface to be tiled and mix the adhesive or mortar for the tiling work using required ratio	4.28	Highly Required	4.25	0.55	4.28	0.60	0.82	NS
49.	Cut tiles to required size to get a desired pattern on wall	4.31	Highly Required	4.30	0.57	4.31	0.52	0.93	NS
50.	Lay wall tiles, grout and finish	4.28	Highly Required	4.20	0.69	4.29	0.47	0.47	NS
51.	Apply National building code legislation in teaching and learning Building Technology	4.22	Highly Required	4.40	0.75	4.18	0.53	0.12	NS
52.	Comply with and apply Capital Development Authority guidelines and documentation	4.07	Highly Required	4.65	0.48	3.96	0.76	0.00	S

The data presented in Table 2 indicated that items 1, 2, 3, and 4 had their mean rating ranged from 3.18 to 3.41, since they fall within 2.50-3.49 response scale, the items are Moderately Required and items 5 to 22 had their mean rating ranged from 3.74 to 4.39,since they fall within 3.50-4.49 response scale, the items are Highly Required as skill Building Technology lecturers need so as to teach the emerging technologies in Building Technology programme of Colleges of Education (Technical) in South East Nigeria. While the t-test analysis revealed that items 1, 2, 3, 4, 6, 15, 30, 42, and 52 had their value less than 0.05 probabilities since it ranged between 0.00 to 0.02, the null hypothesis of no significance difference was rejected. However, items 5, 7-14, 1624, 26-29, and 31-41, 43-51are more than 0.05 probability levels since it ranged from 0.07 to 0.99, null hypothesis of no significance difference was therefore upheld.

Research Question 2

What are the emerging technology skills in Building Construction that could be integrated into the curriculum of Building Technology Programme of Colleges of Education Technical in Nigeria?

Data for providing answer to research question 2 are presented in Table 2.

Table 2: Mean Rating and t-test Analysis of the Responses of Building Technology Lecturers and Building Industry Personnel on the Emerging Technology skills that could be Integrated into Building Technology Programme of Colleges of Education (Technical) in Nigeria.

N=123

SN	Item Statement	$\bar{X}$	Decision	SD_1	$\bar{X}_1$	$\bar{X}_2$	SD_2	Sig.(2-tailed)	Remark
53.	Modern architectural designs (Complex designs)	3.25	Moderately Required	4.55	0.51	3.00	1.70	0.00	S
54.	Landscape designs-soft –horticulture/ flowers and hard-Kerbs mold designs	3.05	Moderately Required	4.35	0.58	2.80	1.50	0.00	S
55.	Modern artistic Motifs/Reliefs and designs	3.02	Moderately Required	4.05	0.75	2.82	1.49	0.00	S
56.	Modern tile designs/types	3.11	Moderately Required	4.30	0.65	2.87	1.58	0.00	S
57.	Modern interior designs	3.20	Moderately Required	4.15	0.67	3.02	1.35	0.00	S
58.	Green alternative-fly ash and rice husk as binder	3.51	Highly Required	3.95	0.68	3.43	0.97	0.02	S

59.	Compressed Laterite Interlock Brick (CLIB)	3.98	Highly Required	4.20	0.61	3.94	0.63	0.09	NS		
60.	Gypsum Plasterboard/Kalsi Board	4.06	Highly Required	3.95	0.68	4.08	0.55	0.36	NS		
61.	Light Steel ,Aluminum Material	3.99	Highly Required	4.00	0.79	3.99	0.51	0.94	NS		
62.	Pre-fabricated Panel-wood, steel and plastic- Composite	4.00	Highly Required	4.00	0.79	4.00	0.46	1.00	NS		
63.	Double Roman Roofing Tile (Green and Recycled)	3.99	Highly Required	3.80	0.89	4.03	0.55	0.13	NS		
64.	Synthetic Solution Tile	3.93	Highly Required	3.45	0.82	4.03	0.66	0.00	S		
65.	Modern Wall Papering	4.00	Highly Required	3.85	0.93	4.03	0.55	0.24	NS		
66.	Dry Construction Technology (DCT)	3.93	Highly Required	3.45	0.82	4.03	0.88	0.00	S		
67.	Molad Construction Technology (MCT)	4.01	Highly Required	3.65	0.87	4.08	0.81	0.03	S		
68.	Modular Building System	4.03	Highly Required	3.95	0.88	4.05	0.79	0.62	NS		
69.	Plaster of Paris (POP)- Wall Screening and Ceiling	4.40	Highly Required	4.40	0.68	4.40	0.58	0.98	NS		
70.	Wall Tiling	4.41	Highly Required	4.35	0.81	4.42	0.67	0.69	NS		
71.	Reviewed National Building Code of Nigeria	4.33	Highly Required	4.65	0.48	4.27	0.61	0.01	S		
72.	Functions/Activities of Capital Development Authority (CDA) in the state	4.16	Highly Required	4.40	0.68	4.12	0.64	0.07	NS		

