Technology Acceptance of LMS—Do Previous Online Learning Experiences Matter?

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Abstract: *Using the Technology Acceptance Model (TAM), this study explores the variability of Chinese college students' technology acceptance of using Learning Management System (LMS) during two semesters of fully online learning. A total of 262 college students participated in this study at a Chinese university. Results showed a significant increase in student technology acceptance towards using the LMS with growing online learning experiences. To be specific, compared to taking fully online courses for the first time, students have a higher level of Facilitating Conditions, Perceived Usefulness, and Attitude of using Technology when attending fully online courses for the second time. However, no difference was found regarding students' perceptions of System Quality, Perceived Self-efficacy, Perceived Ease of Use, and Behavioural Intention to Use the Technology. This study concludes that students' previous online learning experiences can significantly enhance their technology acceptance of using the LMS.*

Keywords: Technology Acceptance Model (TAM), Learning Management System (LMS), online learning, Chinese college student, higher education

1. Introduction

Online learning is considered a learning approach that offers flexibility in participating, ease of access, and convenience, providing educational opportunities accessible to a wide range of audiences (MacDonald & Creanor, 2017). Although many Chinese universities intend to integrate online learning into curriculums, face-to-face instruction has been used as the predominant teaching method for years (Thongsri et al., 2019). In response to the unexpected COVID-19 pandemic that dominated 2020, universities in China had to launch completely online courses for the first time during the spring semester of the same year. It was also the first time Chinese college students attended formal classes in a fully online environment, and many of them were forced to experience online learning without readiness. Because face-to-face learning was the predominant learning method before the pandemic, it was not easy for first-time online students to transfer from traditional face-to-face learning to fully online learning. Specifically, it was a challenge for them to adapt to learning using an online learning management system during this emergent transition in the spring semester of 2020.

As COVID-19 continues, China has gone through periods of isolation, social distancing, lockdowns, and closures. That is, after the outbreak, the government has managed to control the pandemic rapidly and effectively, with confirmed COVID-19 cases dropped from 31,333 (Feb 10th, 2020) to 37 (May 4th, 2020) (WHO). Therefore, many universities reopened face-to-face instructions during the fall semester of 2020. However, the number of confirmed new cases has risen due to the increasing number of inbound passengers. Specifically, Hebei province was reported to experience an outbreak in early 2021 due to the possible reasons that some villagers contacted objects or waste from the airport or inbound passengers who were infected with the virus (Wang et al., 2021). Consequently, universities in Hebei province, again, moved back to online learning in the spring semester of 2021. During this time (i.e., spring 2021), students are identified as experienced online learners. That is, having taken online courses in the spring semester of 2020, these students are assumed to be familiar with using technology tools, including the LMS, for online study.

To examine this assumption, this study explores and compares these students' acceptance of using the LMS for online learning between their first time and second time fully online learning experiences. Specifically, this study was guided by the research question: what are the differences in students' technology acceptance of using the LMS given their different online learning experiences? It is expected that this study will help higher education professionals better understand Chinese college students' online learning experiences and thus provide relevant support in fully online learning environments.

2. Literature Review

2.1. Learning Management System (LMS)

An LMS refers to the software application system for administration, documentation, tracking, reporting, automation, and delivery of educational courses, training programs, or learning and development programs (Ellis, 2009). The development of the LMS makes it easy for students to conduct online learning anytime, anywhere (Hsu et al., 2018). The LMS provides multiple functions include distributing the learning content, facilitating instructional activities, delivering resources, monitoring exams, and evaluating learning objectives (Shayan & Iscioglu, 2017). This

