An Empirical Study on the Influence of College Curriculum Reform on Learning Behavior Willingness Based on Technology Acceptance Model (TAM)

Tingting Zheng

Guangzhou Vocational College of Technology & Business, Guangzhou, China

Keywords: College curriculum reform; Technology Acceptance Model; Willingness to learn behavior; Perceived useful; Perceived ease of use

Abstract: The purpose of this paper is to explore the influence of college curriculum reform on students' willingness to learn, build a research framework based on TAM (Technology Acceptance Model), and conduct in-depth analysis with quantitative research methods. By designing a questionnaire survey tool, the study collected the data of 800 college students about the technology acceptance of curriculum reform, the change of learning experience and the willingness to learn in the future. By using descriptive statistical analysis, SEM (Structural Equation Modeling) and other data analysis methods, this paper verifies the influence mechanism of perceived useful, perceived ease of use, social influence and convenient conditions on learning behavior willingness. The results show that perceived useful and perceived usability significantly positively affect students' willingness to learn, and perceived usability indirectly affects their willingness to learn through perceived useful. Social influence and convenient conditions, as important external variables, have a significant impact on the willingness to learn. These findings enrich the application of technology acceptance theory in the field of education and provide empirical support and practical guidance for curriculum reform in colleges and universities.

1. Introduction

In recent years, with the rapid development of information technology, the curriculum reform in colleges and universities has gradually become an important topic in the field of education [1]. Under the double promotion of globalization and informatization, the traditional teaching mode is undergoing profound changes. From blackboard to multimedia, from offline classroom to online teaching, technology is increasingly widely used in education [2]. It changed the teaching methods, and had a far-reaching impact on educational ideas and effects [3]. It is of great practical significance to explore how to effectively use technology to promote curriculum reform in colleges and universities and improve teaching quality [4].

In the process of this change, TAM has become a key theoretical framework to understand users' acceptance of new technologies [5]. TAM model predicts and explains users' willingness and behavior to use new technologies by analyzing users' perceived useful and perceived ease of use of technologies [6-7]. In the field of education, students and teachers are the main users of new technologies [8]. Their acceptance of technology directly affects the application effect of technology in teaching and the success of curriculum reform [9]. Based on this, using TAM model to analyze and guide the curriculum reform in colleges and universities will help us better understand the attitudes and behaviors of students and teachers towards new technologies and further promote the smooth progress of curriculum reform.

The purpose of this study is to explore how the college curriculum reform based on TAM affects students' willingness to learn. Through in-depth analysis of students' perceived useful and ease of use of new technologies in curriculum reform and how these factors further affect their willingness to learn, we can provide more scientific theoretical basis and practical guidance for curriculum reform in colleges and universities.

2. Research design and implementation

2.1. Research design

This study adopts quantitative research method and builds a research framework based on TAM, aiming to deeply explore the influence mechanism of college curriculum reform on students' willingness to learn. The research design is divided into two stages: ① Through literature review and theoretical combing, the key factors affecting the willingness to learn are determined, and these factors are included in the TAM model for expansion. These factors include perceived useful, perceived ease of use, social impact and convenience, as shown in Figure 1.

