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Factors Influencing Students' Intention to Use E-Learning in Zhanjiang, China

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Abstract

Purpose: This research examined the factors influencing students' behavioral intention to use e-learning in Zhanjiang, China. In the digital age, e-learning is increasingly favored for its convenience, flexibility, and sustainability. Given the widespread use of e-learning in education, it is necessary to conduct an in-depth study to examine the factors that influence students' use of e-learning. **Research design, data, and methodology:** The study started with a validity analysis using the Item-Objective Consistency Index (IOC) and a reliability analysis using Cronbach's Alpha (n=30). Multiple linear regression analyses were then conducted to test whether the variables had a significant relationship. Afterward, a 12-week Strategic plan (SP) was implemented for 30 students, and a paired-sample t-test was conducted on the quantitative results before and after the SP to determine the changes in students' behavioral intentions to use e-learning by implementing the Strategic plan. **Results:** This study verified that the six independent variables (Effort expectancy, Performance expectancy, Habit, facilitating conditions, Hedonic motivation, and social influence) significantly influence the dependent variable (Behavioral intention to use). Concurrently, the paired sample t-test comparing results demonstrated a statistically significant difference between the pre- and post-strategic plan phases regarding students' behavioral intention to use e-learning. **Conclusions:** This study provides a rich research opportunity and theoretical foundation for future in-depth exploration and analysis.

Keywords: E-learning, Behavioral intention to use, Higher education, Zhanjiang

JEL Classification Code: I23, J28, L2

1. Introduction

Entering the 21st century, human society continues to shift to the digital era; as the Internet and intelligent electronic devices continue to develop rapidly, many traditional industries have gained a new direction of development through integration with the Internet, and the education industry is one of them. Among them, e-learning is the main innovative learning modality introduced by new technologies into the field of education.

E-learning has been employed as a global approach, particularly during the COVID-19 outbreak, and its educational activities have been accomplished by using the Internet and electronic devices with the help of E-learning tools, including Moodle, MOOC, Blackboard, Wechat, and so on. E-learning provides resources available everywhere, allowing for smooth accessibility of learning regardless of location, easy interaction, and opportunities for personalized learning (Aljawarneh, 2020). According to Darcin et al. (2016), young people may easily access mobile devices today, which helps them learn and interact effectively. So, e-learning is suitable for the new world of lifelong learning. Through e-learning, the structure and nature of education, as well as teachers' instruction methods and interactions with students, have changed.

A simple understanding is that education via the Internet is known as E-learning. It strives to improve knowledge,

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skills, and productive talents in a global context. It is designed to support interaction and cooperation, and satisfy the needs of learners regardless of location or time.

E-learning, which encourages flexibility and ease of adaptation for learners, is a significant innovation brought about by technology in education. E-learning provides resources available everywhere, allowing for easy access to learning regardless of where you are, easy interaction, and opportunities for personal learning (Aljawarneh, 2020). Compared to traditional learning methods, E-learning solves the problem of learning's dependence on time, place, etc (Liaw, 2008). The chance for digital transformation in education is still open, and the COVID-19 pandemic's consequences have just sped it up. With the introduction of COVID-19, e-learning is now widely accepted as one of the preferred learning methods in higher education institutions. Around the world, e-learning is being used in educational institutions, and it has become a standard in higher education. According to Alexander et al. (2019), there is a trend in higher education to emphasize monitoring students' E-learning and its proponents see it as the way of the future.

The growth of Internet penetration in China has provided the conditions for the development of e-learning so that more and more people can access the web. Thus, e-learning has acquired a broad market base. In the current digital era, e-learning is encouraged and promoted by the Chinese Ministry of Education for their teaching-learning process. For e-learning systems to be successful and consistently adopted by students, teachers, and universities, it is necessary to understand the behavioral intentions that influence students' use. This study investigates the key factors influencing Zhanjiang University of Science and Technology students' behavioral intention to use e-learning systems. To examine whether Effort expectancy, facilitating conditions, Habit, Hedonic motivation, Performance expectancy, and social influence significantly influence students' behavioral intention to use e-learning, this study will adopt a mixed methods approach, combining quantitative and qualitative methods. Teachers and students of higher education institutions can all benefit from the conclusions of this study.

