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Judul Artikel yang direview:	:	*The Impact of Engagement in Live Streaming Learning on English Language Performance: An UTAUT-Based Study*
Bulan, Tahun Artikel yang direview	:	Agustus 2025

UIRmail

Sri Wahyuni <wahyunis@edu.uir.ac.id>

[JTL] Article Review Request

1 message

April King via University of Windsor Journal Publishing <no_reply@scholarsportal.info> Fri, Aug 15, 2025 at 10:09 PM

Reply-To: April King <king92@uwindsor.ca>
To: Sri Wahyuni <wahyunis@edu.uir.ac.id>

Sri Wahyuni:

Thank you for your willingness to review for the Journal of Teaching and Learning. I believe that, given your expertise, you would serve as an excellent reviewer of the manuscript, "The Impact of Engagement in Live Streaming Learning on English Language Performance: An UTAUT-Based Study." The submission's extract is inserted below, and I hope that you will consider undertaking this important task for us.

Please log into the journal web site by 2025-08-22 to indicate whether you will undertake the review or not, as well as to access the submission and to record your review and recommendation.

The review itself is due 2025-09-12.

Submission URL: https://jtl.uwindsor.ca/index.php/jtl/reviewer/submission?submissionId=10222&reviewId=7739&key=6CEtZv

Thank you for considering this request.

April King
king92@uwindsor.ca

"The Impact of Engagement in Live Streaming Learning on English Language Performance: An UTAUT-Based Study"

Abstract

Using the Unified Theory of Acceptance and Use of Technology (UTAUT) to analyse the key factors influencing students‘ behavioural intentions and actual use of the platform, this study examines the factors influencing Chinese university students’ adoption of Tencent Live Classes, a widely-used platform for live-streaming courses. The key determinants studied include achievement expectations, effort expectations, social influence, and facilitation. Data collected from students at Sichuan Early Childhood Teacher Training Higher Colleges showed that achievement expectations and effort expectations were strong predictors of behavioural intention. In contrast, social influence had little effect, suggesting that students tend to use the platform in a self-motivated manner. Using PLS-SEM, the study confirms the reliability of the model and the implications for universities: prioritising ease of use and strong support increases platform adoption and engagement. These findings provide insights for optimising online learning, especially for sustaining education during times of disruption such as pandemics.

Clayton Smith, Editor
April King, Editorial Assistant

The Journal of Teaching and Learning
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Journal of Teaching and Learning

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Review: The Impact of Engagement in Live Streaming Learning on English Language Performance: An UTAUT-Based Study

1. Request 2. Guidelines 3. Download & Review 4. Completion

Request for Review

You have been selected as a potential reviewer of the following submission. Below is an overview of the submission, as well as the timeline for this review. We hope that you are able to participate.

Article Title

The Impact of Engagement in Live Streaming Learning on English Language Performance: An UTAUT-Based Study

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2025-08-15	2025-08-22	2025-09-12
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Review: The Impact of Engagement in Live Streaming Learning on English Language Performance: An UTAUT-Based Study

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JTL Review Form

Reviewers are invited to use the on-line review form when reviewing submitted manuscript assessments.

The problem/topic: its relevance to the interests of our readership and/or mandate of JTL. *

- 1. Of little relevance
- 2. Of some relevance
- 3. Of significant relevance

Comments:

The manuscript is a good fit for JTL because 1) it examines contemporary online learning practices through a robust theoretical framework (UTAUT), 2) it responds to pandemic-driven educational challenges, aligning with JTL's interest in crisis pedagogy, 3) it contributes to debates on technology, equity, and sustainability in education, and 4) it offers empirical evidence with clear implications for teaching, learning, and institutional practice.

Theoretical framework. *

- 1. Not well established.
- 2. Somewhat established.
- 3. Well established

Comments:

The theoretical framework of the paper is well established. The author grounds the study in the Unified Theory of Acceptance and Use of Technology (UTAUT), a widely recognized and robust model for examining technology adoption in educational contexts. The framework is situated within a broader lineage of related theories (TRA, TPB, TAM, TAM2, IDT), which strengthens its conceptual grounding. The constructs, performance expectancy, effort expectancy, social influence, and facilitating conditions, are clearly defined and directly linked to the study's context of live-streaming learning through Tencent Live Classes. Moreover, the paper articulates testable hypotheses derived from the framework and justifies the adaptation of the UTAUT model to fit this specific educational environment. While a deeper critical engagement with the model's limitations could further enrich the analysis, overall the theoretical framework is coherent, appropriate, and sufficiently rigorous to support the study's aims.

Methodology/Data Sources. *

- 1. Not well established.
- 2. Somewhat established.
- 3. Well established.

Comments:

The methodology and data sources are well established. The study draws upon a robust sample of 437 valid student responses, with clear demographic details provided to enhance transparency. The survey instrument is based on validated UTAUT constructs, adapted appropriately to the Tencent Live Classroom context, and subjected to pilot testing and expert review to ensure reliability and validity. Data analysis employs Partial Least Squares Structural Equation Modeling (PLS-SEM) alongside confirmatory factor analysis, with appropriate checks for reliability, convergent validity, and discriminant validity. Fit indices, regression paths, and effect sizes are reported in line with established methodological standards, ensuring rigor and replicability. While the use of a convenience sample from a single institution does limit the generalizability of findings, the study acknowledges this limitation. Overall, the methodological design and data sources are rigorous, appropriate, and well aligned with the study's aims.

Argument/Conclusions. *

- ○ 1. Not well supported.
- ○ 2. Somewhat supported.
- ◉ 2. Well supported.

Comments:

The argument and conclusions are well supported. The study's findings are clearly linked back to the UTAUT framework, with performance expectancy and effort expectancy identified as the strongest predictors of behavioral intention, and facilitating conditions and behavioral intention shown to influence actual use. The discussion is coherent, aligns with prior research, and draws out relevant implications for educators and institutions, particularly regarding the need for ease of use, technical support, and accessibility in online learning platforms. However, some conclusions are presented more assertively than the data can fully justify, especially given the study's limitations of a single-institution, convenience sample and reliance on self-reported data. In addition, the argument could benefit from a deeper critical engagement with contextual and cultural dimensions of technology adoption. Overall, the conclusions are persuasive and consistent with the evidence, though they would be strengthened by more cautious framing and acknowledgment of scope.