learning tool also facilitates communication and collaboration between the instructor and students through online conversations (i.e., message, discussion board) that enhance students' sense of online classroom community (Lin et al., 2020). In sum, the LMS has been used widely among universities to support student learning. On the other hand, students' perceptions of using the LMS influence their online learning. Early studies indicated that students' anxiety of using a technology tool usually affects their interaction with this tool (Tuncer, 2012). In other words, students who are anxious about using the LMS often experience feelings of frustration, the potential of embarrassment, disappointment, and fear of the unknown (Tuncer, 2012). A higher level of technology anxiety they have, a lower level of academic performance they will have. They may then intend to avoid using the LMS for academic purposes (Mooney, 2007). On the opposite, students with a lower level of technology anxiety are more likely to hold positive attitudes regarding using the LMS (Stiller & Koster, 2016). If they believe the LMS is helpful for their learning, they are more likely to use it in the future (Heinecke & Adamy, 2010).

The usefulness and perceived ease of use are important factors regarding using the LMS. These two factors often influence students' intentions to adopt the LMS and their satisfaction with using it (Abdel-Maksoud, 2017). Positive perceived ease of use would result in an active attitude towards using the LMS (Juhary, 2014). That is, students with a positive perceived ease of use regarding utilizing the LMS usually think highly of this platform and are more likely to use it (Ajijola et al., 2019). Likewise, when users believe that they can easily handle learning through the LMS and they find this tool useful, they would prefer to continue using it for online learning (Huang et al., 2020). Meanwhile,

students' previous online learning experiences greatly impact their perceptions toward using the LMS. Scholars noted that previous online learning experiences contribute to positive computer learning attitudes (Hixon et al., 2016). Compared to students new to online learning, those who have had prior online learning experiences often express a higher level of comfort and less anxiety toward using the LMS for online learning (Kuo et al., 2013). With previous online learning experiences, their readiness to be online learners and their confidence in online learning significantly enhance their online learning performance (Wei & Chou, 2020). Additionally, these students can use more effective strategies when taking online courses (Shen et al., 2013). Since face-to-face instruction was the predominant course delivery method in Chinese universities before the pandemic, most Chinese colleges students may have limited previous online learning experiences during the emergent transition in the spring semester of 2020. After attending fully online learning courses in one semester, these students—with experiences of one semester's involvement in a completely online learning environment—probably were more ready when taking online courses during the spring semester of 2021.

Technical difficulties often lead to online learning challenges such as interaction issues between users and the LMS. These technical issues further impact students' beliefs, attitudes, perceptions, intentions, and even behaviours towards using the learning platform (Sivo et al., 2018). When Chinese college students attended fully online learning courses for the first time, minimal technical support was available for them due to the insufficient preparedness of providing completely online courses in higher education in China. Compared with the limited assistance and experiences they received when new to online learning, these students may

receive more technical support when using the LMS during their second time taking online courses. Additionally, their first-time online experiences would enlighten them in terms of which strategies were effective and motivate them to apply relevant strategies wisely. With more readiness for online learning, their attitudes toward using the LMS may also alter. Thus, these students' technology acceptance of using the LMS between the two times of online learning may vary.

However, there has been a paucity of studies examining Chinese college students' technology acceptance of using the LMS in fully online learning environments. Meanwhile, no study has explored how previous online learning experiences may impact Chinese college students' technology acceptance of using the LMS in a completely online learning environment. As a result, our study aims to fill in this gap by exploring the differences of Chinese college students' technology acceptance of using the LMS at two different times. Technology Acceptance Model (TAM) (Davis, 1987; Fathema, 2013) was used to investigate the research question: *what are the differences of students' technology acceptance of using the LMS given their different online learning experiences?*

2.2. Technology Acceptance Model (TAM)

TAM was introduced by Fred Davis (1987) to understand predictors of human behaviour toward their potential acceptance or rejection of the technology (Marangunić & Granić, 2015). TAM was originated and evolved from the psychological Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1975), Theory of Planned Behaviour (TPB; Ajzen, 1991), and social cognitive theory (Bandura, 1986). Both TRA and TPB focus on users' intention of technology acceptance, adoption, and the continued use of technology (Ajzen &

Fishbein, 1975; Ajzen, 1991). TRA presumed that attitude and the subjective norm would determine users' behaviour intentions, leading to actual behaviours (Fishbein & Ajzen, 1975). TPB stated that behavioural, normative, and control impact users' attitudes, subjective norms, and perceived behavioural control (PBC), and these factors further influence their behavioural intentions, then behaviours. In addition, PBC has a direct impact on users' behaviours (Ajzen, 1991).

