Exploring the User Experience Model of Online Teaching Platforms in the Post-Pandemic Era

Wang Mei [1], Siva Shankar Ramasamy [2], Ahmad Yahya Dawod[3], Yu Xi[4]

wang_mei@cmu.ac.th [1], sivashankar.r@cmu.ac.th [2], ahmadyahyadawod.a@cmu.ac.th[3]

International College of Digital Innovation-Chiang Mai University, Chiang Mai, Thailand [1,2,3], University Of Stirling, (Chengdu University), Chengdu, China [4]

Abstract. Online teaching is inevitable during covid and post covid pandemic situations. Schools, teachers, students and parents faced lot of issues in accessing, using, evaluating the performances for the current and future references. This research addresses the issues of inadequate user experience and the lack of a user experience model in the construction of online teaching platforms, Chao Xing. Drawing from the content structure of user experience, relevant theoretical models, and the functionalities and characteristics of online teaching platforms, a user experience model for the Chao Xing Online Teaching Platform is formulated. This article tried to use Teacher Assessment Model and User Acceptance Technology to navigate the users and experiences. The goal is to help Chao Xing Teaching Platform developers improve design and development, prioritize user experience, and enhance construction standards, ultimately creating a superior and satisfying online teaching experience for users.

Keywords: Post-pandemic era, online teaching platforms, TAM, user experience model.

1 Introduction

The widespread adoption of Information and Communication Technology (ICT) has become a hallmark of the current educational landscape, and its position across the globe is unshakable[1]. ICT-based Online Teaching Platform (OTP) have become vital for teaching and communication between educators and students, during COVID-19,prioritizing student safety and participation in teaching activities. These platforms offer supplementary materials unavailable in traditional offline courses, enhancing teacher-student communication [2]. The pandemic has fundamentally changed teaching paradigms, rapidly making online education the primary means rather than a supplementary tool. While OTPs offered crucial support during the pandemic and introduced novel experiences, they also generated significant controversy due to issues such as MOOC platform failures, learning time submissions, and server crashes [3]. To understand the core issues at the heart of these controversies, it's vital to analyze how user concerns have evolved before and after the pandemic. Academic research on online teaching has been extensive, covering construction models, current status, issues, effectiveness, strategies, and

IACIDS 2023, November 23-25, Lavasa, India

DOI 10.4108/eai.23-11-2023.2343195

sharing best practices. However, despite this extensive research, there's still limited understanding of the post-pandemic implementation of User Experience (UE/UX) for teacher users on OTP, especially in the context of extended online teaching periods. UE significantly impacts teaching objectives, instructional design, and organization due to its connection with users' continuous usage behavior.

2 Literature Review

Experience usually refers to the inner feelings of the parties caused by external things and situations. It is both an activity and a result. It is the emotional cognition obtained by the subject from personal experience [4]. Norman introduced the concept of UE, emphasizing that a successful user experience involves meeting user needs, product simplicity and elegance, user happiness in usage and ownership, and the addition of pleasant surprises [5]. The definition of UE by the ISO is highly recognized in academia and industry. The ISO 9241-210 standard defines UE as the subjective feelings and responses that users experience when using or planning to utilize a system, product, or service [6]. The ISO now claims that UE includes all pre-, during-, and post-use emotions, thoughts, convictions, decisions, cognitive perceptions, physical and mental reactions, acts, and outcomes [7]. This is the culmination of ten years of research and development.

The prerequisite of online teaching is that teachers and students accept the new role of technology, establish a high-quality user subjective experience brought by technology interaction in the use process, and are willing to use network technology to design and perform teaching tasks. Technology acceptance is an essential practical use behavior in online teaching practice. Davis proposed the Technology Acceptance Model (TAM) (Fig. 1), which serves as a conceptual framework for elucidating and forecasting users' acceptance of novel technologies [8].

TAM primarily focuses on users' adoption of new technologies, particularly in contexts where users are willing to embrace the technology. TAM's core principle is that user acceptance depends on their perception of the technology's effectiveness, or goal achievement. PEOU relates to users perceiving the technology as simple, usefulness and ease of use. PU pertains to users' perception that the technology improves their work efficiency, and easy to use. This paper uses the extended. TAM model's external variables to measure the online teaching' UE in the post-epidemic era, considering the varying needs of users during and after the epidemic period.