2. Literature Review

2.1 Performance Expectancy

Alowayr (2022) suggested that performance expectancy was the idea among users that certain technologies can help them perform their jobs better. PE can explain students' perceptions of their influence over a system or how much better they perceive it (Perera & Abeysekera, 2022). Research data demonstrate that performance expectancy is an important factor in behavioral intention to adopt e-learning, and those users are more likely to use online learning systems if they find the system useful in their learning process (Tarhini et al., 2017). When PE and e-learning come together, e-learning can help users carry out learning activities more conveniently and improve their educational skills and performance (Samsudeen & Mohamed, 2019). In addition, users who believe that using an e-learning system can enhance their academic achievement are more likely to use it; this view has been widely recognized in the educational field (Mpungose, 2020). According to the research of Venkatesh et al. (2016), performance expectancy is a crucial aspect of technology acceptance; people are more likely to use a technology if they believe it will improve their performance. Hence, this study hypothesizes:

H1: Performance expectancy has a significant influence on behavioral intention to use e-learning.

2.2 Effort Expectancy

Effort expectancy (EE) refers to the ease with which the system can be used (Tarhini et al., 2017). As seen by academic staff, effort expectancy influences behavioral intention in accepting and using e-learning systems (Alkhwaldi & Abdulmuhsin, 2022). EE is the "ease of use" a learner has when utilizing IT (Kurt, 2022). According to Alowayr (2022), Effort Expectancy results from users' convictions that technology use is relativity free from mental effort. Buabeng-Andoh and Baah (2020) indicated that EE refers to the ease with which the system is used and operated. EE is usually a measure of how easy the system is to use, and one believes the technology will be effortless (Fianu et al., 2020). Acceptance of the system and the intention to use it will be influenced by how simple and intuitive the e-learning platform is (Salloum & Shaalan, 2018). Samsudeen and Mohamed (2019) believe that since e-learning is still developing, effort expectancy is crucial in influencing learners' behavioral intentions. El-Masri and Tarhini (2017) and Samsudeen and Mohamed (2019) found that behavioral intention to use e-learning in developing countries can be predicted by effort expectancy. Hence, this study hypothesizes:

H2: Effort expectancy has a significant influence on behavioral intention to use e-learning.

2.3 Social Influence

Social influence was defined as the changes and influences of users' use of technology due to others (Yee, 2015). SI means that when people listen to these people who are socially closer, they make changes to their technology use behavior (Riquelme & Rios, 2010). Twum et al. (2022)

suggest that social influence can play an important role in promoting learners' intention to use e-learning. Hu and Lai (2019) showed that through perceived usefulness, social influence somewhat indirectly affected the aim of college students to adopt learning management systems. In essence, dedicated support from the school and help from teachers can make students feel that the e-learning system is a convenient learning tool (Cho et al., 2009). Lecturers are important contributors to encouraging students to use the e-learning system because of their ability to organize events, engage students, and make suggestions; they are representative social influencing factors (Duggal, 2022). SI's impact was limited to coercive environments and was less effective in the voluntary environment (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). So, this study hypothesizes:

H3: Social influence has a significant influence on behavioral intention to use e-learning.

2.4 Facilitating Conditions

Facilitating conditions were defined as environmental aspects that encourage pupils to get involved in a new system (Twum et al., 2022). FC refers to external environmental factors that promote specific behaviors (Okazaki & Santos, 2012). Reyes-Mercado et al. (2023) believed that facilitating conditions (FC) significantly affect attitudes, behavioral intentions, and use behaviors. FC was considered one of the most influential factors in determining whether an individual intends to use a specific technology (Venkatesh et al., 2003). Conditions such as reliable infrastructure, student/provider/platform support, and Internet accessibility affect e-learning; these key factors can be considered as facilitating conditions promoting e-learning (Duggal, 2022). Facilitating Conditions were considered an environmental factor; put another way, facilitating conditions provide the external conditions needed to reinforce a behavior, and in the use of technology in the workplace, facilitation condition was considered to include the provision of training and support (Ajzen, 1991). In developing countries, adequate resource support is needed to encourage the usage of e-learning systems and improve technology. Conditions such as reliable infrastructure, student/provider/platform support, and Internet accessibility affect e-learning; these key factors can be considered as facilitating conditions promoting e-learning (Duggal, 2022). Hence, this study hypothesizes:

H4: Facilitating conditions have a significant influence on behavioral intention to use e-learning.

