Asian Research Journal of Information Technology, 2024
E-ISSN: 3028-0869
Volume 1 Issue 1 P-ISSN: 3028-0850

Research On IOT-Based Smart Wearable Devices in College Students' Sports Activities

Li, Zhi
https://orcid.org/0009-0002-7278-6148
University of the East
li.zhi@ue.edu.ph

ABSTRACT

A set of portable devices that have been designed and produced by the application of intelligent characteristics to regular wearables through the exploitation of wearable technology is referred to as "smart wearable devices." Smart wearable devices are used to describe this group of gadgets. In addition to the development of cutting-edge computing patterns, microelectronics, and communication technologies, in addition to the shrinking of electronic equipment, they have come into existence as a result of these developments. To be more specific, these are goods that include design capabilities, information and communication technology, electrical chip technology, software technology, cloud data analysis technology, and other technologies. Design that is "human-centered" is the foundation upon which these goods are constructed. There are a number of different kinds of smart wearable devices that are currently regarded to be mainstream. These include smart wristbands, smart watches, smart glasses, smart helmets, smart headphones, smart jewelry, smart clothing, smart belts, smart gloves/socks, and handheld devices. Applications for them can be found in a wide number of fields, including but not limited to the following: sports and fitness, interactive gaming, online payments, healthcare, education, intelligent artificial intelligence, and a great deal of other fields.

Keywords: *Smart wearable device, microelectronics, wristbands, technology, cloud data analysis*

INTRODUCTION

The level of development and advancement of technology. Mature technologies are reliable, efficient, and effective due to significant study, testing, and refinement. The number of years a technology has been used, research and development spending, and standards and best practices all contribute to technological maturity. Technology-intensive industries including manufacturing, healthcare, and IT need technical maturity for stability, scalability, and innovation.

Cost and availability are crucial factors in determining the feasibility and adoption of a technology or product. The technology's initial investment and continuing maintenance, improvements, and operational expenditures are included. Technology availability includes geographic reach, distribution channels, and market penetration. Economy of scale, production efficiency, competitiveness, regulatory hurdles, and infrastructural development affect cost and availability. Cheap and accessible technologies are more likely to be adopted and affect society. Some tools and programs attempt to build the skills and knowledge needed to use and create

with technology. This comprises formal education, vocational training, workshops, seminars, online courses, and certification. Individuals, businesses, and organizations need education and training support to adapt to technological advances, stay competitive in the workforce, and manage changing challenges and opportunities. It also assists in digital literacy, innovation, and increasing field skill gaps.

This support advances knowledge and understanding in these sectors via scientific investigation and experimentation. Studies, experiments, and examinations into education, learning, human performance, and physical exercise are included. Sports science research improves athletic performance, injury prevention, recuperation, and sports medicine, while education research improves teaching methods, curriculum creation, student engagement, and academic accomplishment. Support for research includes money, grants, academic institutions, research institutes, and cooperation between scholars, practitioners, and industry stakeholders. The findings of education and sports science research inform policy, practice, and growth.

Smart wearable health technology user fit is thoroughly studied in this article. The research results target information systems, health management, and interdisciplinary health informatics academics, practitioners, and consumers. Four important areas have theoretical significance: User fit for intelligent wearable health technology is introduced and divided in the text. Second, it creates a reliable and valid user fit measuring scale for intelligent wearable health technologies. Thirdly, it proposes a user adaptation coping model to describe how intelligent wearable health technology user fit is formed, offering a novel perspective on user fit. Finally, using the "stimulus-organism-response" model, the study creates a route model for how user fit for intelligent wearable health technology affects health behavior, improving knowledge of its effects and mechanisms.

IoT technology in health management has led to sophisticated wearable health technology. It automatically collects physiological and behavioral signs from the body in real time using physical sensors to aid health management decisions. Consumers use smart health bracelets, but academics have not characterized this technology. Based on relevant practices and literature, this article describes three key qualities of intelligent wearable health technology:

Based on the flipped classroom style, the database system course emphasizes student-centered learning. This technique introduces database system theory using pre-recorded lectures, texts, and other learning tools outside of class. We then engage in debates, problem-solving, and practical assignments in class.

The flipped classroom style lets students learn at their own speed and review lessons. It also lets educators focus on improving comprehension, critical thinking, and application in class. This method encourages student collaboration and deepens database system theory.