TAM was later on developed and specialized of TRA and TPB by presuming a mediating role of two variables (i.e., perceived ease of use; perceived usefulness) in a complex relationship between system characteristics (external variables) and internal believes of potential system usage with five constructs: perceived usefulness (PU), perceived ease of use (PEOU), attitude toward the technology (ATT), behavioural intention to use the technology (BI), and the actual use of the technology (AU) (Davis et al., 2003). Specifically, PU is defined as "the degree to which an individual believes that using a particular system would enhance his or her job performance" (Davis, 1986, p.82). PEOU refers to "the degree to which an individual believes that using a particular system would be free of physical and mental effort" (Davis, 1986, p.82). ATT is "the degree of a person's positive or negative feelings about performing the target behaviour" (Davis et al., 1989, p.984). BI means "the degree to which a person has formulated conscious plans to perform or not perform some specified future behaviour (Davis 1989). AU depicts "a behavioural response measured by the individual's action in reality (Davis, 1989).

Fathema (2013) later added three external variables (i.e., System Quality (SQ), Perceived Self-Efficacy (PSE), and Facilitating conditions (FC)) to the original

TAM, extending it to answer why users accept or reject information technology and what are the impact factors in a system that influence users' technology acceptance (See Figure 1). SQ measures "the desired characteristics of an e-commerce system (i.e., LMS, website, etc.). Usability, availability, reliability, adaptability and response time (e.g., download time) are examples of qualities that are valued by users of an e-commerce system" (Delone & Mclean, 2003, p. 24). PSE originates from social learning theories and is defined as "people's beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives" (Bandura, 1991, p.257). Fathema (2013) perceived PSE significantly affecting PEOU and PU, and technology usage behaviour due to the determinant impact of self-efficacy on behaviours (Bandura, 1977). FC is "the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system" (Venkatesh et al., 2003, p. 453). According to the extended TAM, the three external variables SQ, PSE, and FC influence the dependent variables ATT, BI, and AU directly or through the mediator of PU and PEOU.
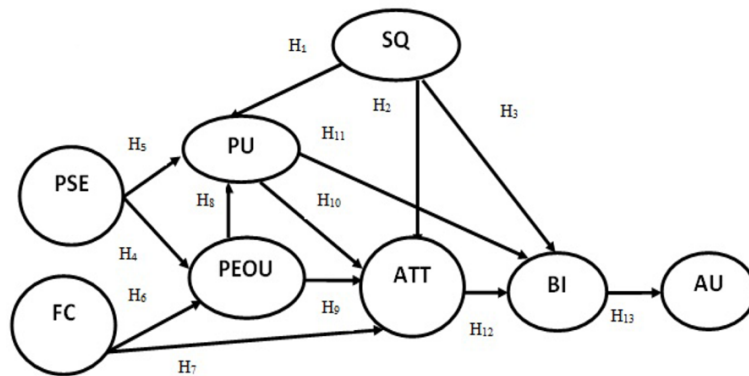

Figure 1. The Extended TAM (Fathema et al., 2015, p. 231)

TAM has been used to explain users' behaviours across broad technology-related domains from website browsing, online shopping, job application management, security management, health assistance, vehicle acceptance (Chan & Lee, 2021; Parikh et al., 2021; Sharif & Naghavi, 2021; Vilaro et al., 2021), and most importantly, to online learning (Farooq et al. 2021; Sivo et al., 2018; Thongsri et al., 2019; Turan & Cetintas, 2020; Venkatesh et al., 2003). Superficially, this model has been used to predict, explain, and facilitate online learning (Farooq et al., 2021).

