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Analysis and Research on Audience Engagement and Learning Satisfaction of AI-Based Educational Live Broadcast

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Keywords: AI education live broadcast; audience participation; learning satisfaction; intelligent interaction; education effect evaluation

Abstract: This study conducted an in-depth analysis based on the question of how AI (artificial intelligence) technology affects audience engagement and learning satisfaction in educational live broadcasts. To solve this problem, the study used a combination of questionnaire surveys and data analysis to collect feedback data from audiences who participated in AI education live courses, and conducted quantitative analysis using statistical software. The results showed that the average participation rate of AI-based education live broadcasts was 97.19%, and the highest learning satisfaction rate reached 92.9%. This result shows that the application of AI technology in educational live broadcast can effectively enhance the audience's interactive experience and learning effect. Therefore, the study believes that AI technology is an effective strategy to improve the quality of educational live broadcast and the audience's learning experience, and it is worthy of further promotion and application in the field of education.

1. Introduction

With the rapid development of information technology, the field of education is undergoing profound changes. In particular, in recent years, AI-based educational live broadcasts, as an emerging teaching model, have gradually attracted widespread attention. With its powerful data processing capabilities and intelligent algorithms [1], AI technology has brought unprecedented interactivity and personalized experience to educational live broadcasts. In this context, how to evaluate and optimize the effectiveness of AI educational live broadcasts, especially their impact on audience engagement and learning satisfaction, has become an important issue that needs to be urgently addressed in the field of educational technology [2]. However, previous research on AI educational live streaming has mostly focused on technical implementation and platform development, with relatively little discussion on audience engagement and learning satisfaction. Although some studies have noted the potential of AI technology in improving learning efficiency

and interactivity, these studies often lack systematic data support and in-depth analysis. Therefore, how to scientifically evaluate the actual effect of AI educational live broadcast, especially its performance in improving audience engagement and learning satisfaction, has become a challenge that needs to be solved urgently.

To address this challenge, this paper conducts an empirical study to explore the impact of AI-based educational live broadcasts on audience engagement and learning satisfaction through questionnaire surveys and data analysis. This paper designs and implements a detailed questionnaire survey to collect feedback data from audiences who participated in AI educational live broadcast courses. The questionnaire content covers the audience's basic information, learning background, participation evaluation and learning satisfaction, etc., to ensure the comprehensiveness and accuracy of the data. After the data collection is completed, this paper uses statistical analysis methods to conduct in-depth processing and analysis of the questionnaire data. By comparing the differences between AI education live broadcast and traditional education live broadcast in terms of audience participation and learning satisfaction, the application effect of AI technology in education live broadcast is revealed. This study not only provides a scientific basis for the effect evaluation of AI education live broadcast, but also provides useful guidance for its application in actual teaching, which has important theoretical and practical significance.

2. Related Works

In the field of education, academics have long explored the possibility of conducting education through live broadcasting. Grafton-Clarke et al. conducted a systematic review and analyzed the transition of medical education from workplace learning to online learning during the COVID-19 pandemic, and found that key developments included online courses and remote simulations [3]. Liao et al. conducted an empirical investigation and used data mining to analyze the behavior of Thai FB Live users, providing insights for social commerce and business model development [4]. Xue et al. explored the policies, systems, and models of online education in China during the epidemic, revealing the characteristics and trends of online education[5]. Heyang and Martin reflected on the use of TikTok in higher education and proposed the concept of posthuman educational encounter, emphasizing the value of considering the interaction between human and non-human aspects[6]. Kim et al. designed an educational metaverse platform, which was applied to actual lectures and supported cross-device participation, providing a reference for the construction of the educational metaverse[7]. Alenezi et al. explored the future potential and difficulties of digital education, pointed out that the higher education system needs to improve its competitiveness, and described the challenges and technical resources currently facing digital transformation[8].

Although the above studies have achieved remarkable results in exploring the field of online education, there are still some shortcomings. These studies tend to focus on the current status and challenges of online education, but there is a relative lack of in-depth discussion on specific implementation details, long-term impacts, and actual application effects. Most studies focus on a specific aspect or region, lacking broad applicability and universal verification. In addition, although some studies have proposed innovative online education platforms or methods, their actual application effects still need time to be tested and supported by more empirical data. In view of this, this study aims to make up for the above shortcomings, not only to deeply analyze the current situation and challenges of online education, but also to further propose more specific and feasible implementation strategies. At the same time, this study will explore and establish scientific evaluation methods to comprehensively and objectively measure the effectiveness of online education practice. In addition, this study will combine current technological development trends and social needs to make reasonable predictions on the future development trends of online

education, thereby providing more comprehensive and forward-looking guidance for the optimization and development of online education practices.