Coherence and Organization. *

- ○ 1. Not coherent.
- ○ 2. Somewhat coherent.
- ◉ 3. Very coherent.

Comments:

The manuscript is very coherent and well organized. It follows a clear academic structure, moving logically from the introduction and theoretical framework through methodology, data analysis, discussion, and conclusion. Each section is well signposted, and the argument is developed progressively, allowing the reader to follow the study's rationale and findings with ease. Tables and figures are effectively integrated to support the text, and key constructs such as performance expectancy and effort expectancy are used consistently throughout. While the literature review is dense in places, it remains relevant and contributes to the coherence of the overall narrative. The paper maintains clarity, focus, and flow, making it accessible to its intended scholarly audience.

Contribution to the Field. *

- ○ 1. Routine.
- ◉ 2. Important, but not novel.
- ○ 3. Significant/innovative/insightful

Comments:

The contribution of this study is important, but not novel. The paper provides timely and contextually valuable evidence on the adoption of live-streaming platforms in higher education, particularly within the Chinese context during the COVID-19 pandemic. By applying the UTAUT framework, it highlights the central role of performance expectancy and effort expectancy in shaping students' engagement with Tencent Live Classes, offering practical implications for educators, administrators, and developers seeking to improve online learning environments. However, the study's contribution is largely confirmatory rather than groundbreaking. The UTAUT framework has been widely applied in technology acceptance research, and the findings, such as the limited impact of social influence, largely align with existing studies. While the specific focus on Tencent Live Classes and the pandemic context adds regional and temporal relevance, the work does not substantially advance theory or methodology in the field.

Overall Recommendation *

- ○ Accept as written
- ◉ Accept with minor revisions
- ○ Revise and resubmit for review
- ○ Reject manuscript (please explain why)

Reviewer's Comments and Suggestions for Improvement.

This manuscript makes a relevant and timely contribution to research on online learning and technology adoption, aligning well with JTL's mandate, particularly its focus on teaching and learning during times of disruption such as the pandemic. It is theoretically grounded, methodologically rigorous, and well organized. However, revisions are needed to temper overgeneralized conclusions, engage more critically with contextual and equity considerations, and provide improvements to both the literature review and the discussion to ensure sharper focus and deeper critical reflection. These are minor revisions that would strengthen the manuscript without requiring substantial restructuring.

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The Impact of Engagement in Live Streaming Learning on English Language Performance: An UTAUT-Based Study

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1 Introduction

Distance education academics have shown heightened interest in long-distance communication throughout the 21st century, driven by advancements in both communication and computer technology. Special emphasis has been placed on the evolution of online learning and the impact of such technological progress on extensive online distance education. Ongoing research is dedicated to discovering methods to enhance the rapport and confidence between live trainers and students attending webcasted classes. Christiaan states that ongoing and successful communication bolsters the trust bond between teachers and pupils, leading to improved effectiveness in the classroom (Anderson, 2008; Garrison & Cleveland-Innes, 2005; Borup et al., 2014). Moreover, live courses, being a novel educational approach, boost learning involvement via immediate interaction (refer to Martin & Bolliger, 2018; Wang & Huang, 2020). Advances in technology render educational content more captivating and dynamic, while permitting more adaptable and varied teaching techniques (Salmon, 2013). Illustratively, employing multimedia devices and interactive mechanisms enables educators to adeptly showcase intricate ideas, and students to deepen their comprehension through direct questioning and engaging in dialogues (Hrastinski,

2008). This methodology ensures students of varied areas and ethnicities have access to uniform educational chances, thereby transcending the inherent geographic and temporal constraints of conventional education (see Means et al., 2010). Moreover, studies indicate that for the improvement of live-streamed courses, instructors must become proficient in particular technical know-how and digital teaching techniques. Latest research frequently centers on efficiently implementing live streaming, enhancing student digital involvement, and creating vibrant online learning communities (Anderson, 2008; Martin et al., 2020). Conclusively, live-streaming initiatives demonstrate the progress in contemporary technology, denoting a major transformation in the educational framework (Garrison & Anderson, 2003).

2. Model of UTAUT

The study utilizes the Unified Theory of Acceptance and Use of Technology (UTAUT) as a basis to meticulously explore the primary influences on online learning. Eight varied theoretical models are employed to evaluate the primary factors in our study. The research is grounded in the UTAUT theory, focusing on the Sichuan Early Childhood Teacher Training Higher Colleges, a Chinese public entity as its research subject. The research focused on assessing the students' actual plans and usage of the online streaming service "Tencent Classroom". The research focused its analysis on the four principal influencers of the UTAUT theory, namely expectations of performance, effort, social impact, and convenience.

Performance expectations are based on a person's expectations about the effectiveness of an online learning platform in enhancing their educational results. The idea mainly illustrates the connection between engaging with an online educational platform and a person's learning results. Within the realm of digital learning, the performance standards of students frequently align with their anticipated achievements in these online courses. This encompasses aspects like how effective the learning platform's information system is and the caliber of the course material. Regarding the live course participants in this research, it relates to the anticipation that the implementation of Tencent Classroom will enhance their educational results.

Expectations of effort are an individual's perceptions regarding the simplicity and skillfulness of the online learning platform and its content. The concept of effort expectation in online education pertains to the level of challenge or simplicity students experience in understanding and maneuvering through the system and its components. This study focuses on how learners perceive the simplicity or complexity of utilizing live technology and how these perceptions influence their goals and the immediate application of knowledge. The study of social influences explores how often individual behaviors or societal norms motivate students towards online education. The inclusion encompasses external factors like peer perspectives and the platform's entire milieu, complemented by feedback from educators and peers regarding the real-time platform (Venkatesh et al., 2003; Al-Emran et al., 2020). Positive situations are linked to the learners' perception of the aid provided by the platform, from both a technical and organizational perspective. This further exploring the extent to which platform design can limit user activities. Zhang's research underscores the significance of favorable situations for the successful integration of technology in virtual education. The courses offered in real-time encompass trustworthy technical support, dependable internet links, and the accessibility of vital resources.