3 Model Assumption

Chao Xing Corporation introduces the "One Platform, Three Ends" Smart Teaching System via the mobile learning tool Chao Xing Online Teaching Platform (CX-OTP) (Fig.1). Drawing from the concept of UE, the UE of OTPs relates to users' subjective perceptions when using them for teaching and learning.

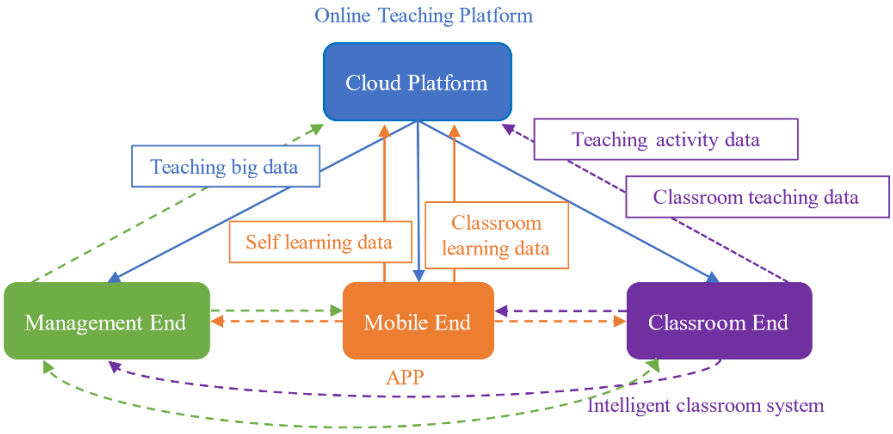

Fig. 1. Chao Xing online teaching Platform, One Platform, Three Ends

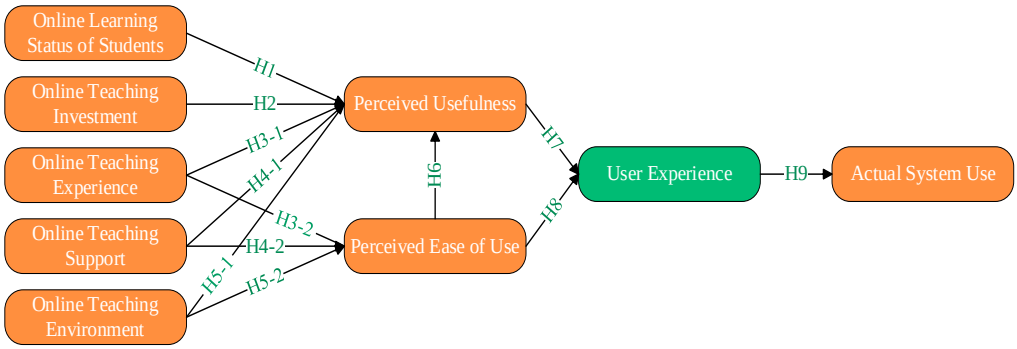

Fig. 2. Chao Xing Online Teaching Platform User Experience Model,CX-OTP-UE

This includes aspects such as whether functionalities, content, and services align with preset goals, user satisfaction, encountered challenges, pleasant surprises, the intention to use OTPs again, and more. This study constructs the Chao Xing Online Teaching Platform User Experience Model (CX-OTP-UEM) based on existing UE content structure, the TAM model, and OTP functionalities. (Fig. 2).

Consider students' existing devices (smartphones, laptops, personal computers, tablets), their tech proficiency, willingness to embrace new technology, and school-provided OTP training. [9]. Students utilize OTPs for pre-class review, assignments, discussions, exams, and sharing learning experiences with peers and instructors [10]. Various situations of students will have a substantial impact on teachers' Online Teaching Activities (OTAs) implementation. Online Learning Status of Students (OLSOS) as one of the external variables.

Teachers are ready to utilize technology and design course content, adapting materials for students' online learning environments amid the abundance of digital resources [11]. For effective demonstrations, careful course link design, engagement stimulation, interactive activities, prompt

student responses, pre-class assignments, and homework collection and assessment are essential [10]. Online Teaching Investment (OTI) is taken as the second external variable.