3. Methods

3.1 Advantages of Educational Live Broadcast

1). Authenticity of the live broadcast subject

The authenticity of the live broadcast subject is a highlight of educational live broadcast. This authenticity is reflected in the authenticity of the video content and the authenticity of the anchor's identity. Compared to video clips, picture displays or text descriptions, live broadcasts directly present images and sounds from real life. Viewers can watch the host' s words and actions in real time[9], feel his or her true emotions, and understand the real events that are happening. This real-time nature not only avoids false transmission and incompleteness of information, but also reduces the possibility of over-embellishment, allowing viewers to fully understand the true face of the event. In addition, the relatively closed space environment of the live broadcast room also encourages anchors and viewers to be more willing to express their true thoughts and opinions.

2). The immediacy of live content

The teacher interacts directly with the audience during the live broadcast, without the need for advance rehearsal or script design, so the live content is highly immediacy. The audience can express their opinions and views instantly through the barrage function, and communicate with the anchor and other audiences in real time. As an innovative interactive method, barrage not only breaks the loneliness of traditional video viewing, but also greatly compresses the time and space dimensions, so that even if the audience watches the same video at different times, they can feel the atmosphere of group viewing, thus realizing virtual interaction and instant sharing.

3). Presence and learning engagement in live learning

In educational live broadcasts, learners' presence and learning engagement are crucial to learning outcomes. The learning engagement theory points out that learning engagement refers to the positive state of an individual's active involvement in activities during the learning process. The immersive sense of presence created by educational live broadcasts helps reduce learners' loneliness and anxiety in online learning. When learners feel a strong sense of presence, they are more willing to invest more time and energy in learning, thus increasing their learning engagement. For example, in a VR environment, the spatial presence brought by the audio-visual sensory experience can enhance learners' memory and promote depth-oriented learning engagement. In addition, cognitive presence and social presence in educational live broadcasts also have a positive impact on learning engagement. Cognitive presence helps learners deepen their understanding of knowledge and stimulate their willingness to continue learning, while social presence can promote collaborative learning and critical thinking among students and help them stay focused during the learning process. All of these help to strengthen learning engagement and improve learning outcomes.

3.2 Challenges in Educational Live Broadcasts

1). Complexity of ideological guidance and value formation

In the context of educational live broadcasts, ideological and political education in colleges and universities faces complex challenges in ideological guidance and value formation. Although the introduction of AI technology has brought convenience and interactivity to ideological and political education, it has also intensified the diversity of information sources and opinions. During the live broadcast, teachers need to guide students to identify and adhere to the correct value orientation among many voices, and ensure that the educational content always meets the established

ideological and political education goals. This requires ideological and political education workers to not only have profound theoretical literacy, but also have keen political sensitivity and superb guidance skills [10]. At the same time, students are in a critical period of active thinking and value formation, and their cognitive level, value orientation and ideological state show diverse characteristics. Therefore, ideological and political education workers must have a deep understanding of students' ideological characteristics and adopt personalized and differentiated guidance strategies to meet the needs of different students. In addition, although the instant feedback and interactivity in educational live broadcasts have increased student engagement, they have also brought greater challenges to teachers' immediate response and problem-solving capabilities.

2). Difficulties of content diversification and information screening

In the process of integrating educational live broadcast into ideological and political education in colleges and universities, the diversification of content and the resulting information screening issues have become a major problem. The openness of AI technology means that live broadcast content comes from a wide range of sources and types, which makes it more difficult for ideological and political education workers to select and design content. Teachers need to filter out content from massive amounts of information that not only meets educational goals but also stimulates students' interest, while also ensuring the accuracy and appropriateness of the information[11] to avoid spreading erroneous or biased views. This process not only requires rapid processing and analysis of information, but also requires teachers to have rich educational experience and judgment. Therefore, how to ensure the quality of educational content while taking into account students' interests and participation has become an important issue that ideological and political education workers need to solve.

