Factors Influencing Students’ Continuous Willingness to Use E-Learning Platforms in Higher Education

Zeyun Li, Tianjin University of Finance and Economics Pearl River College, China

ABSTRACT

The COVID-19 pandemic has imposed significant challenges on education worldwide, particularly in areas with limited online teaching experience. The research design is based on constructivism learning theory and the technology acceptance model. A questionnaire was also distributed to a university of finance and economics in China. Structural equation model was used to test the influence mechanism of social media interaction on college students’ willingness to use e-learning platform continuously. The positive moderating effect of online teaching context on this mechanism is further analyzed. Therefore, the use of social media in the online teaching process in higher education institutions should be encouraged, and a good online teaching context should be fostered.

KEYWORDS

College Students, E-Learning, Social Media, Teaching Context

1. INTRODUCTION

E-learning refers to acquiring learning resources and training services in a more convenient means by using information technologies such as the internet and multimedia system, ultimately achieving the purpose of improving learning quality (Hao et al., 2017). This educational method using modern equipment and technology can provide learners with virtual teaching, mobile learning, computer training, internet training, and other services, as well as learning in the home, workplace, or at any time, anywhere learning provides a convenient, improve the learning efficiency, overcoming the spatiotemporal restriction more absolutely. With the outbreak of COVID-19, many countries and regions have chosen to close offline educational institutions. While lockdown and social distancing are the only ways to break the chain and slow the spread of the virus, the closure of educational institutions has had an impact on students completing their studies on time. Online teaching enables educational resources to overcome the limitation of spatial distance through the network, which is of great significance to education and should be widely studied and paid attention to (Tang et al., 2017).

Although information and communication technology has been widely applied in people’s daily life (Pimmer et al., 2016), there is still a general lack of clear motivation and learning conditions to adopt e-learning (Demir K, et al. 2006). However, the current technological conditions and the
ongoing COVID-19 pandemic have provided sufficient motivation for learners to learn online, and the successful promotion of e-learning will also depend on users’ needs (Shang G, et al. 2012). Before the outbreak of COVID-19, most of the users willing to accept e-learning were part-time learners (Karimi & Sahar, 2016). Today, e-learning has become an important part of higher education, which can be conducted officially or unofficially, and is one of the tools to enrich active learning (Dobre, 2015). As of June 2021, the number of online education users in China was 325 million, accounting for 32.1% of the total internet users, according to the 48th Statistical Report on Internet Development in China. Such a large scale shows the importance of ensuring the healthy and orderly development of online education. In today’s era, the online platform has been transformed into an important way for knowledge sharing and active collaborative learning (Al-Rahmi et al., 2018).

Based on the socio-cultural theory of learning, people acquire knowledge through social interaction, exchange of ideas, and sharing of experiences to facilitate cognitive change. At present, online education and sharing platforms have been widely used, so it is particularly important to study and discuss e-learning methods. Based on the constructivism learning theory and the technology acceptance model, this study investigates the influence mechanism of network interaction in higher education on college students’ e-learning behavioral intention and the moderating role of online teaching context in this mechanism. The results of this study will help to understand the e-learning context of Chinese college students and other educated students, and reveal part of the influencing factors of e-learning behavioral intention.

2. BACKGROUND LITERATURE

2.1 Electronic Learning

Electronic learning (e-learning) is a learning style that has been evolving and developing since the internet era, and its superior advantages have been integrated into the daily life of many people. Nowadays, e-learning has become a perfect distance learning method, helping those who are interested in learning to remove the obstacle of distance (Koç et al., 2016). Generally speaking, the purpose of e-learning is to use online training systems and platforms (such as newsletter publication, e-mail, multimedia CDS, the internet and computers, etc.) to reduce the time and money spent on transportation and promote better, faster, and more convenient learning.