The application of UTAUT theoretical elements to live course research augments our comprehension of crucial determinants influencing online learning adoption, simultaneously providing pragmatic perspectives on the successful crafting and adoption of educational

technologies, especially in academic settings (Zhang, 2020; Venkatesh et al., 2003). Enhancing online and live courses becomes more feasible and achievable by pinpointing and refining essential elements, which ultimately elevates educational quality and accessibility.

Live-streaming

Live teaching has gradually emerged with its interactive and flexible features, and has become part of the education industry due to its advantages.Since 2016, live webcast teaching has gradually emerged with the development of the webcasting industry, and live webcasting teaching platforms have sprung up.In 2020, the start of the school year was delayed in most colleges and universities due to the epidemic, and offline teaching was forced to switch to online. At this stage, webcast teaching platforms with Chinese university characteristics are also gradually online for teachers and students to use, such as Tencent classroom, rain classroom, superstar learning network and so on. The exploration of teaching practice of webcasting courses in the context of the epidemic is also developing, especially in terms of the effect of live learning, experts and scholars at home and abroad, based on the research background combined with the special situation of the epidemic, take live learning, online learning, mobile learning, asynchronous learning as key words to analyse the advantages and disadvantages of the use of large-scale, high-frequency webcasting teaching mode during the epidemic, to reflect on the problems, and to put forward practical solution strategies, such as Jiang Yi et al.'s (2020) "Response and Reflection on Webcast Teaching during the New Crown Pneumonia Epidemic", Wang Bi's (2020) "Analysis of the Pros and Cons of Webcast Teaching during the New Crown Pneumonia Epidemic", and so on. (2020), 'Response and Reflection on Webcast Teaching during the New Crown Pneumonia Epidemic', and Wang Bi (2020), 'Analysis of the Pros and Cons of Webcast Teaching Models during the New Crown Pneumonia Epidemic'.

It can be seen that domestic scholars and related educators have already had specific knowledge and teaching strategies for webcasting teaching during the epidemic, but there is a lack of comprehensive research. and exploration of webcasting teaching modes for specialised disciplines, which is also an issue that the author is going to explore.

The primary advantage of live courses lies in their capacity to facilitate real-time interaction, enabling immediate communication between students and teachers (Martin et al., 2020; Singh & Thurman, 2019), which improves the interactivity of the course, solves the problem of online courses being unable to synchronise their thoughts, and allows them to instantly address students' queries and problems.

Like other online programmes, live courses can be accessed anytime, anywhere with just an Internet connection, enabling wider educational coverage regardless of the learner's geographical location. This feature is in line with UNESCO's goal of promoting equity in education and supports the core elements of the United Nations Sustainable Development Goals (SDG4), which are to ensure inclusive and equitable quality education for all, while promoting lifelong learning opportunities for all. This model not only removes geographical barriers, but also provides learners with more flexible learning options, thus promoting universal and balanced education (UNESCO, 2015; United Nations, 2015).

Live courses integrate rich teaching resources. The live streaming platform integrates many teaching tools for live courses, such as video presentations, presentations, interactive polls, and interactive quizzes, making live courses more lively and exciting.

In summary, live learning can be analyzed through three key dimensions:
1. What: This refers to a crucial aspect of online learning that utilizes information and instructional technologies to enhance the learning experience.

2. How: This involves delivering course content in a virtual environment by using internet-based platforms and specialized software to effectively present learning materials (Singh & Thurman, 2019; Martin et al., 2020).
3. Why: Live course learning helps people achieve educational goals and supports lifelong learning at a lower cost through diverse communication tools and flexible learning options.

Real-time streaming is a form of real-time capture, distribution and simultaneous viewing of video content through Internet technology (Zhou et al., 2019). Its core advantage lies in its ability to significantly enhance the interaction between viewers and satisfy their cognitive needs through immediacy, while effectively enhancing the sense of engagement (Yu et al., 2018; Shen, 2021). Relative to conventional pre-recorded content, live streaming media distinctively fuses extensive synchronization with a pronounced social engagement, fostering a deeper, more enveloping viewing experience for its audience and enhancing opportunities for instantaneous interaction and emotional linkage. Due to this feature, the utilization of real-time streaming media has expanded in education, entertainment, and business sectors, emerging as a key means for distributing today's content (Ang et al., 2018).

Although live learning offers various advantages, its significance should not be exaggerated. In 2020, Chen Yi conducted a study on the application of live broadcast technology in rural schools and analysed how live broadcast technology is used for quality education in rural schools in western China (Chen,2020). Although live learning offers numerous advantages, its impact should not be overstated. Chen Yi (2020) conducted a study examining the use of live broadcast technology in rural schools, shedding light on its practical applications and limitations. Zhang (2017) offers insights into the construction, contestation, and manifestation of gender performativity within the backdrop of live-streaming in China; Megan's 2020 study showcased the successful application of live-streaming technology to broadcast multiple neurosurgical procedures using various video sources. The study concluded that this method not only facilitated education during the challenging circumstances of the pandemic but also has significant potential for advancing medical and graduate medical education in the future (Megan, 2020); the above studies on live-streaming in different fields have shown that the development of live-streaming technology has brought new development opportunities and challenges in various industries, but whether live-streaming, a new technology for learning, brings new learning opportunities and challenges, this paper will make a further study. However, this paper will conduct further research and exploration to see whether the new technology of live broadcasting can bring new enhancement to learning.

