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# The influence of digital technologies on students' physical activity participation in Vietnamese universities

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**Abstract**
This study investigates the influence of digital technologies on students' physical activity participation in Vietnamese universities. A quantitative research approach was employed, and data were collected from 452 university students through a structured questionnaire. The study examined the relationships among Digital Technology Usage (DTU), Motivation for Physical Activity (MOT), and Physical Activity Participation (PAP). Data were analyzed using SPSS and SmartPLS. The results revealed that digital technology usage significantly and positively influences both students' motivation for physical activity and their participation in physical activity. Motivation was also found to have a significant positive effect on physical activity participation and partially mediated the relationship between digital technology usage and physical activity participation. The findings suggest that digital technologies, including fitness applications, wearable devices, online exercise platforms, and social media, play an important role in encouraging active lifestyles among university students. The study provides practical implications for universities and policymakers in developing technology-enhanced strategies to promote physical activity and improve student health in the context of digital transformation.

**Keywords:** Digital technology usage, physical activity participation, motivation, university students, digital transformation, Vietnam

## Introduction

The rapid development of digital technologies has significantly transformed modern society and reshaped the way people learn, communicate, work, and engage in health-related behaviors. Digital technologies, including mobile applications, wearable devices, social media platforms, online fitness programs, and artificial intelligence-based systems, have become increasingly integrated into daily life. In higher education, university students represent one of the most active groups of digital technology users, making digital technologies an important factor influencing their lifestyles and behavioral choices.

Physical activity is widely recognized as a key determinant of physical health, mental well-being, and overall quality of life. Regular participation in physical activity contributes to the prevention of chronic diseases, improvement of cardiovascular fitness, enhancement of psychological well-being, and promotion of healthy lifestyles. The World Health Organization (WHO) recommends that adults engage in at least 150–300 minutes of moderate-intensity physical activity per week. However, despite the well-documented benefits of physical activity, insufficient physical activity remains a global public health concern, particularly among young adults and university students.

University students often experience various challenges that may reduce their participation in physical activity. Academic pressure, demanding coursework, part-time employment, excessive screen time, and changing lifestyle patterns can contribute to sedentary behavior. Several studies have reported declining physical activity levels among university students, which may negatively affect both their physical and mental health. Consequently, identifying innovative approaches to promote physical activity participation has become a priority for educational institutions and public health policymakers.

Digital technologies present both opportunities and challenges for physical activity promotion. On the one hand, excessive use of smartphones, computers, and online entertainment may increase sedentary behavior. On the other hand, digital technologies can serve as effective tools for encouraging active lifestyles. Mobile fitness applications, wearable fitness trackers, online exercise platforms, and social networking communities provide users with opportunities to monitor performance, set goals, receive feedback, and interact with others who share similar health interests.

The increasing popularity of fitness applications such as Strava, Google Fit, Samsung Health, Apple Health, and MyFitnessPal has changed the way individuals engage in physical activity. These applications allow users to record exercise activities, monitor health indicators, establish fitness goals, and track progress over time. Similarly, wearable devices such as smartwatches and fitness trackers provide real-time feedback regarding physical activity levels, heart rate, calories burned, and exercise intensity. Such features may enhance users' motivation and encourage long-term participation in physical activity.

Social media platforms have also emerged as influential channels for promoting physical activity. Platforms such as Facebook, Instagram, TikTok, and YouTube provide access to exercise tutorials, fitness challenges, sports-related content, and online communities. Through social

interaction, peer support, and information sharing, these platforms can positively influence attitudes toward physical activity and motivate individuals to adopt healthier behaviors. The integration of digital technologies into sports and fitness activities has therefore created new opportunities for engaging university students in regular physical activity.

In Vietnam, digital transformation has become a national strategic priority. The rapid expansion of internet access, smartphone ownership, and digital services has significantly changed the lifestyles of young people. Vietnamese university students are highly active users of digital technologies for educational, social, and recreational purposes. At the same time, concerns regarding declining physical activity levels and increasing sedentary behavior among university students have attracted growing attention from educators and health professionals. Understanding how digital technologies influence students' physical activity behaviors is therefore highly relevant in the context of Vietnam's ongoing digital transformation.