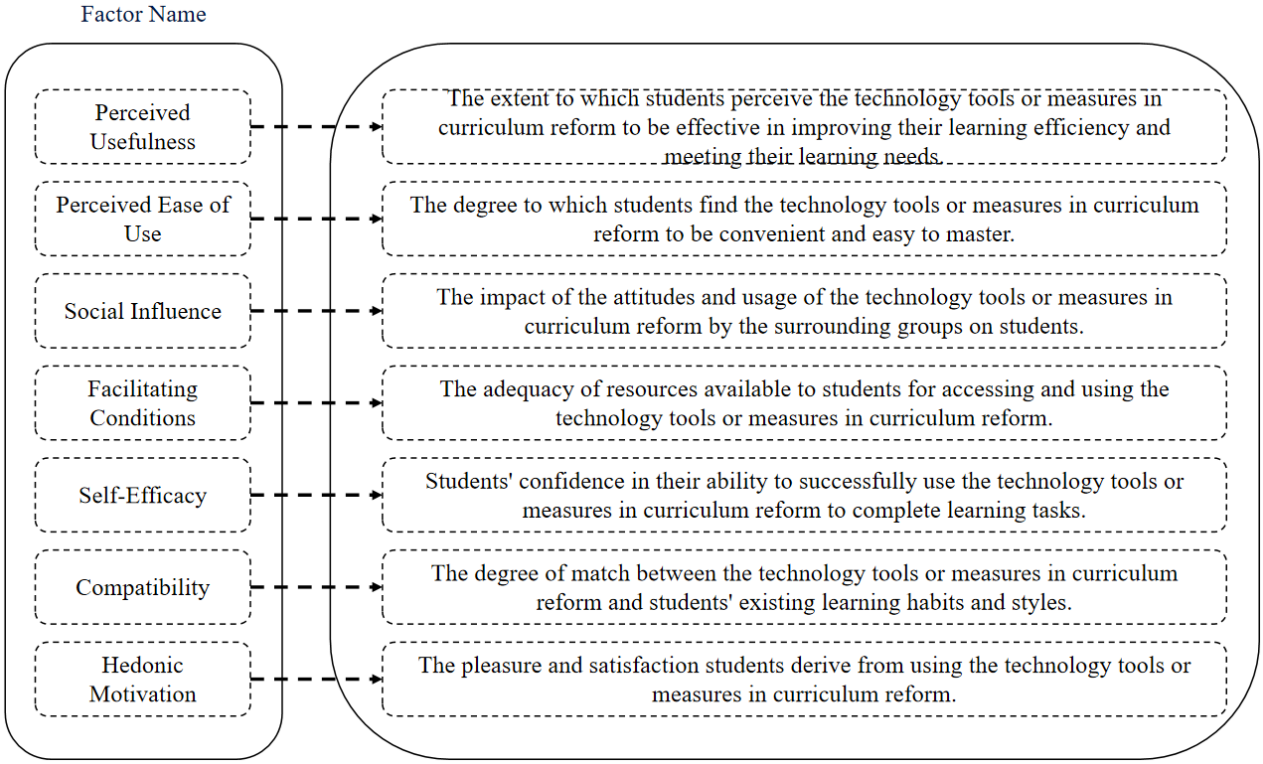

Figure 1 TAM model extended factor table

② Design a questionnaire survey tool to collect data on students' actual feelings and behavior intentions after participating in the curriculum reform. The content of the questionnaire covers many dimensions, such as the acceptance of curriculum reform technology tools, the change of learning experience, and the willingness to continue to use or recommend others in the future. This can ensure that the data can fully reflect the relationship between the constructs of TAM model.

2.2. Sample selection and data collection

In order to ensure the representativeness and effectiveness of the study, the sample selection in this paper follows the principle of combining randomness with convenience. The research subjects are college students from different academic backgrounds, with special attention to those students who have participated in or are participating in at least one curriculum reform project. Data collection is mainly carried out through online questionnaires, and links to questionnaires are published on the campus network platform, supplemented by offline publicity to improve participation. The distribution of questionnaires lasted for one month, during which the recovery rate was improved through email reminders and social media promotion. Finally, we collected 800 valid questionnaires. The sample covers financial and business majors such as smart logistics, e-commerce, social work and business administration, ensuring the diversity and extensiveness of data.

2.3. Data analysis methods

Statistical software SPSS and AMOS were used for data analysis. First, we make descriptive

statistical analysis of the collected data to understand the basic characteristics of the sample and the distribution of each variable. The reliability analysis formula is as follows:

$$\alpha = \frac{k}{k-1}\left(1-\frac{\sum_{i=1}^{k}\sigma_i^2}{\sigma_{total}^2}\right) \tag{1}$$

Where: k stands for the total number of items in the scale; σ_i^2 represents the variance of the i item; σ_{total}^2 stands for population variance of all items; α stands for Cronbach's alpha coefficient, which is used to measure the internal consistency of the scale.

Then, SEM analyzes the path of TAM model, and evaluates the direct and indirect effects of perceived useful, perceived ease of use and other factors on the willingness to learn. This paper also makes a multi-group analysis: comparing the differences of students with different gender, grade and subject background in technology acceptance and willingness to learn, in order to gain a deeper understanding. Multiple comparison (using LSD) formula:

$$\mathrm{LSD} = t_{\alpha/2,df_{error}}\sqrt{\frac{2*MS_{within}}{n}} \tag{2}$$

Where: LSD stands for the smallest significant difference; $t_{\alpha/2,df_{error}}$ stands for the two-tailed critical value of t distribution; MS_{within} stands for mean square within the group; n represents the size of each group of samples; df_{error} stands for error degree of freedom.

In the process of research, we strictly abide by the ethical principles of research to ensure the anonymity of all participants and the confidentiality of data. At the beginning of the questionnaire, the purpose of the study, the way of using data and the rights of participants were clearly informed, and the informed consent of the respondents was obtained.

