

Research on the Influencing Factors of College Students' Learning Experience in Livestreaming Courses*

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The learning experience of online courses has always been a hot topic. As livestreaming courses are online courses with real-time interaction between instructors and students, its learning experience directly affects the learning behavior and effect. The evaluation indicators related to online course learning experience were combined with the attitudes of scholars, enterprise practitioners, and learners in livestreaming courses. When the questionnaire was designed, the exploratory and confirmatory factors were analyzed, the Questionnaire on Learning Experience of College Students in Livestreaming Courses was developed to evaluate the learning experience of college students attending livestreaming courses. Last but not the least, based on the survey data, important factors affecting college students' learning experience in livestreaming courses, including course content, learning environment, course interaction, and learning incentives were discussed and analyzed; strategies to optimize the learning experience in livestreaming courses were proposed.

Keywords: college students, livestreaming courses, learning experience, influencing factor

Introduction

By riding the trend of technology development, presentation and dissemination of educational resources have been enriched. Furthermore, the increasingly common online learning and booming online education have become a “new normal” in education. It is quite popular for instructors and students to rely on fine-designed online courses, MOOCs and other recorded high-quality course resources to carry out teaching, are beneficial for students to learn at anytime, anywhere. However, some studies have shown that there is a lack of emotion and presence in recorded resources, as it can easily make learners feel lonely and lose their motivation and interest. With the development of the live streaming industry and the impact of the COVID-19 pandemic in recent years, a growing number of instructors choose online lecturing characterized by real-time interaction between instructors and students. Thus, how to ensure the learning effect of livestreaming courses has become a

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topic of concern for many scholars. To this end, some scholars get to know the learning effect of livestreaming courses from learning satisfaction (Ma & Bu, 2022), while others try to understand the learner's satisfaction from learning behavior and classroom presence (Faulconer, Griffith, Wood, Acharyya, & Roberts, 2018). A questionnaire was applied in this study to understand the influencing factors of Shenzhen college students' livestreaming course learning experience and, ultimately, to provide a reference for optimizing its learning experience.

Review

The mounting popularity of online course learning behavior has aroused the concern of many scholars on online course learning experience. Some of them focus on the satisfaction of classroom learning in online classrooms, synchronous interactive classrooms, and other classrooms where instructors and students are online at the same time (Jiang, Bai, Wu, & Luo, 2019; Chen, 2017).

Livestreaming Courses

Livestreaming courses are online courses in which teachers and students are online at the same time and can communicate with each other in real time. An online course contains three major elements, namely, teaching content, teaching activities, and teaching support environment, according to "Online Course Construction—Part 1: Information Model", "Technical Specifications for Modern Distance Education Resource Construction", and views of industry scholars. It not only provides teaching content for learners; more importantly, it serves as an online educational interaction activity between instructors and students. Online courses emphasize not only teaching content, but also focus on teaching activities and the relationship between learners and courses during the teaching process. Livestreaming courses are a kind of online courses. Current popular livestreaming lecturing includes real-time online teaching based on Tencent Meeting, Ding Talk, and various subject tools, network-based off-site real-time synchronous classrooms, and livestreaming teaching based on social software such as TikTok and WeChat Video. In this study, real-time online teaching based on subject tools refers to instructors giving lectures online, students learning online, and real-time communication between instructors and students. For example, the one-to-one online course of 51Talk Platform and the one-to-many online course of GOTU.

Learning Experience

Zhang Chuting (2000) believes that experience is a synthesis of multiple mental activities, including cognition, in which emotional integration and attitude generation occur in association with certain experiences. Deep experience requires deep involvement of attitude, emotion, and cognition. The teaching process is not simply a special cognitive process; rather, it is a special cognitive, feeling, and experiential process. That is to say, teaching should not just make students realize, but also make them feel and experience (Zhang, 2000). Combined with Piaget's constructivist ideas, Prof. Chen Youqing (2002) reckons that "experience is a kind of complex mental activity that includes many psychological components such as feeling, emotion, understanding, association and comprehension." (p. 11-16). The process of experience generally begins with the personal feeling of things. On the basis of feeling, emotional reaction to things is formed; then, emotion promotes the subject's in-depth understanding of things, generates rich associations, and, consequently, comprehends things and generates meaning. The learning experience referred to in this study is not only the learner's awareness of his/her

own feelings, but also “direct participation”, which has the identity of subject and object; experience is the subject's feelings and states. It does not refer only to those that can be subjectively reported by the subject; moreover, it refers to the objective behavior, cognition, emotion, physical experience, physiological arousal, and other states; experience is a process of continuous change, which is dynamic and procedural.

