

Application of Artificial Intelligence Tools in Sustainability Education: Catalyst For Enhancing 21st Century Skills Development Among Students

By

Akwo, Erasmus Tiku

erasmustiku@gmail.com

08068454070

Tangban, Ann Nanghata

ann.tangban675@gmail.com

07065493722

Inyang, Ntongha Yibala

inyangntongha@unical.edu.ng

08161683737

Department Of Education Geography And Sustainable Development Studies
Faculty Of Arts And Social Science Education
University Of Calabar, Calabar-Nigeria

Abstract

The study was designed to investigate whether manner of application of AI tools into education for sustainability students' learning environments served to enhance or inhibit acquisition of 21st century learning skills. To achieve this objective, manner of application of AI tools and acquisition of 21st century learning skills served as the investigated variables. A survey research design was adopted and the study's population comprised of post-graduate students of Geography Education and Sustainable Development Studies Department in the College of Education, University of Calabar. A census was conducted as the students are just 11 in number. A questionnaire tagged "Manner of Application of AI Tools and 21st Century Learning Skills' Acquisition Questionnaire" (MAAT21CLSAQ) served as the instrument for data collection. One research question was posed for the study. Descriptive statistics (frequency counts, percentage and mean scores) was used to analyse the data. Findings revealed that manner of application of AI Tools could serve as either a catalyst or a barrier to 21st Century Learning Skills' acquisition. Based on the findings, it was recommended among others that, students should not rely entirely on information obtained from AI tools in their submissions or presentations. It was also recommended that students should seek to expand the horizon of whatever information browsed from AI tools before compiling such.

Word Count: 213

Key words: AI tools, Education Sustainability, Learning environments

Introduction

As a discipline, sustainability education embraces environmental concerns and issues such as human rights, gender equality, holistic education, the fight against poverty, and cultural diversity. It is a field of study which not only enables all persons to acquire the values, knowledge, attitudes, and skills required to shape a sustainable future but also has been gaining prominence in recent times. The increasing number of academic programs focused on sustainability from global universities reflects the modern prominence of sustainability education (Abdullahi *et al.*, 2024). Sustainability education represents a fundamental educational paradigm that promotes not only the acquisition of knowledge but also the development of essential attitudes, skills and values (Bonilla-Jurado *et al.*, 2024). These elements are fundamental to fostering informed and responsible decision-making, contributing to sustainable development. Sustainability has further been emphasized as a form of development that spurs critical thinking and decision-making collaboratively. Also, education for sustainability can create opportunities for students to learn and look at how their resources impact the planet.

Since it entails learning about the environment, interacting with it to make decisions, and deter harmful environmental activities, sustainability education strengthens and fosters the ability of individuals to make choices and decisions that favour a sustainable lifestyle. Sustainability education is a strategy that aims to ensure that all learners have relevant knowledge, values, skills, and dispositions for motivating and empowering them to be informed citizens (Akinsemolu & Arijeniwa, 2021). Contrary to the traditional way of teaching, sustainability education implies embracing a more holistic methodology to education to create a better world for the current and future generations. In Nigeria today, sustainability has been embedded into the school curriculum to foster awareness on poverty reduction, biodiversity, climate change, sustainable consumption, and disaster risk reduction (Okafor & Egenti, 2021). Knowledge acquired would help students relate what is learnt in the classroom with their real-life activities, thus placing them in a better position to change behaviours and embrace sustainable lifestyles. Lastly, sustainability-related skills are critical for identifying and solving environmental issues.

According to Akpan *et al.*, (2024), 21st century skills are abilities, learning dispositions and competencies needed by learners for success in the 21st century society and workplace. The American Association of Colleges of Teacher Education (AACTE, 2010) categorized these

skills into 3 groups – (i) Learning Skills: These are skills for critical thinking, highly required for problem solving, creativity and innovation, collaboration and communication. These are skills that help students to adapt and improve upon a modern work environment. (Joshua, 2017); (ii) Literacy Skills: These skills are concerned with elements in digital comprehension. They include – (a) Information literacy (helps students understand facts, figures, statistics and data); (b) Media literacy (methods and outlets in which information is published), and; (c) Technology Literacy (machines involved in the information age with examples as computers, cloud programming and mobile devices), and; (iii) Life Skills (conceptualised with the mnemonics “FLIPS”): Flexibility (one’s ability to adapt to changing circumstances; Leadership (motivating a team or others to accomplish a goal); Initiative (self-starters and persist along the line of activities); Productivity (the drive and ambition needed to sustain lifelong learning, and students’ ability to complete work in an appropriate amount of time), and; Social skills (this has to do with meeting and networking with others for mutual benefits). For González-Salamanca *et al.*, (2020), these set of competences, which have been termed ‘skills for the 21st century’, regardless of their specific affiliation, differs from traditional academic skills, since they are not based primarily on content knowledge, but may be considered transversal, multifunctional, and independent of context.

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines designed to think, learn, and problem-solve like humans. It refers to systems that display intelligent behaviour by analysing their environment and taking action with some degree of autonomy to achieve specific goals (Boucher, 2020). It encompasses various subfields, including machine learning, natural language processing, robotics, and computer vision, all of which are designed to perform tasks that typically require human cognition (Anayochukwu, 2025). Its algorithms can handle learning, perception, problem-solving, language understanding and logical reasoning. It is transforming higher education globally by enhancing teaching and learning processes. It can play a range of roles in teaching and learning processes and it can improve the process and experience of learning for students (Obasi & Obiekwe, 2025). It enables personalized learning through adaptive systems, facilitates intelligent tutoring, and supports research through data analytics (Luckin *et al.*, 2016). It also performs many simple or technical tasks like basic research, calculations, proofing and so on. Areas in which AI can transform teaching and learning include, but not limited to personalized learning, adaptive learning, special needs education, bilingual education, gamification, ideation, virtual tutor and immersive learning (Akpan *et al.*, 2024). It also provides opportunities for developing smarter educational systems that offer individualized learning experiences, especially in large scale online courses (Ng, 2017).

AI tools have been posited to have the ability to revolutionise the classroom as it can improve teaching and learning, leading to smarter classrooms through personalized learning, improvement of assessments, and reduction in planning time for teachers (Ayala-Pazmiño, 2023). AI has made it possible to learn and conduct research in new ways, increasing the effectiveness of educational activities and opening up access to a wealth of information. AI-enabled tools and technologies are being included into learning procedures more frequently, providing new opportunities to improve the quality of education (Fasola, 2024). Several AI tools can be used for learning. Canva, an AI tool, can be used to enhance designs and this can be particularly useful in creating posters for the library (Baker, 2021). The use of generative AI tools such as ChatGPT to generate ideas for creative and artistic writing, help in bringing up topic outlines and general research that serve as a basis for writing. ChatPDF is particularly useful in helping students get better insights and understanding into educative documents that may be in PDF format (Ogurlu & Mossholder, 2023). Socrative and Quillionz are AI powered tools used to quickly and easily create quiz questions and assessment by teachers. With the use of Turnitin plagiarism check, students can check for originality of their work (Tzoneva, 2023).

According to Akpan *et al.*, (2024), virtual assistants like Google assistant helps in home work, answer questions, assist educational task, Smartboard provides real feedback interactive lessons while Chatbots answers questions, offer suggestions, guide users through learning materials. The learning outcome of students can greatly improve with the use of simple AI tools like ChatGPT, haiper, Gemini, grammarly, claude, runwayML, midjourney, kickresume, udio, immersity.ai, dall.E, coursera AI, doulingo and Socratic by Google etc (Prince *et al.*, 2024). Most generative AI tools share similarities while some are unique in specific task, such as writing, text to image/video, text to music.

Despite the benefits of AI in education, there is growing concern about its unethical use among undergraduates (Osang *et al.*, 2025). The misuse of AI-powered tools for generating essays, solving assignments, and completing research papers without proper attribution has become widespread. The rapid proliferation of its tools, particularly generative AI models like ChatGPT, has introduced a complex set of threats to students' academic development and overall well-being due to the potential for academic dishonesty and the erosion of academic integrity (Alwi *et al.*, 2025). With AI's ability to generate coherent and seemingly original text, students are increasingly tempted to use these tools to complete assignments, essays, and even exams without genuine understanding or effort (Teaching Times, 2025). This overreliance can lead to instances of "AI plagiarism," where students submit AI-generated content as their own, challenging traditional methods of plagiarism detection and making it

difficult for educators to accurately assess a student's true knowledge and critical thinking abilities (Cardiff University, 2025). Studies indicate that AI-driven plagiarism detection software has identified an increase in AI-assisted academic dishonesty, leading to concerns about the authenticity of student work (Cotton et al., 2023). Plagiarism is the act of using another person's work without proper attribution, and AI has exacerbated this issue by enabling students to generate essays, reports, and research papers without original thought.