The success of live streaming lies in its highly interactive and efficient real-time response, which can increase the investment of teachers and students in live learning, and if the usage rate of live

education is high, it will increase the return on investment of more organisations in this mode of learning in the future (Input Theory,) Tencent Live Classes has become one of the most popular and widely used live learning platforms among teachers and students due to its rich functionality and ease of accessibility, offering more than 1 million teachers and more than 80 million students with live classes(Bugua, 2021).

3. Research objectives

Over the past three decades, researchers have been studying the adoption and acceptance of emerging technologies, focusing on factors that influence individuals' intentions to use these technologies (Abbad, 2021). Behavioural intention refers to an individual's willingness to engage in a particular task (Chu and Chen, 2016), while technology acceptance focuses on why and to what extent an individual accepts a new technology (Masrom, 2007). Conversely, the adoption of technology underscores the ongoing application of these innovations (Venkatesh, 2012). Regarding online learning, goals correlate with the embrace of new technologies and how they will be assimilated into future educational experiences (Sathya, 1999). Grasping the motivations driving these processes is crucial for the creation of technologies that have real-world applications. An elevated degree of acceptance reflects increased readiness among users to modify their way of living to include technological advancements (Walter, 1999), a crucial factor in determining technological triumph (Davis, 1993). On the flip side, a restrained level of acceptance may result in technological breakdown and financial depletion (Lewis, 1985).

The research investigates elements that affect China's university students' engagement with Tencent Classroom, a popular educational management system designed to enhance both online and in-person instruction. Tencent Classroom serves as a central hub for Chinese college students and instructors, offering the convenience of uploading educational resources, interacting with classmates and instructors, submitting tasks, and obtaining assessments. At Sichuan Early Childhood Normal College, both teachers and students have the opportunity to use Tencent Classroom as a platform to enhance the learning experience. This system is often integrated with traditional teaching methods by educators aiming to make their classes more engaging. This research adopts the Unified Theory of Acceptance and Use of Technology (UTAUT) model, developed by Venkatesh et al. in 2003, to explore the factors influencing users' adoption and utilization of this innovative tool. The findings of the study will be analyzed through Structural Equation Modeling (SEM) to assess the impact of these factors (Venkatesh et al., 2003; Wang & Zhou, 2022).

Theoretical framework

The research aims to integrate technological aspects and student engagement using the Tencent Classroom live-streaming service. This part explores a range of theories regarding integration in technology, laying the groundwork for the theoretical structure of this study. Scholarly research has pinpointed four key frameworks for comprehending the integration of technology.

The concept known as the Theory of reasoned action (TRA) by Ajzen and Fishbein, originating in 1975, evolved into the Theory of Planned Behavior (TPB) by Ajzen in 1991. The hypotheses indicate that the intention to act is crucial, influencing actual behavior, which is sculpted by individual beliefs and societal standards. TPB advocates for this concept through an emphasis on how one perceives behavioral control, mirroring personal evaluation of their skill in executing the behavior.

Davis's Technology Acceptance Model (TAM) underscores two crucial elements—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—as key in shaping an individual's propensity to embrace a technology. These elements significantly influence the user's readiness and propensity to interact with the technology.

The third model, TAM2, enhances the framework initially crafted by Davis in 2000. The TAM2 schema integrates cultural elements such as individual convictions and mental processes into its foundational design, thus enriching the comprehension of technology acceptance trends.
The fourth model, Innovation Diffusion Theory (IDT), proposed by Rogers in 1983, provides some theoretical support for understanding and predicting technology in this study. Table 1 summarises the key points of these models.

Venkatesh et al. integrated various existing models, including motivational theories and frameworks related to personal computer usage, to create the Unified Theory of Acceptance and Use of Technology (UTAUT). Their research conducted in 2003 showed that UTAUT explained approximately 70% of the variance in the behavioral intention to use technology, while actual usage behavior accounted for about 50% (Venkatesh et al., 2012). Yet, Dwivedi and colleagues criticized the model for its omission of crucial connections, its reliance on assumptions that might not be universally relevant, and the omission of fundamental concepts essential for grasping the reception and application of information systems.

Venkatesh et al.'s 2003 UTAUT theory delves into the manner in which users adopt and utilize technology in information systems, merging the foundational components of earlier theories like TAM, TPB, IDT, TAM, SCT, MPCU, MM, C-TAM-TPB, TAM2, and introduces a novel and holistic theoretical model to examine the interplay between technology and acceptance. The fundamental components of UTAUT encompass the following.

Essential components of UTAUT encompass:

Performance Expectancy denotes the belief by individuals that applying a specific technology will improve their abilities or lead to additional advantages.

Effort Expectancy measures the level of ease and ease with which users regard the technology.

Social Influence mirrors the stress individuals experience from significant figures in their lives, motivating their adoption of modern technology.

Facilitating Conditions reflect a person's view of how accessible organizational and technological resources are for technology utilization.

Such elements together mold how users embrace and utilize technology. The UTAUT model additionally includes influencing factors like sex, age, expertise, and propensity to embrace innovations, impacting the effects of these fundamental elements on the acceptance and application of technology (Venkatesh et al., 2003; Dwivedi et al., 2019).
As depicted in Figure 1, expectations of performance, exertion, and social impact have a direct effect on behavioral intentions, whereas enabling circumstances are closely linked to the real-world utilization of technology. In addition, behavioural intentions are moderated by factors such as gender, age, experience and voluntariness. In order to adapt the UTAUT model to the e-learning environment, Jaradat and Banikhaled (2013) identified website quality as a key factor influencing the intention to use the technology.Nassuora (2012) used the UTAUT model to analyse the acceptance of m-learning, emphasising attitudes rather than just intentional behaviour.Salim (2012) explored the acceptance of e-learning via Facebook for e-learning acceptance, while Gogus and Nistor (2012) studied online communication and interaction using UTAUT in the Turkish education system. In order to assess the adoption of e-learning in academia, Ugur and Turan extended the model by adding two additional constructs: areas of scientific specialisation and system interactivity. More recently, Kim and Lee (2020) developed a conceptual framework for effective ICT-based teaching and learning in the Philippines using UTAUT as a base model.

