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Enhancing Learning Satisfaction in Technology-Driven Education: A Case Study from a Public University in Chongqing, China

Guo Xuan*

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Abstract

Purpose: The study investigates the influence of five independent variables (Perceived Learning Effectiveness, Perceived Enjoyment, Perceived Usefulness, digital communities, and Information Technology) on the dependent variable (Students' Learning Satisfaction). **Research design, data, and methodology:** The research employed the Index of Item-Objective Congruence (IOC) for validity and a Cronbach's Alpha in a pilot test (n=30) for reliability. 80 valid responses from students at a Public University in Chongqing were analyzed by multiple linear regression to verify the significant relationship between variables. Following this, a group of 30 students underwent a 12-week strategic plan. Afterward, the quantitative results from the strategic and pre-strategic plans were analyzed in the paired-sample t-test for comparison. **Results:** In multiple linear regression, the study revealed that perceived learning effectiveness, perceived enjoyment, perceived usefulness, and information technology significantly impacted students' learning satisfaction in Technology-enhanced learning. Finally, the results from the paired-sample t-test for comparison demonstrated significant differences in students' learning satisfaction between the post-strategic and pre-strategic plans. **Conclusion:** The study revealed that the research conceptual model successfully predicted and explained perceived learning effectiveness, perceived enjoyment, perceived usefulness, and information technology emerged as crucial predictors and antecedents of learning satisfaction.

Keywords: Learning Satisfaction, Perceived Enjoyment, Perceived Usefulness, Digital Communities, Information Technology

JEL Classification Code: I23, J28, L2

1. Introduction

Technology integration in higher education has revolutionized the teaching and learning landscape, offering innovative ways to engage students and enhance educational outcomes. In a public university in Chongqing, China, adopting Technology-enhanced Learning (TEL) has become a critical component of the academic experience. However, the effectiveness of TEL in improving students' learning satisfaction remains a topic of significant interest and inquiry.

This study explores the factors that significantly impact students' learning satisfaction within the framework of TEL in higher education. With the rapid proliferation of digital tools and platforms, understanding the determinants of student satisfaction is essential for institutions to tailor their educational offerings to meet students' evolving needs and expectations.

Several factors underscore the significance of this research. Firstly, the pursuit of educational excellence through the integration of technology is a strategic priority for many universities, including the case study institution in Chongqing. Secondly, student satisfaction is a pivotal indicator of the quality of education and a determinant of academic success and retention rates. Lastly, the unique cultural and educational context of the public university in Chongqing offers a distinctive perspective on the global discourse surrounding TEL.

Several challenges necessitate immediate attention to the

1*Guo Xuan, Sichuan International Studies University, China. Email : gxuan92@163.com

factors influencing students' learning satisfaction in TEL environments. The increasing reliance on digital platforms, the diverse needs of a technologically savvy student population, and the need for continuous improvement in educational strategies are among the pressing issues that this research seeks to address.

The current study builds upon the existing body of knowledge by examining the specific context of a public university in Chongqing, China. It contributes to understanding how TEL can be optimized to enhance student satisfaction. Through a comprehensive analysis of the factors at play, this research offers insights and recommendations to inform the development of more effective educational technologies and practices.

2. Literature Review

2.1 Learning Satisfaction

The Oxford Dictionary defines satisfaction as the good feeling you have when you have achieved something or something you want to happen. Oliver (1980) posited that satisfaction can be viewed as a cumulative combination of expectation levels and the resulting inconsistencies; that is, satisfaction is a psychological change resulting from objective differences in expectations and performance outcomes.

Learning satisfaction is a person's general feeling regarding an overall learning process, which leads to an experience and can also be related to the outcome (Hu et al., 2007). Wang et al. (2014) pointed out that learning satisfaction refers to the learners' satisfaction with the learning objectives in the learning process, which is the learners' subjective evaluation of the learning process. Tough (1982) believes that learning satisfaction refers to a feeling or attitude accompanying the learner's learning activities. This feeling and attitude reflects the degree to which the learner's wishes and needs are satisfied. Huang (2001) believes that learning satisfaction refers to the degree to which learners achieve the goals they expected before learning after completing learning activities. If learners' learning needs are met, learners will feel psychologically happy and develop a more positive attitude toward learning activities.

