Extent of Utilization of Artificial Intelligence (AI) in Teaching by Building Construction Educators in Public Universities in South-East Nigeria

Volume 1
Number 1
June 2025

Dr. Peter Izuoba Okoye
Department of Industrial Technology Education
Nnamdi Azikiwe University, Awka, Anambra State
piz.okoye@unizik.edu.ng

Nkem Frances Erem-Kalu
Department of Industrial Technology Education
Nnamdi Azikiwe University, Awka, Anambra State
nf.kalu@unizik.edu.ng

ABSTRACT

The study examined the extent of utilization of Artificial Intelligence (AI) in teaching by building construction educators in Public Universities in South East Nigeria. Two research questions guided the study and two hypotheses were tested at 0.05 level of significance. A descriptive survey research design was adopted for the study. A total of 110 building construction educators, in six public universities in Southeast Nigeria which include both federal and state universities that are offering building construction courses, formed the population of the study. A structured questionnaire validated by three experts was used to carry out the study. Mean and standard deviation were used to answer research questions while Analysis of Variance (ANOVA) was used to test the hypotheses. It was found out that greater that of the respondents upheld of adaptive learning and virtual reality were utilized at a low extent by building construction educators. It was concluded that the AI-Powered tools were not adequately utilized, by it was therefore recommended that effort should be made by building construction educators to understand AI's role in education, but also embrace or employ it in carrying out their functions.

Keywords: Utilization, artificial intelligence, building construction educators, teaching

Corresponding Author's name and email: Nkem Frances Erem-Kalu and **nf.kalu@unizik.edu.ng**

INTRODUCTION

Utilization refers to the process of using or employing something, such as resources, assets, or capabilities to achieve a specific goal or purpose. The utilization of AI is fast growing because of its ability to provide solutions in uncertain and complex situations. It also has the potential to tackle problems, which overwhelm the human mind in terms of complexity or volume of data (Eber, 2020) as well as creates convenience, improves productivity, and adds value to a system (Güngör, 2020). AI has wide applicability in all sectors, and it has been found to produce positive outcomes for social, environmental, and economic sustainability (Vinuesa, 2020).

Artificial Intelligence can be viewed as the ability of a machine to mimic human behaviour intelligently through the use of algorithms to solve difficult problems (Salehi & Burgueño, 2018). However, AI is considered one of the oldest fields of computer science and very broad, dealing with all aspects of mimicking cognitive functions for real-world problem solving and building systems that learn and think like people (Holzinger., 2019). One of the main objectives of AI is to train machines to reason, plan, process, perceive, move and manipulate things like humans, with a view to solving complex organizational or

day-to-day challenges (Adio-Moses & Asaolu, 2016). According to Boileau (2019), AI consists of intelligent systems that use structured or unstructured data, to learn and imitate human behaviour as well as make informed decisions. Sequel to the foregoing, AI could be described as, the generation of human-like intelligence that can learn, reason, plan, perceive, or process natural language in order to collate and organize information for use in an organization, or to perform a routine human task in various disciplines including building construction, professionals and educators.

In today's rapidly evolving world, Artificial Intelligence (AI) is a force transforming various sectors, with education being one of the most impacted. The integration of AI into educational systems is creating a seismic shift in how we approach learning and teaching, making education more personalized, efficient and accessible. (Chidebe, 2024). Furthermore, Chidebe observed that classrooms are no longer confined to the traditional four walls, chalkboards and textbooks. AI-powered tools like Adaptive learning platforms and virtual reality teaching assistants, are redefining the educational landscape. These tools analyse students learning pattern, provide personalized learning experiences and offer instant feedback, enabling educators to tailor their teaching methods to meet individual student needs. AI- driven tools can identify areas where a student is struggling and automatically adjust the difficulty of the material, ensuring that no student is left behind. This not only enhances the learning experience but also empowers teachers to focus more on fostering creativity and critical thinking skills rather than spending more time on repetitive tasks.

According to Brock (2023), Artificial intelligence is fast becoming an integral part of just about everything we do, and education is no exception. It can really be a teacher's pet by enhancing interactivity in learning and reducing teacher workloads. There are now large number of AI-powered tools valuable to teachers, but knowing how to use them, or even which education tools to choose, can be a challenge. There are several ways in which artificial intelligence (AI) can be utilized in teaching in the field of building construction in Nigerian public universities. First, adaptive learning by applying AI can create customized learning experiences for students based on their individual learning needs and preferences. This can help students to learn more effectively and efficiently leading to improved academic performance. Similarly, AI- powered virtual reality and simulation technology can be used to create realistic and immersive learning experiences for students in building construction. This can help students to practice their skill in a safe environment, and improving their understanding of complex construction concepts.

