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THE PERCEIVED IMPACT OF WEARABLE TECHNOLOGY ON SPORTS PERFORMANCE AND INJURY PREVENTION AMONG STUDENTS-ATHLETES AND COACHES IN NIGERIAN UNIVERSITY

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ABSTRACT

Wearable technology has emerged as a major innovation in sports, providing real-time data on training loads, recovery, and physiological responses. Globally, these devices have been employed to enhance athlete performance and minimize injury risks. However, in Nigerian universities, including Nnamdi Azikiwe University (UNIZIK), their adoption remained limited. This study investigated the perceived impact of wearable technology on athlete performance and injury prevention among student-athletes and coaches at UNIZIK. The study was guided by the Technology Acceptance Model and the Diffusion of Innovation Theory, which explain how individuals perceive and adopt new technologies. A review of related literature revealed that wearable technology had the potential to optimize training efficiency, support coaches' decision-making, and prevent injuries. Nonetheless, challenges such as high costs, limited awareness, lack of technical skills, and concerns about data privacy restricted its application within Nigerian university sports. Using a descriptive research design, data were collected from 150 student-athletes and coaches to determine their perceptions of wearable technology in sports performance and injury prevention. Findings showed that while respondents were aware of the potential benefits of wearable devices, actual usage was minimal. Both athletes and coaches perceived wearable technology as capable of improving performance monitoring, detecting fatigue early, and reducing injury risks. However, barriers such as insufficient institutional support and lack of resources limited its integration into sports programs at UNIZIK. The study concluded that wearable technology, if effectively adopted, could play a significant role in enhancing sports development within Nigerian universities. It recommended increased awareness, subsidized access to devices, training for athletes and coaches, and the establishment of data management policies to encourage its wider application.

Keywords: Wearable technology, Sports Performance, Students Athletes, Coaches, injury prevention.

Introduction

Wearable technology has become one of the most influential innovations in sports science and athlete management in recent years. These devices, which include smart watches, fitness trackers, heart rate monitors, GPS sensors, and smart clothing, are designed to be worn on or near the body to continuously

collect data on physical activity, physiological responses, and biomechanical movements (Düking, McGinnis, and Sperlich, 2023). The growing availability and affordability of these technologies have expanded their use beyond elite sports, reaching amateur and university athletes worldwide.

In sports, wearable technology serves multiple critical functions. It enables the precise monitoring of athletes' workload, movement patterns, heart rate variability, sleep quality, and even stress levels. Such information allows coaches and sports scientists to tailor training programs, optimize performance, and develop strategies for injury prevention (Camomilla, Bergamini, Fantozzi, and Vannozzi, 2023).While wearable technology is widely embraced in professional and collegiate sports in many developed countries, its adoption in Nigerian universities remains limited. In particular, universities like Nnamdi Azikiwe University (UNIZIK), Awka, face challenges in integrating such technologies into their sports programs. These challenges include limited financial resources, lack of awareness among athletes and coaches, insufficient technical expertise, and low prioritization of sports science infrastructure (Ogundairo and Ogunlade, 2022). Consequently, many student-athletes continue to rely primarily on traditional training methods that depend heavily on coach observation and self-reported feedback.

The use of wearable technology in UNIZIK's sports environment could transform athlete management by providing data-driven insights that improve training outcomes and reduce injury risk. However, the potential of these technologies depends not only on their availability but also on how athletes perceive and accept them. If athletes view wearable devices as helpful, user-friendly, and enhancing their performance and safety, they are more likely to use them consistently (Venter, Mollentze, and Van der Merwe, 2022). Importantly, perceptions among coaches are equally vital since they are responsible for designing training programs and guiding athlete development. Coaches who view wearable devices positively are more likely to encourage their adoption, while skepticism may limit their integration into sports practice. This study, therefore, aims to explore these dimensions among student-athletes and coaches at UNIZIK, Awka. By examining their views on wearable devices, the study will identify facilitators and barriers to adoption and offer recommendations for integrating wearable technology into university sports programs.