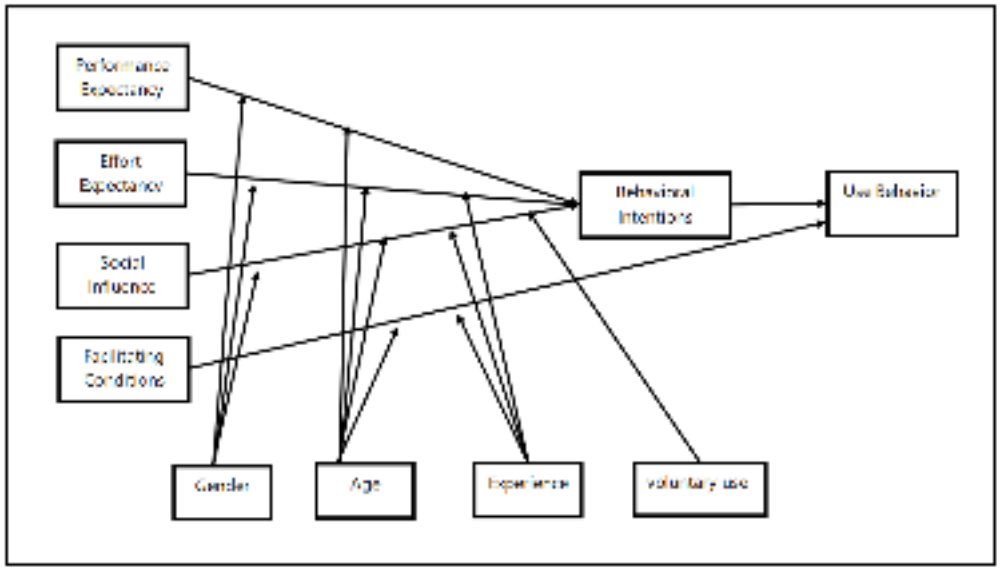

Figure 1 UTAUT Model. Reprinted from Venkatesh

This study used the UTAUT framework to examine the acceptance of Tencent live courses by students in Sichuan Early Childhood Teacher Training College. The study focused on key factors

influencing acceptance behaviours such as performance expectations, social influence, effort expectations and facilitating conditions. Dwivedi and teams (2019) noted that numerous researches often concentrate on just a fraction of the elements in the UTAUT model, instead of utilizing the full framework and omitting moderating variables. The researcher noted the possibility of previous studies neglecting intermediary variables, which might not influence the application and endorsement of live courses, thus, this study will use a modified form of the UTAUT model, integrating five pre-confirmed and confirmed hypotheses (H1-H5).

H1: Performane expectations significantly shape the intention to act.
H2: Effort expectations significantly impacts the intention behind actions
H3: Social influence plays a key role in the formation of behavioural intention
H4: Facilitation has a significant effect on usage behaviour
H5: Behavioural intention strongly influences usage behaviour

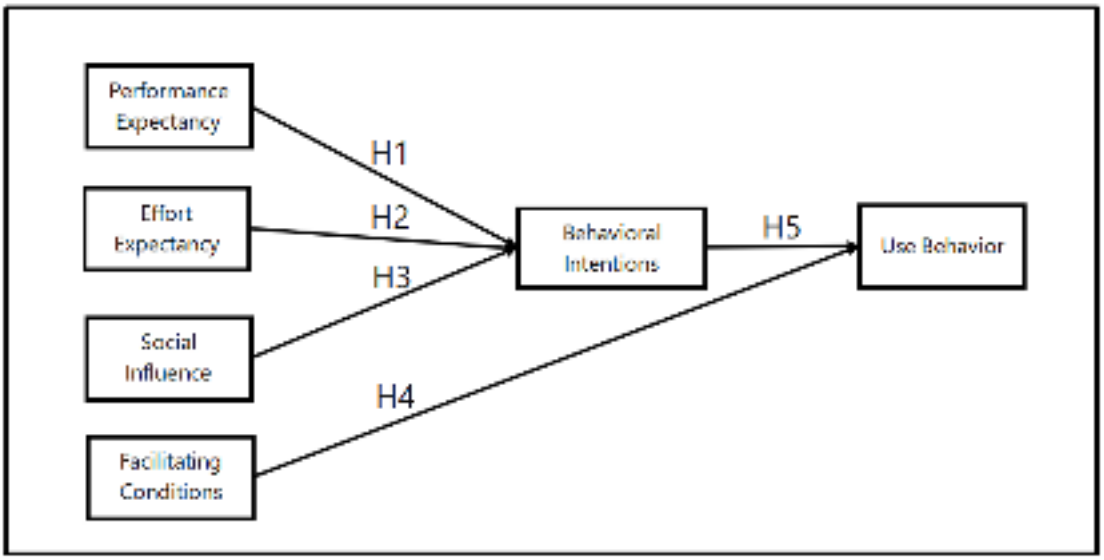

Figure 2 Modified UTAUT

Much like the Theory of Reasoned Action (TRA), Behavioural Intentions (BI) play a pivotal role in molding the elements influencing students' adoption of technology (Maldonado et al., 2011; Park, 2009). The UTAUT structure delineates how user actions are governed by crucial components like Performance Expectations (PE), Effort Expectations (EE), Social Influence (SI), and Facilitation (FC). Performance Expectation (PE) symbolizes students' belief that living in a Tencent Live Classroom enhances their scholastic performance. The level of expected effort (EE) is directly linked to the ease of use in the Tencent Live Classroom. Social Influence (SI) evaluates how a student values viewpoints from others regarding Tencent Live Classroom. Ultimately, the Facilitating Condition (FC) pertains to students' views on the presence of individual or institutional resources that facilitate their access to the Tencent Live system.

Research methodology and data analysis

In this paper, data were collected from a sample of students in Sichuan Early Childhood Teacher Training Higher Colleges using convenience sampling method. The questionnaires were distributed using the Questionnaire Star platform, and a total of 462 questionnaires were

distributed. A total of 437 responses were collected, of which 13 were excluded due to incomplete data. According to the recommendation of Hair et al. (2004), when analysing relationships in structural equations, the sample size for each latent variable should be 15-20 observations.