Based on the above scholars' discussions, this study believes that learning satisfaction refers to learners' feelings and reactions to the overall learning. These feelings and reactions come from the learning results, that is, whether the learning results meet the needs of the learner and whether the learning experience makes the learner feel happy.

2.2 Perceived Learning Effectiveness

Perceived enjoyment is how technology-enhanced learning increases learning enjoyment and enhances students' satisfaction (Al Natour & Woo, 2021). Davis et al. (1992) defined perceived enjoyment as the extent to which the activity of using computers is perceived to be enjoyable, apart from any performance consequences that may be anticipated. Li et al. (2023) proposed that perceived enjoyment is a specific positive emotion that refers to an individual's happiness, joy, and satisfaction. Perceived enjoyment is an emotion. Emotions can be divided into positive emotions and negative emotions according to their positive and negative aspects. Positive emotions reflect the degree of an individual's positive feelings, such as happiness, enthusiasm, excitement, etc.; negative emotions reflect the degree of an individual's negative or disgusting emotional experience, such as tension, sadness, worry, etc. (Xu, 2018). Pleasure is a dimension of emotion representing how an individual feels enjoyed or satisfied. Together with arousal and dominance, it constitutes the PAD model that reflects individual emotions (Mehrabian & Russell, 1974)

Since perceived enjoyment expresses two-level degrees of emotional pleasure and displeasure, scholars often use words that express two-level states to describe them when measuring pleasure. For example, Mehrabian and Russell (1974) used depressed-contented, unhappy-happy, unsatisfied-satisfied, annoyed-pleased, and despairing-hopeful measures of enjoyment. Mattila and Wirtz (2001) used unhappy-happy, despairing-hopeful, melancholic-contented, annoyed-pleased, etc. to express pleasure. Degree. Chebat and Morrin (2007) synthesized previous measures of perceived enjoyment and redesigned the measurement method, using unhappy-happy, annoyed-pleased, unsatisfied-satisfied, melancholic-contented, etc., to express the degree of pleasure. Consequently, the following hypothesis is formulated:

H1: Perceived learning effectiveness has a significant impact on the students' learning satisfaction.

2.3 Perceived Enjoyment

Perceived enjoyment is how technology-enhanced learning increases learning enjoyment and enhances students' satisfaction (Al Natour & Woo,

2021). Davis et al. (1992) defined perceived enjoyment as the extent to which the activity of using computers is perceived to be enjoyable, apart from any performance consequences that may be anticipated. Li et al. (2023) proposed that perceived enjoyment is a specific positive emotion that refers to an individual's happiness, joy, and satisfaction. Perceived enjoyment is an emotion. Emotions can be divided into positive emotions and negative emotions

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H2: Perceived enjoyment has a significant impact on the students' learning satisfaction.

2.4 Perceived Usefulness

Davis (1989) defined perceived usefulness as the degree to which a person believes using a particular system would be free of effort. Perceived enjoyment is how technology-enhanced learning increases learning enjoyment and enhances students' satisfaction. (Al Natour & Woo, 2021) The more usefulness an individual perceives that the system is to his/her study work, the more positive his attitude and willingness to use the system will be (Zhu & Yuan, 2018)

Perceived usefulness is the subjective feeling that the e-commerce live broadcast can benefit the user while watching the e-commerce live broadcast. When consumers perceive that a certain technology can benefit them, they are more likely to have purchase intention. For example, Bi (2009) proposed, based on the TAM model, that when consumers shop online, they perceive the authenticity and usefulness of reviews and will choose whether to buy according to their circumstances. When they think the information is useful, they may have the possibility of purchasing intention. Wu et al. (2019) used empirical evidence to show that the perceived usefulness of WeChat marketing positively affects college students' purchase intention. Based on the SOR theory and TAM model, Zhou et al. (2020) introduced perceived usefulness and perceived trust as dual mediators to study the impact of e-commerce live broadcast characteristics on consumers' purchase intention and confirmed the impact of perceived usefulness on purchase intention. Consequently, the following hypothesis is formulated:

H3: Perceived usefulness has a significant impact on the students' learning satisfaction.