Early studies examining online learning usually focused on the relationship between the TAM constructs and students' online learning adoption. For example, Mazhar et al. (2014) found that PU was positively correlated with using new technology, and it was the most important key factor to determine technology utilization (Liu et al., 2010). Lee et al. (2001) discovered that the PEOU could increase students' technology adoption and usage, and Saeed et al. (2009) additionally stated that both PU and PEOU could affect the students' ATT. Other scholars (Lee & Hsieh,

2009) discovered that the SQ would directly affect the use of smart devices. Turan and Cetintas (2020) found PEOU and PSE had a significant impact on e-learners learning intention. Some recent studies examining TAM during the COVID-19 pandemic showed that TAM was especially crucial to assist online learning instructional technologies during this special time (Al-Maroof et al., 2020; Farooq et al., 2021). For instance, Farooq et al. (2021) explored students' online learning attitudes and behaviours using LMS during the COVID-19 and found that TAM was an effective model to improve students' technology adoption and acceptance in this extreme emergent situation. Al-Maroof et al. (2020) conducted a research study focusing on the emotional effect on students' technology adoption and found fears were closely connected to students' PEOU and PU during the pandemic.

However, there has been a paucity of studies exploring whether students' technology acceptance would alter with their online learning experiences growing. As the pandemic outbreaks in the spring of 2020, citizens in China experienced a time of isolation, social distancing, lockdowns, and closures. Higher education institutions in China had to shut down, forcing students to move into a digital-only educational and social environment for the first time. Although students were moving back to face-to-face instruction in the following semester, some had to switch back to online learning due to the raising confirmed cases in some provinces. Therefore, we intend to explore whether these students' technology acceptance of using the LMS would change with the growth of their online learning experiences. Data was collected from two semesters (i.e., Spring 2020 as Time One (T1), Spring 2021 as Time Two (T2)) when Chinese universities are switching to online learning with the fluctuation of COVID-19, aiming to explore Chinese college students' TAM in an

entirely online environment.

3. Materials and Methods

3.1. Participants and Procedure

As aforementioned that due to the increasing number of confirmed new cases, universities in Hebei province moved back to online learning in the spring semester of 2021. Therefore, a total number of 262 college students were recruited at a large four-year university located in this province with 206 usable responses (usable rate equals 79%). Among them, 64 (31.1%) were male, 138 (67.0%) were female, and 4 (1.9%) did not report their gender. The age range of participants was from 18 to 29 years ($M = 20.0$, $SD = 1.0$). Most of them were sophomores (N=199, 96.6%). All the participants attended fully online courses during the spring semester of 2020 and 2021. In this study, we considered students taking online courses in the spring semester of 2020 as their first-time formal and fully online learning experiences.

Participants were recruited during the spring semester of 2021. Students were invited to participate in this study through emails with a link to an anonymous and voluntary survey, which took approximately 10-15 minutes to complete. No personal information was identified. Participants were able to quit the survey by closing the website. This study was approved by the Institutional Review Board (IRB).

3.2. Data Collection Instruments

Our study aimed to compare the variety of students' technology acceptance of the LMS—Tencent Classroom—between the T1 (i.e., spring semester of 2020) and T2 (i.e., spring semester of 2021) they attended

online courses. Tencent Classroom is a prevalent LMS in China, which serves over 70,000 educational institutes with more than 300 million users (Liao, 2019). Using this LMS, students attend both synchronous and asynchronous online conferencing, communicate with their instructor and peers, read course materials, and conduct class activities.

The survey used in our study consisted of a brief demographic questionnaire and the TAM inventory, which has been used to assess students' attitudes toward web technology adoption in higher education settings (Fathema et al., 2013). The TAM is a 28 item 7-point Likert-type scale (e.g., "*I am satisfied with the Internet speed*"), ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with eight subscales including SQ, PSE, FC, PEOU, PU, ATT, BI, and AU. A higher score indicates a higher level of technology acceptance. These subscales can be used as a whole or separately (Fathema, 2013; Farooq et al. 2021; Huang et al., 2020).

