



The Development of Health Promotion Programs Based on the Smart Application of Students at Lishui University

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Abstract

Background and Aim: This research is of critical significance as it addresses the growing concern of physical health among university students by leveraging cutting-edge information technologies to develop and evaluate smart application monitoring to enhance physical health in students at Lishui University. The program utilizes cutting-edge information technologies such as big data analytics, wearable smart devices, the Internet of Things (IoT), and advanced algorithms to monitor and assess students' physical health comprehensively. The research encompasses a wide range of activities, from the design of the "Lishui University students' physical health smart monitoring platform" to the collection and analysis of data through surveys, physical fitness tests, and data analysis methods.

Materials and Methods: The sample included 400 students from *Lishui University*. In the first semester of 2024. Stratified into an experimental group and a control group. Each group consisted of 200 students, with an equal gender distribution. The participants were selected through a random sampling method. Research tools are used on the smart application monitoring platform and for physical health testing. In data analysis, including means, standard deviations, and paired t-tests.

Results: The results of the study were as follows: After the experiment, the average physical health score of students in the experimental group was significantly higher than that of students in the control group at the 0.05 significance level.

Conclusion: In this study, smart application monitoring can effectively promote the physical health of students at Lishui University.

Keywords: Smart Application; Health Promotion Program; Physical Health

Introduction

In today's rapidly evolving digital era, the integration of advanced technologies into various sectors has transformed the way services are delivered and managed, including the field of health promotion. Among university students, maintaining good physical health is essential for academic success and overall well-being. However, the increasing prevalence of sedentary lifestyles and limited physical activity poses significant challenges to student health (Zhu & Yan, 2023).

Lishui University has embraced the potential of smart application monitoring to enhance physical health for students. The development of health promotion programs based on smart applications offers an innovative solution to monitor, assess, and enhance students' physical health effectively. These applications utilize advanced technologies, such as big data analytics, wearable smart devices, the Internet of Things (IoT), and algorithm-based monitoring systems, to provide comprehensive and real-time insights into students' health conditions (Yin & Hu, 2022).

According to the Technology Acceptance Model (TAM), individuals' perceived usefulness and perceived ease of use significantly influence their acceptance and utilization of technology-based solutions (Davis, 1989). This model highlights the importance of designing intuitive and effective technological environments that encourage students to engage with health-promoting applications. Furthermore, the Health Belief Model (HBM) emphasizes individuals' perceptions of susceptibility, severity, benefits, and barriers as critical factors influencing their engagement in health behaviors (Rosenstock, 1974). Personalized and engaging feedback mechanisms, such as those provided through smart applications, can





enhance students' perceived benefits and reduce perceived barriers, thereby promoting sustained engagement in physical activities.

This research focuses the developing a smart application monitoring to enhance physical health for students at Lishui University. The program aims to enhance the physical health of students to engage in healthier lifestyles by providing personalized feedback, tracking physical activities, and promoting active participation in fitness routines. Furthermore, the study explores how smart applications can serve as a replicable model for other educational institutions aiming to integrate technology into health promotion initiatives. Through this innovative approach, the research seeks to contribute to the advancement of health promotion practices, emphasizing the importance of technological innovation in fostering long-term well-being among university students.

Objectives

To develop and evaluate a smart application for monitoring to enhance physical health in students at Lishui University.

Literature Review

1. Historical Context of Physical Health in China

The development of a smart application for monitoring enhanced physical health for students in China has faced significant historical and infrastructural challenges. China's research on physical health began later compared to other countries, primarily due to infrastructural limitations and socio-economic factors. These challenges initially hindered the development of comprehensive health monitoring systems for students. Du & Fan (2014) highlighted the necessity of integrating physical education classes and exercise performance into students' comprehensive evaluation systems. This integration aims to foster health consciousness and encourage active participation in physical activities. Cheng (2021) identified factors contributing to the decline in physical health among Chinese students, including overconsumption of nutrients due to improved living standards, reduced physical activity stemming from lifestyle changes, and inadequate standardization in school sports programs. Liu et al. (2021) observed challenges in putting national strategies to support young physical health into practice. Enforcement of policies like the “Regulations on Ensuring One Hour of Daily Physical Activity for Primary and Secondary Students” and the “Opinions of the Central Committee of the Communist Party of China and the State Council on Strengthening Youth Sports” was difficult. Only 20% of schools were able to successfully guarantee kids' daily physical exercise, according to the survey, suggesting the need for better implementation techniques.