2.5 Hedonic Motivation

Hedonic motivation (HM) was described as "the users' enjoyment with a system"; it is a key element in determining students' behavioral intentions to take particular activities (Okazaki & Santos, 2012). Hedonic Motivation refers to enjoyment or excitement obtained via Internet use in the Internet age (Thaker et al., 2022). The findings of Tamilmani et al. (2019) revealed that hedonic motivation was a prerequisite for behavioral intent using a range of technologies. Several scholars have analyzed hedonic motivation (HM) and found that it plays a pivotal role in college students' intentions to use e-learning systems (Ain et al., 2016; Masadeh et al., 2016; Raman & Don, 2013; Teo & Noyes, 2014). Hedonic Motivation is among the contributing elements that influence educators' and students' behavioral intentions when they want to use an M-earning management system (Zwain, 2019). Hedonic motivation impacts e-learning usage intentions, so it is important to emphasize to developers that e-learning incorporates features that enhance user enjoyment (Twum et al., 2022).

Once a user has used technology for e-learning, HM may become an internal incentive and an important factor in driving technology implementation in higher education institutions (Tandon et al., 2022).

Hence, this study hypothesizes:

H5: Hedonic motivation has a significant influence on behavioral intention to use e-learning.

2.6 Habit

Habit refers to a behavior that has been ingrained in one's routine, or that is virtually uncontrollable (Rudhumbu, 2022). Earlier studies utilized habits to predict users' conduct because past habits can lead to positive thoughts about the behavior. Frequently, those who always use electronic devices are believed to be more likely to adopt a new educational technology before using it (Venkatesh & Zhang, 2010). Tarhini et al. (2017) predicted that pupils will likely adopt the e-learning system when it becomes a habit. Research has found that habit is a crucial predictor of users' intentions to embrace new technology in education. The research shows that online learning habits significantly impact pupils' intent to utilize e-learning systems at private colleges (Tarhini et al., 2014). According to Gunasinghe et al. (2020), HB can greatly influence users' behavioral intention, especially in technology use. In addition, Twum et al. (2022) found that universities have a moderating effect on habits, facilitating conditions, and behavioral intention of adopting e-learning systems. So, this study hypothesizes:

H6: Habit has a significant influence on behavioral intention to use e-learning.

3. Research Methods and Materials

3.1 Research Framework

This study aimed to examine the goal of this study was to examine students' behavioral intentions to use e-learning at Zhanjiang University of Science and Technology. In constructing the conceptual framework, the researchers combined three main theoretical frameworks (Alkhwaldi & Abdulmuhsin, 2022; Samsudeen & Mohamed, 2019; Tarhini et al., 2017) to build a comprehensive, systematic, and effective conceptual framework to explain better and predict students' behavior. A conceptual framework was described as a graphic representation of the relationships between research variables. The relationship between the prior research framework and conceptual framework exists since the researcher primarily built his or her conceptual framework based on the earlier research framework.

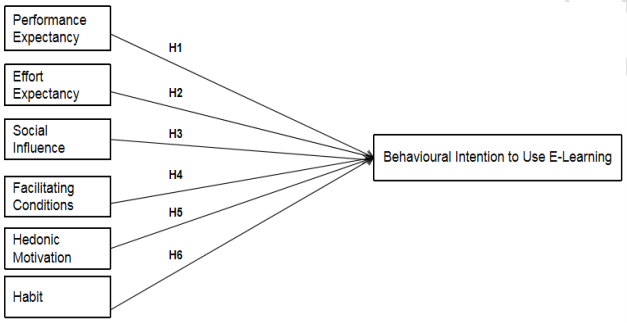

Figure 1: Conceptual Framework

H1: Performance expectancy has a significant influence on behavioral intention to use e-learning.
H2: Effort expectancy has a significant influence on behavioral intention to use e-learning.
H3: Social influence has a significant influence on behavioral intention to use e-learning.
H4: Facilitating conditions have a significant influence on behavioral intention to use e-learning.
H5: Hedonic motivation has a significant influence on behavioral intention to use e-learning.
H6: Habit has a significant influence on behavioral intention to use e-learning.

3.2 Research Methodology

This study utilized a mixed research methodology, and four steps comprised the research process.