Participants answered the TAM questionnaire pertaining to their current state. Next, following an anchoring prompt, they were then asked to complete the same measures again pertaining to their recalled experiences in the spring of 2020. Cronbach's alpha of the seven subscales ranges from 0.84 to 0.94 for the spring of 2021 survey and from 0.88 to 0.95 for the spring of 2020 survey.

3.3. Analysis of Data

The original items were in English and translated into Chinese. To guarantee the validity of the Chinese version of the measure, a standard translation and back-translation procedure was used (Hambleton & Patsula, 1998). Data were analysed via SPSS. Descriptive statistics were used to examine students' demographic status. A paired t-test was conducted to compare the differences in students' technology acceptance of the LMS between their first and second time taking online courses. The alpha level was set at .05.

4. Results and Discussions

Through a paired t-test, we aimed to look at the differences in Chinese students' technology acceptance of the LMS attending online courses between T1 and T2. Results indicated that there was a statistically significant increase in TAM scores from T1 (M = 5.00, SD =.95) to T2 (M = 5.07, SD = 1.02) with a small effect size (η^2=0.02), t (205) = -2.32, p =.02.

To be specific, there was a statistically significant increase in FC from T1 (M = 4.80, SD = 1.16) to T2 (M = 4.99, SD = 1.18) with a small effective size (η^2 =0.16), t (197) = -3.20, p = .002, indicating that students had a higher level of belief regarding the availability of online learning resources that they could work within the LMS when taking online courses during the spring semester of 2021. Similarly, there was a statistically significant increase in PU from T1 (M = 4.78, SD = 1.20) to T2 (M = 4.97, SD = 1.25) with a small effect size (η^2=0.16), t (195) = -3.72, p < .000, showing that students had a higher level of belief towards using the LMS for online learning during the second time attending online courses. Finally, there was a statistically significant increase in ATT from T1 (M =4.95, SD = 1.20) to T2 (M = 5.08, SD = 1.17) with a small effective size (η^2 = 0.11), t (199) = -2.50, p = .013, stating that students were more positive in terms of using the LMS for online learning during the spring semester of 2021. However, no statistically significant difference was found regarding students' scores on SQ, PSE, PEOU, and BI between T1 and T2 (See Table 1).

Table 1. Differences of Students' Scores on Subscales in TAM for Time 1 and Time 2

Pair item	T1 (Mean)	T2 (Mean)	t	df	p	Mean Change	SD
System Quality (SQ)	5.05	5.00	.84	204	.40	.04	.74
Perceived Self-efficacy (PSE)	5.15	5.10	.79	200	.43	.05	.87
Facilitating Conditions (FC)	4.80	5.00	-3.20	197	.002	-.19	.82
Perceived ease of use (PEOU)	5.30	5.28	.42	198	.68	.02	.70
Perceived usefulness (PU)	4.78	4.97	-3.72	195	<.01	-.19	.72
Attitude toward using technology (ATT)	4.95	5.08	-2.50	199	.01	-.13	.76
Behavioral intention to use (BI)	5.07	5.12	-.90	200	.37	-.04	.71