Beyond academic integrity, the pervasive use of AI poses a worrisome threat to the development of students' critical thinking skills and cognitive autonomy (Mathew & Isaac, 2025). Rather than engaging in independent learning and research, students increasingly depend on AI to answer questions, generate solutions, and complete assignments. AI-powered tools like ChatGPT, paraphrasing software, and automated essay generators allow students to produce content with minimal effort, often without understanding the subject matter. Students' over-reliance on AI for academic tasks can serve to diminish their critical thinking and problem-solving abilities (Osang *et al.*, 2025). When students habitually outsource cognitive tasks to AI, such as summarizing articles, explaining concepts, or suggesting research ideas, they engage in "cognitive offloading," potentially hindering their ability to engage in independent thought, analytical reasoning, and complex problem-solving (Gerlich, 2025).

Selwyn (2020) argues that this dependence on AI leads to intellectual laziness, reducing students' ability to analyze and synthesize information. This over-reliance can create an illusion of competence, where students appear to perform well but lack deep understanding. This reliance can also lead to a decline in the mental workout necessary for developing robust critical thinking, as students may become less adept at evaluating information deeply, questioning assumptions, or generating original ideas when AI readily provides answers (EdTech Digest, 2025). Furthermore, unchecked reliance on AI can also impact students' overall well-being, leading to digital fatigue, reduced face-to-face interactions, and potential social isolation, thereby affecting their interpersonal skills and emotional intelligence (Frontiers, 2025).

The unethical use of AI has far-reaching consequences on students and the education system. Firstly, it diminishes students' ability to think critically and solve problems independently, leading to graduates who are ill-equipped for the workforce (O'Neil, 2016). Secondly, it can lead to a decline in the practice of independent thought, analytical reasoning, and the ability to evaluate information deeply, as the immediate gratification provided by technology often bypasses the need for sustained mental exertion (ResearchGate, 2024). Additionally here, it can manifest as a reduced capacity for complex problem-solving, diminished ability to

question norms, and a tendency towards superficial understanding rather than thorough analysis of information (ASJP, 2025). Thirdly, it fosters a culture of dishonesty, where students prioritize convenience over ethical learning. Fourthly, academic institutions run the risk of losing credibility when AI-driven plagiarism becomes widespread, leading to employers and society questioning the value of university degrees (Floridi & Cowlis, 2019). Lastly, the over-reliance on AI may lead to a decline in research quality, as students depend on AI-generated information rather than engaging in rigorous academic inquiry (Mathew & Isaac, 2025).

Research evidence appears to point that sustainability education graduates who are equipped with 21st century skills such as critical thinking, problem-solving, collaboration, communication, and digital literacy are better equipped to navigate complex challenges, adapt to technological advancements, and contribute significantly to the sustenance of the earth and its resources (Belwal *et al.*, 2017). The 21st century graduates of sustainability education require more than certificates to skills and attributes such as critical thinking, communication expertise, creativity, problem-solving, perseverance, collaboration, information literacy, technology, and digital literacy (UNESCO, 2015). With a solid understanding of these skills, graduates can analyse information critically, approach problems creatively, and work effectively in diverse teams as sustainability education experts.

Moreover, sustainability education graduates with 21st century skills can adapt to environmental changes, embrace new technologies, and continuously learn and up-skill themselves (Omoniyi, 2023). Furthermore, graduates with a strong ethical and moral reasoning foundation are better positioned to make responsible decisions, act with integrity, and contribute positively to society (Low *et al.*, 2017). The 21st Century world is moving at a speed beyond imagination. Sustainability education is an instrument for the emancipation of the people and societies in this era of unpredictable climate change consequences. To this end, there is need for a functional and lifelong sustainability education for the acquisition of appropriate skills and the development of mental, physical, as well as social abilities and competencies to equip sustainability education learners to live in, and contribute to the sustainable development of the society.

To this end, this study investigated whether the application of AI tools in Education for Sustainability students' learning environments is a catalyst or barrier to their acquisition of 21st Century learning skills.

Statement of the problem

Notwithstanding the advantages of AI tools' application in the learning process, its use among students has generated perspectives as it concerns the ethical standpoint of its application. Research evidences have reported its seeming widespread misuse for generating essays, solving assignments, and completing research papers without proper attribution. The rapid proliferation of the tools has led to a complicated set of issues to students' academic development and overall well-being as a result of the potential for academic dishonesty and the erosion of academic integrity. With the tools' ability to generate coherent and seemingly original text, students are increasingly prone to using them to complete assignments, essays, and even exams without genuine understanding or effort. The overreliance in turn leads to instances of "AI plagiarism," where students submit AI-generated content as if their own, thereby challenging traditional methods of plagiarism detection and making it uneasy for educators to accurately assess a student's true knowledge and critical thinking abilities.

Aside the issue of academic integrity, its pervasive application serves as a worrisome threat to the sustained development of students' higher level learning skills and cognitive independence/autonomy. Instead of engaging in independent learning and research, they rather indulge in an increasing dependence on AI to answer questions, generate solutions, and complete assignments. Students' over-reliance on AI for academic tasks can serve to diminish their critical and creative thinking, and problem-solving abilities. When students make a habit of outsourcing cognitive tasks to AI, they therefore engage in "cognitive offloading," and this potentially hinders their ability to indulge in independent thought, analytical reasoning, and complex problem-solving. Other consequences of dependence on AI are as follows - it leads to intellectual laziness, reducing students' ability to analyze and synthesize information; it creates an illusion of competence, where students appear to perform well but lack deep understanding; it leads to a decline in the mental workout necessary for developing robust critical thinking, as students may become less adept at evaluating information deeply, questioning assumptions, or generating original ideas when AI readily provides answers, and; it impacts students' overall well-being, leading to digital fatigue, reduced face-to-face interactions, and potential social isolation, thereby affecting their interpersonal skills and emotional intelligence.

The unethical application of the tools has far-reaching complications for the students. The complications include - diminishing students' ability to think critically and solve problems independently, thus leading to graduates who are ill-equipped for the workforce; a decline in the practice of independent thought, analytical reasoning, and the ability to evaluate information deeply, as the immediate gratification provided by technology often bypasses the

need for sustained mental exertion; a reduced capacity for complex problem-solving, diminished ability to question norms, and a tendency towards superficial understanding rather than thorough analysis of information; a decline in research quality, as students depend on AI-generated information rather than engaging in rigorous academic inquiry, and; fostering a culture of dishonesty, where students prioritize convenience over ethical learning. Based on the stated issues above, this study investigated whether the application of AI tools in Education for Sustainability students' learning environments is a catalyst or barrier to their acquisition of 21st Century learning skills.

Purpose of the study

The purpose of the study was to investigate whether the application of AI tools in Education for Sustainability students' learning environments is a catalyst or barrier to their acquisition of 21st Century learning skills.

Research question

The following question was posed to guide the study;

Could the application of AI tools in Education for Sustainability students' learning environments serve as a catalyst or barrier to their acquisition of 21st Century learning skills?

Literature review

Abubakar *et al.*, (2024) explored the impact of artificial intelligence (ChatGPT and Google-bard) on undergraduates' creative writing skills at a university in northeastern Nigeria. The study's only objective examined the impact of selected AI tools on students' creative writing skills and the result showed that a significant improvement was recorded based on the learners' pre- and post-test scores. Akpan *et al.*, (2024) investigated harnessing artificial intelligence for 21st century skills acquisition and undergraduate students' preparation for sustainable lifelong learning in Nigeria. One of the study's posers enquired extent of acquisition of life skills by science education undergraduate students using AI technology. The result showed that extent of life skills acquisition using AI technology was moderate. The impact of artificial intelligence in enhancing the sustainability of technical education in Nigeria was verified by Olojuolawe (2024). One of the study's aims was to ascertain the impact of artificial intelligence on technical students' creativity and innovation skills for employability. The finding revealed that artificial intelligence did have a profound impact on technical students' creativity and innovation skills for employability.