In fact, e-learning is a transformative activity that prepares people to deal with the changes brought about by various environments. By being taught knowledge and skills of various disciplines, online learners’ behaviors and abilities can be improved, although sometimes such improvement is not obvious in the short term (Lee et al., 2013). One of the methods to systematically conduct e-learning is to regularly participate in various learning activities, such as using e-learning platforms for distance learning. Distance education is programmed learning in which learning and teaching are carried out in a separate environment (Mallat, et al., 2009). The realization of distance education relies on communication technology and programming guidance institutions related to learning content, which can meet the needs of communication between learners and lecturers (Shah, 2014).

2.2 Constructivism Learning Theory

As a learning theory, constructivism holds that learning is a dynamic process characterized by the construction of knowledge and individual interpretation and reflection of the empirical world. This is a learner-centered approach, in which teachers’ guidance for learning activities is not strictly predetermined, but flexibly influenced by learners’ needs and learning materials (Taber, 2011).

Constructivism is characterized by providing students with the necessary resources to learn, understand, and solve problems. This study draws lessons from constructivism learning theory, which provides students with active, reflective, collaborative, independent, equitable participation,
and experiential learning methods, in line with the context that online teaching should pursue today (Aderibigbe et al., 2014).

2.3 Technology Acceptance Model

The technology acceptance model (TAM) was proposed by Davis and enjoys a high reputation in 88 research journals. It is an effective and robust model specially used to build a model according to users’ acceptance of the information system (King et al., 2006). TAM has five main structures: perceived ease of use (PEU), which is defined as the ease with which individuals can understand and use computers (Davis, 1989); perceived usefulness (PU), defined as the tendency of individuals to use software or programs to help them work better (Davis, 1989); attitude (A), which can be defined as the positive or negative feelings felt by individuals when performing behaviors (Natasia et al., 2022); and behavioral intention (BI) refers to a behavioral trend of continuous use of a certain technology (Davis F D, 1989). If the system is easy to use and can improve productivity, users will be satisfied with the use of the system and willing to actually use it (Tangke, 2004), that is, BI=A+U.

TAM is simpler and faster in collecting general information about individuals’ views on the use of technology (Natasia et al., 2022). Based on the TAM model, this study constructed a construct framework for influencing factors of college students’ e-learning, collected data through questionnaires, and conducted relevant empirical analysis.

3. DEVELOPMENT OF HYPOTHESES

Social media tools make it more convenient for teachers to communicate with students (Al-Rahmi et al., 2018). Several studies have examined the use of Facebook in the teaching process, and believe that this virtual communication has many benefits for students, which can improve the communication between teachers and students (Kabilan et al., 2010), and encourage students to take learning tasks seriously (Greenhow et al., 2010).

However, few people mentioned that social media tools can be used as a complement to offline teaching and innovative teaching methods in universities. Experiential learning theory once emphasized the importance of experience in the learning process, and social media tools are now an indispensable channel for acquiring experience. In fact, the use of social media by higher education institutions is believed to increase the interaction between advisors and students (Greenhow, C, et al. 2012). This result was confirmed by Fusch (2011), who found that learning tools are just as important as learning goals and that they both need a social presence and interaction in order to learn (Fusch, 2011). Therefore, we can speculate that good interaction between teachers and students on social media will facilitate students’ recognition of the usefulness of e-learning platforms. Therefore, this study proposes that:

H1: Social media interaction between teachers and students has a positive impact on students’ perceived usefulness.