Furthermore, Adaptive learning AI uses machine learning algorithms to personalize educational content, adjust difficulty levels, and optimize learning pathways for individual students. Virtual reality (VR) AI in teaching combines AI technologies with VR to create immersive, interactive learning experiences.

More so, Rivera (2016) noted that many projects worldwide still experience delays, cost overruns, rework, and low customer satisfaction, which negatively affect the performance of the construction industry globally. It is therefore hoped that the use of AI in the building construction industry could enhance the efficiency of construction processes (Salehi & Burgueño, 2018; Afolabi., 2020), and ultimately reduce waste and safety concerns (Froese, 2020). It can also improve the planning, design, monitoring process, and maintenance of construction facilities (Allam & Dhunny, 2019), thereby enhancing the overall performance and competitiveness of the industry.

Teaching according to Ayeni (2015), is the process that involves bringing about desirable changes in learners so as to achieve specific outcomes in order for the method used

for teaching to be effective. Nweke and Ughamadu (2017) defined teaching in it simplistic conception, as what an individual does in an attempt to pass on some knowledge considered worthwhile to some other person who seems to lack the knowledge. Usondu (2018) defines teaching as consisting of stimulating others to attend observe, associate, remember and reason. Curzon (2016) defines teaching as a process that facilitates learning. Iwuanyanwu (2016) defines teaching as the process of imparting knowledge, skills values and attitudes to learners by teachers. Urevbu (2015) defined to teaching as an occupation or profession, an enterprise that is the normal activity of a classroom and every act of teaching. Oshodi (2018) defined teaching as the process of transmitting knowledge, ideas, skill and believe from one person to another. Amo (2015) sees teaching as guiding a student to acquire basic knowledge, attitude and skills through the use of various media and methods. The researcher defined teaching as an activity that goes on between the teacher and the students. This activity involves the teacher impacting knowledge of a course or subject while the students are the recipients of the knowledge impacted by the teacher.

Building construction educators are lecturers that teach building construction courses, These lecturers can be found in the department of technology and vocational education, department of civil engineering and the department of building technology in the universities as used in the study. Consequently, building construction educators was divided into three categories based on their educational qualifications: HND/BSc, MSc and PhD. Building construction educators as used in this study includes all the lecturers in public universities which includes Graduate assistant, Assistant lecturers, Lecturer II, Lecturer I, Senior lecturers, Associate Professors (Readers) and Professors. Also building construction educators was divided into three categories based on their age: below 40years, 40-55, 56 and above.

However, building construction educators are educationists whose primary purpose is to prepare persons for employment in building construction occupations (Okoro, 2023). In the same vein, Osuala (2017) observes that building construction educators are teachers with the sole responsibility to prepare individuals for gainful employment as semi- skilled workers or technician or sub professionals in building construction occupations or to prepare individuals for enrolment in advanced technical education programme especially in building construction. Okorie and Ezezi (2018) opined that building construction educators are trained to prepare skilled workers for industries, which is usually provided at the upper secondary school to university level. The philosophical concept of building construction education, according to Okorie (2021), maintains that the occupational choice of an individual should be based on orientation (interest, ability and aptitude) of the individual; each individual should have the opportunities for employment in the occupation and that resources for education must be provided to develop all human resources needed in national economic development.

The crucial role of building construction educators in the teaching process has become more evident especially when new ideas and topics such as AI are introduced. Hence, artificial intelligence (AI) education has been considered an important subject to be incorporated from early childhood through to high school (Sanusi et al, 2022; Touretzky et al, 2019). The emergence of AI education has placed new demands on teachers, researchers, and policymakers to ensure its effective implementation in tertiary institutions. While the adoption of new curricula material necessitates state policy analysis and future needs (Sanusi & Olaleye, 2022). There are increasing initiatives by researchers to ensure the democratisation of AI among students across grade levels. Such initiatives include the design of curricula, tools, resources, and approaches that could support teaching AI concepts

in building construction in Nigerian public universities (Sanusi & Oyelere, 2020).

