

Study on University Students' Preference of Learning Management System Application Mode and Its Influencing Factors

Chunming Xu¹, Can Wang^{2,*}, Nan Yang³

{email address¹:652196979@qq.com, *Corresponding author email address²: 297413904@qq.com, email address³: 872949965@qq.com}

¹Student affairs office of Dalian University of Science and Technology, No.999-26, Bingang Road, Lvshunkou Economic Development Zone, Dalian City, Liaoning Province, China

²School of Information Science and Technology of Dalian University of Science and Technology, No.999-26, Bingang Road, Lvshunkou Economic Development Zone, Dalian City, Liaoning Province, China

³School of Economics and Management of Dalian University of Science and Technology, No.999-26, Bingang Road, Lvshunkou Economic Development Zone, Dalian City, Liaoning Province, China

Abstract. The popularization of the application of learning management system is a typical manifestation of the evolution of teaching from multimedia assistance to digitalization and networking, and an important symbol of educational informatization. Based on the improved UTAUT model, this paper developed a research tool to explore the preference of LMS application mode and its influencing factors of college students, so as to understand the causes of weak points in mobile application of LMS. The results show that the vast majority of subjects prefer pure mobile or strong mobile and weak non-mobile applications, which indicates that mobile learning has a high popularity among college students. The five direct variables in the improved UTAUT model, namely, performance expectation, convenience, anxiety level, individual innovation and behavioral tendency, have an impact on the LMS application mode of college students. The "network time" of "experience", a moderating variable included in the UTAUT model, has an impact on the LMS application pattern of college students.

Keywords: Learning management system; Application mode; Preference

1 Introduction

Learning management system is an important link in the process of realizing the transformation of teaching informatization. LMS is a computer (network) system with a series of functions, such as organizing, presenting, managing and evaluating course content and teaching activities, and promoting the interaction between teachers and students. Today, there are thousands of LMS.^[1]In addition to Blackboard, Moodle, Sakai, WebCT, Dokeos and other typical global representatives, we also widely use Unipus, Rain Class, Cloud class, Qixuebao and other new LMS. In these systems, mobile applications and non-mobile applications coexist, but the popularity and acceptance of mobile learning among college students continues to improve. The New Media Alliance's 2019 Horizon Report (Higher Education

Edition) also lists mobile learning as a very important technology for higher education in the next year or less. Previous researches on LMS mainly focus on the following aspects: the technical characteristics of LMS and the use of LMS functions. The basic elements of LMS, the evaluation and selection of LMS, the interpretation and prospect of the next generation of LMS. However, the research on the factors influencing students' choice of LMS application mode is extremely scarce. This study will analyze which application mode college students prefer when applying LMS, as well as the factors affecting the application mode, in order to understand the causes of mobile application weaknesses, and put forward relevant countermeasures.

2 Research method

2.1 Research design

Based on UTAUT model, this study designed a research tool to investigate college students' preference for LMS application mode and its influencing factors, so as to understand the causes of mobile application weaknesses. This study attempts to expand the UTAUT model to make it more suitable for this research environment, and with the help of relevant literature references and topics.^[2]Group brainstorming, student focus group interview and other means to design questions. The tested research tool was applied to the tested LMS on the network questionnaire platform.

2.2 Subject and LMS platform

The study was conducted in a medical college. 235 first-year college students were recruited from 6 college English science classes to participate in the study. Participants were asked to log in to an online questionnaire tool to answer the questionnaire. The platform used by the subjects was Uni-pus developed by LMS for a foreign language professional publishing house and put into use in 2016. The platform is a foreign language course management platform that provides professional support for online learning, interactive communication, teaching management, assessment and testing for college foreign language teachers and students.

2.3 Research tools

According to UTAUT model theory, performance expectation, effort expectation, community influence and convenience are the four direct factors that determine behavioral intention or user behavior. Many studies try to improve the UTAUT model. This study attempts to introduce two variables, "individual innovation" and anxiety level, into the UTAUT model, and test the reliability of the improved model. Reliability test results showed that Cronbach's alpha values of performance expectation, effort expectation, community influence, convenience, anxiety level, individual innovation and behavioral tendency reached .906, .871, .829, .864, .813 and .909, respectively.^[3]The Alpha values of all the questions under the 6 categories also reached an acceptable value above .70, indicating that the 6 factors in the third part of the scale and their subordinate questions had a good "individual-population" correlation, and the 6 categories and all the questions were retained. After the reliability test, the questionnaire was entrusted to the teacher of the subject. To the class group, and by the subject in the break. A total of 227 of the 235 subjects completed the answer sheets.

After eliminating the invalid answer sheets, 224 questionnaires were obtained, and the valid questionnaires accounted for 95.3%. The data of the answer paper is processed directly in the statistical analysis software SPSS24.