Oyeyemi *et al.*, (2024) surveyed the perceived effect of Artificial Intelligence tools on the academic performance of students in public universities in Anambra State. The study

examined the relationship between use of AI tools and each of the students' problem-solving and critical-thinking skills. From the result, use of AI tools was found to have a significant relationship with each of the students' problem-solving and critical-thinking skills. The influence of Artificial Intelligence (AI) tools on students' learning outcome in Adult Education Postgraduate Programme in Rivers State University was ascertained by Prince *et al.*, (2024). The study's enquiries were to verify the extent which each of ChatGPT, Gemini and Grammarly as an artificial intelligence (AI) tools influence students' learning outcomes in adult education postgraduate programme in Rivers State University. The finding showed that each of the AI tools had a significant effect on learners' social and communication skills. Ebiringa *et al.*, (2025) investigated generative AI adoption in Nigerian Higher Education with focus on the benefits, challenges, and opportunities. One of the research questions was designed to examine the primary benefits of generative AI integration in tertiary education. The result from obtained data showed that it served to significantly improve creativity skill acquisition.

Harnessing Artificial Intelligence (AI) for interest and engagement in learning activities among university students in Nigeria was explored by Hur-Yagba *et al.*, (2025). One of the study's research questions was designed to ascertain the effect of artificial intelligence (AI) on students' interest in learning activities. The result revealed that AI had the effect of enhancing learners' interest towards acquisition of digital literacy skills. An evaluation of the impact of AI-enhanced adaptive learning on critical thinking skills in Social Studies with focus on benefits and challenges for Nigerian universities was conducted by Ijioma (2025). One of the study's research questions enquired the extent which AI-enhanced adaptive learning platforms impact the development of critical thinking skills among Social Studies students in Nigerian universities. The analysis of obtained results showed that AI-enhanced adaptive learning platforms did have a moderate impact on the development of critical thinking skills among the students. Mbegbu and Emelogu (2025) surveyed students' perception of the integration of AI-driven tools into the teaching and learning of English writing skills at the University of Nigeria, Nsukka. An assessment of the benefits of the use of AI-driven tools in the teaching and learning of English writing skills in Nigerian tertiary institutions was inclusive in the study's posers. The finding revealed that AI-driven tools enhanced learners' English writing skills.

Ngonso *et al.*, (2025) examined influence of artificial intelligence on educational performance of students in tertiary institutions in Nigeria. One of the study's aims was to ascertain the nature of the influence of AI on students' educational performance. The result revealed that it affected their problem solving skill-set more negatively due to the extent of reliance on AI

tools. Nwabueze and Mairo (2025) analyzed effects of Artificial Intelligence on Human Capital Development among staff of University of Abuja, Nigeria. The study's objectives included determining the roles of AI on Human Capital Development in Tertiary Education. The result revealed that one of the roles was to enhance learners' skill acquisition in areas such as problem-solving. In a study on language and communication implications of artificial intelligence on selected Nigerian university undergraduates, Obasi and Obiekwe (2025) ascertained the effect of AI on each of the students' face-to-face and online communication, and their vocabulary and grammar. The finding revealed that application of AI tools by the students significantly improved each of their face-to-face and online communication, and their vocabulary and grammar.

Influence of Artificial Intelligence (AI) on the academic performance of students of University of Cross River State, Calabar, Nigeria was examined by Odey *et al.*, (2025). The study's objectives included verifying the implication of the use of Artificial Intelligence on the creative thinking skills of student of the university. The finding showed that more than half of the respondents experienced negative changes on their creative thinking skill-set as a result of over-reliance on AI tools for academic purposes. Osang *et al.*, (2025) verified unethical issues in the use of Artificial Intelligence (AI) among undergraduates in public universities of Cross River State, Nigeria. One of the study's research questions was designed to examine the issues of over-reliance in the use of Artificial intelligence (AI) among undergraduates. The result revealed the respondents indicating that their reliance on AI tools has reduced their ability to conduct independent research and problem-solving. Owan *et al.*, (2025) investigated acceptance and use of artificial intelligence for self-directed research learning among postgraduate students in Nigerian public universities. One of the study's hypotheses ascertained whether postgraduate students have a low level of AI use for self-directed research learning in universities with implications towards AI use enhancing their problem-solving skills. The result revealed that the alternate hypothesis was rejected while the null was accepted thereby implying that the students' low AI use similarly did have a negative effect on the enhancement of their problem-solving skills.

Methodology

The study adopted a survey research design. The study's population was made up of post-graduate students of Geography Education and Sustainable Development Studies Department in the College of Education, University of Calabar. A census was conducted as the students are just 11 in number. A questionnaire tagged "Manner of Application of AI Tools and 21st Century Learning Skills' Acquisition Questionnaire" (MAAT21CLSAQ) served as the instrument for data collection. It had sections A and B. Section A was designed to obtain data

of the respondents’ demographics while Section B elicited responses concerning manner of application of AI tools and acquisition of 21st Century Learning Skills (10 items), all with a response rubric of strongly agree (SA), agree (A), disagree (D) and strongly disagree (SD).

The instrument was validated by two experts in Measurement and Evaluation in the Department of Educational Foundations and two experts in the Department of Geography Education and Sustainable Development Studies Department who ascertained the degree to which the items on the instrument measured what it is expected to measure. The reliability of the instrument was ascertained by conducting a trial test with 30 respondents from communities that were not part of the sample and the obtained data was analysed using the Cronbach Alpha reliability method. The reliability coefficient for the instrument was 0.85. Data collection for the study was done by the researchers in conjunction with no research assistants lasted just a week. The data collected was analyzed using Descriptive statistics (frequency counts, percentage and judgmental mean scores) was used to analyse the data.

Presentation of results

Research Question

Could the application of AI tools in Education for Sustainability students’ learning environments serve as a catalyst or barrier to their acquisition of 21st Century learning skills? The judgment based on the mean scores was in such a manner that 0 - 0.99 = strongly disagree (SD); 1.00 – 1.99 = disagree (D); 2.00 – 2.99 = agree (A) while 3.00 – 4.00 = strongly agree (SA).

Table 1: Responses concerning perceptions in line with the application of AI tools in Education for Sustainability students’ learning environments serving as a catalyst or barrier to their acquisition of 21st Century learning skills

S/N	Items	SA	A	D	SD	Mean	St. D
1.	Use of AI to generate seemingly original text without genuine effort to do my academic work enhances my sustainability-related creative thinking abilities	3 (27.3%)	2 (18.2%)	1 (9.1%)	5 (45.4%)	2.27	1.28

2.	Habitual outsourcing of academic cognitive tasks to AI can hinder my sustainability-related critical thinking development	3 (27.2%)	2 (18.2%)	2 (18.2%)	4 (36.4%)	2.36	1.23
3.	Submission of AI-generated content as though it is my own can facilitate sustainability leadership skills in me	2 (18.2%)	4 (36.4%)	5 (45.4%)	-	2.73	0.75
4.	Unchecked reliance on AI for my academic tasks can serve as a barrier to the growth of sustainability-related responsiveness expertise in me	3 (27.3%)	3 (27.3%)	5 (45.4%)	-	2.82	0.83
5.	Use of AI-generated content to obtain quick, machine-generated answers is a way of empowering my sustainability-related problem-solving capability	1 (9.0%)	2 (18.2%)	4 (36.4%)	4 (36.4%)	2.00	0.95
6.	Over-integration of AI use in my academic activities can reduce my development of sustainability-based social skills	2 (18.2%)	4 (36.4%)	1 (9.0%)	4 (36.4%)	2.36	1.15
7.	Frequent use of AI to paraphrase content is a way of empowering my sustainability media literacy capability	1 (9.1%)	2 (18.2%)	7 (63.6%)	1 (9.1%)	2.27	0.74

8.	Consistent use of AI to generate content for my academic presentations is a barrier to the growth of sustainability-based collaboration skills in me	1 (9.1%)	2 (18.2%)	5 (45.4%)	3 (27.3%)	2.09	0.90
9.	Steady reliance on AI automated essay generators to produce content with minimal effort without clear understanding of the subject matter can catalyze my sustainability-based communication skills	3 (27.3%)	3 (27.3%)	5 (45.4%)	-	2.82	0.83
10.	The intellectual laziness arising from dependence on AI can drastically reduce my development of sustainability-based life skills	1 (9.1%)	6 (54.5%)	1 (9.1%)	3 (27.3%)	2.45	0.99