4. Results and Discussion

4.1 Audience Participation Survey

The study investigated the participation of students and teachers in live classes in a certain school. The basic composition of the sample is shown in Table 1. In order to compare the participation of online live education, the study selected offline teaching methods of the same course for comparison. The results are shown in Figure 1.

Table 1. Basic information of the survey subjects

Identity	Gender	Number of people	
Students	Male	211	49.37%
	Female	172	40.19%
Teachers	Male	31	7.31%
	Female	13	3.13%
Total		427	100%

According to the data in Figure 1, there are differences in participation and duration between online live classes and offline teaching methods. In terms of participation, the number of participants in online live classes is 415, slightly lower than the number of people who should have attended 427, while the number of participants in offline classes is 387, also lower than the number of people who should have attended 427. However, the participation rate of online live classes (97.19%) is slightly higher than that of offline classes (90.63%). In terms of average participation time, the average participation time of online live broadcast is 53 minutes, which is shorter than the

class time of 90 minutes; while the average participation time of offline classes is 68 minutes, which is closer to the full length of the class. Overall, live streaming performs slightly better in terms of participation, but the average duration of students' participation in live streaming is relatively short, which may reflect the challenge of online live teaching in maintaining students' attention for a long time. Therefore, when improving the quality of online live teaching, we should focus on enhancing teaching interactivity and student participation to extend students' effective learning time.

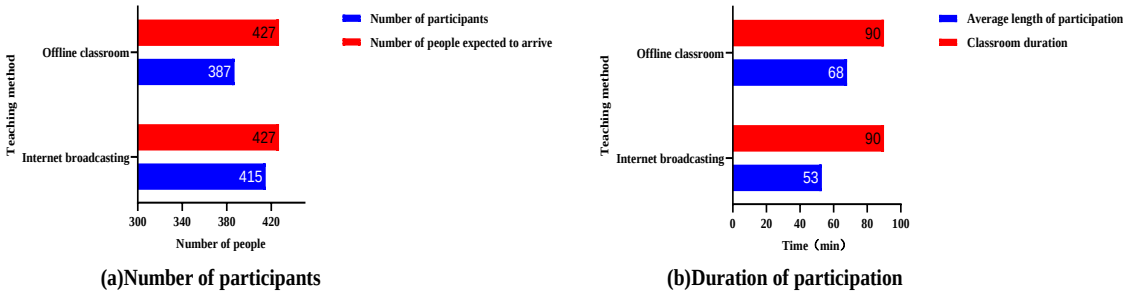

Figure 1. Online live education and offline education classroom situation

Subsequent studies also conducted in-depth investigations into the online platforms that students prefer when taking online courses and teachers prefer when conducting online classes, and conducted detailed statistics and analysis on these preferences. The results are presented in Table 2. By comparing the popularity of different platforms, the study aims to reveal which online platforms can better meet the actual needs of online education, thereby providing strong data support and reference basis for educational institutions and educators when choosing appropriate online teaching platforms.

Table 2. Choice of online platforms by students and teachers in live teaching (percentage: %)

Network platform	Students	Teachers
Dingtalk dingtalk	30.89%	35.21%
Wisdom tree	5.96%	8.12%
Learning pass	20.43%	13.11%
Wecom	4.37%	7.15%
Tencent meeting	37.19%	35.87%
Other	1.16%	0.54%

According to the data in Table 2, in live teaching, students and teachers show a certain degree of concentration in their choice of online platforms. Tencent Conference and DingTalk are the two most popular platforms, with student usage rates of 37.19% and 30.89% respectively, and teacher usage rates of 35.87% and 35.21% respectively.

4.2 Learning Satisfaction

This survey aims to collect students' actual feelings and feedback on online classes. The evaluation indicators of satisfaction include technical operation, teaching quality, teacher-student interaction, learning autonomy, and classroom participation. The survey results are shown in Figure 2.