Statement of the Problem

Wearable technology has become a central part of modern sports, providing real-time insights into athlete performance, training efficiency, and injury risk. These technologies are now widely used across the globe to track metrics such as heart rate, movement efficiency, workload intensity, and recovery patterns. In professional sports, coaches and sports scientists rely heavily on wearable devices to make informed decisions that improve athlete output and reduce the likelihood of injuries . However, this advancement has not been equally embraced or implemented in many Nigerian institutions,

especially within university sports programs like those at Nnamdi Azikiwe University (UNIZIK), Awka.

Despite the numerous benefits associated with wearable devices in sports, such as preventing overtraining, improving conditioning, and providing early warning signs of fatigue or strain, there is a noticeable gap in their usage at the university level in Nigeria. Most student-athletes in UNIZIK still depend on traditional methods of training and injury prevention, often based on subjective feedback and coach observation. This can result in inaccurate assessments, delayed interventions, and higher risk of injury or underperformance. Others may be skeptical, viewing the technology as a luxury reserved for elite or foreign athletes. Without adequate exposure or education, athletes may be unaware of how wearables could help them train smarter, avoid injury, and improve results on the field or court.

Method

The data collected was analyzed based on the research questions stated in Chapter One of the project. Descriptive statistics such as mean, frequency, percentage, and standard deviation were used to summarize and interpret the responses of the participants. The analysis was carried out using the Statistical Package for the Social Sciences (SPSS) to ensure accuracy and ease in data processing. Results were presented in tables and interpreted in relation to the objectives of the study. (See Appendix D for the SPSS output analysis.

Results: Awareness of wearable technology on athletic performance and injury prevention among student athletes/coaches in Nnamdi Azikiwe University, Awka.

Table 1. Mean ratings on the awareness of wearable technology on athletic performance and injury prevention among student athletes/coaches in Nnamdi Azikiwe University, Awka. N=150

		Mean	SD	Remark
1.	I am aware of what wearable technology means in sports (E.g. smart watches, heart rate monitor, GPS tracker, fitness band, etc	3.49	.64	Accepted
2.	I have received information or training on wearable sports devices.	3.00	.78	Accepted
3.	Wearable technology is common in professional sports globally.	3.15	.61	Accepted
4.	In my sport, I am allowed to use wearable technology.	2.49	.91	Rejected
5.	I believe wearable tech is important in modern sports training.	3.07	.74	Accepted

Analysis in this table shows that the respondents accepted in all the questions asked on awareness of wearable technology on athletic performance and injury prevention among student athletes/coaches in Nnamdi Azikiwe University, Awka except number four question. The mean scores of questions 1, 2, 3, and 5 are as follows 3.49, 3.00, 3.15, and 3.07 respectively. Then number four question in 2.49. The respondents however have the following scores in SD; .64, .78. 61, .91, and .74 respectively.

Table 2. Mean ratings on the perception of wearable technology for performance and injury prevention among students-athletes/coaches in Nnamdi Azikiwe University, Awka. N= 150

	Mean	SD	Remark
1. Wearable devices can help me monitor my performance in real-time.	3.19	.71	Accepted
2. I believe wearable technology improves my training outcomes.	2.49	.91	Rejected
3. Wearable Technology provides useful feedback for preventing sports injuries.	2.93	.78	Accepted
4. Data from wearable devices helps identify fatigue or overuse risks early.	2.22	.96	Rejected
5. I find wearable tech easy to use and integrate into training.	2.82	.80	Accepted
6. Coaches in my school understand how to apply data from wearable devices.	2.36	.87	Rejected
7. I trust the data accuracy of wearable sports devices.	2.89	.89	Accepted

As shown in table 2 on the Perception of wearable technology for performance and injury prevention among student athletes/coaches in Nnamdi Azikiwe University, Awka, the respondents accepted on four of the questions asked out of seven questions asked. The mean scores of those questions are as follows 3.19, 2.93, 2.82 and 2.89 respectively. Their mean ratings ranged from 2.82 to 3.19. The mean scores of those questions rejected by the respondents are; 2.49, 2.22 and 2.36 respectively. The respondents however have the following scores in SD; .71, .91, .78, .96, .80, .87 and .89 respectively. Perceived challenges of using wearable technology for performance and injury prevention among student athletes/coaches in Nnamdi Azikiwe University, Awka.