2. Technological Interventions in Health Promotion

Globally, technological advancements have transformed health promotion initiatives. Countries like the United States and Japan have progressed from policy development to practical applications involving technology-driven health promotion and monitoring systems. These technologies include mobile health applications, data analytics, and wearable devices, which enable real-time monitoring and personalized health feedback. In China, the adoption of such technologies is still developing. While policy frameworks exist, integrating advanced technological solutions into health promotion practices is limited. Bridging this gap requires leveraging modern technological interventions to enhance the monitoring, evaluation, and promotion of physical health among students.

3. Smart application monitoring platforms

Smart application monitoring platforms represent an innovative approach to promoting and managing physical health in academic settings. These platforms leverage technologies such as big data analytics, wearable devices, and the Internet of Things (IoT) to provide real-time health insights and personalized feedback. Developing smart application monitoring platforms at Lishui University offers the potential to enhance students' physical health by enabling continuous monitoring, encouraging active participation, and offering personalized recommendations. The platform could also serve as a replicable model for other institutions aiming to integrate technology into health promotion initiatives.



Summary

The reviewed literature highlights that, while China has made significant progress in developing policies to promote student health, challenges remain in terms of practical implementation and monitoring. By drawing from international best practices, the establishment of a structured and comprehensive smart application monitoring system at Lishui University could effectively address these challenges and enhance physical health outcomes for students.

Conceptual Framework

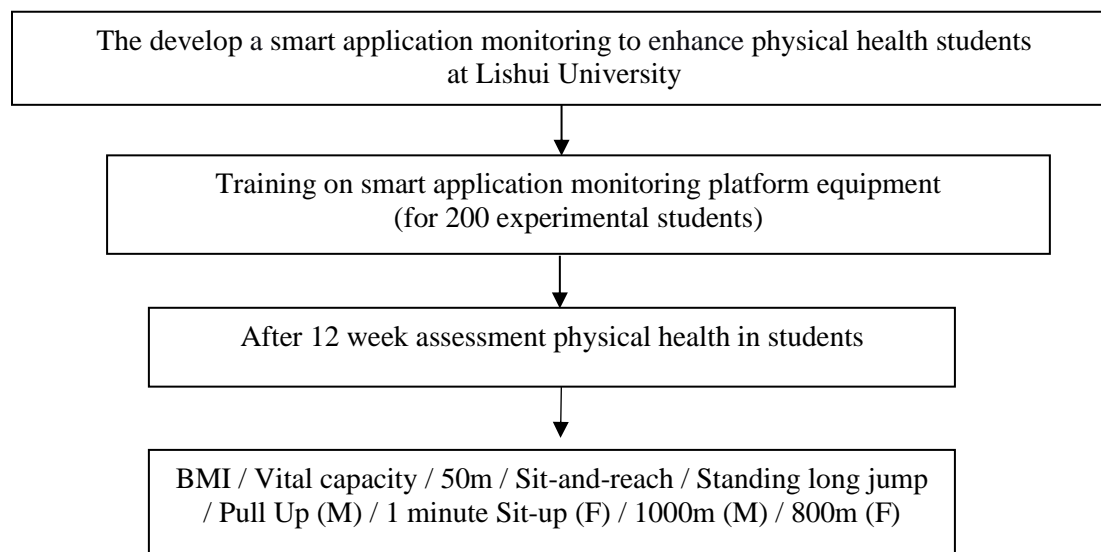


Figure 1 Conceptual Framework

Methodology

1) Population and sample

The study sample comprised 400 students from Lishui University, stratified into an experimental group and a control group. Each group consisted of 200 students. The participants were selected through a random sampling method and divided into an experimental group and a control group.