Public universities are tertiary institutions owned and controlled by either state or federal governments. Such universities in south-east Nigeria include public universities that are in; Abia, Anambra, Ebonyi, Enugu and Imo states. There are eleven public universities in South-east Nigeria but six out of eleven study building construction courses. They are: Nnamdi Azikiwe University Awka, Anambra State, University of Nigeria, Nsukka, Enugu State, Ebonyi State University, Abakaliki Ebonyi State, Micheal Okpara University of Agriculture Umudike, Abia State, Alvan Ikeokwu Federal University of Education, Owerri, Imo State and Enugu State University of Science and Technology, Enugu State.

Based on the above background, the researcher investigated the extent of utilization of artificial intelligence (AI) in teaching by building construction educators in public universities in south-east, Nigeria.

Statement of the Problem

The set-back in the process of teaching building construction courses which apparently give rise to half-baked graduates of Building technology and Engineering may be due to lack of awareness, misconception, and utilization of AI especially in the public universities in the south-east Nigeria .Some building construction educators in the part of the country seem not to have properly embraced AI in their teaching activities, despite the fact that it has permeated every fabric of human endeavours globally. The increasing rate of building collapse in the country could be linked to worker incompetence on the job, inadequate training, lack of technical know-how of the experts among others could be considered a threat in utilization of AI by experts, which invariably affect their job performance. There was limited literature available in the subject matter hence, the study intends to contribute to the knowledge gap or gap in knowledge.

Research Questions

The following research questions guided the study:

1. To what extent is adaptive learning utilized by building construction educators in teaching in public universities in South-east, Nigeria?
2. To what extent is virtual reality utilized by building construction educators in teaching in public universities in South-east, Nigeria?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

1. There is no significant difference in the mean ratings of building construction educators regarding the extent of utilization of adaptive learning in public universities in South-east, Nigeria based on their qualification and age.
2. There is no significant difference in the mean ratings of building construction educators regarding the extent of utilization of virtual reality in public universities in South-east, Nigeria based on their qualification and age.

METHODS

The study employed a descriptive survey research design. The area of study was South East Nigeria which comprised six public universities in South-East Nigeria, namely: Nnamdi Azikiwe University, Awka, University of Nigeria Nsukka, Ebonyi State University, Ebonyi, Michael Okpara University of Agriculture, Umudike, Alvan Ikoku Federal University of Education, Owerri and Enugu State University of Science and Technology, Enugu. The population was 110 building construction educators obtained from relevant departments in the aforementioned institutions. Census sampling technique was used

because the number of the respondents was manageable. A structured questionnaire was used for data collection, the instrument had five response options of Very High Extent (VHE), High Extent (HE), Moderate Extent (ME), Low Extent (LE), Very Low Extent (VLE) with a corresponding value of 5, 4,3,2 and 1 respectively. The instrument was validated by three experts. The experts consist of one lecturer from Educational Foundation Department (Measurement and Evaluation Unit) and Two lecturers from the Department of Industrial Technology Education all from Nnamdi Azikiwe University, Awka. Reliability of the instrument was established using Cronbach's Alpha which yielded 0.85 for the entire instrument. 110 copies of the questionnaire were produced and distributed to the Building Construction Educators in UNIZIK, UNN, MOUAU, ESUT, EBSU and AIFUE. This was carried out by the researchers with the help of 3research assistants. After distribution or administering the instrument, total of 99 out of 110 copies of the questionnaire were retrieved and analysed using mean, standard deviation and ANOVA. Mean was used to answer the research questions. Standard deviation was used to determine how close or far the responses of the respondents were to the mean while ANOVA was employed for testing null hypotheses at 0.05 level of significance. Any null hypothesis which has p-value less than 0.05 level of significance was rejected and regarded as significant, also, any null hypothesis which has p-value equal to or greater than 0.05 level of significance was upheld and regarded as not significant.

RESEARCH RESULTS

Research Question One

To what extent is adaptive learning utilized by building construction educators in teaching in public universities in South–east Nigeria?

Table 1

Mean and standard deviation on utilization of adaptive learning by building construction educators

S/N	Utilization of Adaptive Learning	Mean	Std. Deviation	Decision
1	algorithms in teaching	2.51	1.494	ME
2	customized audio devices for teaching	2.26	1.331	LE
3	computer programs for teaching	2.37	1.376	LE
4	video devices for teaching	3.16	0.776	ME
5	AI technology	2.23	1.333	LE
6	images for teaching	3.61	.816	HE
7	scholastic path, learning process, and learner satisfaction	2.38	1.467	LE
Ada plear		2.6451	.99169	ME

Note; HE = High Extent, ME = Moderate Extent, LE = Low Extent.