Using social media for communication and collaboration helps learners interact more actively (Mugahed et al., 2015). For example, when active collaborative learning is carried out through the Wiki platform, most students’ interest in writing is improved (Li et al., 2012). In addition, Rasiah (2014) points out that Facebook is considered to be a low-risk and versatile learning communication tool that can positively promote collaborative learning and strengthen the connection between students and lecturers in a fairly engaging way (Rasiah, 2014). Thus, hypothesis 2 (H2) is proposed:

H2: Social media interaction between teachers and students has a positive impact on students’ perception of ease of use.
Among the many variables that may influence people’s acceptance or rejection of information technology use, two determinants are particularly important. One of the variables is called perceived usefulness, which refers to the degree to which people tend to use or not use applications and whether they think information technology will help them do their jobs better (Davis, 1989). In addition, even if potential users believe that an application is useful, they may also believe that the system is too difficult to use and that the performance gains of use will be weighed down by the effort of using the application. That is, in addition to usefulness, the use of information technology is theoretically influenced by perceived ease of use (Yan et al., 2019). Thus, hypothesis 3 (H3) is proposed:

H3: Students’ perceived ease of use of e-learning platforms has a positive impact on perceived usefulness.

Davis (1989) proposed that TAM is composed of three factors: attitude, perceived usefulness, and perceived ease of use. Attitude refers to an acquired tendency to react positively or negatively to a particular thing (Davis, 1989). By studying the application of mobile libraries among college students, Yoon (2016) found that there is a positive correlation between perceived ease of use, perceived usefulness, and personal attitude toward mobile library applications (Yoon, 2016). In today’s online education environment, student satisfaction with the overall learning experience begins in the online environment prepared for the learner and continues throughout the course. Students are looking for more than static web pages; they are looking for personalized, integrated information and services to support their higher education experience (Moore, 2019). Thus, hypothesis 4 (H4) and hypothesis 5 (H5) is proposed:

H4: Students’ perceived ease of use of e-learning platforms has a positive impact on e-learning satisfaction.
H5: Students’ perceived usefulness of e-learning platforms has a positive impact on e-learning satisfaction.

Previous studies have shown that satisfaction strongly affects students’ willingness to continue to use learning technologies in higher education environments (Ifinedo, 2018). The influencing factors of learners’ continued use of electronic systems in hybrid learning were discussed. Lin and Wang (2012) found that perceived usefulness had an important influence on the intention to continue using systems (Lin et al., 2012). In the context of e-text research, Baker and Stone (2015) also point out that students’ satisfaction with e-textbooks and perceived usefulness are the main factors affecting students’ willingness to continue using e-textbooks (Baker-Eveleth L et al., 2015). These lead to the suggestion of hypothesis 6 (H6) and hypothesis 7 (H7).

H6: Students’ satisfaction with e-learning has a positive impact on their willingness to use e-learning platforms continuously.
H7: Students’ perceived usefulness of e-learning platforms has a positive impact on their willingness to use e-learning platforms continuously.

The development of technology has changed people’s learning context. Users can carry their devices to study anywhere. Given the interaction between the user and the application, context should be able to describe any information, including subject, place, and object (Hamidi, et al., 2018). Context is believed to play an important role in the success of the system (Hamidi et al., 2018). During epidemic prevention and control of COVID-19, an important task for teachers is to help students understand the necessity of online teaching. Therefore, this study believes that there is a certain relationship between the online teaching context and the main constructs of TAM, and proposes the following hypotheses:
**H8:** Online teaching context plays a positive moderating role in the relationship between students’ satisfaction with e-learning and their willingness to use e-learning platforms continuously.

**H9:** Online teaching context plays a positive moderating role in the relationship between students’ perceived usefulness of e-learning platforms and their willingness to use e-learning platforms continuously.

To sum up, the conceptual model of this study was constructed, and the hypothesis relationships among various constructs were marked. Meanwhile, e-learning experience, educational background, and years of mobile device ownership were selected as control variables to avoid interference of other factors on hypothesis testing, as shown in Figure 1.