Inclusion Criteria:

1. Currently a full-time student at Lishui University.
2. Aged between 18 and 25 years.
3. Ready to consent for participation.

Exclusion Criteria:

1. Students with pre-existing health conditions affecting physical performance.
2. Students who had participated in similar intervention programs within the last six months.

2) Research Design

The study used quasi-experimental research methods to assess the effectiveness of smart application monitoring to enhance physical health in students at Lishui University. The research comprised two phases: the development of the platform, followed by an assessment of its effects on the physical health of students.

3) Development of the smart application monitoring platform

Developed a smart application monitoring platform integrating advanced technologies like big data analysis, wearable technology, IoT, and intelligent algorithms to enhance students' physical health.

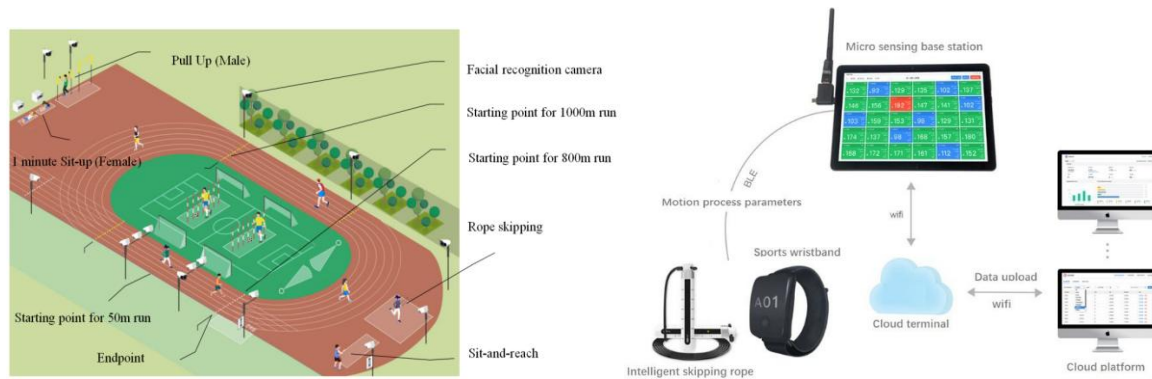


Figure 2 Smart application monitoring to enhance physical health in students at Lishui University



Figure 3 The students use the “Smart application monitoring platform to enhance physical health in students at Lishui University”

4) Data Collection

The data collection to assess physical health students testing devices for measuring indicators such as BMI measurement, vital capacity test, sprint 50m test, flexibility test, muscular strength test, and endurance running test. After 12 weeks of implementing the smart monitoring platform, the experimental group was compared to the control group, which continued with its standard physical education curriculum without the intervention of the smart application monitoring platform.

5) Data Analysis

Data analysis from the physical health tests means standard deviations and paired t-tests.

Results

The results present the findings from the data collected during the study on physical health in students' BMI, vital capacity, speed, flexibility, muscular strength, and endurance, cardiovascular system.

Table 1 Comparison of physical health tests after the experiment between the experimental and control groups.

Test			Mean	N	SD	p
BMI	experimental	Test ^{2nd}	20.8235	200	2.99344	.850
	control	Test ^{2nd}	20.7385	200	2.70382	
Vital capacity	experimental	Test ^{2nd}	3335.685	200	745.4493	.000*
	control	Test ^{2nd}	3124.69	200	772.917	
50m	experimental	Test ^{2nd}	7.761	200	.6885	.708
	control	Test ^{2nd}	7.904	200	.7923	
Sit and reach	experimental	Test ^{2nd}	19.644	200	5.3356	.000*
	control	Test ^{2nd}	18.433	200	6.5771	
	experimental	Test ^{2nd}	214.180	200	30.1185	.000*