Initially, before conducting the questionnaire data collection, the researcher used the Item-Objective Consistency Index (IOC) to test the content validity of the questionnaire. If the value of this item is greater than or equal to 0.67 after expert scoring, these items are retained in the questionnaire. Subsequently, the researcher used Cronbach's Alpha coefficient to test the reliability of the questionnaire. If items in research instruments have passed the reliability test with a score of 0.70 or higher ($a \geq 0.7$), each item in the study is acceptable.

In the second stage, the qualitative approach was applied. Questionnaires were randomly distributed to the entire research population (3377 students) to collect the quantitative data. After the data collection, we need to test the P-values through multiple linear regression (MLR) series to analyze the relationship between the individual structures in the conceptual framework. During P-value testing, when the P-value was less than 0.05 ($P < 0.05$), the hypotheses that met the criteria for retention were kept, while the ones that did not were removed.

Third, the Strategic plans (SP) were presented, a research project that involved 30 participants. At the end stage, after implementing the strategic plan, the researcher will conduct a paired samples t-test on the collected data using Jamovi statistical software to compare the pre-SP and post-SP results. This test will help the researcher determine if there has been a significant change in the variables.

3.3 Research Population, Sample Size, and Sampling Procedures

3.3.1 Research Population

One hundred students (including sophomores, juniors, and seniors) from the College of Economics and Finance, Education, and Culture and Media (including sophomores, juniors, and seniors) at Zhanjiang University of Science and Technology were selected. Because all these selected colleges adopted online teaching during the COVID-19 pandemic, their enrolled students were given a complete online learning experience, and they now study at Zhanjiang University of Science and Technology. which will contribute to the authenticity and reliability of the results of this survey.

3.3.2 Sample size

Hair et al. (2011) argued that a sample size of 30 and 500 for a study is sufficiently adequate. Consequently, the selected sample size is 100 respondents. In this study, 30 was the sample size for the reliability test, and Linear Regression testing was 30 during the preliminary diagnosis stage. At the

Strategic plan stage, 30 students were selected to participate in the Strategic Plan implementation. The same research methods used for the pre-SP stage will also be used for the post-SP stage, with these 30 students serving as respondents. Then, by comparing the differences in pre-SP and post-SP test results, the researcher assessed the effectiveness of the Strategic Plan and determine whether the Strategic Plan has the desired affection.

3.3.3 Sampling Procedures

The researcher conducted three more significant samples, and the relevant sampling procedures and content were described below:

Sampling 1: Sampling for pilot test. The researcher asked 30 students to participate in a random sampling process by filling out a survey and providing feedback on the pilot test and survey.

Sampling 2: Sampling for pre-strategic plan survey. The researchers distributed questionnaires online to the target group. A sample of 170 was selected from the returned valid questionnaires to test the relationship between independent and dependent variables before the strategic plan.

Sampling 3: Sampling for Strategic Plan (SP). A researcher chose a random sample of 30 voluntary students to implement a Strategic Plan (SP).

3.4 Research Instruments

3.4.1 Design of Questionnaire

The researcher took four steps to design the questionnaire:

Step 1: Find the sources for the questionnaires in three publicly available articles (Alkhwaldi & Abdulmuhsin, 2022; Samsudeen & Mohamed, 2019; Tarhini et al., 2017).

Step 2: Modifying and presenting survey questionnaires in the context of Chinese university students.

Step 3: Applying IOC to select the items that meet the target needs.

Step 4: Improve the survey questionnaire.

3.4.2 Components of Questionnaire

The questionnaire of this study has three components:

Part 1: Guidelines of the questionnaire. It mainly includes the purpose of the questionnaire, the method of completing the questionnaire, and the acknowledgment of the respondents. This section was used to remove non-study populations.

Part 2: Basic information on respondents. In this section, each respondent is asked to provide some basic information, such as age, gender, occupation, etc., which helps to understand the sample's basic characteristics.

Part 3: Main section. The core section of the questionnaire measures the attitudes or perceptions of the sample population towards a particular issue. This section consists of a set of statements, each of which has the words "Strongly Agree," "Agree," "Neutral," "Disagree," and "Strongly Disagree." This shows how much the respondent agrees with a particular statement.

3.4.3 IOC Results

The IOC (Index of Item-Objective Congruence) was used to examine the content validity of the items in the relevant questionnaire. Five experts (one Thai professor and four Chinese professors) were asked to comment on the questionnaire in this study. If an item's score

is greater than or equal to 0.67 after the ratings, it is considered within acceptable limits and remains in the survey. The scoring criteria were divided into grades +, 1,0, and 1. Where + 1 indicates that the item has measured the target, -1 means the item measurement is uncertain, and 0 means the project goal is unclear. According to this criterion, all items in this study scored higher than 0.67, proving the effectiveness of the research instrument.

