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The Impact of AI on Teaching and Learning of Physical Education among Secondary Schools in Rivers State: Prospects and Challenges

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ABSTRACT

AI has revolutionized multiple teaching and learning procedures through its integration with physical education (PE). The scope of this research discusses AI implementations in PE classroom settings at secondary schools across Rivers State together with their potential obstacles and advantages. Virtual coaching systems together with AI tools including motion detection software provide students with more engaging and personalized learning opportunities through performance evaluation and tailored instructional feedback. These modern innovations demonstrate great potential to both advance skills education as well as provide data-based tracking and inclusive learning possibilities for disabled students. Several difficulties prevent AI implementation in PE. The barriers to widespread implementation of AI in PE instruction include high infrastructure expenses and educator AI knowledge deficits in addition to privacy issues and decreased human teacher presence in instruction. The successful resolution of these challenges needs strategic steps which combine teacher professional development with investment in infrastructure tools and guidelines about ethical policy making yet linking teachers with technology developers. The article finds that AI technology offers substantial value for PE teaching but its deployment needs careful organizational control to build upon established instructional practices. AI integration within PE subjects should be implemented systematically and funding should increase at the same time as public-private entities join forces to study how effectively AI creates active learning classrooms. Used properly in Rivers State secondary school PE programmes AI will transform learning at these institutions by providing necessary skills required for physical and technological development.

INTRODUCTION

AI has become the dominant transformative power in educational approaches specifically changing traditional teaching methods in all academic subjects including physical education. The educational landscape worldwide sees global changes because students learn physical abilities at higher levels through AI-powered motion tracking technology together with virtual coaches and personalized education systems (Chen et al., 2022). Modern developed nations apply AI-powered technology to enhance performance assessment as well as provide real-time feedback while enabling adaptive learning for physical education (Zhu, 2021). The educational technology adoption dynamics in Africa have induced South Africa along with Kenya to investigate how AI may enhance their educational processes (Ogunleye & Nwankwo, 2023).

As Africa's largest country in terms of population size Nigeria maintains special barriers when integrating artificial intelligence into secondary education institutions. Physical Education in Nigerian secondary schools continues to utilise traditional teaching approaches primarily while Mathematics and Science benefit from more modern digital instructional resources (Adeyemi & Yusuf, 2022). AI-driven physical education projects in Rivers State meet several opportunities and obstacles because of mounting interest in technology-enhanced education. AI creates several promising avenues for secondary schools that want innovative ways to boost physical activity participation and skill training through such techniques as motion analytics alongside virtual coaching systems (Okonkwo et al., 2023). The adoption of artificial intelligence in physical education creates multiple problems because schools lack proper technological infrastructure and their educators need additional training about these systems while students' privacy data remains at risk.

Students require physical education to achieve complete development because this school subject builds both their physical fitness alongside social and cognitive abilities and emotional states. At a time when students gain fundamental movement abilities plus coordination and stamina through regular

physical activities their active lifestyle can be maintained. Physical education demonstrates the power to transform students by building discipline capabilities together with teamwork skills and leadership abilities and self-confidence until creating students who undergo balanced development (Smith & Green, 2021). Students who participate in physical exercise demonstrate improved academic achievements mainly because it strengthens their cognitive performance as well as their ability to remember things and focus better (Sallis et al., 2020). Fostering sustainable health and fitness practises during adolescence requires fundamental physical education programmes in secondary schools because sedentary behaviours and non-communicable diseases continue rising among young people.

Physical education benefits through artificial intelligence integration creates progress in teaching methods while educational systems develop with modern technological developments. The utilisation of AI technologies enables the delivery of custom training sessions and the instant detection of body patterns along with digital skill-learning experiences by using artificial intelligence (Zhu, 2021). Through motion tracking devices students get access to performance-enhancing insights from wearable fitness apps and AI-guided coaching applications that minimise their injury risk (Okonkwo et al., 2023). Through this technology educational modifications become available for students with disabilities leading to equal educational inclusion. Artificial intelligence implementation successful through overcoming infrastructure material and training barriers as well as privacy concerns although creating positive and necessary results.