Test			Mean	N	SD	p
Standing long jump	control	Test ^{2nd}	209.350	200	30.0751	
Pull Up (M)	experimental	Test ^{2nd}	44.350	100	5.3113	.000*
	control	Test ^{2nd}	40.760	100	6.6623	
1 minute Sit-up (F)	experimental	Test ^{2nd}	9.650	100	6.7110	.000*
	control	Test ^{2nd}	8.080	100	7.3191	
800m (F)	experimental	Test ^{2nd}	221.310	100	18.9863	.000*
	control	Test ^{2nd}	221.310	100	18.9863	
1000m (M)	experimental	Test ^{2nd}	230.460	100	28.0124	.000*
	control	Test ^{2nd}	258.200	100	34.1100	
Total score	experimental	Test ^{2nd}	79.7148	200	6.35403	.000*
	control	Test ^{2nd}	74.2523	200	6.82844	

* $p < .05$

As shown in Table 1, after the experiment of 12 weeks, the average of physical health students of variables vital capacity, flexibility, muscular strength, and endurance cardiovascular system significantly changed at the .05. However, BMI and sprint speed showed no significant change at the .05.

Discussion

The study on “Development of a Smart Application Monitoring Platform to enhance physical health in students at Lishui University.” By integrating various sensors and data sources, this platform will help individuals and organizations make informed decisions regarding environmental sustainability and resource management. Enhancing physical health in students at Lishui University provides important insights into the role of smart technology in promoting the physical health of students. It found that the experimental group showed significant improvements in lung capacity, muscle strength, flexibility, and endurance in the cardiovascular system, which confirmed the potential of technology in promoting health. In line with the findings of Ara et al. (2014), the smart tracking platform, consisting of 8 core modules, can provide real-time feedback and personalized advice. In line with what Xu et al. (2019) say, the platform shows how technology can be used to improve students' physical and mental health, leading to better and longer-lasting health outcomes in a variety of educational settings. Similar to what Deng & Wu (2022) and Zhang & Wang (2023) say, adding smart platforms to physical education lessons can be a good example for other schools and a new way to improve students' health. This suggests that technology can be a key way to improve students' health. From a theoretical perspective, the Technology Acceptance Model (TAM), Davis (1989), Loiselle & Travis. (2023) can explain the platform's adoption among students. Factors like perceived ease of use and perceived usefulness likely influenced their engagement levels. The intuitive design and real-time feedback features may have increased the perceived usefulness, encouraging consistent use and better health outcomes. The Health Belief Model (HBM), Rosenstock (1974), provides a lens to understand behavioral changes. The platform likely heightened students' perceived susceptibility to poor health outcomes and their perceived benefits from engaging in regular physical activity. Real-time feedback and personalized recommendations would have acted as cues to action, motivating students to engage more actively in health-improving behaviors.

However, the study found that the BMI did not change significantly, which may be due to the short intervention period. As changes in BMI often take a long time and require dietary considerations, this conclusion is consistent with Moran et al. (2018) and Jakicic et al. (2019). Similarly, improving sprint speed may require specialized training with a focus on speed. This highlights the importance of a comprehensive approach to fitness that integrates both technology and tailored training programs. By addressing various aspects of health and fitness, educators and coaches can better support students in achieving long-term physical improvements.



Conclusion

This study significantly contributes to a smart application monitoring platform by demonstrating the effectiveness of a technology-driven approach in enhancing physical health among university students. The integration of real-time feedback and personalized recommendations proved to be a valuable strategy for encouraging consistent health practices and improving various physical health indicators.

Recommendations

1. Universities should promote smart health monitoring technologies through policies, government funding, and research incentives while collaborating with health and fitness experts to enhance recommendations.

2. The platform's adaptability to diverse cultural and regional contexts will be assessed, with partnerships with international educational institutions tested for cross-border applicability and multilingual, culturally inclusive versions developed.

Recommendations for future research

1. Test the platform in multiple universities to evaluate its effectiveness across diverse educational settings.

2. Conduct longitudinal studies to understand the long-term impacts on BMI and other health metrics.

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