3 Data analysis and discussion

3.1 LMS application mode preference

The differences in Unipus application patterns among subjects' gender, family background, Internet use experience and other factors are shown in Table 1. All the subjects were 224 freshmen from an undergraduate college in Hainan Province, aged between 17 and 19 years old, with a male/female ratio of 35.7% and 64.3%, urban and rural students. The source is 50/50. Most of the participants had been using the Internet for more than four years. The average daily Internet time is more than 1 hour, at least once a week Unipus, indicating that students have sufficient experience in using the Internet.^[4] Most of the subjects thought their foreign language proficiency was weak or weak, indicating that the subjects' self-evaluation or self-efficacy was not strong. The research data showed that the first group in the study was the pure mobile group (45.09%), which only used Unipus with mobile terminals and wireless networks. The following groups were strong mobile and weak non-mobile group (30.36%), semi-mobile and semi-non-mobile group (14.73%), pure non-mobile group (5.36%) and strong non-mobile and weak mobile group (4.46%). 75.5% of the participants used Unipus only or mostly with mobile devices, suggesting that mobile terminals and wireless networks were the LMS of choice for most of the time. However, the total proportion of pure mobile is only 45%, and there are still 55% students more or less with the help of computer application LMS. The proportion of pure mobile is not absolutely dominant. The above findings indicate that the current situation of the subjects supports their application of LMS in various modes. After nearly one year of college study and life, they have a certain basis for LMS application.

3.2 Influencing factors of LMS application mode

3.2.1 Analysis of basic information of subjects

As shown in Table 1, through Chi-square analysis, the first group in which Unipus was applied was pure mobile, accounting for 36.3% (male students) and 50% (female students), respectively. The second largest group is strong mobile weak non-mobile, proportion 28.8% (male) and 31.2% (female) respectively. 65% of male students and 81.3% of female students chose pure mobile and strong mobile and weak non-mobile. The T-test showed that the gender difference was 0.086 ($P > 0.05$), indicating that there was no significant difference in the application pattern of Unipus, and most of the boys and girls used Unipus only or mostly with the help of computers.^[5] The same cross-over analysis method was used to analyze the family background, and the significance was 0.431 ($P > 0.05$). The results showed that no matter from big cities, medium-sized cities, small cities, county towns, towns and rural areas, family background factors had no significant difference in choosing Unipus application mode, and most of them were concentrated on pure mobile and strong mobile and weak non-mobile. Because the subjects were similar in age, age was not included in the analysis. Cross-analysis showed that there was no significant difference between the Internet use years of the subjects and Unipus application mode. No matter the subjects had 1-3 years, 4-6 years, 7-9 years or

more than 10 years of Internet use experience, the subjects all preferred pure mobile and strong mobile and weak non-mobile.

Table 1. Basic information of subjects and application of Unipus

Category	UAM	PN	SW	HM	SM	PM	Total	Proportion
Gender	M	7	5	16	23	29	80	35.71%
	F	5	5	17	45	72	144	64.29%
Family background	BC	1	1	1	4	7	14	6.25%
	MC	2	1	5	19	13	40	17.86%
	SC	3	3	9	21	24	60	26.79%
	TS	1	3	6	4	14	28	12.50%
	RA	5	2	12	20	43	82	36.61%
Foreign language level	VW	4	2	8	7	30	51	22.77%
	W	4	5	16	25	38	88	39.29%
	M	3	2	6	32	25	68	30.36%
	G	0	1	3	4	5	13	5.80%
Weekly network Service duration	VG	1	0	0	0	3	51	22.77%
	0-7h	1	1	12	24	43	81	36.16%
	8-14h	0	0	7	15	19	41	18.30%
	15-21h	1	3	4	16	14	38	16.96%
	22-35h	4	4	7	4	13	32	14.29%
>35h	6	2	3	9	12	32	14.29%	
Service life of network	1-3y	1	1	9	9	15	35	15.63%
	4-6y	5	2	10	26	31	74	33.04%
	7-9y	2	5	11	22	40	80	35.71%
	>10y	4	2	3	11	15	35	15.63%
Unipus usage frequency	OD	6	2	6	10	15	39	17.41%
	5-6T/W	2	3	4	14	16	39	17.41%
	3-4T/W	3	1	7	26	41	78	34.82%
	1-2T/W	1	4	14	14	23	56	25.00%
	NU	0	0	0	0	1	1	0.45%
Total		12	10	33	68	101	224	
Proportion		5.36%	4.46%	14.73%	30.36%	45.09%		

3.2.2 Direct factor analysis of UTAUT model

Table 2 shows the correlation between direct factors and Unipus application model variables by Pearson correlation analysis. The data showed that performance expectation, convenience, anxiety level, individual innovation and behavioral tendency were significantly positively correlated with Unipus application pattern.^[6] This indicates that for the subjects, the application pattern is related to the improvement of learning expectation of LMS, the simplicity of LMS, the degree of anxiety in the process of using LMS, the innovation consciousness of accepting and applying new technologies, and the tendency to use LMS in the present and future.^[7] However, there is no significant difference in the two variables of effort expectation and community influence among different application modes of LMS, indicating that the difference in application mode of LMS of college students will not be reflected in how much effort they need to make, nor will it be reflected in the attitude of teachers, classmates and other people around them to the learning platform, and the hardware and software support of institutions such as schools.