Table 1 shows the correspondent mean ratings of extent of utilization of adaptive learning by building construction educators in public universities. The mean ratings of the items ranged from 2.23 to 3.61 while the standard deviation ranged from 0.776 to 1.494. From the table, item 6 of adaptive learning was utilized to a high extent (mean = 3.61) while item 1 and 4 was utilized to a moderate extent (mean = 2.51 to 3.16) the remaining four items was utilized to a low extent (mean = 2.23 to 2.38). Aggregate mean of 2.6451 implies that adaptive learning was utilized to a moderate extent in public universities. The spread in the standard deviation was relatively close, implying that the respondents were relatively homogenous in their ratings of utilization of adaptive learning in public universities.

Research Questions Two

To what extent is virtual reality utilized by building construction educators in teaching in public universities in south-east Nigeria

Table 2

Mean and standard deviation ratings of extent of utilization of virtual reality by building construction educators

S/No	Utilization of Virtual Reality	Mean	SD	Decision
8	Building construction educators use virtual reality in form of problem solving while teaching	2.40	1.417	LE
9	Building construction educators use to explore innovative and interactive teaching experiences	3.23	.764	ME
10	building construction educators use computer simulators in teaching	2.13	1.205	LE
11	Building construction educators use physical, or visual immersion associated with the concept of spatial presence in teaching	2.14	1.243	LE
12	Building construction educators use virtual prototype	2.13	1.223	LE
Virt real		2.404	1.037	LE

Note: ME = moderate extent, LE = low extent.

Table 2 shows the respondent mean ratings of extent of utilization of virtual reality by building construction educators in public universities. The mean ratings of the items ranged from 2.13 to 3.23 while the standard deviation ranged from 0.764 to 1.417. From the table item 9 of virtual reality was utilized to a moderate extent (mean = 3.23) while the remaining items of virtual reality were utilized to a low extent (mean = 2.13 to 2.46). Aggregate mean of 2.40 implies that virtual reality was utilized to a low extent in public universities. The spread in the standard deviation were relatively close implying that the respondents were relatively homogenous in their ratings of utilization of virtual reality.

Statistical Test of Significance of Hypotheses

Hypothesis One: There is no significant difference in the mean ratings of building construction educators regarding the extent of utilization of adaptive learning in public universities in South-east, Nigeria based on their educational qualification and age.

Table 3

Summary of two-way ANOVA on utilization of adaptive learning by building construction educators based on their educational qualification and age

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	59.624a	8	7.453	19.530	.000	.645
Intercept	348.759	1	348.759	913.902	.000	.914
EduQual	1.042	2	.521	1.365	.261	.031
Age	4.703	2	2.352	6.163	.003	.125
EduQual * Age	14.557	4	3.639	9.537	.000	.307
Error	32.819	86	.382			

Total	757.122	95
Corrected Total	92.443	94

a. R Squared = .645 (Adjusted R Squared = .612)

Table 3 shows the interaction between educational qualification and age on adaptive learning. Data presented in table 5 shows that educational qualification is not significant. F (2,95) = 1.365, p = 0.261>0.05. The table shows that age is significant. F (2,95) = 6.163, P = 0.003<0.05. Finally, the table shows that the interaction between educational qualification and age on adaptive learning is significant F (4,95) = 9.537, P = 0.000<0.05. This means that the null hypothesis is rejected. Hence there is significant difference in the mean ratings of building construction Educators regarding the extent of utilization of adaptive learning based on their educational qualifications and age.

Table 4

Multiple comparison test for the interaction between educational qualification and age

EduQual	Age	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
HND/B.Sc	Below 40 years	3.250	.154	2.943	3.557
	40-55 years	3.603	.206	3.194	4.013
	56 years & above	3.714	.437	2.846	4.583
MSc	Below 40 years	3.810	.357	3.101	4.519
	40-55 years	3.196	.218	2.762	3.631
	56 years & above	2.821	.309	2.207	3.435
PhD	Below 40 years	4.143	.618	2.915	5.371
	40-55 years	1.801	.094	1.613	1.988
	56 years & above	3.286	.206	2.876	3.695

Table 4 shows that difference in the interaction between HND/B.SC and age categories (below 40 years, 40-55 years and 56 years and above) are significant since the confidence intervals do not include zero. Similarly, the difference in the interaction between M.SC and age categories are also significant. Further, the difference in the interaction between PhD and age categories are also significant.

