

# Exploration of University English Teachers' Acceptance and Willingness to Use Learning Management System Data Analysis Tools

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**Abstract:** This study investigates university English teachers' acceptance and willingness to use learning management system (LMS) data analysis tools in their teaching practices. The research employs a mixed-method approach, combining quantitative surveys and qualitative interviews to understand teachers' perceptions and attitudes, and the factors influencing their adoption of LMS data analysis tools. The findings reveal that perceived usefulness, perceived ease of use, technical literacy, organizational support, and data privacy concerns significantly impact teachers' willingness to use these tools. Based on these insights, the study offers practical recommendations for educational institutions to enhance the effective adoption of LMS data analysis tools in English language teaching.

**Keywords:** Learning management system; Data analysis tools; Technology acceptance; University English teachers; Educational technology; Data privacy concerns

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## 1. Background

In recent years, the integration of technology into educational practices has significantly transformed the landscape of higher education. Among the various technological advancements, learning management systems (LMS) have emerged as a central component in modern education, particularly in universities and colleges. LMS platforms provide a comprehensive suite of tools that facilitate various aspects of teaching and learning, such as content delivery, student engagement, assessment, and feedback. These systems, which include popular platforms like Blackboard, Moodle, Canvas, and others, offer a unified environment where instructors and students can interact, access resources, and monitor academic progress.

English language teaching, especially at the university level, requires an adaptable approach that can cater to a wide range of proficiency levels and learning styles. The integration of LMS into English language teaching offers numerous benefits. It allows for the distribution of multimedia content, the facilitation of interactive activities, and the provision of real-time feedback, all of which can enhance the learning experience. Moreover,

LMS platforms provide tools for communication and collaboration, such as discussion forums and messaging systems, which can support language practice and peer learning outside of the traditional classroom setting.

Beyond these functionalities, one of the most promising features of LMS is its capacity for data analysis. LMS platforms collect a wealth of data on student engagement, performance, and learning behaviors. These data points can include metrics such as time spent on tasks, quiz and assignment scores, participation in discussions, and access patterns to course materials. Through sophisticated data analytics tools, LMS can process this information to provide valuable insights into students' learning processes. These insights enable instructors to identify patterns and trends, predict potential learning challenges, and tailor instructional strategies to meet individual student needs. For English language teachers, such data-driven insights are particularly valuable as they can highlight specific areas where students may struggle, such as reading comprehension, vocabulary acquisition, or writing skills, allowing for more targeted intervention.

Despite the clear benefits of using LMS data analysis tools, the adoption of these technologies among university English teachers has been uneven. Several factors may contribute to this variability in adoption rates. Firstly, the successful implementation of LMS data analysis requires a certain level of technical literacy and confidence among educators. Teachers need to be familiar not only with the basic functionalities of the LMS but also with more advanced data analysis features. This technical requirement can pose a significant barrier, particularly for educators who may not have received adequate training or who may feel overwhelmed by the perceived complexity of these tools.

Secondly, institutional factors play a crucial role in influencing teachers' willingness to use LMS data analysis tools. Organizational support, including professional development opportunities, access to technical resources, and encouragement from administrative leaders, is critical in fostering a positive attitude toward technological adoption. Without sufficient institutional backing, teachers may lack the motivation or confidence to explore and integrate new technologies into their teaching practices.

Lastly, cultural attitudes toward technology in education also shape how educators perceive and utilize LMS data analysis tools. In some educational contexts, there may be resistance to adopting technology-driven approaches due to traditional views on teaching and learning or a lack of awareness of the potential benefits. This resistance can further complicate efforts to promote widespread adoption of LMS data analytics among English language teachers.

Given these complexities, it is crucial to explore the factors influencing university English teachers' acceptance and willingness to use LMS data analysis tools. Understanding these factors can provide valuable insights into the barriers and facilitators of technology adoption in educational settings, particularly in the context of language teaching.