Table2. Correlation analysis between direct factors and application mode of improved UTAUT model

		PE	SE	CI	CON	AL	PI	BT
UAM	PC	.161*	.125	.082	.144*	.212**	.204**	.185**
	SIG	.016	.062	.223	.032	.001	.002	.006

Table 3 Results of one-way analysis of variance show that performance level has an impact on LMS. The influence of application mode is mainly reflected in the ability of learning assisted by Unipus. Try to complete the learning task faster, restrict the time of the subjects to complete the learning task. It is helpful to improve academic performance and promote the cooperation between subjects and other students learning helps. The higher the expectation of these four items, the more inclined college students are to LMS. Mobile applications, otherwise they prefer non-mobile applications.^[8] LMS movement with the help of mobile terminals and wireless networks, it is convenient for learners at any time learning anywhere helps the subjects to complete the learning task quickly collaboration, whiteboard, Wiki and other tools to implement the system. Smart phones based on wireless networks have a strong role in supporting the above services.^[9] Personal success performance management and time to complete learning tasks are functions of learning management move.

Table 3. Factors affecting the application mode of LMS in improved UTAUT model

UTAUT category	Project	Significance
Performance expectation	It helps me finish my study task faster	.133*
	It is helpful to promote my collaborative study with other students	.164*
	It's good for my study	.155*
	It can effectively restrict my time to complete learning tasks	.139*
Strive to expect	Output (typing, answering, etc.) is effortless	.151*
	It's convenient to communicate with others	.259**
Community influence	A lot of it is the influence of teachers	-.156*
	A lot of it is the influence of classmates	.205**
Convenience	I can get help on "How to use it"	.164*
Anxiety level	Learning with Unipus is fun	.179**
	I like to use Unipus as a learning aid	.153*
	I'm not worried about the cost of network usage	.142*
	I wasn't worried about running out of battery capacity	.176**
	I'm not worried about network outages	.139*
	I'm not worried about being interrupted	.267**
Individual innovation	Enjoy trying new technologies (including new software, new equipment, etc.)	.201**
	Whenever I hear about a popular APP, I always look forward to giving it a try	.162*
	Among my peers, I often try new technologies before others	.143*
	Like to try new technology (such as new development of a variety of learning purposes APP) to assist my study	.153*
Behavioral tendency	We intend to use Unipus more frequently in future studies	.185**
	I will happily use Unipus in the future	.157*
	Will recommend Unipus to others	.219**

4 Conclusion

Mobile learning is another hot topic in theory and practice after E-learning. This study shows that due to the portability of mobile terminals, sex, high coverage rate, regardless of gender,

family background and foreign language level, most college students (75%) tend to use LMS only or completely with the help of mobile terminals and wireless networks, but 55% students still use LMS more or less with the help of computers, and the proportion of pure mobile is not absolutely dominant. The empirical factors influencing the application pattern of LMS in college students include the time spent on the Internet, and the proportion of students who use the Internet for a long time per week choose computer to access LMS is higher.^[10]In addition, five variables including performance expectation, convenience, anxiety level, individual innovation, and behavioral tendency were significantly correlated with the application of Unipus model. These findings have certain reference significance for the further development and application of LMS and the promotion of mobile learning.

References

- [1] Zhao Guodong: Research on the Selection Strategy of College Learning Management System. *Technology Surgical Application*. pp. 66-70(2008)
- [2] Xu Zhenguo: Next Generation Learning Management System: Connotation, Core elements and its development. *Audio-visual Education Research*. pp.62-67 (2017)
- [3] Jing Feilong, Qin Jie: Research on mobile planning assisted language learning abroad visualization analysis of Hot spots and Frontiers. *China Distance Education*. pp. 79-85(2019)
- [4] Li Jiayi, Zhang Xiulan: Characteristics and Influencing Factors of College Students' mobile Learning. *Office Automation*. pp. 23-26(2021)
- [5] Xu Zhenguo, Zhang Guanwen, Shi Lin, An Jing: Next Generation Learning Management System: Connotation, Core Elements and Development. *Research on Audio-Visual Education*. pp.41-42(2017)
- [6] Li Jiahou, Zhao Yi: Curriculum Management System (CMS) and Its Selection. *Modern Educational Technology*. pp.25-28(2019)
- [7] Zhao Guodong, Huang Yongzhong, Lin Li: Research on the Selection Strategy of University Curriculum Management System. *Distance Education in China*. pp.36-41(2018)
- [8] Li Juan: Factors influencing college students' acceptance of English mobile Learning. *Literary Education (II)* . pp. 19-23(2019)
- [9] Chen Junmin: College students' bad mentality and its Correction. *Journal of College Counselors*. pp.27-31(2010)
- [10] Xu Zhenguo, Wang Yue, Zhao Chunyu: Research on Influencing Factors of Learning Engagement in Intelligent Learning Environment. *Digital Education*. pp. 29-30(2022)