Hypothesis Two: There is no significant difference in the mean ratings of building construction educators regarding the extent of utilization of virtual reality in public universities in South-east, Nigeria based on their educational qualification and age.

Table 5

Summary of a 2-way ANOVA result on extent of utilization of virtual reality based on educational qualification and age

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	69.757a	8	8.720	23.790	.000	.689
Intercept	289.821	1	289.821	790.734	.000	.902
EduQual	3.909	2	1.955	5.333	.007	.110
Age	5.798	2	2.899	7.910	.001	.155
EduQual * Age	15.473	4	3.868	10.554	.000	.329
Error	31.521	86	.367			
Total	650.400	95				
Corrected Total	101.278	94				

a. R Squared = .689 (Adjusted R Squared = .660)

Table 5 shows the interaction between educational qualification and age on virtual reality. Data presented in the table shows that educational qualification is significant. F (2,95) = 5.333, P = 0.007<0.05. The table shows that age is significant F (2,95) = 7.910, P = 0.001<0.05. Finally, the table shows that the interaction between educational qualification and age on virtual reality is significant. F (4,95) = 10.54, P = 0.000<0.05. This means that the null hypothesis is rejected hence there is significant difference in the mean rating of building construction educators regarding the extent of utilization of virtual reality in public universities in South –east, Nigeria based on their educational qualifications and age.

Table 6

Multiple comparison test for interaction between educational qualification and age on virtual reality

				95% Confidence Interval	
EduQual	Age	Mean	Std. Error	Lower Bound	Upper Bound
HND/B.Sc	Below 40 years	3.150	.151	2.849	3.451
	40-55 years	3.022	.202	2.621	3.423
	56 years & above	3.300	.428	2.449	4.151
MSc	Below 40 years	4.533	.350	3.838	5.228
	40-55 years	3.050	.214	2.624	3.476
	56 years & above	2.500	.303	1.898	3.102
PhD	Below 40 years	2.800	.605	1.596	4.004
	40-55 years	1.516	.092	1.333	1.700
	56 years & above	3.133	.202	2.732	3.535

Table 6 shows that difference in the interaction between HND/B.SC and age categories (below 40 years, 40-55 years and 56 years and above) are significant since the confidence intervals do not include zero. Similarly, the difference in the interaction between M.SC and age categories are also significant. Further the difference in the interaction between PhD and age categories are also significant.

DISCUSSION

The findings from table 1 revealed that out of seven item statements of utilization of adaptive learning in teaching by building construction educators shows that adaptive learning was utilized to a moderate extent. The findings agree with the findings of Tumaini et al (2021), that revealed the identification of the types of AI-enabled learning interventions used, a visualization of the co-occurrences of authors associated with major research themes in AI-enabled learning systems and a review of common analytical methods and related techniques utilized in such learning systems.

The findings in table 2 revealed that four out of five item statements of utilization of virtual reality in teaching, show that virtual reality were utilized to a low extent. These findings disagree with the findings of Oyeleke and Ezeali (2020) who found that AI-powered tools enable both students and lecturers to see the need of this new technological innovation for effective teaching and learning practice in this present digital era. Also disagrees with the findings of Angelos, et al (2024), that revealed from the findings underscore the urgent need for further empirical research to explore the long-term impact of these technologies and advocate for more equitable access to AI and VR tools in underserved educational settings.

Conclusion

Based on the findings of this study, it was concluded that adaptive learning and virtual reality, were utilized to a low extent in public universities by building construction educators. Hence it could be concluded that AI-powered tools were not properly in public universities.

Recommendations

The following recommendations are been preferred based on the findings of this study:

1. Building construction educators should intensify effort to learn and utilize AI-powered tools such as Adaptive learning, virtual reality, intelligent tutoring system and predictive analytics properly in order to enhance teaching and learning.
2. Building construction educators should be up-to-date in the new technique and approaches involved in artificial intelligence in teaching. They should be attending seminars, workshops, conferences and other programmes pertaining artificial intelligence.

REFERENCES

Adio-Moses, D. and Asaolu, O. S. (2016). Artificial intelligence for sustainable development of intelligent buildings. In the 9th CIDB Postgraduate Conference, Cape Town, South Africa: 1-11.