Although previous studies have examined physical activity participation and digital technology adoption separately, research exploring the relationship between digital technology use and physical activity participation among Vietnamese university students remains limited. Existing literature provides insufficient evidence regarding how digital technologies influence students' motivation to engage in physical activity and whether technology usage contributes to greater participation in sports and exercise activities. This gap highlights the need for empirical research within the Vietnamese higher education context.

Therefore, this study aims to investigate the influence of digital technologies on students' physical activity participation in Vietnamese universities. Specifically, the study examines the relationships between digital technology usage, motivation for physical activity, and physical activity participation. The findings are expected to contribute to the growing body of knowledge on digital transformation and health promotion while providing practical implications for universities, educators, and policymakers seeking to encourage active lifestyles among university students in Vietnam.

## Literature Review and Hypothesis Development

### Digital Technology Usage and Physical Activity Participation

Digital technologies have become increasingly important in promoting healthy lifestyles and encouraging participation in physical activity. Mobile fitness applications, wearable devices, online exercise platforms, and social media communities provide users with convenient tools to monitor exercise behaviors, track performance, and receive personalized feedback. Previous studies have suggested that digital technologies can positively influence physical activity by increasing accessibility, self-monitoring, and engagement in exercise-related activities.

Fitness applications such as Strava, Google Fit, and Samsung Health allow users to record physical activity, establish exercise goals, and evaluate progress over time. Similarly, wearable devices provide real-time information that may enhance awareness of health behaviors and encourage more active lifestyles. Consequently, students who frequently use digital technologies may be more likely to participate in physical activity.

**H1:** Digital technology usage positively influences students' physical activity participation.

### Digital Technology Usage and Motivation for Physical Activity

Motivation is widely recognized as one of the most important determinants of physical activity participation. Digital technologies may enhance motivation by providing performance feedback, social interaction opportunities, achievement tracking, and personalized exercise recommendations.

Through digital platforms, users can compare achievements, participate in fitness challenges, and receive encouragement from peers. Such features may increase intrinsic and extrinsic motivation for exercise. Previous studies have reported that technology-assisted interventions can improve exercise motivation and support long-term behavioral change.

**H2:** Digital technology usage positively influences students' motivation for physical activity.

### Motivation and Physical Activity Participation

Motivation is a critical predictor of exercise behavior. Students who possess stronger motivation are generally more likely to engage in regular physical activity and maintain healthy exercise habits. Motivation may originate from health improvement, enjoyment, social interaction, stress reduction, or personal achievement.

Numerous studies have demonstrated a positive relationship between motivation and physical activity participation among university students. Therefore, motivated students are expected to participate more actively in sports and exercise activities.

**H3:** Motivation positively influences students' physical activity participation.

### The Mediating Role of Motivation

Digital technologies may not directly increase physical activity participation alone. Instead, they may influence participation through enhancing students' motivation to engage in exercise. Fitness applications, wearable devices, and online communities may first stimulate motivation, which subsequently leads to greater participation in physical activity.

Based on this argument, motivation is expected to serve as a mediating variable between digital technology usage and physical activity participation.

**H4:** Motivation mediates the relationship between digital technology usage and students' physical activity participation.

**Research Model**

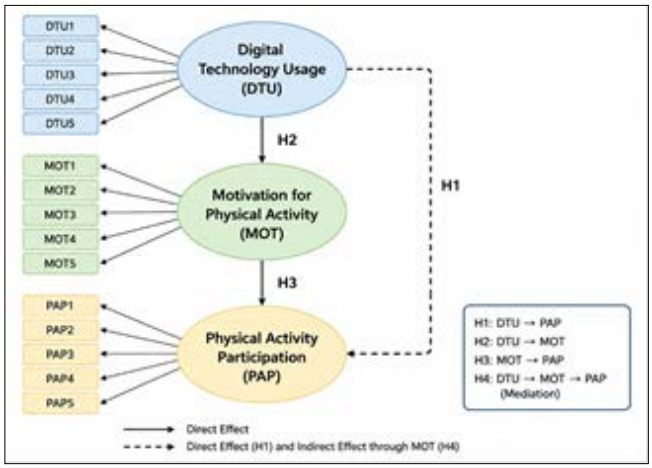


**Fig 1:** Conceptual Research Model

In addition, a direct relationship is proposed between Digital Technology Usage and Physical Activity Participation.