From the table, for the 1st item it was observed that 5 (45.4%) respondents strongly disagreed that use of AI to generate seemingly original text without genuine effort to do their academic work enhances their sustainability-related creative thinking abilities while 1 (9.1%), 2 (18.2%), and 3 (27.3%) subjects, respectively, disagreed, agreed and strongly agreed to the above stated assertion. The result produced a mean of 2.27 which is within 2.00 –3.00 thus the assertion was agreed. For the 2nd item, it was observed that 3 (27.2%) respondents strongly agreed that habitual outsourcing of academic cognitive tasks to AI can hinder their sustainability-related critical thinking development while 2 (18.2%), 2 (18.2%), and 4 (36.4%) subjects, respectively, agreed, disagreed and strongly disagreed in the above regard. The result produced a mean of 2.36 which is within 2.00 – 3.00 thus the assertion was agreed. The 3rd item showed that nil respondents strongly disagreed that submission of AI-generated content as though it is their own can facilitate sustainability leadership skills in them while 5 (45.4%), 4 (36.4%), and 2 (18.2%) subjects, respectively, disagreed, agreed, and strongly

agreed to the item. The result produced a mean of 2.73 which is within 2.00 – 3.00 thus the assertion was agreed.

The 4th item revealed that 3 (27.3%) respondents strongly agreed that unchecked reliance on AI for their academic tasks can serve as a barrier to the growth of sustainability-related responsiveness expertise in them while 3 (27.3%), 5 (45.4%), and nil subjects, respectively, agreed, disagreed and strongly disagreed to the item. The result produced a mean of 2.82 which is within 2.00 – 3.00 thus the assertion was agreed. For the 5th item it was observed that 4 (36.4%) respondents strongly disagreed that use of AI-generated content to obtain quick, machine-generated answers is a way of empowering their sustainability-related problem-solving capability while 4 (36.4%), 2 (18.2%), and 1 (9.0%) subjects, respectively, disagreed, agreed and strongly agreed to the above stated assertion. The result produced a mean of 2.00 which is within 2.00 – 3.00 thus the assertion was agreed. For the 6th item, it was observed that 2 (18.2%) respondents strongly agreed that over-integration of AI use in their academic activities can reduce their development of sustainability-based social skills while 4 (36.4%), 1 (9.0%), and 4 (36.4%) subjects, respectively, agreed, disagreed and strongly disagreed in the above regard. The result produced a mean of 2.36 which is within 2.00 – 3.00 thus the assertion was agreed.

The 7th item showed that 1 (9.1%) respondents strongly disagreed that frequent use of AI to paraphrase content is a way of empowering their sustainability media literacy capability while 7 (63.6%), 2 (18.2%), and 1 (9.1%) subjects, respectively, disagreed, agreed, and strongly agreed to the item. The result produced a mean of 2.27 which is within 2.00 – 3.00 thus the assertion was agreed. The 8th item revealed that 1 (9.1%) respondents strongly agreed that consistent use of AI to generate content for their academic presentations is a barrier to the growth of sustainability-based collaboration skills in them while 2 (18.2%), 5 (45.4%), and 3 (27.3%) subjects, respectively, agreed, disagreed and strongly disagreed to the item. The result produced a mean of 2.09 which is within 2.00 – 3.00 thus the assertion was agreed. For the 9th item it was observed that 3 (27.3%) respondents strongly agreed that steady reliance on AI automated essay generators to produce content with minimal effort without clear understanding of the subject matter can catalyze their sustainability-based communication skills while 3 (27.3%), 5 (45.4%), and nil subjects, respectively, agreed, disagreed and strongly disagreed to the above stated measure. The result produced a mean of 2.82 which is within 2.00 – 3.00 thus the measure was agreed. For the 10th item, it was observed that 1 (9.1%) respondents strongly agreed that the intellectual laziness arising from dependence on AI can drastically reduce my development of sustainability-based life skills while 6 (54.5%), 1 (9.1%), and 3 (27.3%) subjects, respectively, agreed, disagreed and strongly disagreed in

the above regard. The result produced a mean of 2.45 which is within 2.00 – 3.00 thus the measure was agreed.

Discussion of Findings

The results from the posers showed that the responses in terms of whether application of AI tools in Education for Sustainability students' learning environments could serve as a catalyst or barrier to their acquisition of 21st Century learning skills were all agreed. A close look at the items reveals that all the even numbered items were positively worded while all the odd numbered items were negatively worded. By implication, the finding reveals that application of AI tools in the students' learning environments could serve both as a catalyst and a barrier to their acquisition of 21st Century learning skills.

Conclusion and Recommendation

The acquisition of 21st Century learning skills is an imperative for Education for Sustainability students. By this, there will be guarantee that a citizenry equipped for the ever-changing dynamics of the natural environment would be on ground to further teach others about the necessity of environmental sustainability. To assist in the acquisition of the learning skills is the application of AI tools. Yet its application can be both a blessing and a curse. On one hand, its advantages to acquiring the learning skills is basically based on the advent of AI technologies to facilitate learning processes. On the other hand, without appropriate awareness of the dangers of either its unethical use or over-reliance, a student may only end up causing so much irreparable harm to his/her environmental-related learning outcomes as no meaningful learning skill would be acquired.

Based on the findings, it is strongly recommended that students should not rely entirely on information obtained from AI tools in their submissions or presentations. It is also recommended that students should seek to expand the horizon of whatever information browsed from AI tools before compiling such.

References

- Abdullahi, A. M., Hussein, H. A., Ahmed, M. Y., Hussein, O. A., & Warsame, A. A. (2024). The impact of education for sustainable development on university students' sustainability behaviour: A case study from undergraduate students in Somalia. *Frontiers in Education*, 9(1413687), (e-journal). Retrieved on 18/10/2025 from doi:10.3389/feduc.2024.1413687

- Abubakar, S., Aliyu, M. M., & Nurchalis, N. F. (2024). Impact of artificial intelligence (ChatGPT and Google-bard) on undergraduates' creative writing skills at a university in Northeastern Nigeria. *English Education Journal*, 7(2), 257-273
- Akinsemolu, A. A., & Arijeniwa, F. V. (2021) Current trends in sustainability education and the future of sustainability education in Nigeria. *The Journal of Sustainable Development, Law and Policy*, 12(2), 421-440
- Akpan, A. O., Oyakhirome, A. H., & Udoh, A. P. (2024). Harnessing artificial intelligence for 21st Century skills acquisition and undergraduate students' preparation for sustainable lifelong learning in Nigeria. *International Journal of Research and Innovation in Social Science (IJRISS)*, VIII(IIIS), 1069-1083
- Alwi, S., Mariappan, U., Singh, H. K. B., Singh, H. K. B., Amin, M. R. M., Abbas, M. S., & Heng, H. K. (2025). Artificial intelligence and academic impact on the integrity of higher education institutions. *Cuestiones De Fisioterapia*, 54(2), 1834-1840
- American Association of Colleges of Teacher Education (2010). *21st century knowledge and skills in education preparation*. Available at scribd.com/documents/321128/aacte-21-whitepaper.
- Anayochukwu, A. A. (2025). Artificial intelligence awareness and adoption patterns among university students in Nigeria: A review. *World Journal of Innovation and Modern Technology*, 9(5), 101-114
- ASJP. (2025, January 15). *The impact of AI on learners' critical thinking. A case study: The Algerian academic landscape*. Available at <https://asjp.cerist.dz/en/downArticle/880/6/1/262181>
- Ayala-Pazmiño, M., (2023). Artificial intelligence in education: Exploring the potential benefits and risks. *593 Digital Publisher CEIT*, 8(3), 892-899
- Baker, R. S. (2021). Artificial intelligence in education: Bringing it all together. In OECD Digital Education Outlook 2021: *Pushing the Frontiers with Artificial Intelligence, Blockchain and Robots*, (pp. 43- 54). Available at <https://doi.org/10.1787/f54ea644-en>
- Belwal, R., Priyadarshi, P., & Al-Fazari, M. H. (2017). Graduate attributes and employability skills: Graduates' perspectives on employers' expectations in Oman. *International Journal of Educational Management*, 31(6), 814-827
- Bonilla-Jurado, D., Zumba, E., Lucio-Quintana, A., Yerbabuena-Torres, C., Ramírez-Casco, A., & Guevara, C. (2024). Advancing university education: Exploring the benefits of Education for Sustainable Development. *Sustainability*, 16(7847), (e-journal). Retrieved on 19/10/2025 from <https://doi.org/10.3390/su16177847>
- Boucher, P. N. (2020). *Artificial intelligence: How does it work, why does it matter, and what can we do about it?* Brussels: European Union