3.4.4 Pilot survey and Pilot test results

A pilot test is usually necessary, and the researchers' findings after estimation will support enhancing the questionnaire's validity, making the responses more explanatory. The researcher randomly distributed a pilot survey to 30 students, asking them to complete the questionnaire and provide feedback.

After that, the researcher used Cronbach's Alpha (CA) to investigate the instrument's reliability. According to Cronbach (1951), the results for each concept should have an alpha value larger than or equal to 0.7 to confirm that the research tool is working. All items in this research instrument have passed the reliability test with a score of 0.70 or higher. Table 1 shows that the reliability of each concept in this study is acceptable.

Table 1: Pilot Test Result

Variables	No. of Items	Sources	Cronbach 's Alpha	Strength of Association
Effort expectancy (EE)	3	Alkhwaldi and Abdulmuhsin (2022)	0.911	Excellent
Facilitating conditions (FC)	4	Tarhini et al. (2017)	0.929	Excellent
Habit (HB)	4	Tarhini et al. (2017)	0.845	Good
Hedonic motivation (HM)	3	Samsudeen and Mohamed (2019)	0.814	Good

Variables	No. of Items	Sources	Cronbach 's Alpha	Strength of Association
Performance expectancy (PE)	4	Tarhini et al. (2017)	0.835	Good
Social influence (SI)	4	Samsudeen and Mohamed (2019)	0.774	Acceptable
Behavioral intention to use (BI)	5	Samsudeen and Mohamed (2019)	0.958	Excellent

4. Results and Discussion

4.1 Results

4.1.1 Demographic Profile

In regression analysis, many researchers say there should be at least ten observations per variable (Hair et al., 2014), and the minimum sample size is 70 respondents. Therefore, the researchers chose a sample size of 100 respondents, and then, the group of chosen students (n = 30) took part in the Strategic Plan (SP) as shown in Table 2.

Table 2: Demographic Profile

Entire Research Population (n=100)		**Frequency**	**Percent**
Gender	Male	19	19.00%
	Female	81	81.00%
College	Economics and Finance	59	59.00%
	Education	12	12.00%
	Culture and Media	29	29.00%
Use experience (e-learning)	YES	98	98.00%
	NO	2	2.00%
Total		**100**	**100%**
SP Participants (n=30)		**Frequency**	**Percent**
Gender	Male	6	20.00%
	Female	24	80.00%
College	Economics and Finance	18	60.00%
	Education	3	10.00%
	Culture and Media	9	30.00%
Grade	Freshman	9	30.00%
	Sophomore	9	30.00%
	Junior	12	40.00%
Use behavior (e-learning)	At least once a week	2	6.67%
	More than 3 times a week	5	16.67%
	At least once a month	14	46.66%
	At least once a year	9	30.00%
Total		30	100%

4.1.2 Results of multiple linear regression

All hypotheses were examined using multiple linear regression analysis. The result of significant value ($P < 0.05$) shows that all independent variables have an impact on BI. In addition, having an R square value of 0.918, it can be shown that the independent variables account for 91.8% of the dependent variables. In multiple linear regression, the regression t-value is usually used together with the p-value, and it is well acknowledged that when the regression's t-value is more than 1.96 and the p-value is less than 0.05, it indicates a stronger relationship between independent variables and dependent variables. The regression t-values' absolute values are displayed in Table 3; t-values are all greater than 1.96, and the corresponding p-values are all less than 0.05; the independent variable significantly influences the dependent variable.

Table 3: The multiple linear regression of five independent variables on behavioral intention to use

Variables	Standardized Coefficients Beta value	t-value	p-value	VIF	R^2
Effort expectancy (EE)	0.255	3.24*	0.004	2.32	0.918
Facilitating conditions (FC)	0.366	4.01*	0.000	2.40	
Habit (HB)	0.210	3.34*	0.003	1.37	
Hedonic motivation (HM)	0.240	3.72*	0.001	1.37	
Performance expectancy (PE)	0.220	3.06*	0.005	1.38	
Social influence (SI)	0.210	3.47*	0.002	1.05	

Note: p-value <0.05*

The results were consistent with the hypotheses H1, H2, H3, H4, H5, and H6. The multiple linear regression (MLR)results supported the six hypotheses. A strategic plan (SP) was then carried out to investigate the following hypotheses:

H7: There is a significant mean difference between pre-SP and post-SP in Effort Expectancy (EE).