2.5 Digital Communities

The concept of "community" was first proposed by the German sociologist Tönnies (1887) in his book Community and Society. Tönnies (1887) summarized "community" or "community" as "instinctive liking" and "lasting and real common life." Parker (1936), a professor of sociology at the Chicago School, pointed out in his study of communities that communities have three basic characteristics: "First, there are populations organized according to regions; second, these populations are connected to varying degrees with the land on which they live; third, everyone living in the community is in an interdependent interactive relationship."

Digital communities refer to the activities necessary to ensure that all people and communities within a society have access to information technology (Atiquil et al., 2022). Ye and Liu (2007) proposed that digital community education uses modern information technology as a tool to form a learning society composed of communities. Its goal is to enable residents to freely control their study time and make educational services exist in various forms, making it more convenient and faster and allowing them to allocate educational resources to optimize their educational resources reasonably. Zeng and Luo (2005) believe that digital community education uses computers and electronic communication technologies to integrate residents' work and life with the community government's management and services so that community managers, training institutions, and residents can conduct various forms of information exchange. It uses the Internet and various communication technologies to not only quickly and comprehensively meet the needs of community residents for learning and life but also eliminate the limitations of traditional learning time and location, allowing all residents to participate in community education to achieve the goal of lifelong learning. Consequently, the following hypothesis is formulated:

H4: Digital communities have a significant impact on the students' learning satisfaction.

2.6 Information Technology

Karami (2003) defined information technology as the knowledge process and its methods of application, processing, transferring, and making progress in information. It includes gathering, organizing, storing, publishing, and using the information in the form of sound, picture graphics, text, and numbers, by using the computer and telecommunication tools (Raees Dana, 2002). Important changes resulting from IT have become the source of basic changes in the classes. The most important changes have roots in the fact that technology has enabled students to accent the out-of-class information, and this has caused an increase in their motivations for learning (Mishra, 2005).

In education, it is important to distinguish between information technology and multimedia. Multimedia is a technology that combines text, images, sounds, and other media. It uses computers to store and manage language, text, audio, and other information, thereby achieving real-time communication with computers and using multiple senses. A means of communication. It can scientifically combine all media to give users more intuitive and vivid information (Chen, 2023). Zhao (2021) mentioned that information technology is a technology that can complete various functions such as information acquisition, processing, transmission, and reuse. Nan (2004) regards information technology as a system for information collection, processing, storage, communication, and application. Liu (2021) also has a similar opinion. He pointed out that the essence of information technology is the acquisition, transmission, processing, and utilization of information. Consequently, the following hypothesis is formulated:

H5: Information technology has a significant impact on the students' learning satisfaction.

3. Research Methods and Materials

3.1 Research Framework

The researcher applied three model theories from Sharma (2022), Al Natour and Woo (2021), and Nikou and Maslov (2023). All three theoretical frameworks mentioned above supported and developed a conceptual framework in Figure 1.