## **2. Literature review**

The rapid development of information technology in education has made LMS a vital tool in higher education. LMS platforms provide not only a convenient teaching management platform for teachers but also flexible learning resources and interaction channels for students. Recent research has increasingly focused on the application of LMS in English teaching and its impact on teaching effectiveness.

### **2.1. Application and advantages of LMS in English teaching**

LMS in English teaching has shown significant advantages, including providing diverse teaching resources, enhancing teacher-student interaction, and supporting personalized learning. For instance, Dabbagh and Kitsantas found that LMS, by integrating various multimedia resources and interactive tools, offers students

a more diverse learning experience, which not only increases their motivation but also enhances their self-regulated learning ability <sup>[1]</sup>. In non-English speaking countries, LMS creates more opportunities for language practice, aiding students in continuous learning and reinforcing language skills outside the classroom <sup>[2]</sup>. These studies indicate that LMS usage can significantly improve learning outcomes, especially in the cultivation of English language skills.

However, despite the advantages of LMS in English teaching, its data analysis functionality remains underutilized. Research indicates that while many teachers recognize the potential of LMS data analysis, they often lack the motivation to use these tools due to the complexity of the technology and difficulties in data interpretation <sup>[3]</sup>. Understanding teachers' attitudes and willingness to use LMS data analysis becomes essential under such circumstances.

## **2.2. Teachers' acceptance and willingness to use LMS data analysis**

Teachers' acceptance and willingness to use LMS data analysis tools are critical factors influencing their actual use. According to the Technology Acceptance Model (TAM), perceived usefulness and perceived ease of use are the primary determinants of users' acceptance of new technology <sup>[4]</sup>. In the context of educational technology, perceived usefulness refers to the extent to which teachers believe that using LMS data analysis tools can improve their teaching effectiveness, while perceived ease of use refers to how easy and straightforward these tools are to use. Studies show that if teachers believe LMS data analysis tools can provide valuable instructional feedback and help them better understand students' learning progress, they are more likely to accept and use these tools <sup>[5]</sup>.

Moreover, teachers' technical literacy significantly impacts their acceptance of LMS data analysis. Research suggests that teachers with higher technical literacy are more inclined to use LMS data analysis tools because they are more comfortable understanding and operating these technical tools <sup>[3]</sup>. Conversely, teachers with lower technical literacy may find learning and using these tools too complex, reducing their willingness to use them. This phenomenon is particularly evident among university English teachers, as language teaching involves high levels of interaction and complexity, requiring a balance between traditional teaching methods and technical tools.

## **2.3. Impact of data privacy and ethical concerns**

In addition to technological factors, data privacy and ethical concerns are critical factors influencing teachers' willingness to use LMS data analysis. With the increasing prominence of data privacy issues, many teachers adopt a cautious attitude toward using LMS data analysis tools. They worry that student data may be misused or leaked, particularly when sensitive information is involved <sup>[5]</sup>. Such concerns may lead to a reluctance among teachers to fully utilize LMS data analysis tools, affecting their application in English teaching.

## **2.4. Application of theoretical frameworks**

Understanding university English teachers' acceptance and willingness to use LMS data analysis requires analysis based on appropriate theoretical frameworks. The TAM provides a useful framework to explain teachers' attitudes toward LMS data analysis tools. According to TAM, perceived usefulness and perceived ease of use directly influence users' attitudes and behavioral intentions toward technology, with these factors further influenced by external variables such as technical literacy, organizational support, and data privacy concerns <sup>[4]</sup>. By applying the TAM model, researchers can better understand university English teachers' decision-making processes when adopting LMS data analysis tools.

The Diffusion of Innovations (DOI) theory emphasizes that the adoption of new technology is a social

process influenced by various individual and organizational factors <sup>[6]</sup>. According to DOI, the innovation adoption process can be divided into several stages: knowledge, persuasion, decision, implementation, and confirmation. For university English teachers, adopting LMS data analysis tools first requires understanding their features and advantages (knowledge stage), followed by evaluating their usefulness based on teaching needs (persuasion stage), deciding whether to adopt these tools (decision stage), applying the tools in actual teaching (implementation stage), and continuously assessing their effectiveness during use (confirmation stage). This adoption process is influenced by several factors, including peer opinions, school support, and training opportunities.