H8: There is a significant mean difference between pre-SP and post-SP in Facilitating Condition (FC).

H9: There is a significant mean difference between pre-SP and post-SP in Habit (HB).

H10: There is a significant mean difference between pre-SP and post-SP in Hedonic Motivation (HM).

H11: There is a significant mean difference between pre-SP and post-SP in Performance Expectancy (PE).

H12: There is a significant mean difference between pre-SP and post-SP in Social Influence (SI).

H13: There is a significant mean difference between pre-SP and post-SP in Behavioral intention to use (BI).

4.2 Strategic Plan Process

The strategic plan was implemented over approximately 12 weeks based on quantitative and qualitative data collected during the implementation phase. The aim was to increase the behavioral intentions of university students to use the e-learning system. The researcher illustrated the process and content of the strategic plan implementation in chronological order, as shown in Figure 2.

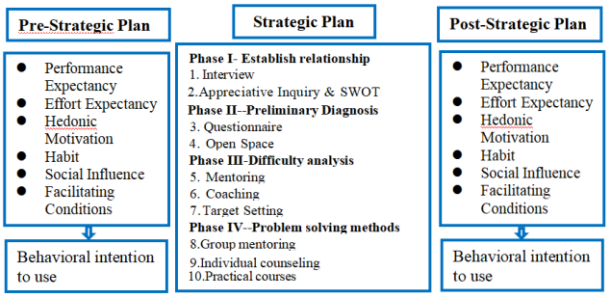

Figure 2: SP Activities

4.3 Results Comparison between Pre-IDI and Post-IDI

Following the 12-week Strategic Plan, the same 30 students were given the questionnaire again using WJX, an online tool. Afterward, the researchers quantitatively analyzed the data gathered through the questionnaire. Table 4 displays the paired samples T-test results between pre-SP and post-SP of each variable, tests the effectiveness of the Strategic Plan (SP), and answers hypotheses H7-H13. The paired-sample t-test analysis on the seven variables is fully shown in Table 4 below.

Table 4: Paired-Sample T-Test Results

Variables	Mean	SD	SE	p-value
Effort expectancy				
Pre-SP	3.63	0.850	0.1552	p<0.001
Post-SP	4.50	0.566	0.1033	
Facilitating conditions				
Pre-SP	3.52	0.743	0.1356	p<0.001
Post-SP	4.59	0.471	0.0860	
Habit				
Pre-SP	3.54	0.815	0.1488	p<0.001
Post-SP	4.51	0.611	0.1115	
Hedonic motivation				
Pre-SP	3.53	0.796	0.1453	p<0.001
Post-SP	4.26	0.720	0.1315	
Performance expectancy				
Pre-SP	3.63	0.715	0.1306	p<0.001
Post-SP	4.54	0.505	0.0921	
Social influence				
Pre-SP	3.58	0.744	0.1358	p<0.001
Post-SP	4.42	0.686	0.1252	
Behavioral intention to use				
Pre-SP	3.57	0.732	0.1336	p<0.001
Post-SP	4.50	0.601	0.1096	

Table 4 displays the paired samples' T-test results between each variable's pre-SP and post-SP, tests the effectiveness of the Strategic Plan, and tests the research hypothesis of H7-H13.

Table 4 shows that between pre-SP (M=3.63, SD=0.850, SE=0.1552) and post-SP (M=4.50, SD=0.566, SE=0.1033) conditions, Effort expectancy (EE) differs significantly. Additionally, p<.001, and the mean difference was -0.87. So, the hypothesis H7 was tested: There is a significant difference between pre-SP and post-SP in Effort Expectancy (EE).

Facilitating conditions (FC) differ significantly between pre-SP (M=3.52, SD=0.743, SE=0.1356) and post-SP (M=4.59, SD=0.471, SE=0.0860) conditions. Additionally, p<.001, and the mean difference was -1.07. So, hypothesis H8 was tested: There is a significant difference between pre-SP and post-SP in Facilitating conditions (FC).