The findings of this study indicate that students' previous online learning experiences significantly affect their technology acceptance of using the LMS. As stated earlier, students can use online learning strategies more effectively with previous online learning experiences (Shen et al., 2013). Our study reveals that with preparedness while taking online courses for the second time, students were more sophisticated towards using related online learning resources provided in the LMS. They also expressed a higher level of belief in the usefulness of utilizing the LMS for online learning. Additionally, students were more positive towards using the LMS in online courses during the second fully online semester. These findings mirror Park and Yun's (2017) study that students who are familiar with using the LMS because of their previous online learning experiences would have fewer learning problems than students who are not familiar with using the LMS. Likewise, the findings of our study echo with the previous conclusion that prior online learning experiences could contribute to positive computer learning attitudes (Hixon et al., 2016). Specifically, the present study yields a significant difference in students' FC, PU, and ATT of the LMS between the first and second time taking online courses. That is, with online learning experiences increasing, students are more likely to believe in the availability of the related online learning resources that they could work in the LMS. They also have stronger beliefs that using the LMS would enhance their learning performance, and finally, they hold more positive attitudes regarding using the online learning platform. These findings align with a meta-analysis study revealing that users' experiences have a significant influence on their information technology satisfaction (Mahmood et al., 2000). Consistency is also found between the present study and the previous study (Venkatesh et al., 2003), demonstrating that prior learning experiences could mediate FC and online learning behaviours. In other words, students with a more or advanced level of previous online learning skills believe that they can easily get access to online learning

resources in the LMS, thus, leading to better learning behaviours.

Our study, however, did not find significant differences in students' BI to use the LMS although owning more online learning experiences. This finding argues with the previous conclusion that prior online learning experiences can significantly impact students' intention to use information technology (Harris, 2016). Differ from the finding noted by Alasmari and Zhang (2019), there is no significant difference in students' PEOU of the LMS between the two semesters. In other words, previous online learning experiences do not contribute to students' perspectives regarding the proficiency level of using the LMS. One possible reason is that students may easily get access to online learning resources anytime, even without previous online learning experiences, thus, eliminating the differences in online learning literacy. It is noteworthy that no significant difference was found in PSE concerning students using the LMS with their varied online learning experiences. That said, students' beliefs about their capabilities to use the LMS disregard their learning experiences in the present study. As Bandura (1997) postulated that mastery experience is one crucial source of self-efficacy. Supposedly, the change in students' online learning experiences should lead to a difference in their PSE. However, our study disapproved of this assumption. As aforementioned, one possible reason may be the ubiquitous access to digital devices (e.g., computers, laptops, tablets, smartphones) in higher education institutions that alleviate the influence of the alter of students' learning experiences (Reyna et al., 2019; Taneja & Fischer, 2015). In addition, no significant difference was found in students' satisfaction towards the LMS quality between T1 and T2. This finding argues with the previous conclusion that satisfaction towards the system quality is significant in discriminating between groups with and without digital technology using learning experiences (Park et al., 2018). In short, although differences were reported in other studies, no significant difference was found in students' BI, PEOU, PSE of using the LMS, nor the satisfaction towards the LMS system quality. The discrepancy warrants additional confirmation from other empirical studies and longitudinal studies to further identify the role that previous online learning experiences would play in students' technology acceptance of the LMS.

4.1. Implications

Overall, this study provides insight regarding Chinese college students' technology acceptance of using the LMS, comparing their first-time and second-time fully online learning experiences. Findings demonstrate that students' previous online learning experiences can significantly enhance their acceptance of using the LMS, specifically their facilitating conditions, perceived usefulness, and their attitude toward using the LMS. With a growth of the online learning experiences, students would have a stronger belief that they could find available learning resources in the LMS. Prior online learning experiences would additionally boost students' learning performance and enhance their positive attitudes towards using the LMS for online learning.

Considering the importance of online learning experiences for students' future technology acceptance of the LMS, higher education policymakers and professionals should provide policy, technology, and pedagogical support for online courses. First and foremost, higher education institutions should ensure compliance and quality assurance of students' initial online learning experiences. All pertinent attempts should

be made towards a successful beginning of the adoption and implementation of the LMS among college students (Jaiyeoba & Iloanya, 2019). The Chinese Ministry of Education has proposed the "Guidance on the Organization and Management of Online Teaching in the Higher Education Institutions During Epidemic Prevention and Control Period" (Ministry of Education, 2020), which requires national and local governments to support colleges and universities, together with the society, to joint implementation of online education (Zhu & Liu, 2020). The government and stakeholders should continue to propose relevant policies and strategies to further facilitate the development of online education so as to improve the online learning conditions and support students to access online learning devices.