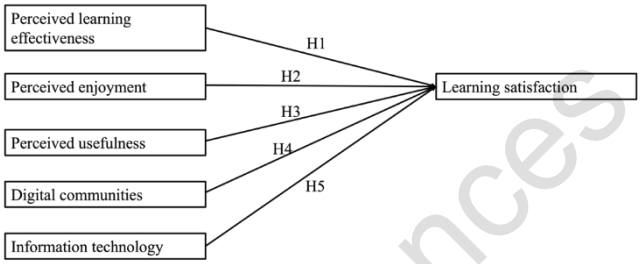

Figure 1: Conceptual Framework

H1. Perceived learning effectiveness has a significant impact on the students' learning satisfaction.
H2. Perceived enjoyment has a significant impact on the students' learning satisfaction.
H3. Perceived usefulness has a significant impact on the students' learning satisfaction.
H4. Digital communities have a significant impact on the students' learning satisfaction.
H5. Information technology has a significant impact on the students' learning satisfaction.

3.2 Research Methodology

The research methodology is structured into four clear phases. Initially, a comprehensive survey was conducted among the entire research sample(n=80) to gather data pertinent to the theoretical framework under investigation. This data collection was followed by meticulously examining all proposed hypotheses by applying multiple linear regression analysis. The significance of each hypothesis was evaluated against a stringent p-value threshold of less than 0.05, leading to the retention of those hypotheses that garnered empirical support and the exclusion of those that failed to meet the established criteria.

Moving forward to the second phase, pre-strategic plan assessments were carried out on the subset of 80 students whose data supported the valid hypotheses. This was succeeded by the third phase, which marked the introduction and implementation of a strategic plan targeted at a select group of 30 participants. The culmination of this process was the fourth and final phase, wherein the 30 participants who engaged with the strategic plan provided post-implementation feedback through a survey. This feedback was instrumental in conducting a paired-sample t-test to juxtapose the outcomes of the pre-strategic plan and post-strategic plan phases.

This systematic and exhaustive approach ensured a profound analysis of the research objectives and the validation of the hypotheses, thereby offering a robust foundation for the study's conclusions.

3.3 Research Population, Sample Size, and Sampling Procedures

3.3.1 Research Population

The research population for this thesis comprises students spanning four academic years who have majored in various colleges at public universities in Chongqing, China. The researcher selected 5 out of 17 colleges as they are the Top 5 major colleges with the most students. The colleges include English Studies, Business English, International Business and Management, Translation and Interpreting, and International Finance and Economics. Currently, there are 2108 students in the College of English Studies,1543 students in the College of Business English, 1422 students in the College of International Business and Management, 1456 students in the College of Translation and Interpreting, and 973 students in the College of International Finance and Economics, resulting in a total of 7502 students across the five colleges. Among these 7502 students, the researcher selected 80 students as analysis samples. These students collectively represent the research population for this study.

3.3.2 Sample size

Hair et al. (2010) recommended that a sample size of 30 to 500 is generally sufficient for most research purposes. In the proposal defense stage, the sample size for multiple linear regression testing is 80. During the strategic plan stage, 30 students are selected to participate in the strategic plan implementation. In the post-strategic plan stage, these 30 students will serve as respondents, allowing for applying the same research methods employed in the pre-strategic plan stage.

3.3.3 Sampling Procedures

In this research, purposive sampling guides the distribution of questionnaires, deliberately selecting students from the top 5 major colleges within a public university in Chongqing, China. The questionnaire was disseminated via a WeChat group and reached 80 students. The subsequent Multiple Linear Regression (MLR) analysis of the survey results forms a crucial foundation for shaping the final action research plan.

Moving into the second stage of the strategic plan, 30 participants are selected from the previously surveyed students based on their active engagement in classes and a pronounced focus on self-satisfaction. These participants, representing diverse grades and majors, voluntarily enroll to ensure a well-rounded dataset.

In the post-strategic plan phase, students from the experimental group undergo a second round of the survey questionnaire, providing valuable insights into the outcomes of the strategic interventions. This iterative process, characterized by deliberate sampling and thorough analysis, contributes to refining and validating the action research plan, ensuring its relevance and effectiveness in enhancing student learning satisfaction.

3.4 Research Instruments

3.4.1 Design of Questionnaire

The researcher designed a survey questionnaire that followed three steps.

