

# Research on the influence of intelligence equipment on college students' exercise behavior in China

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Received: 28 Nov 2022; Received in revised form: 25 Dec 2022; Accepted: 03 Jan 2023; Available online: 10 Jan 2023

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**Abstract**—In addition to the construction of cultural knowledge system, college students should also strengthen the cultivation of physical health literacy, so as to achieve the goal of common physical and mental development. In order to improve the universality of the guidance of college students' physical exercise, this study focuses on the basic status quo and influencing factors of college students' physical exercise, and proposes corresponding optimization strategies. The research results show that the influence of college students' exercise intention includes attitudes, subjective norms, perceived behavioral control, information richness, and information interaction.

**Keywords**— College students, exercise, intelligence equipment, TPB

## I. INTRODUCTION

The university stage is the key period that affects the development of exercise habits. According to the research of Sparling & Snow [1] on the physical activities of alumni in the vicinity of American universities, it is pointed out that university is the best time to develop lifelong exercise habits. 84.7% of college students develop the habit of regular exercises in school, and will continue to maintain regular exercises after graduation; On the contrary, 81.3% of college students without exercises will not actively participate in exercises after graduation. Most of the regular exercise habits come from college life. Through the school sports or leisure activities courses, we can gain positive exercises and leisure experience, and transform exercises and leisure behavior into a part of daily life. However, according to a number of survey data, the current health status of Chinese college students shows a downward trend [2], and there is still room for students to strengthen their physical fitness, which will have a negative impact on national health in the long run.

In recent years, the development of mobile intelligent technology has changed people's exercise behaviors and habits, especially the intelligent sports on the mobile have become the main choice of college students' physical fitness. Therefore, from the perspective of the practical

application of mobile intelligent technology, this research evaluates exercise behavior on the basis of the Theory of Planned Behavior (TPB), and integrates the two dimensions of information richness, and information interaction to further expand the principle of influencing exercise behavior intention, and more comprehensively analyze the health management awareness of contemporary college students.

## II. RELEVANT LITERATURE

According to the basic assumption of Theory of Planned Behavior (TPB), consumers' behavior is controlled by their will and their thinking is systematic, in which whether consumers perform a specific behavior is dominated by their behavior intention [3]. The behavioral intention is affected by consumers' attitude towards behavior, subjective norm and perceived behavioral control. Behavior attitude refers to the positive or negative evaluation of the specific behavior. The more positive an individual's attitude toward behavior, the higher his behavioral intention. On the contrary, the more negative an individual's attitude toward behavior, the lower his behavioral intention [3][4]. Subjective norms refer to the individual's perception of other people's views on their implementation of the specific behavior, such as the

degree of support of reference groups such as family members or friends for the individual's implementation of the behavior. When the society tends to support his behavior, the stronger the individual's motivation for compromise, the stronger his subjective norms, which impel him to engage in the behavior [3][4]. Perceptual behavior control mainly refers to the individual's cognition of the difficulty of completing a specific behavior. When individuals feel that they have a stronger ability to perform a specific behavior, more resources, and less expected obstacles, their perceived control is stronger [3][5].

The TPB has been used in the field of psychology in the past. In recent years, TPB has been widely used to explore different areas of behavior research. Many empirical studies further explored the Influence of sports behavior attitude, subjective norms, and perceived behavior control on sports behavior intention. These three variables have different degrees of influence on behavior intention. Shan [6] found that the influence of exercise behavioral control sense on behavior intention exceeded that of behavior attitude and subjective norms after analyzing the exercise behavior of female college students. Zhang & Xu [7] pointed out in their research on the application of TPB to the physical exercise of college students in five colleges and universities in Jiangxi Province that the physical exercise behavior of college students is affected by the attitude towards physical exercise and the control of perceived behavior, and subjective norms (the support and demonstration of parents and teachers) have the most significant impact on the physical exercise intention. Chen & She [8] studied the impact of smart phone sports software on college students' sports exercise behavior, and found that behavior attitude has the highest impact on behavior intention, and the impact of subjective norms and behavioral control on behavior intention is only weakly related.

After literature retrieval, the integrated application of mobile intelligence technology in sports and health management has the following three advantages, which can solve the gaps in many past related research and practical applications: 1. Integrating various sensing and communication technologies will help us collect more information that could not be collected in the past, especially personalized long-term, real-time and continuous data. 2. Intelligence technology can integrate different sources and types of data, combine with back-end information platform, and conduct more forward-looking analysis to find out some potential causal relationships that are worth studying. As shown in Figure 1, the hypotheses are proposed as follows:

H1: Exercise attitude positively influences exercise intention

H2: Exercise subjective norm positively influences exercise intention

H3: Exercise perceived behavior control positively influences exercise intention

H4: Information richness positively influences exercise intention

H5: Information interaction positively influences exercise intention

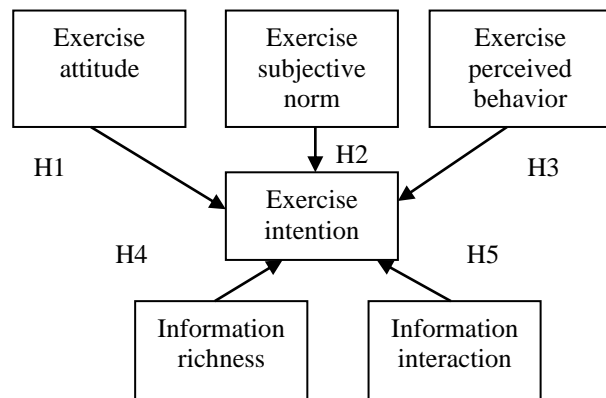


Fig.1 Proposed Research Framework

### III. RESEARCH METHODS

Respondents are college students in Hubei Province in China. A total of valid 177 questionnaires were collected using convenience sampling. The questionnaires were designed according to the relevant literature in this study. Five items were used to measure attitude toward the behavior, subjective norms, and perceived behavioral control, respectively. Information richness and information interaction were both assessed using four items. Exercise intention was adapted using four items. Five-point Likert scales anchored by 1 (strongly disagree) and 5 (strongly agree) were used throughout the questionnaire. After data screening, regression analysis was employed using SPSS 22.0 to identify the proposed paths in the framework.