Secondly, researchers suggested that students' self-efficacy in terms of using the LMS is an important factor for their online learning (Park & Yun, 2017). According to the TAM, among all technology acceptance factors, users' satisfaction towards facilitation condition and technology self-efficacy is the initiating factor (See Figure 1) that impacts students perceived ease of use, then further influence the technology attitude, perceived usefulness, and eventually their intention of using the LMS. Online learners with higher perceived self-efficacy will have higher learning satisfaction and better learning performance (Tsai et al., 2020; Wang et al., 2013). Therefore, LMS developers should involve user-friendly, personalized, and self-paced interfaces to improve the user experience of an LMS (Fresen, 2018), especially for first-time online students. Simplicity and user-centricity interface design, such as intuitive data entry capabilities, will render the operation of the LMS easier accessible for digital novices. In addition, an online mentor system would be a valuable

resource for students new to online learning (Wang et al., 2009). Such a system would help them navigate the LMS and then accept using the online learning technology smoothly. The above-mentioned strategies would contribute to improving students' satisfaction towards the LMS facilitation conditions and their using self-confidence, and eventually increase new online students' intentions to further use the LMS. Additionally, because training paradigms can make a difference to individuals' existing technology acceptance (Harris, 2016), online learning tips and technology training should be included in students' orientations and online learning preparation programs or workshops, along with efficient IT support and intervention. Last but not least, online instructors should pay attention to online teaching pedagogy, as well as providing online technology assistance, online office hours, and assigning teaching assistance for online courses.

5. Limitations and Conclusions

Several limitations exist in this study. First, among the sample, 64 (31.1%) self-identified as men, 138 (67.0%) as women, and 4 (1.9%) did not report their gender. Considering the literature that gender-related differences in technology acceptance have been reported (Harris, 2016), there may be potential validity issues for generalization to the whole Chinese college student population. Despite this caveat, the study provides valuable insight both for further research and online teaching pedagogy. Secondly, all participants in this study were volunteered instead of random sampling, which conceded generalization to all students limited. Further research may take random sampling methodology into consideration. Additionally, our study was conducted during the COVID-19 pandemic. Virtually all universities worldwide had to move to online learning platforms. Therefore,

on one hand, it provides an opportunity to investigate students' technology acceptance of using the LMS. On the other hand, students may lack sufficient readiness and willingness to participate in online learning, which would impact their technology self-efficacy and attitudes. Students' readiness to be online learners and their confidence in online learning are identified as significant components that influence their experiences when taking online courses (Wei & Chou, 2020). They may need more time to develop their adaptiveness, technology self-efficacy, and online learning skills in an online learning context. Moreover, instructors' readiness for online teaching may be another confounding factor that impacts students' differences in technology acceptance. With more online instruction experiences, instructors may be more proficient in online teaching, which could further influence students' online learning experiences (Bervell & Umar, 2020). In other words, the short interval between students' two times of fully online learning may not be long enough to explore the differences in their technology acceptance of using the LMS, excluding other confounding impact factors. Therefore, a longitudinal empirical study is needed.

Overall, this study provides evidence of the differences in Chinese college students' online learning technology acceptance of using the LMS between two fully online semesters. Findings demonstrate that students' previous online learning experiences can significantly enhance their acceptance of using the LMS. Therefore, higher education professionals should provide opportunities or options for students to take completely online courses in universities. Being familiar with online education would pave students' way for their further online learning, thus reducing their learning anxiety and the online course drop-out rate. Future studies should explore other factors that impact students' technology

acceptance of using the LMS across different ages, gender, and social groups in diverse learning contexts with more comprehensive perspectives and insights. Finally, there remains a need for more research towards learners' technical acceptance of using the LMS through mixed-methodological approaches.

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