The sample consisted of undergraduate students from various colleges, including 33.6% in Education, 29.5% in IT, 24.4% in Management, and 12.4% in other fields. The students were almost evenly distributed across year levels:1 year, 2 year, and 3 year (see Table 2).

Table 2 Demographic characteristics of the sample

Variable	Number of Respondents	Percent (%)
Gender		
Male	181	41.3
Female	256	58.7
Age		
18-20 years	121	27.6
21-23 years	179	40.9
Above 23 years	137	31.4
Year Level		
1 year	93	21.2
2 year	257	58.8
3 year	87	19.9
College		
Education	147	33.6%
IT	129	29.5%
Management	107	24.4%
Others	54	12.4%

Materials required by students in the live classroom, including the syllabus, PPT presentations and homework assignments, were available upon access to the platform. The questionnaire was distributed through the Questionnaire Star platform with a total of 462 participants. Of these, 437 responses were collected and 13 were excluded due to incomplete data. According to the guidelines developed by Hair et al. (2004), a sample size of 15 to 20 observations per latent variable is appropriate for analysing relationships in structural equation modelling. This study included six latent variables, such as the actual usage of the Tencent live class platform, to ensure that the sample size was sufficient for a robust analysis.

Table 3 Scale Items

Variable	Description of Items	Source
Performance	PE1: I find using LSC beneficial for my learning.	Venkatesh et al.(2011)
Expectancy	PE2: LSC helps me complete learning tasks more efficiently	Al-Shahrani (2016)
	PE3: Using LSC enhances my learning productivity.	Al-Qeisi et al.(2015)
	PE4: Using LSC improves my chances of achieving higher marks in my courses.	
Effort Expectancy	EE1: I find my interaction with LSC to be clear and easy to understand.	Venkatesh et al.(2011)
	EE2: I am confident in my ability to use LSC.	Al Shahrani (2016)
	EE3: It is easy for me to learn how to use LSC	Al-Qeisi et al (2015)
	EE4: I find it easy to use LSC to learn what I need.	
Social Influences	SI1: People whose opinions matter to me believe I should use LSC.	Venkatesh et al.(2011)
	SI2: People who influence my behavior think I should use LSC	Al-Shahrani (2016)
	SI3: Senior students in my college are supportive when it comes to using LSC.	Al-Qeisi et al.(2015)
	SI4: Overall, the university encourages the use of LSC.	
Facilitating Conditions	FC1: I have access to the resources required to use LSC	Venkatesh et al (2011)
	FC2: I possess the necessary knowledge to use LSC.	Al-Qeisi et al.(2015)
	FC3: LSC does not integrate well with other systems I use	
	FC4: There is someone (or a team) available to help me when I encounter issues with LSC.	
Behavioural Intentions	BI1: I intend to continue using LSC in the future.	
	BI2: I expect that I will use LSC in the future	Davis(1986)
	BI3: I plan to keep using LSC going forward.	Venkatesh et al.(2011)
	BI4: I would recommend LSC to my peers	Al-Shahrani (2016)
Usage Behaviour	UB1: I regularly use LSC.	Al-Qeisi et al.(2015)
	UB2: I prefer using LSC whenever it is available.	Al Qeisi et al.(2015)
	UB3: I complete most of my learning tasks using LSC	
	UB4: I tend to rely on LSC as much as possible.	

Evaluation of all UTAUT aspects was done utilizing the elements described in Table 3, modifying the initial UTAUT model by Venkatesh et al. along with other recognized research applying UTAUT in digital and online learning scenarios. In order to analyze Tencent's online classroom in action, this research utilized a survey to assess the real-world engagement with the platform by users. Johnson and colleagues pointed out the difficulty in assessing real-life system utilization, owing to the complications in acquiring dependable measures of consumer behavior and intents, along with collecting necessary specific data for achieving study goals.

The research consisted of 24 items, each quantified by a 5-tier Likert scale (A. Strongly Disagree, B. Disagree, C. Neutral, D. Agree, E. Strongly Agree). The survey, which was converted from English to Chinese, underwent initial testing with 46 students chosen at random from a group of 462 participants. Two specialists in the field examined and sanctioned the approach and survey tool employed in this research to confirm its accuracy and consistency.

4 Data analysis and results

The study used the Partial Least Squares Structural Equation Modelling (PLS-SEM) method to validate the research model and test the hypotheses. Following the two-step approach proposed by Anderson and Gerbing (1988), the reliability and validity of the measurement model was first assessed and then the structural model was assessed to test the hypothesised relationships. As shown in Table 4, model fit was assessed using key goodness-of-fit (GoF) metrics. The measures encompassed are CMIN/df (≤ 3.00), Goodness of Fit Index (GFI ≥ 0.90), Incremental Fit Index (IFI ≥ 0.90), Adjusted Goodness of Fit Index (AGFI ≥ 0.80), Comparative Fit Index (CFF ≥ 0.90), and Root Mean Square Error of Approximation (RMSEA ≤ 0.08). Studies showed that a majority of the data either adhered to or nearly reached the suggested limits, confirming a strong correlation

with the model (Hair et al., 2017; Hu & Bentler, 1999). Similar to data disguised for an official event—it may not be an ideal match, but it certainly isn't misplaced!

Table 4 CFA Statistics of Model Fit

Goodness-Fit Indexes	Recommended Value	Result Model
Chi2/df	< 3.00	[illegible]
Goodness-of fit index (GFI)	> 0.90	[illegible]
Incremental fit index (IFI)	> 0.90	[illegible]
Adjusted goodness-of-fit index (AGFI)	≥ 0.80	[illegible]
Comparative fit index (CFI)	≥ 0.90	[illegible]
Root mean square error of approximation (RMSEA)	≤ 0.08	[illegible]

5 Measurement model

The study advises conducting CFA evaluations, examining the adjustment metrics, and examining the uniform residual matrices for the six fundamental variables. It's necessary to remove latent variables that show CFA values above 3 for a fully accurate model fit, thereby validating the model's suitability (Byrne, 2016; Hair et al., 2019).