3. Empirical analysis and result discussion

3.1. Descriptive statistical analysis

In the initial stage of empirical analysis, this paper makes a comprehensive descriptive statistical analysis of 800 valid questionnaire data collected. This step aims to describe the basic outline of the sample, including the gender distribution, age structure, subject category and their basic attitude towards curriculum reform. The results are shown in Table 1:

Table 1: Descriptive Statistical Analysis of the Sample

Variable	Description
Gender Distribution	Male: 50% (400 participants); Female: 50% (400 participants)
Age Structure	Below 18: 5% (40 participants); 18-20: 60% (480 participants); 21-22: 25% (200 participants); Above 22: 10% (80 participants)
Discipline Category	Humanities: 30% (240 participants); Science: 35% (280 participants); Engineering: 20% (160 participants); Arts/Sports: 10% (80 participants); Other: 5% (40 participants)
Learning Behavior Intention	Mean: 4.2 (on a 5-point scale); Standard Deviation: 0.8
Perceived Useful	Mean: 3.9 (on a 5-point scale); Standard Deviation: 0.7
Perceived Ease of Use	Mean: 4.1 (on a 5-point scale); Standard Deviation: 0.6
Attitude Towards Curriculum Reform	Support: 65% (520 participants); Neutral: 20% (160 participants); Oppose: 15% (120 participants)

Note: All values are based on the statistical analysis of 800 valid questionnaire responses.

The results of Table 1 show that the proportion of men and women in the sample is balanced,

and the age is mainly between 18 and 22 years old, covering a wide range of disciplines. Through the analysis of the mean, standard deviation and frequency distribution of key variables such as willingness to learn, perceived useful and perceived ease of use, we have preliminarily grasped the overall technical acceptance level and learning willingness of students under the background of curriculum reform.

3.2. Hypothesis test and model analysis

Based on the research framework constructed by TAM, this section puts forward a series of specific hypotheses about the influence of curriculum reform on the willingness to learn. In order to verify these assumptions, we use SEM to analyze the path. The specific results are shown in Table 2:

Table 2: Path Analysis Results of SEM

Path	Standardized Path Coefficient	t-Value	p-Value	Significance
Perceived Useful → Learning Behavior Intention	0.65	4.87	<0.001	Significant
Perceived Ease of Use → Learning Behavior Intention	0.42	3.65	<0.001	Significant
Perceived Ease of Use → Perceived Useful	0.58	4.29	<0.001	Significant
Social Influence → Learning Behavior Intention	0.30	2.71	0.007	Significant
Social Influence → Perceived Useful	0.25	2.30	0.022	Significant
Social Influence → Perceived Ease of Use	0.18	1.96	0.051	Marginally Significant
Facilitating Conditions → Learning Behavior Intention	0.28	2.56	0.011	Significant
Facilitating Conditions → Perceived Useful	0.22	2.08	0.038	Significant
Facilitating Conditions → Perceived Ease of Use	0.35	3.12	0.002	Significant

Note:

The standardized path coefficients represent the strength and direction of the relationships between variables.

The t-values indicate the statistical significance of the path coefficients.

The p-values represent the probability of the significance of the path coefficients, with $p<0.05$ typically considered significant.

The "Significance" column indicates whether the path coefficients are significant based on the p-values.

The results in Table 2 show that both perceived useful and perceived ease of use significantly positively affect students' willingness to learn, and perceived ease of use indirectly affects their willingness to learn through perceived useful, which verifies the core path of TAM model. Social influence and convenience conditions have also been proved to be important external variables, which directly affect the willingness to learn, and at the same time play an indirect role by enhancing perceived useful and perceived ease of use. These findings provide empirical support for us to deeply understand how curriculum reform affects students' learning behavior.

3.3. Discussion of results

The above research results show that the curriculum reform in colleges and universities has achieved positive results in improving students' technical acceptance and stimulating their willingness to learn. In particular, the improvement of perceived useful is regarded as the key factor to promote the change of students' learning behavior. This means that when curriculum reform can effectively improve students' learning efficiency and meet their learning needs, students are more

willing to actively participate in and continue to use these reform measures. The importance of perceived ease of use cannot be ignored. It is a direct factor that affects the willingness to learn, and it is also an important prerequisite to enhance the usefulness of perception. The remarkable role of social influence and convenient conditions reveals the important influence of external environment on students' learning behavior, suggesting that we should fully consider the social atmosphere, school support and the perfection of technical facilities when promoting curriculum reform.