### **3. Methodology**

#### **3.1. Research design**

This study adopted a mixed-method approach, combining quantitative and qualitative methods to comprehensively understand university English teachers' acceptance and willingness to use LMS data analysis tools. The research primarily collected data through surveys and semi-structured interviews.

#### **3.2. Participants**

The participants were university English teachers from a university in Hainan Province, China. This university was selected because it has widely implemented an LMS system and encourages teachers to utilize data analysis features to optimize teaching. A total of 150 English teachers were invited to participate in the study, with 120 completing the survey and 10 participating in follow-up semi-structured interviews.

The participants' average age was 35, with teaching experience ranging from 1 to 15 years. Among the participants, 70% were female, and 30% were male.

#### **3.3. Data collection**

##### **3.3.1. Survey**

A survey consisting of five main sections was designed to collect data on teachers' attitudes and willingness to use LMS data analysis tools:

Section 1: Demographic information: Basic information about the teachers were collected, such as age, gender, and teaching experience.

Section 2: Technical literacy (TL): Teachers' technical skills and familiarity with LMS were measured using a five-point Likert scale.

Section 3: Perceived usefulness (PU) and perceived ease of use (PEU): Teachers' perceptions of the usefulness and ease of use of LMS data analysis tools were assessed.

Section 4: Data privacy concerns (DPC): Teachers' concerns about data privacy when using LMS data analysis tools were evaluated.

Section 5: Organizational support (OS) and behavioral intention (BI): The level of organizational support perceived by teachers and their intention to use LMS data analysis were measured.

##### **3.3.2. Semi-structured interviews**

In-depth interviews were conducted with 10 participants to gain detailed insights into teachers' experiences with LMS data analysis tools. Interview questions included:

- (1) Teachers' understanding and use of LMS data analysis features;
- (2) Challenges and obstacles encountered during use;

(3) Overall attitudes towards LMS data analysis tools and future plans.

### 3.4. Data analysis

The quantitative data collected were analyzed using SPSS software, including descriptive statistics, correlation analysis, and regression analysis. Qualitative data were analyzed using thematic analysis to identify key factors influencing teachers' willingness to use LMS data analysis tools.

## 4. Results

The results in **Table 1** showed that teachers have relatively high scores in technical literacy and perceived ease of use (mean = 3.8 and 3.9, respectively), suggesting that most teachers are comfortable and familiar with the technical requirements and operation of LMS data analysis tools. The highest score was in perceived usefulness (mean = 4.1), indicating that teachers generally perceive LMS data analysis tools as having a positive impact on teaching. Data privacy concerns scored relatively lower (mean = 2.7) but had a larger standard deviation, indicating varied levels of concern among teachers.

Pearson correlation analysis was conducted to explore the relationships between the factors.

**Table 1.** Descriptive statistics

Variables	Mean	Standard deviation
Technical literacy (TL)	3.8	0.9
Perceived usefulness (PU)	4.1	0.7
Perceived ease of use (PEU)	3.9	0.8
Data privacy concerns (DPC)	2.7	1.1
Organizational support (OS)	4.0	0.8
Behavioral intention (BI)	3.7	0.9

The results in **Table 2** showed a significant positive correlation between perceived usefulness and behavioral intention ( $r = 0.68, P < 0.01$ ), and between perceived ease of use and behavioral intention ( $r = 0.62, P < 0.01$ ). Additionally, organizational support is positively correlated with both perceived usefulness ( $r = 0.57, P < 0.01$ ) and perceived ease of use ( $r = 0.54, P < 0.01$ ).

Multiple linear regression analysis was conducted to examine the impact of various factors on behavioral intention.