KEY: N1=Number of Building Technology Teachers, N2= Number of Building Industry personnel, X_1=Mean of Building Technology Teachers, X_2=Mean of Building Industry Personnel, SD_1=Variance of Building Technology Teachers, SD_2 =Variance of Building Technology Teachers, df=121, sig=Sig.2-tailed (it applies to all tables), S=Significant, NS=Not Significant.

The data presented in table 2 indicated that items 53, 54, 55, 56, and 57 had their mean rating ranged from 3.02 to 3.25 revealing that the item are Moderately Required and items 58 to 72, had their mean rating ranged from 3.51 to 4.41 revealing that the items are highly required as emerging technology skills in Building construction that are needed to be integrated into Building Technology Programme of Colleges of Education (Technical) in Nigeria. While the t-test analysis revealed that sig. (2-tailed) value of items 53, 54, 55, 56, 57, 58, 64, 66, 67, and 71 is less than 0.05 probabilities since it ranged from 0.00 to 0.03, the null hypothesis was rejected. However, items 59, 60, 61, 62, 63, 65, 68, 69, 70, and 72l had sig. (2-tailed) value more than 0.05 probabilities since it ranged from 0.07 to 1.00, the null hypothesis was upheld.

Findings/Discussion

The analysis of research question 1 revealed that skill items 23 to 26 are moderately required and items 27 to 52 are highly required. The 4 skill items as revealed by Table 1 include apply modern interior designs, produce and make use of green alternativefly ash and rice husk as binder in construction, prepare laterite earth before moulding or compressing, mix the prepared laterite soil with 5% percent Portland cement and water as recommended that are Moderately Required. It could be inferred that Building teachers may need certain training due to emerging technologies in order to improve their productivity. This is in agreement with Okafor, (2013) who opined that when there is gap between actual performance and what is needed, productivity suffers.

The training items as revealed to be highly required in Table 1 include apply modern interior designs, produce and make use of green alternative-fly ash and rice husk as binder in construction, prepare laterite earth before molding or compressing, mix the prepared laterite soil with 5% percent Portland cement and water as recommended, dry-stalk compressed laterite interlock brick to form all sorts of structure, stalk wall corner accordingly, interlock the various courses of compressed laterite interlock brick without mortar, form the modern frame work upon which to lay double Roman roofing tiles, set the pitch angle, fix the centre batten, lay the roof tiles straight bonded with its interlock intact, finish the roof perimeter and abutment and roof around window work devoid of leaking and falling off, select the correct wall paper material or design, know the paper size, designs and patterns in vogue, prepare the wall surface to be decorated , cut the paper into sizes and arrange the pattern desired, paste the wall paper materials without squeezing or damaging, apply synthetic solution tile on well-laid block wall surface, measure and cut to required size of synthetic solution tile, produce fly ash and rice husk as an alternative binder, apply fly ash and rice husk as a substitute binders, assemble cement board, gypsum board, plaster board, fibre board or kalsi board in wall and floor construction, supervise work on modern prefabricated panel for roofing and ceiling construction, assemble pre-fabricated panel for roofing and ceiling construction. It could be inferred from the findings that teachers may need up skilling in order to remain relevant in the work. This is similar to the observation of the Government of Western Australia (2014) that emerging technologies may require the attainment of new skills and up-skilling of workforce.