Methods

Design of the Evaluation Scales

Scholars' questionnaires on online course learning experience were referenced, such as the quality evaluation index system based on learning experience designed by Zhao, Huang, Shu, Li, and Zhou (2020), the Questionnaire on User Experience of Large-Scale Online Courses compiled by Chen (2017), and the questionnaire on synchronous recording and asynchronous recording online learning behaviors and satisfaction carried out by Ma and Bu (2022). Next, combined with the Delphi expert elicitation method, interviews were conducted with enterprise employees, learners, and professional instructors of the livestreaming courses. Eventually, the items were added, deleted, and adjusted to generate a draft questionnaire with 25 items including four dimensions: course content, course environment, course interaction, and course incentives.

Exploratory Factor Analysis (EFA)

Through the website of www.wjx.cn, the questionnaires were distributed to Shenzhen higher vocational colleges and universities, and 262 valid questionnaires were recovered at last. Then, data were processed by means of SPSS software, providing the foundation for factor analysis and reliability analysis. Correlation method and difference index method were applied in this study to analyze the question items in ways that determine whether there was differentiation between the question items. Results showed that the total correlation coefficient between the scores of each item and the questionnaire was greater than 0.3, indicating that there was differentiation between the items. By analyzing the KMO and Bartlett's Test of Sphericity of the questionnaire data, it was determined that the survey sample was adequate and the bias correlation coefficients between the variables were small. After analyzing the factor loadings and variance loadings of the draft questionnaire, it was found that some of the questions had low factor loadings and their deletion had very little effect on the variance contribution. Options with factor loadings less than 0.5 were therefore removed, leaving the final questionnaire with 19 items.

Confirmatory Factor Analysis (CFA)

The updated questionnaires were distributed again to different groups of college students. For exploratory factor analysis, KMO and Bartlett's Test of Sphericity as well as diagonal rotation was chosen to rotate the factor matrix, and the items contained in each factor as well as the factor loadings were extracted according to the number of factors with eigenvalues greater than 1. The values of the KMO and Bartlett's Test of Sphericity were both increased, with the values of the KMO = 0.922, the Bartlett's Test of Sphericity = 2233.713, $p < 0.000$. This indicated that after some deletion of the scale entries, it was more suitable for factor analysis. The final evaluation scale for livestreaming course learning experience was generated as shown below.

Table 1

Factor Loadings and Variance Contribution Ratio of Evaluation Scale of College Students' Learning Experience in Live streaming Courses

Dimension	Item number	Question	F1	F2	F3	F4
Course content	N1	Livestreaming course is what I'm interested in	0.753			
	N2	Livestreaming course is an assignment I have to learn	0.727			
	N3	Instructors in livestreaming courses are highly qualified	0.711			
	N4	Livestreaming courses are well received or recommended by other learners	0.671			
Course environment	N5	Stable and smooth network environment for livestreaming courses		0.630		
	N6	Livestreaming course platform is user-friendly		0.734		
	N7	Livestreaming course platform interface design is clear and simple		0.693		
	N8	The videos in livestreaming courses have clear sound and picture		0.819		
	N9	Video playback support for livestreaming courses		0.789		
	N10	Courses are of appropriate length, with pauses or breaks when studying for long periods of time		0.667		
	N11	Livestreaming courses are available on different terminals such as computers, cell phones, and tablets		0.580		
Course interaction	N12	Instructors communicate directly with me in livestreaming courses			0.717	
	N13	Instructors communicate with other students in livestreaming courses			0.796	
	N14	Livestreaming courses focus on my learning and provide feedback and suggestions			0.710	
	N15	Livestreaming courses are set up with a classroom teacher or advisor to help monitor learning and answer questions			0.614	
	N16	Other learners communicate with me in livestreaming courses			0.692	
Course incentives	N17	During the livestreaming course learning process, the instructors give us rewards such as coins and points				0.580
	N18	Livestreaming courses provide me with proof of learning, such as credits, certificates, and certifications				0.640
	N19	The performance of livestreaming courses is included in the course grade evaluation				0.593
Contribution (%)			15.13	22.76	17.37	9.51
Cronbach α coefficient			0.8137	0.8259	0.8278	0.8052

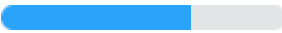
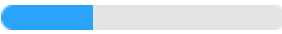
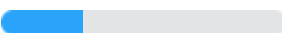
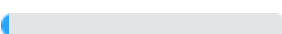
Findings

The factor loadings and variance contribution rates of each item in the evaluation scale of the learning experience in livestreaming courses show that the items with factor loadings greater than 0.7 include: Livestreaming course is what I'm interested in, Livestreaming course is an assignment I have to learn, Instructors in livestreaming courses are highly qualified, Instructors communicate directly with me in livestreaming courses, Instructors communicate with other students in livestreaming courses, Livestreaming courses focus on my learning and provide feedback and suggestions, The videos in livestreaming courses have clear sound and picture, Livestreaming course platform is user-friendly, and Video playback support for livestreaming courses.

As shown in Table 2, when interviewing college students about their overall attitudes toward livestreaming courses, it was found that they were most concerned about the content of the courses. It can be said that whether the content of a livestreaming course is something that students want to learn actively has the greatest impact on their learning experience. This is followed by the teaching level of the instructors, the hardware environment, and the support services of the livestreaming courses.