Habit (HB) differs significantly between pre-SP (M=3.54, SD=0.815, SE=0.1488) and post-SP (M=4.51, SD=0.611, SE=0.1115) conditions. Additionally, p<.001, and the mean difference was -0.97. So, the hypothesis H9 was tested: There is a significant difference between pre-SP and post-SP in Habit (HB).

Hedonic motivation (HM) differs significantly between pre-SP (M=3.53, SD=0.796, SE=0.1453) and post-SP (M=4.26, SD=0.720, SE=0.1315) conditions. Additionally, p<.001, and the mean difference was -0.73. So, hypothesis H10 was tested: There is a significant difference between pre-SP and post-SP in Hedonic motivation (HM).

Performance expectancy (PE) differs significantly between the pre-SP (M=3.63, SD=0.715, SE=0.1306) and the post-SP (M=4.54, SD=0.505, SE=0.0921) condition. Additionally, p<.001, and the mean difference was -0.91. So, the hypothesis H11 was tested: There is a significant difference between pre-SP and post-SP in Performance expectancy (PE).

Social influence (SI) differs significantly between pre-SP (M=3.58, SD=0.744, SE=0.1358) and post-SP (M=4.42, SD=0.686, SE=0.1252) conditions. Additionally, <.001, and

the mean difference was -0.84. So, the hypothesis H12 was tested: There is a significant difference between pre-SP and post-SP in Performance expectancy (PE).

Behavioral intention to use (BI) differs significantly between pre-SP (M=3.57, SD=0.732, SE=0.1336) and post-SP (M=4.50, SD=0.601, SE=0.1096) conditions. Additionally, p<.001, and the mean difference was -0.93. So, hypothesis H13 was tested: There is a significant difference between pre-SP and post-SP in Behavioural intention to use (BI).

In conclusion, paired-sample t-test results demonstrated that all seven variables had significant differences between pre-SP and post-SP conditions. The researchers also found that there was a significant increase in students' behavioral intention to use e-learning systems between the pre-SP and post-SP phases.

5. Conclusions, Recommendations and Limitations

5.1 Conclusions & Discussions

This study aimed to examine the key factors affecting students' behavioral intention to use e-learning systems in Zhanjiang, China (taking Zhanjiang University of Science and Technology as an example). To obtain relevant findings, the study used an extensive research design, data collection, and methodology.

The researcher comprehensively adopted the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) theory to construct a new theoretical framework for the research process. Under the guidance of the theoretical framework, we first combed through the various factors that affect students' acceptance and use of e-learning systems and finally extracted six key variables, such as performance expectation, effort expectation, social influence, facilitating condition, hedonistic motivation, and habits. These six variables were considered the most important factors influencing Zhanjiang University of Science and Technology students' behavioral intention to use e-learning.

This study was divided into three key stages: pre-strategic plan, strategic plan implementation, and post-strategic plan. In these three phases, a series of steps were taken to ensure the accuracy and validity of the study results. Before implementing the strategic plan, the researcher performed a SWOT analysis of e-learning systems. After completing the SWOT analysis and data collection, the investigators began to develop a strategic plan to improve students' use of e-learning systems. They lay the foundation for their long-term development. The implementation of the Strategic Plan takes about three months in total. Then, 30 students participated as experimental groups in implementing the strategic plan. Pre-SP methodologies comprised determining the sample size and target population, introducing research tools (lOC, P-test, Linear Regression, and Pair-sample t-test, etc.), creating questionnaires, gathering data, and evaluating hypotheses. After the implementation phase, the researchers conducted an in-depth analysis of the experimental data to compare the differences. The researcher used paired samples T-test to analyze the experimental data. The quantitative data demonstrated significant differences between pre-SP and post-SP stages on Performance expectancy, Effort expectancy, Social Influence, facilitating condition, Hedonic motivation, Habit, and Behavioural intention to use. So, the hypothesis H7-H13 were tested.

In conclusion, this study takes Zhanjiang University of Science and Technology as an example; a local university in China aims to test the main factors that influence students' behavioral intention to use the e-learning system from six aspects: performance expectation, effort expectation, social influence, facilitating condition, hedonistic motivation, and habits. The results showed that they all significantly affected the e-learning system use behavior, and there was a significant increase in students' behavioral intention to use e-learning systems between the pre-SP and post-SP phases. This study proposed targeted strategic plans, and through the comparative analysis before and after the implementation of strategic plans, the researcher found that the implementation of strategic plans can significantly increase students' behavioral intention to use the e-learning system. This means that in the local colleges and universities in China, the targeted adjustment and optimization of the e-learning system can effectively improve the students' behavioral intention to use it to improve the quality of education and teaching. This study provides a useful reference for optimizing the e-learning system in local universities in China.