Educational institutions in Rivers State need to study how artificial intelligence affects physical education instruction because they should adapt to international educational models to evaluate all aspects of successful implementation. An investigation of secondary school physical education illustrates how artificial intelligence technology transforms physical education practises and proposes required solutions and educational opportunities for

proper implementation. The decision-making ability of stakeholders strengthens when they recognise the logical connexion between artificial intelligence and physical education for developing an inclusive learning environment based on modern educational technologies.

DISCUSSION AND ANALYSIS

AI in Education

Educational transformation through artificial intelligence (AI) happens when it automates educational delivery methods while adaptively tailoring approaches using insights derived from data analysis. The phrase "artificial intelligence (AI)" describes machines making cognitive operations possible which involves learning and reasoning steps as well as problem-solving processes (Russell & Norvig, 2020). Education benefits from artificial intelligence through novelty features such as adapted learning materials and operational improve in teaching processes and interactive teaching techniques. Multiple educational systems now implement vital AI concepts consisting of machine learning together with natural language processing and computer vision and automation as part of their learning experience enhancement efforts (Holmes et al., 2021).

Educational institutions adopting artificial intelligence technology now allow students to learn differently. The intelligent learning systems functioned by artificial intelligence optimize content delivery based on student understanding which results in unique educational paths for every learner (Chen et al., 2022). The smart tutoring platforms permit self-learned educational experiences through computer-based instruction modules with continuous feedback evaluation. Teaching staff reduces their workload because automated assessment software provides precise feedback on student evaluation materials. Virtual and augmented reality solutions serve as experiential tools which create virtual scenarios of real-life conditions to improve student engagement particularly in physical education (Wang & Wu, 2021). Educational predictive

models allow teachers to identify struggling students thus enabling them to create interventions which enhance student achievement results and AI-powered chatbots together with assistance programmes respond to student questions and help with academic assignments (Siemens & Baker, 2020).

Numerous artificial intelligence-based optimization tools are now commonly utilised to enhance learning environments. With AI functionality built into Google Classroom and Microsoft Teams users can achieve online learning goals and enhance student interaction as well as track performance assessment results. AI adapts educational programs within Khan Academy and Coursera according to student learning achievements for customized instructions throughout the educational process. The writing assistance tools Grammarly and Quillionz instantly fix problems with grammar alongside coherence and writing style. Socrative and Quizlet function as AI assessment tools that allow students to perform quizzes in real time and show them their advancement while Fitbit and Garmin wearable devices empowered by AI help students evaluate their progress besides monitoring their physical activity and personalizing their fitness programs. The combination of these devices helps decision systems based on educational data achieve better effectiveness and result in better learning outcomes.

Educational institutions gain many advantages from AI technology when teachers receive suitable training combined with needed facilities and all parties resolve student privacy issues. Artificial intelligence can successfully improve education through strategic planning which requires financial investment as well as proper regulations to suit different educational contexts. Machine learning serves as a vital tool for educational development because it establishes unique potential that enhances teaching methods combined with better learning environments for students.

Current Trends in Physical Education

The field of physical education undergoes transformation through artificial intelligence because it develops modern tools which improve teaching methods along with training approaches and student instruction techniques. Physical education teaching methods now advance through performance tracking systems which AI-based coaching functions to evaluate student skills more efficiently. The motion tracking systems equipped with artificial intelligence algorithms evaluate athlete movements thus generating real-time feedback to enhance technique execution and minimize injuries. Cognitive tools including Hudl and Dartfish allow coaches to perform data analysis of performance data which results in enhanced athletic growth and improved training outcomes (Wang & Wu, 2021).

Physical education experiences transformation through Virtual and Augmented Reality (VR/AR) which deliver immersive learning experiences. Students train their sport techniques within virtual reality simulations that artificial intelligence enhances until they achieve proficiency to transfer their skills to actual physical scenarios. The visual elements of augmented reality provide step-by-step directions to students who use them for skill improvement during physical activities. These technologies are beneficial for children with difficulties in mainstream teaching because they improve physical education (Holmes et al., 2021).