Step1: Identifying questionnaire sources from three openly published articles (Al Natour & Woo, 2021; Hu & Hui, 2012; Sharma et al., 2022)

Step 2: Adjusting and Presenting survey questionnaires on Chinese university students' Context.

Step 3: Implementing IOC.

3.4.2 Components of Questionnaire

Survey questionnaire items were composed of the following two parts:

Part 1: Basic info Questions. There were questions to gain basic info about the research population, including gender and grade.

Part 2: Survey Questions. There were questions for the survey to determine the current level of PLE, PU, PE, DCOM, IT, and LS to 80 students.

3.4.3 IOC Results

Three independent experts were invited to implement IOC (Index of item-objective congruence). One holds a PhD in management, one is a professor of finance, and the remaining is a market research expert in an education institution. In this IOC process, independent experts marked +1 for Congruent, 0 for Questionable, and -1 for Incongruent. In this research, all questionnaire items were greater than 0.67, so experts retained the original questions after discussing them.

3.4.4 Pilot survey and Pilot test results

The researcher conducted a pilot survey by randomly selecting 30 students and requesting they complete a questionnaire and provide feedback. Subsequently, the researcher applied Cronbach's Alpha to assess the internal consistency and reliability of the survey, setting the acceptable threshold for the Alpha values at 0.6 or higher (Hair et al., 2015). The ensuing table presents the outcomes that substantiate the high reliability of each measured construct.

Table 1: Pilot Test Result

Variables	No. of Items	Sources	Cronbach's Alpha	Strength of As sociation
Perceived learning effectiveness	3	Davis et al. (1992)	0.667	Moderate
Perceived enjoyment	3	Davis et al. (1992)	0.842	Very Good
Perceived usefulness	3	Davis (1989)	0.687	Moderate
Digital communities	3	Ye and Liu (2007)	0.850	Very Good
Information technology	4	Karami (2003)	0.784	Good
Learning satisfaction	4	Oliver (1980)	0.780	Good

4. Results and Discussion

4.1 Results

4.1.1 Demographic Profile

The researcher demonstrated the demographic profile of the entire research population (n=80), followed by the selected students' group (n=30), who participated in the strategic plan as shown in Table 2.

Table 2: Demographic Profile

Entire Research Population (n=80)		Frequency	Percent
Gender	Male	37	46%
	Female	43	54%
Grade	Freshman	20	25%
	Sophomore	24	30%
	Junior	16	20%
	Senior	20	25%
Total		80	100%
Strategic Plan Participants (n=30)		**Frequency**	**Percent**
Gender	Male	9	70%
	Female	21	30%
Grade	Freshman	6	20%
	Sophomore	11	37%
	Junior	9	30%
	Senior	4	13%
Total		30	100%

4.1.2 Results of multiple linear regression

The results of the regression indicated that the five predictors explained 83.2% of the variance (R2=.832, F (5,74) =79.5, p<.001). It was found that:

PLE significantly impacts LS (β = .3297, p<0.001).

PE significantly impacts LS (β = .0985, p=0.042).

PU has a significant impact on LS (β = .1370, p=0.045).

DCOM has no significant impact on LS (β = -.0289, p=0.737).

IT significantly impacts LS (β = .5348, p<0.001).

Table 3: The multiple linear regression of five independent variables on learning satisfaction

Variables	Standardized Coefficients Beta value	SE	t	p	R2
Perceived learning effectiveness (PLE)	0.3297	0.0722	3.703	<.001 **	0.832
Perceived enjoyment (PE)	0.0985	0.0683	2.072	0.042 *	
Perceived Usefulness (PU)	0.1370	0.0621	2.039	0.045 *	
Digital communities (DCOM)	-0.0289	0.0776	-0.337	0.737	
Information Technology (IT)	0.5348	0.0838	5.964	<.001 **	

Note: p-value <0.05*, p-value <0.001**

Therefore, H1: Perceived learning effectiveness (PLE) significantly impacts the students' learning satisfaction (LS). H2: Perceived enjoyment (PE) significantly impacts the students' learning satisfaction (LS). H3: Perceived usefulness (PU) significantly impacts the students' learning satisfaction (LS). H5: Information technology (IT) significantly impacts the students' learning satisfaction (LS). These four hypotheses are supported.