**4. RESEARCH METHODS**

**4.1 Sample and Main Data Collection**

The data was collected through a questionnaire survey. A small-scale predictive test was conducted first, and then a formal questionnaire was formed after appropriate adjustments were made to the unclear sentences. Due to the impact of COVID-19, all formal questionnaires were distributed and filled out online from August to September 2021 in a university of finance and economics in China, and a total of 318 valid questionnaires were collected. Among the valid samples collected, 161 were male (50.5%) and 157 were female (49.5%). From the respondents, 69 were freshmen (21.6%), 96 were sophomores (30.1%), 105 were juniors (33.2%) and 48 were seniors (15.05%). Most of the students (272, 85.3%) owned mobile devices for more than one year and spent more than one hour online (299, 93.7%) every day. Only 98 students (30.7%) have e-learning experience of fewer than four months, and the other students have e-learning experience of more than five months (220, 69.3%).

**4.2 Measures**

All of the items used five-point Likert scales. Among them, the scale of social media interaction refers to the study of Liu (2003). Perceived ease of use and perceived usefulness used the classic scale of Davis (1989). Online satisfaction refers to the scale of Moore (2019). The willingness to use e-learning platforms continuously refers to the research of Chintalapati and Daruri (2017). The online teaching context adopts the scale of Hamidi and Chavoshi (2018).

**5. RESULTS**

**5.1 The Results of the Measurement Model**

AMOS 21.0 and SPSS25.0 were used to process and analyze the data. The reliability test results showed that the overall Cronbach’s Alpha was 0.973, which did not improve greatly after deleting any
item. The lowest value of the combined reliability of each variable was 0.84>0.6. The Kaiser–Meyer Olkin (KMO) value of 0.983 and a significant Bartlett sphericity (6511.615, P<0.001) showed that some common factors between matrix and data are suitable for factor analysis.

Confirmatory factor analysis was performed for each variable in the model. The results showed that Chi-square = 345.101, CMIN/DF=1.215<3, RMSEA=0.026<0.08, GFI=0.924, SRMR=0.023<0.08, the absolute fitting indexes were all within the acceptable range. TLI=0.989, CFI=0.990, IFI=0.990, all greater than 0.9, relatively ideal fitting index.

To test the effect of homology deviation, the potential error variable control method was used. The results showed that the indexes of the factor analysis model with common method bias were CMIN/DF =1.247, RMSEA=0.029, both larger than the original model, indicating that the fitting indexes of the model did not improve after the inclusion of common method bias latent variables. Therefore, this study was affected by homology deviation within an acceptable range, and the scale also had good reliability and validity.

### 5.2 The Results of the Structural Model

The fitting indexes of the theoretical model proposed in Figure 1 are tested, and the fitting indexes are as follows: CMIN/DF =1.293<3.0, GFI=0.936, AGFI=0.918>0.9, RMSEA=0.030<0.05, TLI=0.988, CFI=0.990, IFI=0.990, all greater than 0.9. The significance of each path in the model and the test results of some research hypotheses are shown in Table 1.

The moderating effect of this study was tested by grouping linear structural equation analysis. According to the mean value of students’ evaluation of the online teaching context, the whole sample was divided into two groups: high online teaching context group (170 students) and low online teaching context group (148 students). The standardized load of each observation variable of the two groups of samples on its latent variable is more than 0.5 and statistically significant, and other fitting indexes can also reach the critical standard. The two groups of samples were analyzed and compared using the path coefficient sameness test. The first group consists of the unrestricted model and the restricted modelI (limited the path of Perceived usefulness→willingness to use the e-learning platform continuously). The other group includes the unrestricted model and