Students receive individualized instructional content through artificial intelligence programs which bases their learning content on their specific abilities and development level. Software evaluations of student performance data produce exercise recommendations which adapt to their fitness programs and monitor their advancement through time. The fitness level of each learner guides adaptive AI systems to create progressive workout plans that reduces possible physical harm (Chen et al., 2022). Students who use the HomeCourt and TrainAI AI coaching systems benefit from personalized instruction because they can exercise anytime and receive automated evaluation data about their athletic approach and athletic results.

Information technology embedded in wearable devices and motion sensors plays a fundamental role in physical education applications of artificial intelligence. Current smart fitness trackers including Fitbit, Garmin and Apple Watch track student exercise levels, heart rate and caloric output to provide immediate fitness performance reports. The evaluation of posture and biomechanics and body balance through motion analysis is possible by cameras along with sensors which track body movements. The integration of these technologies allows physical education teachers to develop data-based training curricula that helps them identify weak points for improvement among students.

Using wearable technology enables teachers to provide more specific health and physical performance evaluations of their students (Siemens & Baker, 2020). By using artificial intelligence in physical education programs schools can achieve three main benefits that improve student performance through engagement and improve monitoring capabilities and skill development opportunities. The successful use of this technology needs suitable infrastructure as well as proper trainer education and rules that protect students' data privacy. By introducing artificial intelligence technology into physical education educational procedures will undergo revolutionary changes which will optimize sports learning and fitness program delivery.

Prospects of AI in Teaching and Learning Physical Education

Physical education (PE) teaching benefits from artificial intelligence through different means to boost learning results educationally and to improve both student participation and teaching approaches. Artificial intelligence delivers two main benefits to physical education involving enhanced student engagement while simultaneously encouraging higher motivation. Students can experience educational growth through virtual reality programs and AI-powered interactive situations with gamification features which create compelling educational environments. Introduction of immersion learning technology creates proper student involvement in virtual sports training with

practical locations combined with automated performance assessments. The level of engagement specifically benefits students who naturally avoid physical exercise as it encourages their continued participation (Holmes et al., 2021).

Through data evaluation and performance monitoring that relies on artificial intelligence physical education teachers can conduct precise student biomechanical, physical activity and advancement evaluations. Real-time data about student operations emerges from wearable machines together with motion sensors and AI analytics systems that measure bodily performances and fitness attributes. The gained data helps teachers create better instructional strategies and fair performance evaluation goals while helping them identify weaknesses students need to address. The AI-powered platforms Kinovea and Dartfish deliver biomechanical feedback for performing motion analysis which benefits both teachers and learners when developing their performance skills and safety measures (Siemens & Baker, 2020).

AI-driven physical education comes with the major benefit of delivering customized expertise development while offering individually tailored feedback to students. Training programmes created by AI adaptive learning platforms suit each student because they adjust to their individual fitness level alongside learning approach and learning speed. Artificial intelligence performs data analysis of performances which allows ongoing improvement through specific intervention methods and adjusted advisory systems and challenge modifications. The personalized AI educational applications Home Court and TrainAI supply students with immediate real-time feedback and detailed assessment through the implementation of machine learning algorithms which allows students to learn skills efficiently. Each student can progress independently according to their specific needs because of personalised educational plans that boost teaching effectiveness (Chen et al., 2022).

AI makes education accessible to disabled students which strengthens the inclusive aspects of physical education. The combination of exoskeletons and

motion-adaptive rehabilitation systems represents artificial intelligence-assisted devices which help students with mobility issues to participate in physical fitness programs. Educational applications which recognize voice and see using computers allow teachers to generate specific lessons for students who need assistance with hearing or seeing. The usage of virtual reality environments allows students with physical disabilities to partake in specific sports and fitness exercises within controlled and secure environments that build an environment of inclusion for physical education. The implementation of AI eliminates participation barriers thus creating equal learning opportunities for all students irrespective of their ability in physical education according to Wang & Wu (2021).

The field of physical education can benefit substantially from artificial intelligence developments through which researchers find new ways to utilize its expanding set of applications. Artificial intelligence development enables better physical education comprehensiveness by allowing improved performance assessment and individualized learning strategies. Proper AI integration depends on sufficient infrastructure support combined with teacher training and ethical protocols which will enable successful and appropriate implementation of these advantages. The planned implementation of artificial intelligence (AI) should revolutionize physical education (PE) to provide students with an interactive and all-inclusive data-based learning system.