- Cardiff University. (2025, January 9). *Generative AI in higher education: Balancing innovation and integrity.* Available at <https://orca.cardiff.ac.uk/id/eprint/175351/1/bjbs-81-14048.pdf>
- Cotton, D. R. E., Cotton, P. A., & Shipway, J. R. (2023). ChatGPT, AI, and the impact on academic integrity. *Innovations in Education and Teaching International*, 60(2), 234-246
- Ebiringa, O. T., Ikerionwu, C. O., Erike, A. I., & Asiegbu, B. C. (2025). Generative AI adoption in Nigerian Higher Education: Benefits, challenges, and opportunities. *African Journal of Humanities & Contemporary Education Research*, 20(1), 285-304
- EdTech Digest. (2025, May 27). *AI is killing critical thinking—but it doesn't have to be that way.* Available at <https://www.edtechdigest.com/2025/05/27/ai-is-killing-critical-thinking-but-it-doesnt-have-to-be-that-way/>
- Fasola, O. S. (2024). Awareness, perception and use of artificial intelligence tools by LIS educators in Nigerian higher institutions. *Cybrarians Journal*, 72, 1-20
- Floridi, L., & Cowls, J. (2019). A unified framework of five principles for AI in society. *Harvard Data Science Review*, 1(1).
- Frontiers. (2025, February 2). *Exploring the effects of artificial intelligence on student and academic well-being in higher education: A mini-review.* Available at <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1498132/ful>
- Gerlich, A. (2025). AI tools in society: Impacts on cognitive offloading and the future of critical thinking. *Journal of Sensor and Actuator Networks*, 15(1), 6.
- González-Salamanca, J C., Agudelo, O. L., & Salinas, J. (2020). Key competences, Education for Sustainable Development and strategies for the development of 21st Century skills. A systematic literature review. *Sustainability*, 12(10366), (e-journal). Retrieved on 18/10/2025 from doi:10.3390/su122410366
- Hur-Yagba, C. N., Ugosor, S. A., & Mkuma, B. V. (2025). Harnessing Artificial Intelligence (AI) for interest and engagement in learning activities among university students in Nigeria. *International Journal of Innovative Information Systems & Technology Research*, 13(3), 25-33
- Ijioma, I. C. (2025). Evaluating the impact of AI-enhanced adaptive learning on critical thinking skills in Social Studies: Benefits and challenges for Nigerian universities. *World Journal of Innovation and Modern Technology*, 9(9), 49-59
- Joshua, M. T. (2017). *21st century skills: Implication for education for careers in the 21st century, (A festschrift in honour of Professor Daniel I. Denga).* Calabar: University of Calabar Press.

- Low, E. L., Hui, C., & Cai, L. (2017). Developing student teachers' critical thinking and professional values: A case study of a teacher educator in Singapore. *Asia Pacific Journal of Education*, 37(4), 535-551
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson Education.
- Mathew, S., & Isaac, E. A. (2025). Artificial Intelligence (AI): A threat to education in Nigeria. *Journal of Education Research and Library Practice (JERLP)*, 8(8), 67-78
- Mbegbu, C. C., & Emelogu, N. U. (2025). Students' perception of the integration of ai-driven tools into the teaching and learning of English writing skills at the University of Nigeria, Nsukka. *International Journal of Studies in Education [Special Edition]*, 21(2), 158-167
- Ng, A. (2017). *Artificial intelligence and the future of education*. MIT Media Lab.
- Ngonso, B. F., Egielewa, P. E., Egenti, G., Uduehi, I., Sunny-Duke, F., Ukhurebor, K. E., Onwusinkwue, S., Odezuligbo, I., Abiodun, A. O., Talabi, A. A., Jokthan, G., Opataye, J., Nwankwo, U. C., Eneche, B. M., & Osemengbe, U. O. (2025). Influence of artificial intelligence on educational performance of Nigerian students in tertiary institutions in Nigeria. *Journal of Infrastructure, Policy and Development*, 9(1), 9949, (e-journal). Retrieved on 19/10/2025 from <https://doi.org/10.24294/jipd9949>
- Nwabueze, O. J., & Mairo, S. M. (2025). Effects of artificial intelligence on human capital development among staff of University of Abuja, Nigeria. *Zamfara International Journal of Education (ZIJE)*, 5(1), 125-133
- Obasi, J. C., & Obiekwe, B. (2025). Language and communication implications of Artificial Intelligence on selected Nigerian university undergraduates. *Àgídìgbò: ABUAD Journal of the Humanities*, 13(1), 303-326
- Odey, B. E., Erubami, A. J., & Akor, G. B. (2025). Influence of Artificial Intelligence (AI) on the academic performance of students of University of Cross River State, Calabar, Nigeria. *Communication and Media Codes*, 2, 23-29
- Ogurlu, U., & Mossholder, J. (2023). The Perception of ChatGPT among educators: Preliminary findings. *Research in Social Sciences and Technology*, 8(4), 196-215
- Okafor, O. J., & Egenti, U. P. (2021). Education for Sustainable Development in Nigeria. *Unizik Journal of Educational Research and Policy Studies*, 8, 86-92
- Olojuolawe, S. R. (2024). Impact of artificial intelligence in enhancing the sustainability of technical education in Nigeria. *IOSR Journal of Computer Engineering (IOSR-JCE)*, 26(1), 34-41
- Omoniyi, T. O. (2023). Potential graduates' knowledge, readiness, and disposition to 21st Century employability skills in the University of Ibadan, Ibadan Nigeria. *Unilorin Journal of Lifelong Education*, 7(2), 164-176

- O'Neil, C. (2016). *Weapons of math destruction: How big data increases inequality and threatens democracy*. Crown.
- Osang, O. G., Idiong, S. P., & Akanimoh, M. E. (2025). Unethical issues in the use of Artificial Intelligence (AI) among undergraduates in public universities of Cross River State, Nigeria. *Journal of Humanities and Social Policy*, 11(5), 136-142
- Owan, V. J., Chukwu, C. O., Agama, V. U., Owan, T. J., Ogar, J. O., & Etorti, I. J. (2025). Acceptance and use of artificial intelligence for self-directed research learning among postgraduate students in Nigerian public universities. *Discover Education*, 4(329), (e-journal). Retrieved on 18/10/2025 from <https://doi.org/10.1007/s44217-025-00770-6>
- Oyeyemi, A. A., Okoye, A. T., Okenwa-Fadele, I., & Abiakwu, F. O. (2024). Perceived effect of artificial intelligence tools on the academic performance of students in public universities in Anambra State. *International Journal of Innovative Research and Advanced Studies (IJIRAS)*, 11(2), 16-21
- Prince, D., Wobo, S. E., & Didi, F. E. (2024). Influence of Artificial Intelligence (AI) tools on students' learning outcome in Adult Education Postgraduate Programme in Rivers State University. *International Journal of Advanced Research and Learning*, 3(4), 132-141
- ResearchGate. (2024, June 15). *The erosion of cognitive skills in the technological age: How reliance on technology impacts critical thinking, problem-solving, and creativity*. Available at <https://www.researchgate.net/publication/381452876> The Erosion of Cognitive Skills in the Technological Age How Reliance on Technology Impacts Critical Thinking Problem-Solving and Creativity
- Selwyn, N. (2020). *Should robots replace teachers? AI and the future of education*. Polity Press.
- TeachingTimes. (2025, January 21). *How will generative AI change education in 2025?* Available at <https://www.teachingtimes.com/how-will-generative-ai-change-education-in-2025/>
- Tzoneva, I. (2023) *Benefits and challenges in using AI-powered educational tools*. Available at <https://end-educationconference.org/wpcontent/uploads/2023/07/2023v2end079.pdf>
<https://doi.org/10.36315/2023v2end079>
- UNESCO. (2015). Rethinking Education: Towards a global common good?" *UNESCO Education Research and Foresight, Policy Paper 1*, Year: 2015
<https://unesdoc.unesco.org/ark:/48223/pf0000232535>