### IV. RESULTS

The examination of the sample demonstrated that the highest proportion of students is female (64.2 percent), majority of the students were juniors (55.4 percent) and business major (69.4 percent). As shown in Table 1, all the Cronbach alpha coefficients range between 0.814 (perceived behavioral control) and 0.931 (subjective norm) and thus exceed the suggested threshold of 0.70. Therefore, the scales had great reliability and internal consistency. the highest mean score was subjective norm

(17.734), while the lowest mean score was information richness (16.016).

Table 1 The Results of Mean, SD, Cronbach's Alpha

Research constructs	Mean	SD	Cronbach's $\alpha$
Attitude	17.426	2.926	0.844
Subjective norm	17.734	2.609	0.931
Perceived behavior control	16.177	2.439	0.814
Information richness	16.016	2.293	0.831
Information interaction	16.246	2.246	0.846
Intention	16.305	2.253	0.884

The results of regression analysis showed that attitude ( $\beta = 0.144, p = 0.003$ ), subjective norm ( $\beta = 0.181, p = 0.006$ ), and perceived behavioral control ( $\beta = 0.166, p = 0.040$ ) had a positive impact on behavioral intentions, which supports H1 to H3. Moreover, information richness ( $\beta = 0.353, p = 0.000$ ) and information interaction ( $\beta = 0.311, p = 0.000$ ) had a significant and positive relationship with behavioral intentions, providing support for H4 and H5.

Table 2 The Results of Linear Regression

Model		Standardized Coefficients	t	Sig.
		Beta		
1	(Constant)		3.881	0.000
	Att	0.144	2.669	0.003
	SN	0.181	2.788	0.006
	PBC	0.166	1.478	0.040
	InR	0.311	3.894	0.000
	InI	0.353	4.662	0.000

Note: Att: exercise attitude; SN: exercise subjective norm; PBC: exercise perceived behavioral control; InR: information richness; InI: information interaction

The summary of the hypotheses results is shown in Table 3. Overall, all variables have significant impact on behavioral intention. Five factors (i.e., attitude, subjective norm, perceived behavioral control, information richness, and information interaction) are to have positive impact on behavioral intention in this study.

Table 3 The Summary of Hypotheses Results

Hypothetical Path	Expected sign	Results
H1: Exercise Attitude → Behavioral intention	+	Support
H2: Exercise subjective norm → Behavioral intention	+	Support
H3: Exercise perceived behavioral control → Behavioral intention	+	Support
H4: Information richness → Behavioral intention	+	Support
H5: Information interaction → Behavioral intention	+	Support

## V. DISCUSSION

Based on the results of this study, we make the following suggestions.

First, enhancing the richness of intelligent information. The college students choose intelligent devices to assist them in the process of exercise behaviors, which to a large extent comes from the richness of intelligent information. In the use process, if the intelligent information is too monotonous, it will greatly reduce the enthusiasm of college students to use it. The intelligent sports devices currently used still have great room for progress in improving the richness of intelligent information. The survey results show that different functional information in intelligent devices will affect the use intention of college students. At the same time, it also reflects that the diversification of intelligent information makes intelligent sports devices more abundant, which will stimulate the use desire of college students, and also drive college students' enthusiasm for exercise.

Second, enhancing the interactivity of intelligent information. According to this survey, social interaction is a part of the factors that college students consider when using intelligent sports devices. As the Internet, artificial intelligence and other scientific and technological continue to endow sports intelligence with new colors and functions, consumer demand is becoming more diversified. Many intelligent sports devices lack some improvement in enhancing the interactive level of intelligent information. They only monitor and record data on the surface. Therefore, efforts should be made in this regard to improve the enthusiasm of college students' exercises with the help of intelligent sports devices. College students are constantly enhancing their sense of acquisition from autonomous movement, upgrading their intelligent

information from a sense of science and technology to more spiritual satisfaction, releasing their physical mechanisms, and reducing their sense of loneliness, all of which are closely surrounding the enhancement of the interaction of intelligent information.

Third, changing the attitude toward exercise. The results indicated that most college students do not have a strong interest in participating in exercises and do not have a deep understanding of the convenient services brought by intelligent equipment. Therefore, we should strengthen this publicity, increase the initiative of college students in their exercise awareness and widely understand the convenience of intelligent devices to modify their attitudes toward exercise.

Finally, obtaining support from classmates and teachers. We should pay attention to students' interest in exercises. By stimulating and maintaining students' interest in exercises, students can consciously and actively carry out physical exercise. At the same time, we should increase the publicity of intelligent equipment among students, so that intelligent equipment can be widely understood among students.

#### ACKNOWLEDGEMENTS

This study was supported by Law & Business College of Hubei University of Economics with the grant number of 2022K07.

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