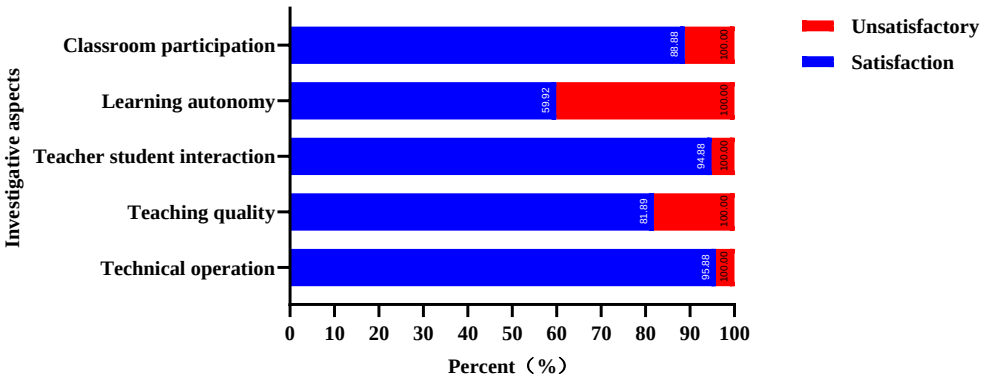

Figure 2. Students' satisfaction with online live teaching

According to Figure 2, students' satisfaction with online classes is high in terms of technical operation and teacher-student interaction, reaching 95.88% and 94.88% respectively. In contrast, the satisfaction rates for learning autonomy and classroom participation are lower, at 59.92% and 88.88% respectively, and the dissatisfaction rates are 40.08% and 11.12% respectively, reflecting that students encounters more difficulties or challenges in independent learning and classroom interaction. Online teaching performs well in terms of technology and teacher-student interaction, but there is still room for improvement in promoting students' independent learning and increasing classroom participation. In the future, we should focus on strengthening these two aspects to improve the overall teaching quality and student satisfaction.

Subsequent studies also conducted an in-depth investigation of teachers' satisfaction with online live teaching, and the results are presented in Figure 3. The survey aims to fully understand teachers' acceptance of this emerging teaching model, their experience in actual operation, and their evaluation of its teaching effectiveness.

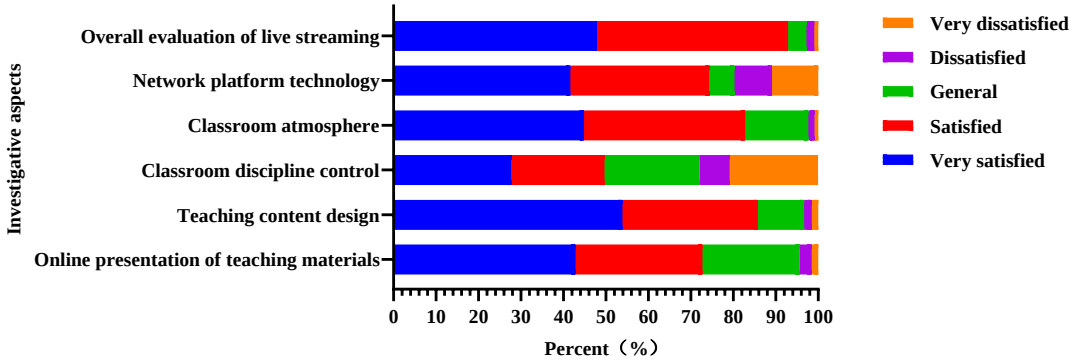

Figure 3. Teachers' satisfaction with online live teaching

According to the data in Figure 3, most teachers are satisfied or very satisfied with all aspects of online live teaching, especially in teaching content design (53.90% are very satisfied) and overall evaluation (47.92% are very satisfied + 44.98% are satisfied = 92.9%). However, in terms of classroom discipline control, teachers' satisfaction is relatively low, with 20.88% of teachers expressing great dissatisfaction. In addition, there is a certain gap in satisfaction with online

platform technology, with 10.86% of teachers expressing great dissatisfaction. These data show that although online live teaching has been widely recognized in terms of content design and overall effect, classroom discipline control and platform technology still need to be improved. In the future, these aspects should be optimized to improve teacher satisfaction and teaching effectiveness.

5. Conclusion

This paper explores the impact of AI-based educational live broadcast on audience participation and learning satisfaction. The research results found that the application of AI technology in educational live broadcast significantly improved the average audience participation and learning satisfaction, and effectively enhanced the interactive experience and learning effect. This finding reveals that AI technology is an effective strategy to improve the quality of educational live broadcasts and the audience's learning experience. Through intelligent and personalized teaching methods, it stimulates the audience's interest and enthusiasm in learning, thereby promoting higher participation and satisfaction. However, this study also acknowledges that there are certain limitations, such as possible biases in sample selection, data analysis methods, etc. Therefore, it is recommended that future research further explore the deep integration and innovative application of AI technology in educational live broadcasts while expanding the sample range and optimizing data analysis methods.

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