Table 5 Reliability and Convergent Validity Coefficients

Factor	Variables	Standardized Loadings (> 0.708)	Reliability (R²) (> 0.5)	AVE (> 0.5)	Composite Reliability (CR) (> 0.7)	Cronbach's Alpha (> 0.7)
Performance Expectancy (PE)	PE1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	PE2	[illegible]	[illegible]			
	PE3	[illegible]	[illegible]			
Effort Expectancy (EE)	EE1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	EE2	[illegible]	[illegible]			
	EE3	[illegible]	[illegible]			
Social Influence (SI)	SI3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	SI4	[illegible]	[illegible]			
Facilitating Condition (FC)	FC1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	FC2	[illegible]	[illegible]			
	FC3	[illegible]	[illegible]			
Behavioral Intention (BI)	BI1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	BI2	[illegible]	[illegible]			
	BI3	[illegible]	[illegible]			
	BI4	[illegible]	[illegible]			
Usage Behavior ([illegible])	UB2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	UB3	[illegible]	[illegible]			
	UB4	[illegible]	[illegible]			

Table 6 Factor Correlations

Factor	FC	SI	EE	PE	IU	AU
FC	1					
SI	0.263	1				
EE	0.714	0.274	1			
PE	0.559	0.437	0.574	1		
IU	0.462	0.362	0.351	0.517	1	
AU	0.339	0.293	0.582	0.733	0.594	1

Subsequent studies primarily focused on evaluating the convergence and discrimination in validity to validate the model's structural precision. Evaluating convergent validity using factors such as loadings, collective dependability, and the analysis of average variance extracted (AVE) served as measures to confirm adequacy (Fornell & Larcker, 1981; Kline, 2011). Table 5 indicates that Cronbach's alpha scores exceeding 0.7 were deemed sufficient for maintaining both consistent and convergent validity (Nunnally & Bernstein, 1994). To verify the dependability of the construct, a detailed assessment of discriminant validity was performed, as detailed in Table 6. The model's appropriateness was confirmed by the consistency of correlation coefficients with established standards (Kline, 2011).

Structural model and hypotheses testing

The next step in this study involved testing the structural model. To examine the relationships between the UTAUT factors, behavioral intention, and the usage of Tencent live classes at Sichuan Early Childhood Teacher Training College, we utilized PLS-SEM—a robust method for evaluating hypothesized relationships between variables (Hair et al., 2010). The final structural model was developed based on improvement criteria and includes the 18 items outlined in the metrics model section.

Table 7 Standardised Effects for the Model

Factor	Determinant	Direct Effect	Indirect Effect	Total Effect
Intention to Use	FC	-	-	-
(R^2 = 47.7)	SI	**0.127**	-	**0.127**
	EE	**0.304**	-	**0.304**
	PE	**0.381**	-	**0.381**
Actual Use	FC	**0.357**	-	**0.357**
(R^2 59.9)	SI	-	0.062	0.062
	EE	-	**0.179**	**0.179**
	PE	-	**0.231**	**0.231**
	BI	**0.593**	-	**0.593**

Effect sizes greater than 0.1 are in **bold**

A comprehensive assessment of the entire model was carried out. Table 7 summarises the results of the structural model analysis, detailing the model fit and associated metrics, indicating an acceptable level of fit. Using AMOS 23 software, the final model was represented by two unstandardised regression coefficient equations:

BI=0.126SI +0.294EE+0.539PE

R^2=45.2 Error variance=54.8

UB=0.479BI+0.329FC

R^2=56.2 Error variance=43.8

In these structural equations, the path coefficients represent regression weights. For example, the coefficient 0.314 (1 - R1) (where R1 represents the coefficient of determination) reflects the error variance in the second equation. As shown in Table 7, this model accounts for approximately 47.4% of the variance in behavioural intentions and 56.7% of the variance in actual use. Although these values are relatively high, they are still below the 70% threshold suggested by Venkatesh et al. (2003).

Table 7 also provides the standardised, direct, indirect and total effects implied by the model. The main determinant of intention to use the platform is Performance Expectation (PE) with a total effect of 0.381. The second determinant is Effort Expectation (EE) with a total effect of 0.304, followed by Social Influence (SI) with a total effect of 0.127. All of the total effects come from direct effects.

Regarding actual use, the main determinants are Behavioral Intention (BI) and Facilitating Conditions (FC), which have direct effects of 0.593 and 0.357, respectively. PE, EE, and SI also influence actual use indirectly, with effects of 0.231, 0.179 and 0.062, respectively.

According to Cohen's (1988) effect size interpretation guide, behavioural intention to use the Tencent live classroom platform had a large overall effect on students (greater than 0.5), while facilitation had a moderate effect on behaviour (greater than 0.3). Effect sizes greater than 0.1 are highlighted in bold in Table 7.

In addition, Table 8 presents the path coefficients, critical ratios (C.R.) calculated by dividing the path values by the standard error (S.E.) and the significance level (P-value). Four of the five paths have critical ratios greater than 1.96 and p-values below 0.05, indicating statistical significance.

Table 8 Results of Path Tests

Relationship	Estimate	S.E.	C.R.	P	Comment
BI ← SI	**0.132**	**0.088**	**1.483**	**0.127**	Not Sig.
BI ← EE	**0.314**	**0.102**	**2.827**	0.002	Sig.
BI ← PE	**0.497**	**0.137**	**3.274**	***	Sig.
UB ← FC	**0.293**	**0.083**	**3.656**	***	Sig.
UB ← BI	**0.359**	0.085	**4.837**	***	Sig.

Effect sizes greater than 0.1 in bold

Table 9 provides a summary of the supported and unsupported hypotheses. It was found that 'Grade Expectation' (Hypothesis 1) and 'Effort Expectation' (Hypothesis 2) significantly affect students' acceptance and use of Tencent's live classroom platform.