<table>
<thead>
<tr>
<th>H</th>
<th>Independent Variable</th>
<th>Relationship</th>
<th>Dependent Variable</th>
<th>Estimate</th>
<th>C.R.</th>
<th>P</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Social media interaction</td>
<td>→</td>
<td>Perceived usefulness</td>
<td>0.769</td>
<td>6.820</td>
<td>&lt;0.001</td>
<td>Supported</td>
</tr>
<tr>
<td>H2</td>
<td>Social media interaction</td>
<td>→</td>
<td>Perceived ease of use</td>
<td>0.920</td>
<td>16.509</td>
<td>&lt;0.001</td>
<td>Supported</td>
</tr>
<tr>
<td>H3</td>
<td>Perceived ease of use</td>
<td>→</td>
<td>Perceived usefulness</td>
<td>0.245</td>
<td>2.308</td>
<td>0.021</td>
<td>Supported</td>
</tr>
<tr>
<td>H4</td>
<td>Perceived ease of use</td>
<td>→</td>
<td>Students’ satisfaction with e-learning</td>
<td>0.428</td>
<td>2.565</td>
<td>0.010</td>
<td>Supported</td>
</tr>
<tr>
<td>H5</td>
<td>Perceived usefulness</td>
<td>→</td>
<td>Students’ satisfaction with e-learning</td>
<td>0.550</td>
<td>3.328</td>
<td>&lt;0.001</td>
<td>Supported</td>
</tr>
<tr>
<td>H6</td>
<td>Students’ satisfaction with e-learning</td>
<td>→</td>
<td>Willingness to use e-learning platform continuously</td>
<td>0.420</td>
<td>2.615</td>
<td>0.009</td>
<td>Supported</td>
</tr>
<tr>
<td>H7</td>
<td>Perceived usefulness</td>
<td>→</td>
<td>Willingness to use e-learning platform continuously</td>
<td>0.581</td>
<td>3.657</td>
<td>&lt;0.001</td>
<td>Supported</td>
</tr>
</tbody>
</table>
the restricted model II (limited the path of students’ satisfaction with e-learning→willingness to use the e-learning platform continuously).

In the low online teaching context group, an insignificant relationship was found between perceived usefulness and willingness to use e-learning platform continuously (β=-1.366, P = 0.517), nor was students’ satisfaction with e-learning and willingness to use e-learning platform continuously (β=2.544, P = 0.266). In the high online teaching context group, with regards to a willingness to use the e-learning platform continuously, it was found to be insignificantly related to perceived usefulness (β=0.631, P<0.001) and students’ satisfaction with e-learning (β=0.370, P = 0.004). Testing results of moderating effect are shown in Table 2.

Table 2 showed that Δχ² was statistically significant for both limiting models. The positive moderating effect of online teaching context on the path of perceived usefulness→willingness to use the e-learning platform continuously (Δχ²=9.949, P=0.020) and the path of students’ satisfaction with e-learning→ willingness to use the e-learning platform continuously (Δχ²=6.329, P=0.012) was verified, and hypothesis H8 and H9 were supported.

6. DISCUSSION

The results of this study reveal the relationship between students’ perceived ease of use, students’ perceived usefulness, students’ satisfaction with e-learning, students’ willingness to use e-learning platform continuously, online teaching context, and social media interaction. The research results have certain reference value for the expansion of existing research for online education, distance education, and mobile learning, and also provide suggestions and guidance for educational management of higher education institutions and product design of social media enterprises.

6.1 Managerial Implications

Due to the need for e-learning in the current COVID-19 pandemic and the recognition of individual differences among students, e-learning platforms have provided students with many ideal functions and environments, such as autonomous learning, learning anytime and anywhere, and choosing the right content from the perspective of interest. But there are still questions about how to use computer facilities, online platforms, and so on, so the quick feedback and learning performance evaluation provided by teachers will be very meaningful. Social media has become a very important part of people’s lives today. Students can exchange information and understand teachers’ instructions more clearly through social media, and thus have a more positive performance in learning (Li et al., 2012). The interaction between teachers and students on social media can also promote the generation of a learning environment characterized by active collaboration and participation (Al-Rahmi et al., 2018). Students are more likely to use online systems and consider them valuable to their learning.