But H4: Digital communities (DCOM) significantly impact the students' learning satisfaction (LS). This is not supported (Note that p-value = 0.05; Hypothesis is supported).

Afterward, the strategic plan was conducted to follow the below hypotheses:

H6: There is a significant mean difference in perceived learning effectiveness between pre- and post-strategic plans.

H7: There is a significant mean difference in perceived enjoyment between pre- and post-strategic plans.

H8: There is a significant mean difference in perceived usefulness between pre- and post-strategic plans.

H9: There is a significant mean difference in information technology between the pre- and post-strategic plans.

H10: There is a significant mean difference in learning satisfaction between pre- and post-strategic plans.

4.2 Strategic Plan Process

The strategic plan lasted for 12 weeks and was based on quantitative and qualitative data collected at the pre-strategic plan stage to achieve the purpose of this research, which was improving students' learning satisfaction through TEL. Table 4 illustrates the time and activities of the strategic plan intervention.

Table 4: Time and activities as the strategic plan

No.	Time and Duration	Objective	Plan Keywords
1	Week 1-2	Planning and Preparation	Needs Analysis
			Goal Setting
			Resource Assessment
2	Week 3-4	Infrastructure and Training	Platform Selection
			Technical Training
			Content Development
3	Week 5-6	Implementation and Engagement	Course Launch
			Enhance Interaction
			Feedback Mechanism
4	Week 7-8	Evaluation and Adjustment	Mid-term Evaluation
			Content Adjustment
			Technical Optimization
5	Week 9-10	Deepening the learning experience	Project-driven
			Peer learning
			Personalized learning
6	Week 11	Comprehensive evaluation	Learning outcomes presentation
			Comprehensive feedback
7	Week 12	Summary and outlook	Effectiveness evaluation
			Experience summary
			Future planning

4.3 Results Comparison between Pre-IDI and Post-IDI

This part would show the results of paired samples t-tests before and after each variable's strategic plan variable and reveal whether the intervention or not.

Table 5: Paired-Sample T-Test Results

Variables	Mean	SD	SE	p-value
Perceived learning effectiveness (PLE)				
Pre-SP	3.16	0.791	0.1445	0.005
Post-SP	3.82	0.921	0.1682	
Perceived enjoyment (PE)				
Pre-SP	3.53	0.591	0.1079	< .001
Post-SP	2.34	0.610	0.1113	
Perceived Usefulness (PU)				
Pre-SP	3.19	0.801	0.1462	< .001
Post-SP	4.12	0.483	0.0882	
Information technology (IT)				
Pre-SP	3.02	0.666	0.1216	< .001
Post-SP	4.01	0.282	0.0515	
Learning satisfaction (LS)				
Pre-SP	2.90	0.645	0.1178	< .001
Post-SP	3.86	0.439	0.0801	

Table 6 shows a significant difference in PLE for the Pre-Strategic Plan (M=3.16, SD=0.791) and Post-Strategic Plan (M=3.82, SD=0.921) conditions; p=0.005.

There is a significant mean difference in PE for Pre-Strategic Plan (M=3.53, SD=0.591) and Post-Strategic Plan (M=2.34, SD=0.610) condition; p<.001.

There is a significant mean difference in PU for Pre-Strategic Plan (M=3.19, SD=0.801) and Post-Strategic Plan (M=4.12, SD=0.483) condition; p<.001.

There is a significant mean difference in IT for Pre-Strategic Plan (M=3.02, SD=0.666) and Post-Strategic Plan (M=4.01, SD=0.282) condition; p<.001.