Initially, completing tasks can be challenging, but as teachers gain OTA experience, teaching activities become more seamless. With problem-solving skills, teachers can swiftly resolve issues, ensuring a positive UE that persists beyond OTA [12]. Online Teaching Experience (OTEx) as the third external variable.

Teachers' varying digital literacy levels can hinder their ability to effectively find, assess, and make use of tech tools for instructing and interacting with students [11][13]. Will the organization provide teacher training for OTP usage? Is there a dedicated teaching team or colleagues for ongoing OTA experience sharing? The OTP staff promptly and effectively assist teachers in resolving technical issues during

OTA and other support activities [14]. Online Teaching Support (OTS) as the fourth external variable.

Teachers also require a separate teaching space at home, just like students [15]. Teachers' technology readiness and their familiarity with new tools can also impact their teaching experience [9]. OTPs services, such as convenient access to the teaching platform, fast operation, jump speed, high efficiency, and OTA through OTPs multi-terminal. Online Teaching Environment (OTEn) is the fifth external variable.

H1: OLSOS has a significant impact on PU.

H2: OTI has a significant impact on PU.

H3-1: OTEx has a significant impact on PU.

H3-2: OTEx has a significant impact on PU.

H4-1: OTS has a significant impact on PU.

H4-2: OTS has a significant impact on PEOU

Table 1: Test values of model path parameters and verification of research hypotheses

Hypothesis	Path	β	S.E.	C.R.	P	Hypothetical judgment
H1	OLSOS→PU	0.415	0.048	8.587	***	Significant
H2	OTI→ PU	0.152	0.085	2.993	**	Significant
H3	OTEx→ PU	0.223	0.082	4.732	***	Significant
H4-1	OTS→ PU	0.163	0.027	3.942	***	Significant
H4-2	OTS→ PEOU	0.179	0.061	4.337	***	Significant
H5-1	OTEn→ PU	0.244	0.119	5.045	***	Significant
H5-2	OTEn→ PEOU	0.301	0.118	6.546	***	Significant
H6	PEOU→ PU	0.237	0.031	4.55	***	Significant

H7	PU→ UE	0.713	0.103	8.898	***	Significant
H8	PEOU→ UE	0.151	0.057	2.897	**	Significant
H9	UE→ ASU	1.115	0.09	14.327	***	Significant

Note: *** indicates P<0.001 ** indicates P<0.01 * indicates P<0.05

H5-1: OTEn has a significant impact on PU.

H5-2: OTEn has a significant impact on PEOU.

H6: PEOU has a significant impact on PU.

H7: PU has a significant impact on UE.

H8: PEOU has a significant impact on UE.

H9: UE has a significant impact on ASU

4 Empirical Research

There are two sections to the questionnaire. Basic data, including demographics like age, gender, experience teaching online, and topic background, are covered in the first section. College instructors' self-evaluations based on their online teaching experiences—which are categorized into novice, competent, and expert types—determine the nature of the online learning environment. The second part is the user experience measurement module. Based on the nine dimensions of the user experience in the theoretical hypothesis model, the item is prepared. To reflect the continued use of CX-OTP by college teachers in the intelligent era. The items in the survey scale are based on Likert's 5-level scoring method (very inconformity=1, inconformity=2, general conformity=3, conformity=4, very conformity=5). The research object is college teachers who use the OTP.

To ensure the validity of the measurement items, the researcher invited three experts (including two professors and an associate professor) in the field of information education to evaluate the scientific validity and appropriateness of the scale items. The expert evaluation mainly includes the following two aspects: First, the expression of the initial items, that is, whether there is ambiguity, repetition, incoherence, ambiguity, or incomprehensibility in the expression. Second, the validity of the content of the sports school is the degree of the concept of each dimension expressed by the item measurement. The experts evaluate and revise the initial item based on an in-depth understanding of each dimension of the online teaching experience of college teachers. After verification, the invited experts agreed with the overall structure of the items, adjusted the expression of the items appropriately, and finally determined 37 pre-survey items.

The data of two surveys were collected by sending questionnaires through the network. The first was a pre-survey, which was used to test the reliability and validity of the scale and correct it appropriately. The second is a formal survey for confirmatory factor analysis and structural equation model validation.