Recreational Facility Awareness and Availability: Implications for Patronage and Residents' Well-Being in Cross River State

By

Chukwuogo Virginia Ego

Department of Tourism Studies

University of Calabar, Calabar

Abstract

This study is on Recreational Facility Awareness and Availability: Implications for Patronage and Residents' Well-Being in Cross River State. The study is guided by two research hypotheses in line with the two objectives of the study. The population of this study comprises 741,55 residents of Calabar Municipality. The study adopted a descriptive survey design using mixed method approach, key informant interviews were conducted among participants that were purposively selected, a structured questionnaire administered and key Informant Interview to 400 respondents selected through purposive and simple random sampling technique. The data were analyzed Multiple Regression Analysis and Chi-square tests. Results revealed a statistically significant relationship between public awareness and the level of patronage and availability recreational facilities significantly influences the well-being of residents. This implies that as residents visit recreational facilities more frequently, during preferred times, and experience favorable return factors such as good service or affordability, their sense of well-being increases. Since the two variables are significant at $p < 0.05$, the null hypothesis is rejected, affirming that the availability and use of recreational facilities significantly influence the overall well-being of residents in Calabar Municipality. Additionally, the study established that factors such as income level, proximity, cost of access, and availability of amenities play a significant role in influencing patronage. It was recommended among other that Government agencies and recreational facility operators should develop comprehensive, multi-channel awareness campaigns, including social media, community events, and partnerships with schools and local organizations to increase knowledge of recreational opportunities.

Keywords: Recreational Facility, Awareness, Availability, Patronage and Residents' Well-Being

Introduction

Recreational facilities are key community assets that promote leisure, physical activity, and social interaction, thereby contributing significantly to improved quality of life. They include

parks, sports centres, viewing centres, cultural spaces, resorts, and other recreational environments where individuals can relax, socialize, and engage in various forms of recreation (Rao, 2021). These facilities encourage healthy lifestyles by providing opportunities for physical activities such as jogging, sports participation, and fitness training, which help reduce stress levels and prevent lifestyle-related diseases. In addition to physical health benefits, they also enhance mental well-being by offering serene environments that enable individuals to relax and recover from daily pressures. In Cross River State, particularly Calabar Municipality, recreational facilities are integral components of urban development strategies aimed at improving residents' welfare and quality of life. They also contribute to environmental beautification and enhance the overall livability of urban spaces. However, the extent to which these benefits are realized is largely dependent on the level of public awareness and patronage of such facilities. This underscores awareness and other influencing factors as key determinants of utilization and effectiveness. Therefore, in the context of this study, recreational facilities are viewed as essential resources whose impact on community well-being is shaped by their awareness, accessibility, and patronage patterns (Brockis, 2024).

Recreational facilities also function as social spaces that promote interaction, integration, and cohesion among different groups of people. They bring together individuals from various ethnic, cultural, and socio-economic backgrounds, thereby fostering unity and mutual understanding within communities. These spaces provide opportunities for children to play and develop social skills, while adults engage in networking, relaxation, and recreational sports activities. Such interactions help to reduce social isolation and strengthen community relationships. In Cross River State, recreational centres such as parks, resorts, and sports arenas serve as gathering points for festivals, leisure activities, and communal events. These activities help to build a sense of identity and belonging among residents. They also encourage cultural exchange and shared experiences that enhance social harmony. Furthermore, recreational participation promotes positive behaviour and reduces engagement in antisocial activities. Thus, recreational facilities contribute significantly to social development and community stability (Adisa, Ifeta & Adegbesan, 2021).

In addition to their social and health benefits, recreational facilities contribute to economic growth and tourism development within communities. They create employment opportunities in areas such as facility management, security, hospitality, and event organisation. In Cross River State, recreational facilities attract tourists and visitors, thereby generating income for local businesses and the government. Events held in these facilities, such as cultural festivals and sports competitions, further stimulate economic activities in surrounding areas. Well-developed recreational spaces also enhance the attractiveness of urban centres, encouraging

investment and infrastructural development. However, the level of economic benefit derived from these facilities is influenced by public awareness and patronage levels. Where awareness is low, patronage tends to decline, limiting their economic impact. This highlights the importance of proper publicity and sustainable management of recreational spaces. Overall, recreational facilities serve as key drivers of health, social cohesion, and economic development in Cross River State (Rao, 2021; Brockis, 2024).

Awareness and patronage of recreational facilities are essential for unlocking their full potential, contributing significantly to both individual and community well-being. Globally, these facilities ranging from parks and sports complexes to cultural centers are recognized as critical assets in urban and rural development. They provide spaces for physical activity, relaxation, and social interaction, promoting healthier lifestyles and fostering social cohesion (Shahmirzadi, Mahale, & Ogbemudia, 2024). To maximize their utilization, many governments and organizations integrate awareness campaigns into public health initiatives, highlighting the importance of recreational activities in combating sedentary behaviours and associated health risks. Effective communication strategies and robust government investments have played pivotal roles in enhancing awareness, leading to increased patronage and a deeper appreciation of leisure as a valuable aspect of life.

In developed nations, recreational facilities often enjoy high levels of patronage due to advanced infrastructure and effective promotional strategies. Countries like the United States, Canada, and Australia prioritize the maintenance of parks, sports arenas, and other recreational spaces, ensuring they remain accessible to a wide range of users (Mandagi, & Tappy, 2024). Digital platforms and mobile applications are increasingly utilized to promote these facilities, providing real-time updates about events, schedules, and available amenities (Groulx et al., 2024). Organized community events, such as sports tournaments or cultural exhibitions, further encourage patronage by creating a sense of inclusivity and belonging. Additionally, the design of these facilities often incorporates features that accommodate diverse populations, including children, the elderly, and individuals with disabilities, making them truly inclusive spaces.

Awareness and patronage of recreational facilities present a mixed picture, reflecting varying levels of socio-economic development and cultural attitudes. In countries like South Africa and Kenya, governments and private entities are making concerted efforts to promote recreational spaces through campaigns that emphasize their health and social benefits. These efforts are particularly noticeable in urban centers, where growing middle-class populations increasingly recognize the value of such facilities (Ngome, & Yeom, 2024). However, in many

other African nations, recreational facilities remain underutilized due to factors like inadequate infrastructure, lack of funding, and limited public awareness. Rural areas face even greater challenges, with many residents unaware of or unable to access recreational spaces. This highlights the urgent need for inclusive policies and initiatives that extend the reach of these facilities to underserved communities, ensuring equitable access for all.

In Cross River State, which is richly endowed with natural and cultural resources, recreational facilities are increasingly recognized as important tools for promoting public health, tourism, and community engagement. Urban centers such as Calabar have witnessed growing efforts to promote parks, sports complexes, and cultural venues, particularly through festivals and organized events that enhance visibility and attract participation (Obijuru, 2023). While these initiatives have contributed to increased awareness, significant gaps remain, especially in terms of accessibility, inclusivity, and consistent patronage across different segments of the population.

Balogun (2021) observed that residents in Nigerian cities are beginning to appreciate the physical, psychological, and social benefits of recreational environments, particularly in the face of rising urban stress and sedentary lifestyles. This growing awareness represents a foundational step toward increased patronage and utilization of recreational facilities, as individuals are more likely to engage with services they know exist and understand to be beneficial.

However, it is important to note that awareness is not evenly spread across all population segments within Calabar Municipality. The study reveals that younger and more educated individuals are significantly more informed about the existence and location of recreational facilities than their older or less formally educated counterparts. This discrepancy is consistent with the work of Oncescu and Loewen (2020), who found that disparities in recreational access and awareness often mirror broader socioeconomic and educational inequalities. In their analysis, those with higher education levels typically have more exposure to online platforms, tourism information, and social circles that promote awareness of leisure opportunities.

Supporting this observation, Agbor's (2021) investigation into the effects of urban sprawl in Calabar noted that peripheral communities often less formally planned and underserved by public infrastructure have limited access to both physical facilities and information regarding their availability. This has significant implications for urban planning and public health, as residents in these areas may face compounded disadvantages stemming from both

environmental neglect and informational exclusion. Bridging this gap would require targeted communication strategies, including the use of vernacular media channels and community mobilization to increase awareness in underrepresented areas.