This shows that the four questions out of six listed items on Perceived challenges of using wearable technology for performance and injury prevention among student athletes/coaches in Nnamdi Azikiwe University, Awka were accepted by the respondents. However, the item numbers two and three were rejected. The mean scores of the questions are as follows 2.58, 2.36, 2.49, 2.52, 2.94 and 2.54 respectively. The respondents however have the following scores in SD; .86, .80, .91, .75, .74, and .86 respectively.

Discussion

The findings of this study reveal a high level of awareness and general acceptance of wearable technology among student-athletes of Nnamdi Azikiwe University (UNIZIK). Respondents agreed that they are familiar with devices such as smart watches, fitness bands, GPS trackers, and heart rate monitors. Many also indicated that they had received some form of education, training, or exposure concerning the function and purpose of wearable technologies in sports. This shows a positive trend toward technological awareness and a readiness to adopt new innovations in sports training and monitoring.

This outcome supports the assertion of Camomilla, Bergamini, and Vannozzi (2023), who observed that wearable technologies have increasingly become part of modern athletic environments, not just in elite sports but also among aspiring athletes in institutions of learning. According to them, this increase in awareness is largely due to media exposure, social influence, academic engagement, and digital marketing strategies by tech companies.

The study further revealed that respondents believe wearable technology plays an essential role in modern sports, particularly by providing real-time data, tracking physiological metrics, and enhancing decision-making during training and competitions. This aligns with the study by Akinbola and Okonkwo (2022), who emphasized that wearable devices bridge the gap between science and performance by offering athletes immediate feedback on their physical exertion and readings. This significant gap between awareness and access highlights a major challenge in sports development at UNIZIK. While the athletes are mentally ready and technologically aware, they are practically limited due to the non-availability or non-implementation of wearable devices in their sports programs. This finding supports the observations of Ogundairo and Ogunlade (2022),

Another key finding is that respondents acknowledged the potential of wearable technology to aid injury prevention. They agreed that these devices help monitor their body responses in real-time and can provide valuable data on fatigue levels, physical strain, and movement patterns. This finding is in line with Shah et al. (2023), who emphasized the role of wearable devices in minimizing sports-related injuries by providing feedback that coaches and athletes can use to make informed decisions about rest, recovery, and load management.

Conclusion

This study set out to examine the need for wearable technology in sports development among students of Nnamdi Azikiwe University (UNIZIK). The findings of the study have provided insightful conclusions regarding the level of awareness, perceived usefulness, challenges, and readiness for integration of wearable technologies among university athletes.

From the results, it can be concluded that student-athletes at UNIZIK have a high level of awareness and a generally positive attitude towards wearable technology. They understand the relevance of such technology in improving athletic performance, tracking physiological data, and reducing the risk of injury. This awareness signifies an increasing alignment of university athletes with global trends in sports science and performance monitoring. However, despite their readiness and positive perception, there exists a notable gap between awareness and access.

Recommendations

Based on the key findings and the conclusions drawn from this study on the perceived attitudes towards wearable technology in sports among students at Nnamdi Azikiwe University, the following recommendations are made to enhance the awareness

Provision and Accessibility of Wearable Technology: It is highly recommended that the university management, in collaboration with the sports directorate and faculty of Human Kinetics and Sports Science, invest in the procurement of modern wearable sports devices. These devices—such as smart watches, fitness bands, heart rate monitors, GPS trackers, and motion sensors—should be made readily available for both training and competition purposes.

Capacity Building for Athletes and Coaches: To bridge the gap between availability and effective usage, there is a strong need for consistent and well-structured capacity-building initiatives. The university should organize periodic training programs, practical workshops, and seminars aimed at equipping both student-athletes and their coaches with the technical know-how needed to operate wearable technology.

Integration into University Sports Policies and Curriculum: Wearable technology should be incorporated into the official sports policy framework of the university. This includes clearly defined protocols for usage, safety measures, and privacy protection.

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