**Table 2.** Correlation matrix

	BI	PU	PEU	TL	DPC	OS
BI	1	0.68	0.62	0.45	-0.32	0.50
PU	0.68	1	0.59	0.48	-0.29	0.57
PEU	0.62	0.59	1	0.53	-0.28	0.54
TL	0.45	0.48	0.53	1	-0.20	0.42
DPC	-0.32	-0.29	-0.28	-0.20	1	-0.27
OS	0.50	0.57	0.54	0.42	-0.27	1

Abbreviations: BI: Behavioral intention; PU: Perceived usefulness; PEU: Perceived ease of use; TL: Technical literacy; DPC: Data privacy concerns; OS: Organizational support

The results in **Table 3** indicate that perceived usefulness and perceived ease of use positively affect behavioral intention significantly ( $\beta = 0.45, P < 0.01$ ;  $\beta = 0.32, P < 0.01$ ). Technical literacy also significantly impacts behavioral intention ( $\beta = 0.24, P < 0.05$ ), although to a lesser extent. Conversely, data privacy concerns have a significant negative impact on behavioral intention ( $\beta = -0.22, P < 0.05$ ).

**Table 3.** Regression analysis results

Variable	Standardized coefficient ( $\beta$ )	t value	P value
Perceived usefulness (PU)	0.45	5.21	< 0.01
Perceived ease of use (PEU)	0.32	3.76	< 0.01
Technical literacy (TL)	0.24	2.45	< 0.05
Data privacy concerns (DPC)	-0.22	-2.13	< 0.05
Organizational support (OS)	0.30	3.42	< 0.01
Constant		1.34	0.19

## 5. Discussion

### 5.1. Importance of perceived usefulness and perceived ease of use

The results indicate that perceived usefulness and perceived ease of use are crucial factors influencing university English teachers' willingness to use LMS data analysis tools. This finding aligns with the theoretical assumptions of the TAM, which suggests that users' acceptance of technology is primarily driven by their perceived usefulness and ease of use<sup>[4]</sup>. Teachers believe that LMS data analysis tools can provide effective instructional feedback, helping them better understand students' learning progress and needs, making these tools widely regarded as useful (high PU score, mean = 4.1). Additionally, teachers generally consider LMS data analysis tools easy to learn and use (PEU score, mean = 3.9), further promoting their acceptance and willingness to use these tools.

### 5.2. Impact of technical literacy and organizational support

Technical literacy and organizational support also significantly influence teachers' willingness to use LMS data analysis tools. The impact of technical literacy is reflected in teachers' ability to operate and understand LMS data analysis tools, consistent with Nguyen's<sup>[3]</sup> view that teachers with higher technical skills are more likely to accept and use new technology tools. The study shows that technical literacy directly and indirectly affects willingness to use through perceived usefulness and ease of use.

Similarly, the positive impact of organizational support on willingness to use indicates that the technical support, training, and resources provided by schools and educational institutions are crucial for teachers to adopt new technology. This finding aligns with the DOI, which suggests that organizational environment and support are essential factors influencing the adoption of innovative technologies<sup>[6]</sup>. In this study, teachers' acceptance of LMS data analysis tools is closely related to the level of organizational support they perceive, indicating that enhancing the adoption rate of new technology among teachers requires better organizational support mechanisms.

### 5.3. Negative impact of data privacy concerns

This study found that data privacy concerns negatively impact willingness to use significantly, consistent with Teo's<sup>[5]</sup> research findings. With the increasing prominence of data privacy and security issues, teachers express

concerns about how student data is used and secured. These concerns may limit their willingness to use LMS data analysis tools, particularly when sensitive student information is involved. Therefore, although teachers generally perceive these tools as helpful in enhancing teaching effectiveness, their concerns about privacy and security remain significant barriers.

#### **5.4. Theoretical and practical implications**

Theoretically, this study supports the validity of the TAM and the DOI theories, particularly in explaining university English teachers' attitudes and behaviors toward LMS data analysis tools. The influence of perceived usefulness, perceived ease of use, technical literacy, and organizational support validates these theoretical frameworks' applicability in educational technology research.