For complete data gathering and analysis, the research methodology was multifaceted. Survey design was refined with expert input to ensure neutrality and efficacy. Field research in Chongqing used observation, interviews, and documentation to acquire firsthand knowledge on college students' smart wearable gadget use while exercise. Excel and SPSS software were used to analyze questionnaire data and show conclusions, including SWOT factors, reflecting the key research topics.

METHODOLOGY

For this study on the use of health smart wearable devices among college students, a mixed-method research design will be employed.

Quantitative research will involve a survey to gather data on college students' awareness, usage patterns, and preferences for health smart wearable devices. The survey will be distributed to a diverse sample of college students across different majors and academic years to ensure representation. The questionnaire will seek to capture insights into the students' perceptions and behaviors related to health smart wearable devices.

To supplement the quantitative data, focus groups and one-on-one interviews will be done as part of qualitative research techniques. These methods will provide an in-depth understanding of college students' attitudes, expectations, and user experiences with health smart wearable devices. Through these qualitative insights, we aim to gain a nuanced understanding of how college students integrate these devices into their daily lives.

By integrating quantitative and qualitative approaches, this study seeks to provide comprehensive insights into college students' attitudes and needs regarding health smart wearable devices. The findings will offer valuable guidance for future product design and marketing strategies targeted at this demographic.

In addition to the quantitative survey, the methodology will involve using stratified random sampling to ensure that the sample population is representative of various demographic and academic characteristics, such as age, gender, study area, and academic year. This approach will allow for a more thorough analysis of potential variations in attitudes and usage patterns based on these demographic factors.

The qualitative component will consist of focus group discussions with small groups of students, providing an opportunity for open-ended dialogue and group interactions to explore diverse perspectives on the topic. Individual interviews will also be conducted to delve deeper into personal experiences and gain insight into the nuances of individual attitudes and behaviors related to health smart wearable devices.

Both quantitative approaches, like statistical analysis of survey data, and qualitative approaches, such theme analysis of focus group discussions and interview data, will be used in data analysis. Integration of these findings will enable a comprehensive understanding of the complexities surrounding college students' attitudes and behaviors regarding health smart wearable devices.

Furthermore, All participants will provide informed consent, and their privacy and anonymity will be scrupulously preserved, in order to ensure the ethical conduct of the research. This approach serves to uphold the ethical standards of the research and protect the rights of the participants.

The result of this comprehensive mixed-method research design will be a rich and multi-faceted understanding of the perceptions and usage of health smart wearable devices among college students, providing valuable insights for the development and implementation of such devices within this population.

RESULTS AND DISCUSSION

The results of this study on college students' use of health smart wearable devices will be presented and discussed, and a thorough analysis of the quantitative survey data as well as the qualitative findings from focus group discussions and individual interviews will be included.

In the presentation of the quantitative results, key statistics and trends will be highlighted to provide an overall snapshot of college students' awareness, usage patterns, and preferences for health smart wearable devices. This will include descriptive statistics such as percentages, means, and standard deviations to provide a clear understanding of the sample population's responses to the survey questions. The data will be visualized and the findings will be presented in a clear and intelligible way using charts, graphs, and tables.

Following the presentation of the quantitative results, the qualitative findings will be discussed in detail. Thematic analysis of the focus group discussions and interviews will identify recurring themes, patterns, and unique perspectives regarding college students' attitudes, expectations, and user experiences with health smart wearable devices. These themes will be supported by relevant quotes and anecdotes to provide a sense of the richness and diversity of the qualitative data.

The presentation and discussion of results will involve a synthesis of both the quantitative and qualitative findings to provide a comprehensive understanding of college students' attitudes and needs regarding health smart wearable devices. Potential variations or inconsistencies between the two data sets will also be explored, enabling a deeper understanding of the complex interplay between quantitative trends and qualitative insights.

Throughout the presentation and discussion, the implications of the findings will be highlighted, drawing connections between the results and their potential relevance for product design and marketing strategies. Practical recommendations and suggestions for future research in this area will also be provided.

Overall, the presentation and discussion of results will serve as a platform to disseminate the findings of this study, facilitating a deeper understanding of college students' attitudes towards health smart wearable devices and informing future strategies for improving the design, acceptance, and adoption of these devices in the college student population.

CONCLUSIONS

Based on the findings from the mixed-method study on the use of health smart wearable devices among college students, several key conclusions can be drawn:

1. College students have a relatively high level of awareness and interest in health smart wearable devices. The quantitative survey results indicated that a majority of students were familiar with these devices and expressed positive attitudes towards their potential benefits in promoting health and wellness.