The pre-survey takes the teachers at Sichuan Tourism University, a comprehensive university that implements online teaching, as the survey object, and uses the CX-OTP to teach. It randomly distributes questionnaires to colleagues who are familiar with it. 31 questionnaires are collected, 28 are valid, and the effective rate is 90%. the reliability analysis module of SPSS 26 software was used in this paper to test the reliability of 37 items. After calculation, the $\alpha = 0.789 > 0.7$,

indicating that the reliability of the questionnaire is good. Based on statistical research, only when the KMO test coefficient is more than 0.5 and the P value of the Bartlett's Test of Sphericity is less than 0.05 does the questionnaire have structural validity. The pre-survey validity analysis's KMO = 0.711 > 0.7, and Bartlett's Test of Sphericity result is significant ($P < 0.001$) at this level. Detailed information reveals that the questionnaire has a good level of structural validity and that its questions can be utilized for evaluation.

This paper conducted a large-scale random formal-survey of university teachers in Sichuan Province, recovering 317 valid questionnaires. Reliability analysis using SPSS 26 software indicated that the questionnaire exhibited strong internal consistency with $\alpha = 0.68$. The KMO = 0.70. Further confirmatory factor analysis demonstrated that user experience items effectively reflected the measured variables, with each item having a factor load greater than 0.7 ($P < 0.05$). Both the combination reliability (CR) and average variance extracted (AVE) values surpassed 0.6 and 0.5, respectively, respectively, indicating good reliability and validity. Overall, this paper achieved a relatively ideal level of reliability and validity.

AMOS 24.0 software was used to estimate path coefficients in a sample model with nine variables and 37 measurement indicators using the maximum likelihood method. To determine the relevance of path coefficients, a C.R. absolute value exceeding 1.96 and a P-value less than 0.05 were regarded as indicative of significance. However, the path fromOTEx to PEOU was found to be insignificant in the final path coefficient table. Consequently, this path was removed after considering the actual circumstances and the underlying model.

The model's fit indices were within acceptable limits, with CMIN/DF at 2.358 and RMSEA at 0.078, indicating a good fit. The results, including standardized regression coefficients (β), standard errors (S.E.), critical ratios (C.R.), significance levels (P), and hypothesis testing, are presented in Table 1.

5 Results

The primary external factor influencing PU is students' online learning status, indicating that college teachers' PU is primarily linked to students' learning progress and knowledge mastery. College teachers' main motivation to use the OTP is that it helps students acquire professional knowledge and skills through CX-OTP. The psychological impact of OTEx and the OTEn on college teachers' PU is greater than that of online teaching input and support. OTEn and support can influence UE through PEOU, motivating users to use the OTP. OTS has a limited impact on college professors' reported ease of use and usefulness. The psychological impact of an OTEn is more significant than PU The model reveals that UE directly affects the ASU, with perceived utility being the key factor influencing UE. PU has a considerably greater influence coefficient on UE compared to PEOU.

Moreover, the influence coefficient of PEOU on the UE through PU is greater than that of PEOU directly on UE. This means that college teachers are looking forward to the useful teaching effect when implementing online teaching through the CX-OTP.

6 Conclusion

The CX-OTP-UEM, constructed in this paper, starting from five external factors: OLSOS, OTI, OTEx, OTS, OTEn, it triggers users' intrinsic experiences of PU and PEOU. The practical value of this model extends not only to educational management institutions, information technology

companies, schools, teachers, and students but also offers a viable approach for assessment and resource allocation. However, this is worth noting the elements, indicators, and model for evaluating the UE in the design of OTPs are formulated based on the current societal, institutional, and ICT contexts, thus possessing temporality and limitations.

Although this paper used a subjective evaluation method to emphasize the significance of user experience in platform development, the evaluation subject was overly straightforward, the sample consisted only of university professors, and the regional features were not sufficiently highlighted. Only one platform was selected, and the user experience of other OTP was not compared. The analysis of platform multi-agent, or subject to multi-platform, multi-data can increase the scientific evaluation. With the development of big data technology, the function of OTP data collection and processing is becoming more and more powerful. The follow-up research needs to increase the multi-agent and multi-platform research, to achieve more objective and scientific research results on user experience.