**Methodology**

**Research Design**

This study employed a quantitative research approach to examine the influence of digital technologies on students' physical activity participation in Vietnamese universities. A survey method was adopted to collect empirical data from university students. The proposed research model was developed based on previous studies on digital technology adoption, physical activity behavior, and motivation theory.

**Participants**

The target population consisted of undergraduate students enrolled in Vietnamese universities. Data were collected from students at selected universities in Ho Chi Minh City, including the University of Finance – Marketing and other higher education institutions.

A convenience sampling technique was employed. A total of 500 questionnaires were distributed, and 452 valid responses were retained for analysis after data screening. The sample size exceeded the minimum requirements for Structural Equation Modeling (SEM) and SmartPLS analysis.

**Measurement Instruments**

The questionnaire consisted of two sections.

**Section A: Demographic Information**

- Gender
- Age
- Academic year
- Frequency of physical activity participation
- Experience using digital technologies for physical activity

**Section B: Research Constructs**

Three constructs were measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

**Digital Technology Usage (DTU)**

**DTU1:** I frequently use mobile applications to monitor physical activity.
**DTU2:** I use online videos to support exercise and sports activities.
**DTU3:** I follow sports-related content on social media.
**DTU4:** Digital technologies help me manage my physical activity.
**DTU5:** I use wearable devices to track my exercise performance.

**Motivation for Physical Activity (MOT)**

**MOT1:** Digital technologies motivate me to exercise regularly.
**MOT2:** Digital technologies make physical activity more enjoyable.
**MOT3:** Digital technologies encourage me to achieve fitness goals.
**MOT4:** Digital technologies increase my interest in sports participation.
**MOT5:** Digital technologies help me maintain exercise habits.

**Physical Activity Participation (PAP)**

**PAP1:** I participate in physical activity regularly.
**PAP2:** I spend sufficient time exercising each week.
**PAP3:** I actively participate in sports activities at university.
**PAP4:** I maintain a physically active lifestyle.
**PAP5:** I intend to continue participating in physical activity.

**Data Collection Procedure**

Data collection was conducted between January and March 2026. The questionnaire was distributed both online and offline. Participation was voluntary, and respondents were informed about the purpose of the study. Confidentiality and anonymity were guaranteed throughout the research process.

**Data Analysis**

The collected data were analyzed using SPSS 26.0 and SmartPLS 4.0.

The analysis procedure included:

1. Descriptive statistics;
2. Reliability analysis using Cronbach's Alpha;
3. Convergent validity assessment using Composite Reliability (CR) and Average Variance Extracted (AVE);
4. Discriminant validity assessment using the HTMT criterion;
5. Structural Equation Modeling (SEM);
6. Bootstrapping analysis to test research hypotheses;
7. Mediation analysis to examine the indirect effect of motivation.

**Results**

**1. Respondent Profile**

A total of 452 valid responses were collected from university students in Vietnam. Among the respondents, 214 (47.3%) were male and 238 (52.7%) were female. Regarding academic year, 26.1% were first-year students, 28.8% were second-year students, 24.6% were third-year students, and 20.5% were fourth-year students. Furthermore, 71.2% of respondents reported using digital technologies for physical activity-related purposes at least several times per week.

**Table 1:** Demographic Characteristics of Respondents (n = 452)

| Characteristics | Frequency | Percentage (%) |
|---|---|---|
| Male | 214 | 47.3 |
| Female | 238 | 52.7 |
| First year | 118 | 26.1 |
| Second year | 130 | 28.8 |
| Third year | 111 | 24.6 |
| Fourth year | 93 | 20.5 |

The results indicate that the sample was relatively balanced in terms of gender and academic year, suggesting adequate representation of university students.

## 2. Measurement Model Assessment

The reliability and convergent validity of the constructs were assessed using Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE).

**Table 2:** Reliability and Convergent Validity Results

| Construct | Cronbach's Alpha | CR | AVE |
|---|---|---|---|
| Digital Technology Usage (DTU) | 0.891 | 0.920 | 0.697 |
| Motivation (MOT) | 0.903 | 0.928 | 0.721 |
| Physical Activity Participation (PAP) | 0.887 | 0.918 | 0.691 |

The findings indicate that all Cronbach's Alpha values exceeded the recommended threshold of 0.70. Similarly, Composite Reliability values were above 0.70, while AVE values exceeded 0.50, confirming satisfactory reliability and convergent validity.