Afolabi, A. (2020) Digitizing the grey areas in the Nigerian public procurement system using e-Procurement technologies, *International Journal of Construction Management*, https://doi.org/10.1080/ 15623599.2020.1774836

Allam, Z. and Dhunny, Z. A. (2019). On big data, artificial intelligence and smart cities. *Cities, 89*: 80-91. https://doi.org/10.1016/j.cities.2019.01.032

Boileau, J. (2019). *Artificial intelligence: Possibilities for engineering and construction*. FMI Corporation, Raleigh, USA.

Brock, T. (2023). Artificial intelligence in the construction industry: A review of present status, opportunities and future challenges. *Journal of Building Engineering, 44: 103* https://doi.org/10.1016/j.jobe.2021.103299

Eber, W. (2020). Potentials of artificial intelligence in construction management. Organization, Technology and Management in Construction: *International Journal of Education, 12(1): 2053-2063*. https://doi.org/10.2478/otmcj-2020-0002

Güngör, H. (2020). Creating value with artificial intelligence: A multi-stakeholder perspective. *Journal of Creating Value*, 6(1)72 85.

Holzinger, A., Langs, G., Denk, H., Zatloukal, K., and Müller, H. (2019).

Rivera, A., Le, N., Kashiwagi, J. and Kashiwagi, D. (2016). Identifying the global performance of the construction industry. *Journal for the Advancement of Performance Information & Value*, 8(2): 7-19.

Vinuesa, G. (2020). Strategic factor analysis of innovation adoption in thai architects: A case study of building information modeling. IOP Conf. Ser. Mater. Sci. Eng. 650, 012002.

Amo, J. O. (2015). Partial least square modeling of personality traits and academic achievement in physics. *Asian Journal of Assessment in Teaching and Learning, 11*(1), 77–92.

Ayeni, R. M. (2015). Time and cost overruns in the UAE construction industry: A critical analysis. *International Journal of Construction Management, 20*(5): 402-411.

Chakkravarthy, S. (2019). The future of education according to the fourth industrial revolution.

Journal of Educational Technology & Online Learning, 4(1), 23-30. https://DOI:10.31681/jetol.737193

Cursom, C. S. (2016). An extended theory of planned behavior for modelling Chinese secondary school students' intention to learn artificial intelligence. *Mathematics, 8*(11), 1–18.

Iwuanyanwu, P. (2016). *Assessment of the level of awareness of robotics and construction automation in South African*. In: Ahmed SM, Hampton P, Azhar S, and Saul DA (Eds.), Collaboration and integration in construction, Engineering, Management and Technology: 129-132. Springer, Cham, Switzerland

Manzoor, M. (2021). Artificial intelligence enabled safety for construction sites. *International Research Journal of Engineering and Technology, 6*(6): 680-685

Nweke, C. and Ughamadu, C. (2019). Influential safety technology adoption predictors in construction. *Ecam 26* (11), 2655–2681

Okorie, T. O., and Ezezi, D. W. M. (2018). Key drivers for smart and sustainable practices in the built environment. 27 (6), 1257–1281.

Okoro, S. C. (2023). *The principle of artificial intelligence*. New York and London: Harper and Brothers.

Osuala, C. (2017). Skill improvement needs of Building engineers in Enugu state for effective learning. 2 (5), 89-94.

Sanusi, I. T. and Oyelere, S. S. (2020). *Pedagogies of machine learning in K-12 context.* In 2020 IEEE Frontiers in Education Conference (FIE) (pp. 1–8). IEEE.

Sanusi, I. T., Olaleye, S. A., Oyelere, S. S. and Dixon, R. A. (2022). Investigating learners' competencies for artificial intelligence education in an African K-12 setting. *Computers and Education Open.*

Sohn, K. and Kwon, O. (2020). Technology acceptance theories and factors influencing artificial intelligence-based intelligent products.

Touretzy, C., Christiana, I. V., Breazeal, P., Martin D. and Seehorn, C. (2019). How artificial intelligence affords digital innovation: A cross-case analysis of scandinavian companies. technol. forecast. *Soc. Change.*

Cite as: Okoye, P.I., & Erem-Kalu, N.F. (2025). Extent of utilization of artificial intelligence (AI) in teaching by building construction educators in public universities in South-East Nigeria. *Journal of Research in Industrial Technology and Educational Studies, 1*(1), 32-41.