This study enriches the application of TAM in the field of education and provides practical guidance and policy suggestions for curriculum reform in colleges and universities. Colleges and universities should attach importance to the practical and easy-to-use design of curriculum reform to ensure that the reform measures can truly meet the learning needs of students, reduce learning costs and improve learning efficiency. Colleges and universities also need to strengthen social propaganda and campus culture construction, create a positive learning atmosphere, and enhance students' sense of identity and participation in curriculum reform. The government and educational institutions should increase their support for curriculum reform in colleges and universities, provide necessary technical and financial support, optimize the allocation of educational resources, and create favorable conditions for curriculum reform. In addition, this paper proposes to establish a continuous feedback and evaluation mechanism, adjust and optimize the curriculum reform plan in time, and ensure that the reform results can continue to benefit the majority of students.

4. Conclusions

Based on TAM, this study deeply discusses the influence of college curriculum reform on students' willingness to learn, and draws a series of important findings. The research proves that perceived useful and perceived ease of use are the key factors that drive students' willingness to learn, and there is a significant interaction between them. Social influence and convenient conditions also have an important impact on students' willingness to learn. These findings enrich the application of technology acceptance theory in the field of education and provide strong empirical support for curriculum reform in colleges and universities. And it emphasizes that the reform measures should pay attention to practicality, ease of use and the creation of external environment, so as to effectively promote students' learning participation and willingness to continue learning.

Theoretically, this study expands the application boundary of TAM model in the field of educational technology acceptance, and provides a new perspective and theoretical framework for understanding how curriculum reform affects students' learning behavior. In practice, the research conclusion provides valuable reference for college education administrators and curriculum designers, guiding them on how to promote curriculum reform more effectively and improve students' learning experience and effectiveness. By optimizing the curriculum reform scheme, enhancing the usability and usefulness of technology, and creating a good learning atmosphere, students' learning motivation can be significantly stimulated, and the overall improvement of education quality can be promoted. Future research can further explore the differences of students' technology acceptance in different disciplines and learning styles, as well as the combination of new technology and curriculum reform, and provide more in-depth reference for curriculum reform in colleges and universities around the world.

Acknowledgements

2024 Annual China Labor Studies Institute "Industry-Education Integration, School-Enterprise Cooperation" Education Reform and Development Project - Construction of Modern Logistics Management Major Curriculum System under the Background of New Quality Productivity (Cea12024168)

References

[1] Yu Kunpeng, Li Wei. Research on Consumers' Willingness to Use Food Blockchain Traceability

Systems Based on the Technology Acceptance Model [J]. China Soft Science, 2023(8): 62-72.

[2] Wu Xiaobo, Zhang Weiqi, Li Sihan, et al. Research on the Chain Influence Mechanism of Users' Adoption Intention of Intelligent Investment Advisers Based on the Technology Acceptance Model (TAM) [J]. Journal of Zhejiang University: Humanities and Social Sciences Edition, 2023, 53(7): 5-19.

[3] Wang Ruochen, Mu Yongran, Zhu Xuefang, et al. Factors Influencing Researchers' Adoption Intention of Digital Humanities Technologies: A Perspective Based on the Technology Acceptance Model [J]. Library Forum, 2019, 39(06): 1-9.

[4] Xu Xiaozhou, Fu Meilan. Analysis of Learning Effects in Online Courses: A Case Study of the "Entrepreneurship Basics" Course [J]. Journal of Higher Engineering Education Research, 2022, 70(5): 144-150.

[5] Song Lina, Jin Lifu. Practical Significance and Implementation Pathways of Effective Ideological and Political Education in University Courses from the Perspective of Cognitive Evaluation Theory [J]. Journal of Higher Education Management, 2024, 18(3): 73-81.

[6] Hong Zaoqing, Yuan Shengli. Reform Orientation and Teaching Quality Improvement of University Courses Based on the Construction of Ideological and Political Education [J]. Journal of Higher Education Management, 2022, 16(1): 38-46.

[7] Sun Yang, Wang Mingzhe. Research on the Reform Strategies of Broadcasting and Directing Courses in Applied Universities in the Era of Intelligent Media [J]. Education Theory & Practice, 2024, 44(6): 53-56.

[8] Wu Liang, Liu Guoying. Reform Pathways for Ideological and Political Education in Software-Related Courses in Universities [J]. Education Theory & Practice, 2023, 43(30): 38-42.

[9] Wang Zhonghe, Wang Jun, Liu Mouquan, et al. Reform and Countermeasures for Food Science Courses in Universities Amidst the COVID-19 Pandemic [J]. Food Industry, 2022, 43(4): 264-266.