Table 2

Overall Attitude Toward the Livestreaming Course Learning Experience

Item	Subtotal	%
Livestreaming course is important to me and is something I really want to learn about	176	 67.18%
Instructors in livestreaming courses are highly qualified	168	 63.36%
The hardware environment of the livestreaming course is well-guaranteed, such as easy operation, stable network with clear pictures	140	 53.44%
Someone interacts with me while I'm learning in a livestreaming course, e.g., the instructor calls me by name, reminds me, monitors me, praises me, etc.	86	 32.82%
There is an incentive mechanism for livestreaming courses, such as gold coins awards, praise, certificates, and certifications.	76	 29.01%
Support services for live streaming courses, such as pre-class prep reminders, clock-in reminders, and lesson playback.	122	 46.56%
Others	8	 3.05%
Number of valid entries	262	

The importance of course content and the quality of the instructor's teaching are key factors that clout on the learning experience. Whether the course is of interest to students or whether it is an assignment that students must complete will affect the learning experience. Students' participation is higher when instructors set up learning assignments for livestreaming courses; but when students independently choose livestreaming courses for learning, only the content they are interested in, or the courses with strong teaching ability of teachers, can bring better experience to them.

The learning environment is another key factor in ensuring a learning experience, especially the clarity and smoothness of the videos and pictures, which is the highest factor loading among all the question items. After interviews with some participants, it was found that the clarity and smoothness of live streaming courses greatly affect user experience. Just name a few, blurry picture quality, unstable network, and inconvenient operation. It is also worth mentioning that some of the tools for livestreaming courses tend to give participants a negative experience when they need to be installed separately and are not easy to install, or when they cannot be installed quickly on multiple platforms.

The presence of livestreaming courses is also an integral part as interaction has a significant impact on learners' experiences. As evident from the factor loading values, the livestreaming course learning process is more likely to give students a favorable experience when the instructor communicates directly with the learners during the learning process or provides appropriate feedback and suggestions regarding the learners' learning effectiveness and progress. The survey also found that communication between instructors and other learners in livestreaming courses has a great impact on the learning experience, possibly because college students prefer teachers to communicate with other classmates. This is quite different from the attitudes of learners in livestreaming courses geared toward the elementary grades. In previous observation interviews with elementary school students, it was found that elementary school students preferred teachers to communicate with themselves rather than with other learners.

The effect of learning incentives on college students' learning experience is relatively small. Although its value also reaches significant validity, the factor loadings are the smallest among several dimensions. It may be because college students are not particularly interested in incentives such as gold coins, points, praise, and encouragement. The reason for these settings is due to previous interviews with multiple corporate mentors selling livestreaming courses, who revealed that it was a common incentive mechanism for livestreaming courses.

It now appears that these incentives may be more appropriate for elementary school students. It is necessary to design some more targeted incentives for college students.

Discussions and Recommendations

Content Design Enhancement to Ensure the Quality of Livestreaming Courses

Based on the statistical data from the questionnaire, it was found that the content was a key factor affecting the learning experience of college students, both in terms of the overall opinions of the college students and the factor loadings of the course content question items. The usefulness of the course and the appropriateness of the instructor's lecturing affect the learning experience. Only when the content is important, necessary, and well taught can it bring a good learning experience to students.

Simplified Software Operation to Ensure Smooth Running of Livestreaming Courses

The survey found that the hardware environment and whether the software was easy to operate affect the learner experience. From the interviews, many students suggested that the livestreaming course directly uses Tencent Meeting, ZOOM, and other mature video conferencing tools, without having to download or install new ones. This is because they suppose that the simpler the operation, the better, and if they have to install the software, they want it to be small and easy to install. In regards of the exploratory factor analysis, it was noticeable that students were not so concerned about the interface design of the live course software or whether the livestreaming course tools could be installed on multiple terminals such as tablets, cell phones, and computers. It may be due to the fact that college students have stronger learning objectives and software operation ability. They focus more on the related environment to be stable and simple to operate. As such, when it is not necessary, instructors can try their best to carry out live lecturing through Tencent Meeting, Ding Talk, TikTok, and other tools, in other words, to simplify the difficulty of software operation, guarantee the network environment, and ensure the smooth operation of the course.

Communication Feedback Improvement to Advance Continuous Learner Participation

Students attach great importance to the after-class support services of livestreaming courses. When factor loadings were analyzed, college students believed that teachers' evaluation and feedback in response to learning outcomes were very influential to the learning experience. And this kind of communication feedback for course content and teaching effect was more popular with learners than classroom interaction behaviors such as naming and praising in class. This is also a big difference with younger learners. Therefore, when carrying out livestreaming courses for college students, it is imperative to pay more attention to the learning behavior and learning effect, and try to provide them with targeted feedback and suggestions, aiming to promote the continuous participation of learners.

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