In exploring what drives people to actually use recreational spaces, the study identifies four primary motivators: convenience, safety, facility quality, and social influence. These findings are consistent with broader trends in leisure behavior. Akinbogun, Kayode, and Oyedokun (2024) emphasize that perceived safety is one of the most critical factors affecting individuals' willingness to visit recreational environments. In Calabar, where urban crime and insecurity occasionally make headlines, the assurance of safety through visible security personnel, adequate lighting, and emergency services cannot be overstated. Dao's (2025) recent global study on recreational sports further corroborates this, arguing that comfort and perceived security are universal determinants of leisure space patronage, regardless of location or cultural context.

The physical condition and aesthetics of a recreational facility also matter greatly. Patrons are more likely to return to environments that are well-maintained, hygienic, and equipped with modern amenities. Social factors equally play a role. Word-of-mouth recommendations, peer influence, and the presence of familiar faces often encourage first-time visits and repeat patronage. In this regard, the role of community engagement becomes central. Chan, Marzuki, and Mohtar (2021) contend that involving local residents in the planning and management of recreational spaces enhances their sense of ownership and responsibility, which, in turn, supports long-term sustainability

These persistent challenges indicate that the mere availability of recreational facilities does not automatically translate into their effective utilization. There is therefore a critical need to systematically examine the Recreational Facility Awareness and Availability: Implications for Patronage and Residents' Well-Being in Calabar Municipality, Cross River State.

Statement of the problem

In Cross River State, the utilization of recreational facilities remains below expected levels, despite the availability of several parks, sports centres, resorts, and other leisure spaces intended to enhance residents' quality of life. Many residents still lack adequate awareness of these facilities, including their locations, services, and benefits, which significantly limits their patronage. This challenge is further intensified by weak publicity mechanisms and insufficient sensitization programmes, leading to the continuous underuse of many

recreational assets. As a result, the potential of these facilities to promote healthy lifestyles, social interaction, and community development is not fully realized.

Furthermore, the condition and distribution of recreational facilities across the state contribute to their low usage. Several facilities suffer from poor maintenance, inadequate infrastructure, and unfavourable environmental conditions, making them less attractive to potential users. Accessibility also remains a major barrier, particularly for residents in remote or underserved areas who face difficulties in reaching available recreational spaces. In addition, transportation costs and the expense of private recreational centres discourage low-income earners from regular participation. These economic and structural limitations often force residents to prioritize basic needs over leisure activities, thereby reducing opportunities for relaxation and physical well-being.

Socio-cultural factors also strongly influence the level of patronage of recreational facilities in Cross River State. In many communities, recreation is still regarded as a luxury rather than a necessity, especially among individuals engaged in demanding economic activities. This perception reduces the importance placed on leisure time and limits consistent engagement in recreational activities. In addition, some facilities are not adequately designed to accommodate all population groups, particularly the elderly and persons with disabilities, thereby limiting inclusivity. These cultural and demographic constraints highlight the need to understand how social attitudes and population characteristics shape the use of recreational spaces.

Despite efforts by relevant authorities to improve recreational infrastructure and encourage usage, challenges such as inadequate funding, weak policy implementation, and safety concerns continue to hinder progress. Without addressing these issues, the effectiveness of recreational facilities in promoting well-being and social cohesion will remain limited. It is against this background that this study focuses Recreational Facility Awareness and Availability: Implications for Patronage and Residents' Well-Being in Cross River State.

Purpose of the study

This study examined Recreational Facility Awareness and Availability: Implications for Patronage and Residents' Well-Being in Cross River State. This study will specifically seek to;

1. Assess the level of public awareness of recreational facilities in Cross River State
2. Examine how Availability of recreational facilities influence the well-being of residents

Research questions

The following research questions were raised to guide the study:

1. There is no significant relationship between public awareness of recreational facilities and their patronage in Cross River State.
2. Availability of recreational facilities does not significantly influence the well-being of residents

Methodology

This study adopted a descriptive survey research design to examine recreational facility awareness and availability and their implications for patronage and residents' well-being in Cross River State, Nigeria. The study was guided by four research hypotheses focusing on awareness, patronage, demographic characteristics, and residents' well-being. The population of the study comprised residents, recreational facility operators, and government officials associated with recreational services in Calabar Municipality, with selected facilities including Marina Resort, Christmas Village, Club X, Calabar Sports Club, and other recreational centers. A sample size of 392 respondents was determined using Taro Yamane's formula and selected through purposive and simple random sampling techniques. Purposive sampling was used to select facility operators, government officials, and active users of recreational facilities, while simple random sampling ensured equal representation of residents within the municipality. Data were collected using structured questionnaires, Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), and personal observation checklists. The questionnaire gathered information on awareness, patronage patterns, demographic characteristics, and perceptions of well-being, while interviews and discussions provided qualitative insights into operational challenges and users' experiences. Data collected were analyzed using Chi-square and multiple regression analysis to test the hypotheses and determine the relationship between recreational facility awareness, availability, patronage, and residents' well-being.

Results

This section presents the data analysis based on the hypotheses in the study.

HO₁

There is no significant relationship between public awareness of recreational facilities and their patronage.

The appropriate test statistic used in testing the hypothesis is the Chi-Square Test of Independence. Table 1 presents a crosstabulation of respondents' sources of awareness of recreational facilities against their frequency of visit. The data reveal that the most common source of awareness is social media, which also corresponds with the highest levels of patronage - 30 people visit daily and 50 weekly Television/radio follows, also showing moderate patronage. Conversely, traditional media such as newspapers had the lowest levels of both awareness and usage, with only 3 daily and 2 weekly visitors. Word of mouth and roadside banners contributed to some level of awareness, though with lower frequencies of use compared to social media and TV/radio. This distribution suggests that the mode through which people learn about recreational facilities may influence how often they utilize them.

Table 2 shows the result of a Chi-Square test used to assess the relationship between awareness source and frequency of recreational facility visits. The Pearson Chi-Square value is 26.984 with 16 degrees of freedom, and the asymptotic significance (p-value) is 0.041. Since the p-value is less than 0.05, the result is statistically significant. This indicates that the null hypothesis (which claims no relationship between awareness and patronage) is rejected in favor of the alternative hypothesis. Therefore, it was fit to conclude that there is a significant relationship between the public's source of awareness and how frequently they visit recreational facilities in Calabar Municipality.

Table: Crosstabulation: Awareness Source × Frequency of Visit

Awareness Source	Daily	Weekly	Monthly	Occasionally	Never	Total
Social Media	30	50	25	25	10	140
Television/Radio	20	30	20	20	10	100
Word of Mouth	10	20	15	25	10	80
Roadside Banners	5	10	10	20	5	50
Newspaper	3	2	5	10	2	22
Total	68	112	75	100	37	392

Table 2: Chi-Square Test Result

Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.984	16

*Significant at $p < 0.05$

HO₂

Availability of recreational facilities does not significantly influence the well-being of residents.

The Multiple Regression Analysis was used in the test of hypothesis two. Table 3 presents the model summary for the multiple regression analysis assessing how recreational facility usage variables influence residents' overall well-being in Calabar Municipality. The model shows a correlation coefficient (R) of 0.642, indicating a moderately strong relationship between the independent variables (frequency of visit, time of visit, and return factors) and the dependent variable (overall well-being). The R Square value of 0.412 suggests that approximately 41.2% of the variation in residents' well-being can be explained by the model. The adjusted R Square (0.403) further confirms the model's reliability, accounting for the number of predictors.

Table 3 shows the ANOVA result for the regression model. The F-statistic is 56.391 with a significance level of $p = .000$, which is highly significant ($p < 0.001$). This means the model as a whole is statistically significant and explains a meaningful proportion of variance in the dependent variable. The significant F-value indicates that the combination of frequency of visit, time of visit, and return factors collectively predict the overall well-being of residents in a statistically significant way.