There is a significant mean difference in LS for Pre-Strategic Plan (M=2.90, SD=0.645) and Post-Strategic Plan (M=3.86, SD=0.439) condition; p<.001.

In summary, the above quantitative results showed significant differences between the pre-strategic plan and post-strategic plan stages in perceived learning effectiveness, perceived enjoyment, perceived usefulness, information technology, and learning satisfaction.

5. Conclusions, Recommendations and Limitations

5.1 Conclusions & Discussions

The digital era has transformed global education delivery, with a particular focus on a public university in Chongqing, China. The study was divided into three phases: assessment and preparation for intervention, the strategic plan itself, and post-implementation evaluation.

The research began with a literature review and SWOT analysis, identifying key variables from established studies to form a conceptual framework. Experts developed and validated a questionnaire and tested it with a pilot sample for reliability. It was then distributed to 80 Chongqing students, with hypotheses tested using multiple linear regression (MLR). MLR showed significant effects on satisfaction from learning effectiveness, enjoyment, usefulness, and IT but not from digital communities.

Qualitative interviews with students informed the strategic plan's development, focusing on interactive activities over 12 weeks to enhance satisfaction. Post-implementation, a paired sample t-test indicated significant improvements in satisfaction and perceptions of the strategic plan's components.

The 2-year study integrated literature, consultation, framework development, data collection, interviews, plan execution, and analysis, concluding that perceived effectiveness, enjoyment, usefulness, and IT application are crucial for student satisfaction in TEL environments.

5.2 Recommendations

The research findings highlight that interactive element like perceived learning effectiveness, enjoyment, usefulness,

and information technology significantly boost student satisfaction in TEL environments. Here are condensed recommendations:

5.2.1 Active Learning Integration

Adopting active learning in TEL promotes engagement and enhances learning effectiveness. Techniques such as problem-based learning, simulations, and quizzes encourage critical thinking and practical application of knowledge. Clear instructions, scaffolding, assessment, and reflection are crucial for the success of active learning strategies.

5.2.2 Gamification of Learning

Incorporating gamification elements, such as points, badges, and leaderboards, makes learning more enjoyable and motivates students. Challenges, quests, and narratives can add excitement and personalization to the curriculum, catering to diverse learning styles.

5.2.3 Real-World Application Alignment

Linking academic content to real-world applications through case studies, project-based learning, and guest lectures from industry professionals increases the perceived usefulness of TEL. This approach prepares students for practical scenarios and enhances the relevance of their education.

5.2.4 Advanced IT Utilization

Investing in advanced IT infrastructure with cloud services and analytics supports a seamless TEL experience. Cybersecurity is vital for protecting data and maintaining trust. Continuous improvement and responsiveness to feedback are essential for staying current with IT advancements and optimizing the learning experience.

In summary, integrating active learning, gamification, real-world applications, and advanced IT can significantly improve student satisfaction in TEL by making learning more interactive, enjoyable, practical, and technologically robust.

5.3 Limitations for Future Research

This study has limitations affecting its broader application and interpretation, suggesting areas for future work. The research is confined to a single university in Chongqing, China, which may not represent other educational contexts, thus limiting the generalizability of the results. The study's timeframe is restricted and may not fully capture the long-term impacts of TEL on satisfaction, necessitating longer-term studies. It may also have overlooked external influences like individual traits, family influences, and social culture, which could affect satisfaction, marking a direction for deeper future inquiry. The study's reliance on subjective satisfaction measures could lead to bias; future research could use objective indicators for a more rounded assessment.

For future TEL satisfaction studies, incorporating objective metrics—such as engagement data, completion rates, scores, retention rates, resource use, feedback rates, tech support queries, certifications, employment results, peer reviews, adaptive learning analytics, and long-term survey data—can yield a well-rounded, quantifiable evaluation. Combined with subjective measures, these provide a complete view of satisfaction, reflecting both TEL's educational effectiveness and students' platform interaction experiences.

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