Table 9 Summary of Hypotheses

Hypothesis	Result
H1: Performance expectancy will affect the behavioural intention.	Supported
H2: Effort expectancy will affect the behavioural intention.	Supported
H3: Social influence will affect the behavioural intention.	Not Supported
H4: Facilitating condition will affect the use behaviour.	Supported
H5: Behavioural intention will affect the use behaviour.	Supported

7. Discussion and implications

The primary aim of this study was to identify the UTAUT factors influencing university students' adoption of Tencent's live class platform. The findings indicate that UTAUT effectively explains the behavioral patterns of students using the platform, with all but one of the hypothesized relationships being supported. Notably, social influence did not have a significant impact on behavioral intentions, which is consistent with similar findings in technology acceptance research. In the context of online and live learning, Cheng (2019) and Wang et al. (2023) reported comparable results, where social influence had little to no effect on students' behavioral intentions.

This indicates that social impact doesn't significantly foresee behavior intentions, particularly in the era of digital tools, where learners, accustomed to a tech-abundant setting, might not depend extensively on the influence of their teachers or peers (Jambuliangam, 2013). Expectations of performance were the most robust forecaster of students' willingness to engage with Tencent Live. This result aligns with earlier research (Anderson et al. 2006; Khecchine et al. 2014; Kim & Lee 2020). The primary focus of students is on enhancing their academic achievements, viewing Tencent Live as an effective resource for reaching this objective.Considering these results, there's an imperative for educators, school administrators, and creators of live course systems to enhance their efficiency and output to maximize student academic achievement.

The anticipation of effort stands as the second most significant factor influencing the intention to behave. This result corresponds with prior research concentrating on UTAUT within online educational contexts (Venkatesh et al. 2003; Abdullah and Ward 2016; Raman and Don 2013; Cheng 2019). Specifically, Almarashdeh and Alsmadi, in conjunction with Tarhini and their team, pinpointed the key factor influencing students' intentions to access university websites. Similarly, Al-Emran and team have demonstrated that the expected amount of effort forecasts student engagement with mobile learning tools. Learners who found Tencent Live appealing demonstrated a stronger inclination to engage with this platform. The study corresponds with concepts such as the Technology Acceptance Model (TAM), a notion widely recognized in IT adoption research (Davis, 1986; Manar & Davis, 2000; Abbad et al., 2009). Consequently, universities must focus on developing immediate and accessible academic frameworks to improve student engagement. Its basic usage significantly shapes students' inclinations towards Tencent Live, aligning with prior research on technology acceptance (Venkatesh et al., 2003; Salloum et al., 2019). Students' likelihood of engaging with the platform rises as they can access essential resources and obtain reliable technical support. Universities enhance their platform accessibility by providing

educational resources, comprehensive advice, and professional support, as well as encouraging experienced professors to guide pupils through challenges.

The Unified Theory of Acceptance and Use of Technology (UTAUT) highlights how its components impact the adoption and objective of digital educational mediums (Venkatesh & Bala, 2008; Chauhan & Jaiswal, 2016). Components such as expected endeavor, feelings of being backed, and predictions of performance are influential in shaping students' readiness for digital learning, while social elements exert a relatively minor effect. Acting desire was highlighted as a primary driver for active involvement in Tencent Live, corroborating earlier research which indicates stronger behavioral intentions lead to increased usage (Venkatesh et al., 2012; Kim et al., 2015).
Additionally, the anticipation of academic success acted as a subtle drivers of student engagement, underscoring the platform's importance in enhancing learning outcomes. Understanding the factors that affect student engagement and active participation assists universities in selecting appropriate technologies. In crises like the global pandemic, the contribution of online educational platforms in sustaining continuous learning settings is undeniable (Hodges et al., 2020; Dhawan, 2020).

8. Conclusion

The objective of this study was to examine the elements affecting student involvement with the Tencent live education platform. The research underscores a notable link between how students behave and their engagement with the platform, influenced by projected outcomes and the necessary effort required. Additionally, the presence of assistance considerably influenced the usage trends we noted. The research suggests the use of the UTAUT framework in higher education as an influential predictive instrument to analyze student actions and interactions with the Tencent Live Class in developing countries.

Motivated by these results, universities are urged to implement Tencent Live Class to improve student academic achievements, underlining the significance of student receptiveness for its effective execution. Crafters ought to focus on developing accessible and direct channels to maintain student participation. Universities must guarantee that students, teachers, and developers receive key resources, being skilled in preparing them for emergencies like those caused by pandemic disturbances.

Nonetheless, the research concedes several limitations. Results from a sole university in Sichuan might not hold applicability for different academic or national institutions, even under comparable circumstances. Moreover, the research did not account for intervening variables like age, gender, experience, and voluntary participation, elements that could have improved the predictive precision of the model. Furthermore, solely depending on self-reported information could lead to biased research techniques. For enhancing dependability, future studies ought to encompass comprehensive research tracking system use in real-time and integrating a wider array of factors. The research highlights the significance of contextual elements like age and gender in influencing the uptake of e-learning.

However, the limitations of our study's sample size and extent call for deeper investigative work to confirm and extend these findings.Uniformity in the samples could lead to skewed results, failing to accurately reflect the real scenarios different user groups endure. Additionally, the study mainly employs methods of gathering self-reported data, which are prone to individual prejudices, and the analysis of system records along with user activities is found to be somewhat insufficient.

In order to fully understand the factors influencing the use of e-learning systems, subsequent studies should expand their participant pool to include a wider range of environments and a wider array of user groups. Concurrently, the use of diverse scientific methods, encompassing both quantitative and qualitative analyses, enhances comprehension of the intricacies and diversity in user behavior. The improvements facilitate a more lucid understanding of e-learning systems' usage, thereby strengthening support for suitable policy formulation and educational tactics.Although our research has uncovered preliminary patterns, further empirical analyses are essential to confirm these findings and their relevance and efficacy across an expanded educational scope.

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