Table 3 equally details the regression coefficients for each predictor variable. All three independent variables frequency of visit ($B = 0.334$, $p = .000$), time of visit ($B = 0.241$, $p = .000$), and return factors ($B = 0.198$, $p = .001$) have statistically significant positive effects on well-being. This implies that as residents visit recreational facilities more frequently, during preferred times, and experience favorable return factors such as good service or affordability, their sense of well-being increases. Since all variables are significant at $p < 0.05$, the null hypothesis is rejected, affirming that the availability and use of recreational facilities significantly influence the overall well-being of residents in Calabar Municipality.

Table 3: Model Summary of multiple regression analysis of Availability of recreational facilities does not significantly influence the well-being of residents

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	0.642	0.412	0.403	0.722		

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	88.321	3	29.440	56.391	.000***
Residual	125.456	388	0.323		
Total	213.777	391			

Coefficients	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	1.215	0.204	—	5.956	.000
Frequency of Visit	0.334	0.053	0.415	6.302	.000
Time of Visit	0.241	0.067	0.272	3.597	.000
Return Factors	0.198	0.061	0.225	3.246	.001

***Significant at $p < 0.001$

Discussion of findings

Public awareness of recreational facilities and their patronage

The findings of this study underscore a moderate to high level of public awareness regarding recreational facilities in Calabar Municipality. This outcome is encouraging, as it mirrors a growing body of literature suggesting that urban populations in Nigeria are becoming increasingly attuned to the role of leisure spaces in promoting community well-being. This finding is in agreement with Balogun (2021) who, observed that residents in Nigerian cities are beginning to appreciate the physical, psychological, and social benefits of recreational environments, particularly in the face of rising urban stress and sedentary lifestyles. This growing awareness represents a foundational step toward increased patronage and utilization of recreational facilities, as individuals are more likely to engage with services they know exist and understand to be beneficial.

However, it is important to note that awareness is not evenly spread across all population segments within Calabar Municipality. The study reveals that younger and more educated individuals are significantly more informed about the existence and location of recreational facilities than their older or less formally educated counterparts. This discrepancy is consistent with the work of Oncescu and Loewen (2020), who found that disparities in recreational access and awareness often mirror broader socioeconomic and educational inequalities. In their analysis, those with higher education levels typically have more exposure to online platforms, tourism information, and social circles that promote awareness of leisure opportunities.

Supporting this observation, Agbor's (2021) investigation into the effects of urban sprawl in Calabar noted that peripheral communities often less formally planned and underserved by public infrastructure have limited access to both physical facilities and information regarding their availability. This has significant implications for urban planning and public health, as residents in these areas may face compounded disadvantages stemming from both environmental neglect and informational exclusion. Bridging this gap would require targeted communication strategies, including the use of vernacular media channels and community mobilization to increase awareness in underrepresented areas.

Availability of recreational facilities and the well-being of residents

The findings of the study revealed that the availability of recreational facilities significantly influences the well-being of residents in Cross River State. Residents who had access to functional and well-maintained recreational spaces reported improved physical health, relaxation, social interaction, and psychological well-being. The study further identified convenience, safety, facility quality, and social influence as major factors encouraging residents to patronize recreational facilities. These findings suggest that accessible and secure recreational environments contribute positively to healthy living and community development.

The result agrees with the findings of Akinbogun, Kayode, and Oyedokun who noted that perceived safety is a major determinant of individuals' willingness to visit and utilize recreational environments. In Calabar Municipality, where issues relating to insecurity and urban crime occasionally arise, the presence of security personnel, proper lighting systems, and emergency support services were found to encourage patronage and enhance users' confidence. Similarly, the study aligns with the work of Dao, whose global study on recreational sports emphasized that comfort, accessibility, and perceived security are universal factors influencing the use of leisure facilities across different societies. The

findings also imply that when recreational facilities are adequately available and properly managed, they contribute to improved mental wellness, social cohesion, and quality of life among residents. Therefore, government authorities and private investors should prioritize the development, maintenance, and security of recreational centers to enhance residents' well-being and encourage active participation in leisure activities.

The physical condition and aesthetics of a recreational facility also matter greatly. Patrons are more likely to return to environments that are well-maintained, hygienic, and equipped with modern amenities. Social factors equally play a role. Word-of-mouth recommendations, peer influence, and the presence of familiar faces often encourage first-time visits and repeat patronage. In this regard, the role of community engagement becomes central. Chan, Marzuki, and Mohtar (2021) contend that involving local residents in the planning and management of recreational spaces enhances their sense of ownership and responsibility, which, in turn, supports long-term sustainability.

Conclusion

The study established that awareness of recreational facilities in Calabar Municipality is moderate but not yet optimal, underscoring the need for more robust information dissemination and community outreach programs. Increasing awareness is crucial for enhancing patronage, as many potential users remain unaware of available amenities and their benefits. This gap suggests that communication strategies should be more targeted and inclusive, leveraging modern media platforms and community networks. With reference to well-being of residents the study also confirmed that multiple factors influence the patronage of recreational facilities, with accessibility, security, cost, and quality of services being primary considerations for users. The findings demonstrate that without addressing these factors, recreational facilities risk underutilization and diminished public health impact. Therefore, improving facility management and creating safer, more affordable, and accessible environments are essential to foster greater community participation.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Government agencies and recreational facility operators should develop comprehensive, multi-channel awareness campaigns, including social media, community events, and partnerships with schools and local organizations to increase knowledge of recreational opportunities
2. To the well-being of the residents, managers of recreational facilities should enhance infrastructure, safety, and inclusivity. This can be done through the upgrade facilities

to include security, accessibility features, and age/gender-friendly programs to encourage participation from women, seniors, and persons with disabilities.

References

- Agbor, E. A. (2021). Assessment and Analysis of Urban Sprawl and Squatter Settlements in Calabar Metropolis. *European Journal of Development Studies, 1*(4), 37-43.
- Akinbogun, S. P., Kayode, O. F. & Oyedokun, T. B. (2024). Security practices in retail properties in a developing economy: a logistic analysis of impacts on customers' satisfaction and patronage. *Journal of Facilities Management, 22*(3), 416-431.
- Balogun, B. A. (2021). Leisure activities and recreation facilities in Nigeria: Implications for wholesome community health. *Handbook of sustainable development and leisure services, 51-65.*
- .Brockis, J. (2024). *The Natural Advantage: How more time outside reduces stress, improves health and boosts social connection.* Major Street Publishing.
- Carneiro, M. J., Alves, J., Eusébio, C., Saraiva, L., & Teixeira, L. (2022). The role of social organisations in the promotion of recreation and tourism activities for people with special needs. *European Journal of Tourism Research, 30,* 3013-3013.
- Chan, J. K. L., Marzuki, K. M., & Mohtar, T. M. (2021). Local community participation and responsible tourism practices in ecotourism destination: A case of lower Kinabatangan, Sabah. *Sustainability, 13*(23), 128-142.
- .Çoban, S. (2022). Gender and telework: Work and family experiences of teleworking professional, middle-class, married women with children during the Covid-19 pandemic in Turkey. *Gender, Work & Organization, 29*(1), 241-255.
- Dao, T. C. (2025). The Evolution and Impact of Recreational Sports: A Global Perspective. In *Social Inclusion Tactics for People with Intellectual and Developmental Disabilities, 261-294.* IGI Global.
- Groulx, M., Wigglesworth, J., DeLorey, R., Harris, N., Harris, P., Lamb, H. & McBride, C. (2024). Not for all: Barriers to universal accessibility in nature-based tourism and recreation spaces across British Columbia, Canada. *Journal of Outdoor Recreation and Tourism, 47,* (2) 213-231
- Guan, S. & Wang, J. (2023). Research on the Optimal Design of Community Public Space from the Perspective of Social Capital. *Sustainability, 15*(12), 9767.
- Mandagi, D. W. & Tappy, Y. P. (2024). Determinants of Health Tourism Destination Attractiveness: A Comprehensive Systematic Review. *Jurnal Studi Perhotelan dan Pariwisata, 2*(2), 57-69.

- Obijuru, C. C. (2023). The politics of cultural tourism in Nigeria: People, culture and power in the Calabar Festival (Doctoral dissertation, Brunel University London).
- Oncescu, J., & Loewen, M. (2020). Community recreation provisions that support low-income families' access to recreation. *Leisure/loisir*, 44(2), 279-302.
- .Rao, P. (2021). Role of green spaces for maintaining well-being in residential community development. *Improving Quality of Life Exploring Standard of Living, Wellbeing, and Community Development*, 171.
- .