## 3. Discriminant Validity

Discriminant validity was evaluated using the Heterotrait–Monotrait Ratio (HTMT).

**Table 3:** HTMT Results

| Constructs | DTU | MOT | PAP |
|---|---|---|---|
| DTU | - | | |
| MOT | 0.694 | - | |
| PAP | 0.587 | 0.731 | - |

All HTMT values were below the recommended threshold of 0.85, indicating satisfactory discriminant validity among the constructs.

## 4. Structural Model Assessment

The structural model was evaluated using path coefficients, t-values, and p-values generated through bootstrapping procedures.

**Table 4:** Structural Model Results

| Hypothesis | Path | β | t-value | p-value | Result |
|---|---|---|---|---|---|
| H1 | DTU → PAP | 0.286 | 5.213 | <0.001 | Supported |
| H2 | DTU → MOT | 0.624 | 13.854 | <0.001 | Supported |
| H3 | MOT → PAP | 0.473 | 8.967 | <0.001 | Supported |

The results indicate that digital technology usage significantly influenced physical activity participation ($\beta = 0.286$, $p < 0.001$) and motivation ($\beta = 0.624$, $p < 0.001$). In addition, motivation significantly influenced physical activity participation ($\beta = 0.473$, $p < 0.001$).

## 5. Mediation Analysis

A mediation analysis was conducted to examine whether motivation mediated the relationship between digital technology usage and physical activity participation.

**Table 5:** Mediation Analysis Results

| Indirect Effect | β | t-value | p-value | Result |
|---|---|---|---|---|
| DTU → MOT → PAP | 0.295 | 7.642 | <0.001 | Supported |

The indirect effect was statistically significant, indicating that motivation partially mediated the relationship between digital technology usage and physical activity participation.

## 6. Coefficient of Determination ($R^2$)

**Table 6:** Predictive Power of the Model

| Endogenous Variable | $R^2$ |
|---|---|
| Motivation (MOT) | 0.389 |
| Physical Activity Participation (PAP) | 0.541 |

The $R^2$ value for Motivation was 0.389, indicating that digital technology usage explained 38.9% of the variance in motivation. Furthermore, Digital Technology Usage and Motivation jointly explained 54.1% of the variance in Physical Activity Participation. These values suggest moderate explanatory power of the proposed model.

Overall, the results provide strong empirical evidence that digital technologies positively influence university students' physical activity participation both directly and indirectly through motivation. The findings highlight the important role of digital technologies in encouraging active lifestyles among university students in Vietnam.

## Discussion

The purpose of this study was to investigate the influence of digital technologies on students' physical activity participation in Vietnamese universities. The findings provide important insights into the role of digital technologies in promoting active lifestyles among university students and contribute to the growing body of literature on digital transformation and health-related behaviors in higher education.

One of the most significant findings of this study is the positive relationship between digital technology usage and physical activity participation. The results indicate that students who frequently use digital technologies such as fitness applications, wearable devices, online exercise platforms, and social media-based fitness communities are more likely to engage in physical activity. This finding supports previous studies suggesting that digital technologies can serve as effective tools for promoting healthy behaviors. Through activity tracking, goal setting, performance monitoring, and personalized feedback, digital technologies provide users with greater control over their exercise behaviors and encourage continuous participation in physical activity.

The results also reveal that digital technology usage has a significant positive influence on students' motivation for physical activity. This finding is consistent with motivation theories, which emphasize the importance of external support mechanisms in encouraging behavioral engagement. Digital technologies provide immediate feedback, reward systems, social recognition, and opportunities for self-

monitoring, all of which may strengthen motivation. Fitness applications and wearable devices allow users to observe their progress over time, while online fitness communities offer social support and encouragement. These features may enhance both intrinsic and extrinsic motivation to participate in physical activity.

Another important finding is the strong positive relationship between motivation and physical activity participation. Students with higher levels of motivation reported greater involvement in sports and exercise activities. This result is consistent with previous research demonstrating that motivation is one of the most important determinants of physical activity behavior. Individuals who are motivated to improve health, reduce stress, achieve fitness goals, or enhance physical appearance are more likely to maintain regular exercise habits. Therefore, motivation serves as a critical mechanism through which digital technologies influence students' physical activity participation.