### **6. Conclusion and recommendations**

Perceived usefulness and perceived ease of use are critical determinants of teachers' willingness to use LMS data analysis tools. Teachers believe these tools effectively enhance teaching effectiveness and are easy to operate and use.

Technical literacy and organizational support positively impact teachers' willingness to use LMS data analysis tools. Teachers' technical abilities and the technical support and training provided by schools help increase their willingness to adopt new technologies.

Data privacy concerns significantly inhibit teachers' willingness to use LMS data analysis tools. Teachers have concerns about the privacy and security of student data, especially when clear data privacy policies are lacking.

Based on the findings of this study, the following recommendations are proposed for educational institutions, teacher training program developers, and policymakers to promote the effective use of LMS data analysis tools in university English teaching.

#### **6.1. Providing comprehensive technical training and support**

Educational institutions should offer systematic technical training to help teachers become familiar with using LMS data analysis tools. These trainings should include the following:

- (1) Basic training: Covering the fundamental functions of the LMS platform, how to use data analysis tools, and how to interpret analysis results. This training can help teachers build basic operational skills and data analysis capabilities.
- (2) Advanced training: For teachers interested in deeper learning, advanced data analysis training is provided, such as using data-driven methods to optimize teaching strategies and design personalized learning paths.
- (3) Ongoing support: A technical support team is established to provide ongoing technical assistance and consulting services, helping teachers resolve issues during actual use. Schools can also create teacher communities or learning groups to encourage teachers to share their experiences and teaching resources.

#### **6.2. Developing clear data privacy and security policies**

To address teachers' concerns about data privacy, educational institutions should develop and implement clear data privacy and security policies:

- (1) Transparent data usage policies: Educational institutions should clearly define how LMS data is

collected, stored, and used, ensuring all data processing complies with privacy protection standards to avoid data misuse.

- (2) Data security measures: Advanced data encryption technologies and security protocols are used to prevent data breaches and unauthorized access, ensuring the safety of teachers' and students' data.
- (3) Regular review and updates: Data privacy policies are regularly reviewed and updated to ensure they comply with the latest laws, regulations, and technical standards, while communicating any changes or improvements to teachers and students.

### **6.3. Enhancing organizational support**

Educational institutions should strengthen their support for teachers using LMS data analysis tools to encourage broader application:

- (1) Providing resource support: Necessary hardware and software resources are offered, such as high-performance computers and the latest versions of LMS software, to teachers using LMS data analysis tools.
- (2) Establishing incentive mechanisms: Teachers are encouraged to use LMS data analysis tools in their classrooms by offering awards for teaching innovation, technology application, etc. Schools can consider incorporating the use of data analysis tools into teacher performance evaluations and career development assessments.
- (3) Policy support: Clear policies encouraging teachers to use LMS data analysis tools in their teaching are developed and they are provided with time and resources to ensure they have sufficient time to learn and apply the tools.

### **6.4. Improving teachers' technical literacy**

In addition to providing technical training and support, educational institutions should also focus on enhancing teachers' overall technical literacy:

- (1) Incorporation into professional development plans: Information technology and data analysis skills development is included in teachers' professional development plans, encouraging them to participate in relevant courses and workshops.
- (2) Regular technical literacy assessment: Regular assessments of teachers' technical literacy are conducted to identify skill gaps and develop corresponding training plans to fill these gaps.

### **6.5. Fostering a culture and attitude shift**

Educational institutions should create a positive culture of technology use, encouraging teachers to explore and experiment with new technologies:

- (1) Setting examples: Successful cases and experiences of LMS data analysis tool applications in teaching are promoted, inviting these teachers to share their experiences to encourage more teachers to try these tools.
- (2) Encouraging innovation and experimentation: An environment that supports teachers' innovation and experimentation in teaching is created, encouraging them to try different technology tools and methods and providing support and feedback for these attempts.

## **Disclosure statement**

The author declares no conflict of interest.



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