Previous studies believe that satisfaction can be defined as an emotional state derived from students’ evaluation of the services provided by e-learning platforms (Westbrook, 1989). Students’

Table 2. Testing results of moderating effect

<table>
<thead>
<tr>
<th>Path Constraint</th>
<th>Chi-square</th>
<th>DF</th>
<th>CMIN/DF</th>
<th>CFI</th>
<th>RMSEA</th>
<th>Δχ²</th>
<th>P(Δχ²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted model</td>
<td>403.500</td>
<td>364</td>
<td>1.109</td>
<td>0.986</td>
<td>0.019</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Restricted model I (limited the path of Perceived usefulness→willingness to use e-learning platform continuously)</td>
<td>413.449</td>
<td>365</td>
<td>1.133</td>
<td>0.982</td>
<td>0.020</td>
<td>9.949</td>
<td>0.020</td>
</tr>
<tr>
<td>Restricted model II (limited the path of Students’ satisfaction with e-learning→willingness to use e-learning platform continuously)</td>
<td>409.828</td>
<td>365</td>
<td>1.123</td>
<td>0.984</td>
<td>0.020</td>
<td>6.329</td>
<td>0.012</td>
</tr>
</tbody>
</table>
satisfaction is largely related to their experience of product quality and their relationship with manufacturers (Taylor, 2001). In other words, if students have a good experience with the e-learning platform and find the system easy to use and valuable, they will naturally be satisfied. On the other hand, it can be found in practical teaching that teachers often have to replace system manufacturers as technical instructors to help students solve technical problems. Otherwise, students will only be dissatisfied with the e-learning method, not the e-learning platform. In addition, the high level of satisfaction also leads to some commitment between students and universities. When students are satisfied, they are interested in continuous communication with universities and their products (Lee et al., 2001), and are willing to form continuous e-learning intentions.

The results in Table 2 show that perceived usefulness and students' satisfaction with e-learning are not significant for willingness to use the e-learning platform continuously in a low online teaching context. In a high online teaching context, perceived usefulness and students' satisfaction with e-learning positively promote the formation of willingness to use the e-learning platform continuously. This indicates that even if students are satisfied with the effect of e-learning, due to the low learning context and lack of communication and exchange with others, they will not further form the willingness to continue e-learning, and even desire to return to face-to-face collaborative learning. Therefore, if a series of measures are taken to establish a higher online teaching context, students will continue to adapt to e-learning. For example, making it easy for students to share and recommend learning content to other students and users on the e-learning platform. Guide students to encourage each other to use e-learning platforms. Enhance the reputation of the online system and provide better service.

In addition, based on the results of this study, the use of social media is also conducive to the development of an online teaching context, which can promote students' interactive participation and learning group discussion, and enrich the e-learning environment (Balakrishnan et al., 2016). These findings are of great significance to scholars engaged in educational research and teachers engaged in practical teaching.

6.2 Limitations and Further Research

This research verified the effectiveness of the constructivism learning theory and TAM model in studying the use of social media to help students accept e-learning, but there are still some limitations. First, the research on e-learning involves many influencing factors, and any interpretation can only focus on certain aspects. This study focuses on the impact of social media use and online teaching context. Future research can continue to explore the influence of other factors such as student-faculty relationship quality. Second, the samples selected by the research are universities majoring in finance and economics in China. According to the descriptive statistical report, mobile devices have a good penetration rate among the subjects selected in this study. However, if we select the samples from universities of science and technology or comprehensive universities, whether different research conclusions will be drawn can be further studied.

ACKNOWLEDGMENT

This work was supported by major project of Tianjin University of Finance and Economics Pearl River College (ZJZD20-06).

FUNDING

This work was supported by a major project of Tianjin University of Finance and Economics Pearl River College (ZJZD20-06).

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this article.
REFERENCES


Zeyun Li was born in Tianjin, P.R. China, in 1986. He received the Doctor degree from Harbin Institute of Technology, P.R. China. Now, he works in School of Management, Tianjin University of Finance and Economics Pearl River College. His research interests include tourism management, brand extension and consumer psychology.