The mediation analysis provides additional evidence regarding the role of motivation in the proposed research model. The findings indicate that motivation partially mediates the relationship between digital technology usage and physical activity participation. This result suggests that digital technologies influence physical activity not only through direct effects but also by enhancing students' motivation to engage in exercise. In other words, digital technologies appear to function as motivational tools that encourage students to become more physically active. This finding extends previous studies by demonstrating the indirect pathway through which digital technologies contribute to health-related behaviors among university students.

The explanatory power of the research model further supports the importance of digital technologies and motivation in understanding physical activity participation. The model explained a substantial proportion of variance in both motivation and physical activity participation, indicating that the selected variables are meaningful predictors of exercise behavior among university students. Nevertheless, a considerable proportion of unexplained variance remains, suggesting that additional factors such as self-efficacy, social support, physical environment, health awareness, and lifestyle habits may also influence physical activity participation.

The findings have important implications for higher education institutions in Vietnam. Universities should recognize digital technologies as valuable tools for promoting student health and well-being. The integration of fitness applications, wearable devices, online exercise resources, and digital health campaigns into student wellness programs may encourage greater participation in physical activity. Universities can also utilize social media platforms to organize sports challenges, virtual fitness competitions, and health promotion activities that increase student engagement.

Furthermore, physical education programs should incorporate digital technologies into teaching and learning activities. Technology-enhanced physical education may improve students' learning experiences and increase their motivation to adopt active lifestyles. Training programs that help students effectively utilize digital health technologies may also contribute to long-term behavioral changes.

From a policy perspective, the findings support the broader objectives of Vietnam's digital transformation strategy. Policymakers should encourage the development and adoption of digital health technologies that promote physical activity among young people. Collaboration between educational institutions, technology companies, and public health agencies may facilitate the development of innovative digital solutions tailored to the needs of university students.

Despite its contributions, this study has several limitations. First, the use of convenience sampling may limit the generalizability of the findings. Second, the study relied on self-reported data, which may be affected by response bias. Third, the cross-sectional design does not allow for the examination of causal relationships over time. Future studies may employ longitudinal designs, include students from a larger number of universities, and examine additional variables such as self-efficacy, social support, mental health, and quality of life.

Overall, the findings demonstrate that digital technologies play a significant role in promoting physical activity participation among university students in Vietnam. By enhancing motivation and providing accessible tools for exercise management, digital technologies can contribute to healthier lifestyles and support the development of physically active student communities in the digital era.

**Conclusion**

This study examined the influence of digital technologies on students' physical activity participation in Vietnamese universities. The findings revealed that digital technology usage plays a significant role in promoting physical activity among university students. Technologies such as mobile fitness applications, wearable devices, online exercise platforms, and social media-based fitness communities provide students with convenient tools to monitor exercise behaviors, access health information, and engage in physical activity more effectively.

The results demonstrated that digital technology usage positively influences both students' motivation for physical activity and their actual participation in sports and exercise activities. Furthermore, motivation was found to have a significant positive effect on physical activity participation and partially mediated the relationship between digital technology usage and physical activity participation. These findings indicate that digital technologies contribute to physical activity promotion not only through direct behavioral support but also by enhancing students' motivation to maintain active lifestyles.

The study also highlights the growing importance of digital transformation in supporting health promotion initiatives within higher education institutions. Universities can leverage digital technologies to encourage student engagement in physical activity through technology-enhanced physical education programs, digital wellness campaigns, fitness applications, and online sports communities. Such initiatives may contribute to improving students' physical health, psychological well-being, and overall quality of life.

From a practical perspective, university administrators, physical education educators, and policymakers should consider integrating digital technologies into health promotion strategies and student development programs. Investments in digital health tools, technological infrastructure, and digital literacy training may further enhance students' participation in physical activity and

support the development of healthier university communities.

Despite its contributions, this study is subject to certain limitations, including the use of convenience sampling and self-reported data. Future research should expand the sample to include a broader range of universities and explore additional factors that may influence physical activity participation, such as social support, self-efficacy, mental health, and environmental conditions.

In conclusion, digital technologies represent valuable resources for promoting physical activity participation among university students in Vietnam. By increasing motivation and facilitating access to exercise-related information and support, digital technologies can play an important role in fostering active lifestyles and advancing student health in the era of digital transformation.

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