The training needs items as revealed by Table 1 still include apply dry wall components like stone, light steel and aluminum materials as an alternative to block and mortar construction, erect Molad plastic formwork on already laid foundation, clip together Molad plastic formwork accordingly, reinforce in-situ the set up formwork in Molad construction, mix aerated concrete (stone-less concrete) accordingly, compact the poured concrete to for durable and one piece reinforced walling system, dismantle the plastic formwork after curing have taken place and to re-use subsequently, apply modular building components like pre-cast concrete, light weight steel, suspended steel chassis, wood panel, and aluminum panel in alternative to traditional method of construction to save time and cost, assemble modular components, supervise work on modular construction, apply safety precaution in modular construction, prepare the surface to be screed and designed, mix gypsum powder with water to form past, apply the paste with the right tool without waste, handle the tools used in POP work like corner bead, design artwork with POP paste on ceiling and walls, apply precautionary measure during POP mixing, screeding and leveling, handle and maintain tiling tools, measure and know the number of tiles needed for a certain wall surfaces, prepare the surface to be tiled and mix the adhesive or mortar for the tiling work using required ratio, cut tiles to required size to get a desired pattern on wall, lay wall tiles, grout and finish, apply National building code legislation in teaching and learning Building Technology, comply with and apply Capital Development Authority guidelines and documentation. It could also be inferred that Building Technology teachers needed training in order to keep abreast of technological trend in the industry. This is in line with observation of Halt, Benham, and Bigelow, (2015) that it is incumbent on educators to keep abreast of technology in the industry.

Analysis of research question 2 which sought to determine emerging technologies in Building Technology that need to be integrated into Building Technology programme of Colleges of Education

(Technical) in South East Nigeria showed that items 53, 54, 55, 56, and 57 are Moderately required and items 58 to 72 are Highly Required. Those items as revealed by the Table 2 include modern architectural designs (complex designs), landscape designs-softhorticulture or flowers and hard kerbs mold designs, modern artistic motifs- reliefs and designs, modern tile designs and types, modern interior designs, as Moderately Required and green alternative-fly ash and rice husk as binding material and compressed laterite interlock brick, gypsum plaster board, Kalsi board, light steel, aluminum material, pre-fabricated panel-wood, steel, and plastic (composite), double Roman roofing tile, synthetic solution tile, modern wall papering, dry construction technology, Molad construction technology, modular building system, plaster of Paris (POP)-wall screeding and ceiling, wall tiling, reviewed National building code of Nigeria and functions, activities of Capital Development Authority (CDA) in states as Highly Required.

The findings revealed that the 20 items listed are the emerging technologies that need to be integrated into Building Technology programme of Colleges of Education (Technical). It could be inferred that the current curriculum of Colleges of Education (Technical) are obsolete and lack some knowledge and skills

needed to train students on what they are expected to perform to remain relevant in the 21st Century Nigeria. This is similar to opinion of Halt, Benham, and Bigelow, (2015) that considering emerging technologies in construction, it is the responsibility of the higher education to train students for the work they will perform and it is incumbent on educators to keep abreast of technology in the industry and in line with observation of Abdulwahab & Rasheed (2014) and Okoro and Anaele (2010) who in their separate studies observed that Colleges of Education (Technical) curriculum need to be restructured or reviewed due to emergence of new technologies to accommodate them. It is also in consonance with opinion of The Government of Western Australia (2014) that emerging technologies may require the attainment of new skills or trades with the consequence of establishing new or redesigned training programme.The declaration of Valetsianos (2010) that emerging technologies are characterized may or may not be new technologies, exist in a state of coming into being, undergo through stages, satisfy the not yet criteria may have been use by the respondent in determining the emerging technologies.

Conclusion

Building construction in Nigeria is experiencing a paradigm shift and tremendous transformation due to existence of emerging technologies in Building Technology. Hence, designs and concepts development in building, building materials, building methods is changing and some building policy issues are emerging. As a result, building contractors only engage the workers that are updated in the trending technologies in order to achieve maximum result in construction. This now have negative effect on the craftsmen trained by NCE (T) graduates who were being trained with obsolete curriculum. Therefore, there is the need to determine the emerging technologies in Building Technology for programme of Colleges of Education (Technical) in South East

Nigeria.

Recommendations

The following recommendations were made based on the findings of this study.

- The identified emerging technologies in Building Technology should be integrated into the national curriculum of Colleges of Education (Technical) by NCCE and NBTE.
- NCCE, FGN should partner with NIOB and other relevant building professional bodies in forming or reviewing curriculum in Building Technology programme in order to produce a curriculum that will stand the test of time and produce relevant NCE graduates.
- Retraining on emerging technologies should periodically be organized by the relevant authorities for the Building Technology teachers through conferences, industrial training, seminars, online lectures, trip to megacities within the country to see what is obtainable in the industry.

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