References

[1] X. Chen and J. Hu, 'ICT-related behavioral factors mediate the relationship between adolescents' ICT interest and their ICT self-efficacy: Evidence from 30 countries', Comput. Educ., vol. 159, p. 104004, Dec. 2020, doi: 10.1016/j.compedu.2020.104004.

[2] F. Zhang, J. Pang, Y. Guo, Y. Zhu, and H. Zhang, 'A Study of Factors Influencing the Use of the DingTalk Online Lecture Platform in the Context of the COVID-19 Pandemic', Sustainability, vol. 15, no. 9, p. 7274, 2023.

[3] T. Chen, L. Peng, X. Yin, J. Rong, J. Yang, and G. Cong, 'Analysis of User Satisfaction with Online Education Platforms in China during the COVID-19 Pandemic', Healthcare, vol. 8, no. 3, Art. no. 3, Sep. 2020, doi: 10.3390/healthcare8030200.

[4] M. Al Breiki and A. Al Abri, 'The Extended Technology Acceptance Model (ETAM): Examining Students' Acceptance of Online Learning During COVID-19 Pandemic', International Journal of Emerging Technologies in Learning (iJET), vol. 17, pp. 4–19, Nov. 2022, doi: 10.3991/ijet.v17i20.29441.

[5] W. L. in R.-B. U. Experience, 'The Definition of User Experience (UX)', Nielsen Norman Group. Accessed: Oct. 03, 2023. [Online]. Available: https://www.nngroup.com/articles/definition-user-experience/

[6] B. ISO and B. STANDARD, 'Ergonomics of human-system interaction', British Standards Institution, 2010.

[7] O. Boiral, 'Managing with ISO Systems: Lessons from Practice', Long Range Plann., vol. 44, no. 3, pp. 197–220, Jun. 2011, doi: 10.1016/j.lrp.2010.12.003.

[8] F. D. Davis, 'Technology acceptance model: TAM', Al-Suqri, MN, Al-Aufi, AS: Information Seeking Behavior and Technology Adoption, pp. 205–219, 1989.

[9] L. Lorenza and D. Carter, 'Emergency online teaching during COVID-19: A case study of Australian tertiary students in teacher education and creative arts', International Journal of Educational Research Open, vol. 2, p. 100057, Jan. 2021, doi: 10.1016/j.ijedro.2021.100057.

[10] A. H. Y. Yau, M. W. L. Yeung, and C. Y. P. Lee, 'A co-orientation analysis of teachers' and students' perceptions of online teaching and learning in Hong Kong higher education during the COVID-19 pandemic', Studies in Educational Evaluation, vol. 72, p. 101128, Mar. 2022, doi: 10.1016/j.stueduc.2022.101128.

[11] T. Trust and J. Whalen, 'Should Teachers be Trained in Emergency Remote Teaching? Lessons Learned from the COVID-19 Pandemic', Journal of Technology and Teacher Education, vol. 28, no. 2, pp. 189–199, 2020.

[12] T. Vuckovic, D. Stefanovic, D. C. Lalic, R. Dionisio, A. Oliveira, and D. Przulj, 'The Extended Information Systems Success Measurement Model: e-Learning Perspective', APPLIED SCIENCES-BASEL, vol. 13, no. 5, p. 3258, Mar. 2023, doi: 10.3390/app13053258.
[13] O. B. Adedoyin and E. Soykan, 'Covid-19 pandemic and online learning: the challenges and opportunities', Interact. Learn. Envir., vol. 31, no. 2, pp. 863–875, Feb. 2023, doi: 10.1080/10494820.2020.1813180.
[14] M. Adnan and K. Anwar, 'Online Learning amid the COVID-19 Pandemic: Students' Perspectives.', Online Submission, vol. 2, no. 1, pp. 45–51, 2020.
[15] H. Jiang, A. Y. M. A. Islam, X. Gu, and J. M. Spector, 'Online learning satisfaction in higher education during the COVID-19 pandemic: A regional comparison between Eastern and Western Chinese universities', Education and Information Technologies, vol. 26, no. 6, pp. 6747–6769, Nov. 2021, doi: 10.1007/s10639-021-10519-x.