Challenges of AI Integration in Physical Education

Physical education experiences major implementation barriers when incorporating artificial intelligence technology because of various significant adoption obstacles. The high financial requirements for infrastructure and technology stand as the main obstacle. Wearable fitness devices along with virtual reality simulations and motion tracking systems require major financial investments to operate via artificial intelligence algorithms. Secondary schools from underdeveloped regions struggle to buy and maintain artificial intelligence-powered physical education devices because they lack sufficient funds and

resources. Heritable systems face a big barrier to integrate AI because educational institutions need high-speed internet alongside modern computer systems alongside constant maintenance while operating within budget constraints (Siemens & Baker, 2020).

The major barrier to AI systems integrates depends on students and teachers not fully understanding the capabilities of artificial intelligence. Teachers from physical education departments find it challenging to adopt AI technology for their classroom presentations because they lack knowledge about automated teaching approaches. Educational staff who lack proper training frequently cannot recognise the whole value of AI-controlled tools nor process AI-generated information properly. The lack of understanding about AI learning platforms prevents students from effectively utilzing these technologies which results in lowered ability to develop skills and measure performance. Educational institutions need to provide AI literacy training to teachers alongside implementing educational programmes which focus on using AI for physical education in order to make both students and teachers proficient in AI-based physical education practises (Holmes et al., 2021).

Physical education demonstrates a tremendous obstacle in implementing AI because of its ethical concerns and data protection challenges. The combination of performance monitoring tools and motion analysis software along with AI-driven fitness monitors gathers significant amounts of personal student data consisting of their physiological measurements bodily movement information. The implementation of strict data protection laws stops private information from misuse thus preventing ethical issues and privacy breaches. Schools need to create specific guidelines which define data acquisition methods together with data storage systems and information distribution protocols to achieve student privacy protection as well as legal and ethical standards compliance. Artificial intelligence systems require transparent use in evaluation practises to eliminate assessment mistakes and errors that harm student learning assessment and progress monitoring (Chen et al., 2022).

Another issue emerges from declining personal student-teacher relationships in the field of physical education. Active learning through physical education creates sociable environments because it focuses on building teams while encouraging communication along with practical coaching methods. When AI systems replace human-led instruction there could be reduced student-instructor connexion that leads to weaker development of interpersonal abilities and impedes immediate personalized feedback. AI requires assistance from teachers in education rather than taking their place since AI delivers better learning results through data analytics but also enables personalized training material development. The social and interactive qualities of physical education need balanced integration between artificial intelligence technology and traditional teaching methods according to Wang & Wu (2021).

Schools need to implement a multifaceted solution which comprises enough financial support and teacher service alongside secure data processes and AI and human instruction alignment. Schools can reach full integration of artificial intelligence in physical education by resolving these barriers which results in delivering personalized learning experiences to each student. Success in the use of artificial intelligence for physical education depends on combined work between educators and policymakers with technology developers to make this tool beneficial instead of obstructive.

AI Implementation Strategies for Effective PE Learning

Physical education will achieve optimal AI integration through correct implementation methods. Fundamental to physical education success are well-trained programmes for educators. Many teachers lack sufficient understanding of artificial intelligence-driven technology because of which they struggle to apply it effectively within educational settings. Teachers will gain sufficient technical skills and confidence for AI-based learning tools through ongoing training about artificial intelligence applications in physical education as well as seminars and professional development initiatives. Teachers require training

about virtual coaching systems along with motion analysis through AI technology and individualised feedback platforms to better adopt educational technology in their practise (Holmes et al., 2021).

Fundamental for optimising AI in PE is to allocate funds toward AI infrastructure development with appropriate technological resources. The provision of funds by educational institutions is essential for acquiring virtual and augmented reality systems along with AI-driven wearable devices and data analytics solutions that advance physical education instruction methods. The successful integration of AI systems depends on both maintaining AI-based equipment and software as well as securing quick internet access. Educational institutions which partner with technology companies and government programmes can access affordable AI platforms and systems to extend their AI-enhanced physical education efforts (Siemens & Baker, 2020).