5.2 Recommendations

Improve students' performance expectations and effort expectations of the e-learning system. Enhance students' understanding of the role of the e-learning system. Through lectures, seminars, and other forms, let the students understand the advantages of the e-learning system in improving the learning effect to improve their performance expectations. Set up a reasonable learning goal. According to the actual situation of students, set specific and measurable learning goals for them so that they have a clear direction in the e-learning process. Strengthen the motivation and feedback of students. When students achieve certain results, give affirmation and praise, let them feel that their efforts are rewarded for improving the e-learning system's performance expectation and creating a good learning atmosphere. The

organization of online learning groups, learning competitions, and other activities lets students enjoy learning and improves their expectations of the e-learning system.

Build a high-quality social environment and create conditions conducive to students' application. The school actively builds or introduces more e-learning platforms so that learners can easily obtain high-quality resources. At the same time, the management and evaluation of educational resources should be strengthened to optimize the allocation of resources to ensure that learners enjoy high-quality e-learning experiences. Encourage teachers and students to participate in relevant training and improve the level and application level of e-teaching. Parents should pay attention to their children's e-learning needs, actively cooperate with the school to carry out e-education activities and create a good atmosphere that respects knowledge and advocates learning.

Enhance students' hedonistic motivation and develop good use habits. Combine the e-learning system with real-life entertainment activities to make students feel fun in the learning process, give them a sense of achievement and satisfaction when using the e-learning system, and encourage various online and offline activities to increase their interest in the e-learning system. In the era of artificial intelligence, learning is no longer limited to the classroom, and the change in learning style provides students with a more flexible and personalized learning way. Students can actively acquire knowledge and improve their learning efficiency through online learning platforms, online courses, and other channels 1. Students can use the rich resources of the online education platform to learn the areas they are interested in and systematically learn and master new knowledge. At the same time, students can choose their own learning time and rhythm according to their own learning progress and time arrangement, improving learning efficiency and making the learning process more personalized and flexible.

The school provides the necessary support to meet the student's learning needs. In promoting e-learning programs for students, schools must provide adequate technical equipment and software resources to ensure the stability and security of the network environment and create a reliable e-learning platform for students. Such a program can not only cater to the needs of independent learners and provide rich online resources and personalized learning paths but also offer diverse communication opportunities, such as online discussions and collaborative projects for students who prefer interaction and cooperation. With the development of education technology, university students should actively master and use various emerging learning tools, such as Coursera and other online platforms, to learn in-depth, which not only enhances learning efficiency but also helps improve students' professional skills and research ability. Through these comprehensive measures, the university can create a flexible, efficient, and supportive environment for students to adopt e-learning systems for personalized learning.

5.3 Limitations for Future Research

There are some limitations to this study. Although this study provides valuable research on the factors influencing students' behaviors and intention to use e-learning; analyzing its limitations is crucial for other scholars to conduct deeper research in the future.

Sample Size. In terms of study sampling, this study was conducted at Zhanjiang University of Science and Technology in Zhanjiang City, China, and the study sampling area was small. Future research should extend the study to different cultural backgrounds and conduct similar studies in different countries and geographical areas to verify the generalisability of the findings. This will help to understand the similarities and differences in students' behavior using e-learning in different cultures, educational backgrounds, and economic conditions.

Variables. The six independent and dependent variables in the conceptual framework are derived from the UTAUT2 theory. Our findings support UTAUT2 in local Chinese universities, but the findings should be treated with caution in other countries. This is because by incorporating more structural variables, such as learning value, trust, and demographic characteristics, we can observe the changes in students' use of e-learning systems through a period of tracking. Future research could use the new theory to explore more variables and their potential interactions.

Research Methodology. Given the limitations of this study in resource allocation, this work used a quantitative cross-sectional study design, which partly limits the in-depth analysis of the evolution of technology uptake and acceptance processes over time. If using longitudinal methods, future studies will reveal the evolving trends of individuals' or groups' attitudes and behaviors toward e-learning technologies at different times to provide a richer perspective on understanding the dynamics of technology adoption.

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