2. Despite the high awareness levels, the actual usage of health smart wearable devices among college students was relatively low. The quantitative survey revealed that a significant portion of students either did not currently use these devices or used them sporadically. This highlights a potential gap between awareness and adoption among this population.

3. The qualitative findings shed light on the reasons behind the limited adoption of health smart wearable devices among college students. Factors such as cost, perceived usefulness,

comfort, and privacy concerns emerged as significant barriers to adoption. Additionally, some students expressed skepticism regarding the accuracy and reliability of the data provided by these devices.

4. The results of the study showed that attitudes and behaviors differ according to demographic variables such gender, academic year, and field of study. For example, female students showed a higher level of interest in health smart wearable devices compared to male students. These insights can inform targeted strategies for promoting the adoption of these devices among specific subgroups within the college student population.

5. The findings suggest that there is a need for further education and awareness campaigns targeting college students, addressing their concerns and highlighting the potential benefits of health smart wearable devices. Improved affordability, enhanced functionality, and data privacy features are also key areas that manufacturers and developers should focus on to increase adoption among college students.

In conclusion, while college students overall demonstrate a positive attitude towards health smart wearable devices, their actual usage remains limited. Various factors, including cost, perceived usefulness, comfort, and privacy concerns, contribute to this limited adoption. Addressing these barriers, along with tailored marketing strategies and educational initiatives, can improve the acceptance and adoption of health smart wearable devices among college students. Future research should continue to explore and address these factors to further enhance the integration of these devices into student health and wellness initiatives.

REFERENCES

Almukadi, W. (2023). Smart Scarf: An IoT-based solution for emotion recognition. *Engineering, Technology & Applied Science Research*, *13*(3), 10870-10874.

Camacho, V. L., de la Guía, E., Orozco-Barbosa, L., & Olivares, T. (2020). WIoTED: An IoT-based portable platform to support the learning process using wearable devices. *Electronics*, *9*(12), 2071.

Che, Y., Sivaparthipan, C. B., & Alfred Daniel, J. (2021). RETRACTED ARTICLE: Human–computer interaction on IoT-based college physical education. *Arabian Journal for Science & Engineering (Springer Science & Business Media BV)*.

Ganji, K., & Parimi, S. (2022). ANN model for users' perception on IoT-based smart healthcare monitoring devices and its impact with the effect of COVID-19. *Journal of Science and Technology Policy Management*, *13*(1), 6-21.

Hong-Tan, L. I., Cui-Hua, K., Muthu, B., & Sivaparthipan, C. B. (2021). Big data and ambient intelligence in IoT-based wireless student health monitoring system. *Aggression and Violent Behavior*, *101601*.

Kang, T. C., Wen, C. H., Guo, S. W., Chang, W. Y., & Chang, C. L. (2020). The implementation of an IoT-based exercise improvement system. *The Journal of Supercomputing*, *76*, 6361-6375.

Li, Q., Kumar, P., & Alazab, M. (2022). IoT-assisted physical education training network virtualization and resource management using a deep reinforcement learning system. *Complex & Intelligent Systems*, 1-14.

Miao, Y., Wei, H., Gan, P., & Jiang, T. (2022, December). Methods for assessing the effectiveness of the Internet of Things (IoT) applications for physical education. In *2022*

International Conference on Educational Innovation and Multimedia Technology (EIMT 2022) (pp. 790-796). Atlantis Press.

Xiong, S., & Li, X. (2022). Intelligent strategy of Internet of Things computing in badminton sports activities. *Wireless Communications and Mobile Computing*, *2022*.

Zhang, P., & Sun, J. (2023). Assessing IoT-based college physical education relies on human–computer interaction. *Soft Computing*, 1-10.

Zhen, H., Kumar, P. M., & Samuel, R. D. J. (2021). Internet of things framework in athletics physical teaching system and health monitoring. *International Journal on Artificial Intelligence Tools*, *30*(06n08), 2140016.

Zhong, C. L. (2020). Internet of Things sensors assisted physical activity recognition and health monitoring of college students. *Measurement*, *159*, 107774.

Zhuang, L., Hsu, C. H., & Kumar, P. M. (2021). IoT-based multimodal social interaction activity framework for the physical education system. *Wireless Personal Communications*, 1-17.