Student safety along with data privacy and justice require ethical artificial intelligence guidelines for educational settings to be created as part of resolution efforts. Explicit rules concerning data storage and collection practises and usage policies must exist because artificial intelligence systems collect many biometric data sets and student performance measurement points. Educational facilities must follow privacy-centered guidelines which show clear AI assessment practices while developing bias-prevention protocols for AI-produced feedback. Ethical AI legislation protecting physical education teacher-student relationships must establish AI as an instrument which assists human instructors instead of replacing them (Chen et al., 2022).

The creation of AI solutions designed for physical education teaching requires joint work between educational professionals and software creators. The active involvement of teachers allows AI technologies to receive their input for creating customised systems to improve teaching strategies while improving student interest and solving physical education obstacles. Educational institutions should form partnerships between AI developers and universities

along with sports technology experts to implement AI-driven solutions that enhance evaluation performance and talent growth and accessibility. Through collaboration educational institutions can maintain the positive aspects of artificial intelligence implementation while achieving practical benefits compatible for student and teacher use (Wang & Wu, 2021).

SUGGESTIONS

To ensure the successful integration of Artificial Intelligence (AI) in the teaching and learning of physical education (PE) in secondary schools in Rivers State, the following suggestions should be considered:

1. Educational institutions must offer training that enables faculty to understand AI applications for Physical Education so they can implement them as part of their teaching practise. The educational framework will need to teach instructors about AI-based coaching alongside motion evaluation and customised learning platforms.

2. Government funding together with school money should support the purchase of wearable gadgets and virtual and augmented reality tools and performance monitoring systems. Partnerships between schools and IT companies and private sector entities will enable the acquisition of modern artificial intelligence technology and funding for its implementation.

3. Comprehensive legislation should exist to control ethical AI applications in education so it safeguards educational data and student safety. Governments should make policies that focus on proper student performance data management along with requirements to have AI technology work alongside people in physical education programmes.

4. Building through systemized AI-related elements in physical education enhances both educational processes and student classroom participation rates. Education plans in schools must include AI-based learning methods to deliver technology-supported physical education benefits to students.

5. Educational institutions need to promote combined academic, athletic and technical partnership efforts for creating AI applications within physical education. The partnerships will use their funding to help implement AI systems in addition to providing both specialist expertise and supporting resources.

6. Institutions that educate students should establish virtual coaching with AI support and offer individualised learning opportunities followed by specific feedback. When students have access to these resources their motivation together with skill advancement increases.

7. Periodic cheques will determine the extent to which AI technology has improved teaching physical education. Educational AI deployment tactics need inputs from all stakeholders and staff together with students to grow and transform according to future educational needs.

CONCLUSION

Physical education teaching and learning experience changes through artificial intelligence technology integration although it creates distinct technological hurdles to overcome. Through the use of AI-driven apps education gains enhanced engagement from students as these apps supply personalized content and process student data for performance assessment. New technology like wearable devices and motion analysis with virtual reality capabilities has advanced skill learning by enabling personalized feedback thus promoting the whole educational development of learners. Artificial intelligence possesses the capability of improving disability accessibility in physical education so that every child can participate fully in programmes.

Multiple obstacles make it difficult to run artificial intelligence programmes effectively for physical education. The combination of education cost scalability with under-awareness regarding AI capabilities between students and teachers produces ethical data privacy problems and may reduce actual student-teacher engagement during learning activities. A full solution for resolving these barriers requires both teacher training and staff member capacity

development supported through financial investments into AI infrastructure development combined with ethical guidelines creation and improved interaction between educators and technology developers. Permanent solutions must develop from educational facilities and government bodies so they can unite artificial intelligence technology with traditional teaching methods for protecting physical education from loss of its interactive and social aspects.

Regulatory measures must be established to monitor AI implementation in secondary physical education that ensures its value adds to human-instructed teaching practices. The educational institutions of Rivers State together with other organizations possess the ability to create new educational systems that train students for modern technology while preserving their health by teaching them to conquer obstacles using AI responsibly.

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