Research on the Application of Informatization Teaching Mode Based on Computer Live Broadcast Technology Under the Background of Internet Big Data

Le Chen and Xiao Xiao[(✉)]

School of Nursing, Xiangnan University, 889 Chenzhou Avenue, Chenzhou, China
867433067@qq.com

Abstract. Objective: To explore the application effect of the informatization teaching mode based on computer live broadcast technology in medical nursing. Methods: 200 nursing students who participated in online teaching courses in 2020 were selected as the experimental group, and 210 nursing students who participated in on-site teaching in 2019 were selected as the control group. After the teaching, the big data management software was used to investigate the course teaching situation of the two groups of students, and the learning situation, classroom management satisfaction and teaching effect satisfaction of the two groups of students were compared. Results: The students in the experimental group were significantly more satisfied with classroom management and teaching effect than the students in the control group, and the difference was statistically significant. Conclusion: The effect of informatization teaching is equivalent to that of on-site teaching, and webcasting can be used as one of the main teaching methods of medical courses. In the future, we should combine the advantages of traditional teaching and online live classroom, innovate the mixed teaching mode of online and offline, and improve the effect of informatization teaching.

Keywords: informatization teaching · online class · Medical Nursing · nursing Education · Internet big data

1 Introduction

With the increasing maturity of information technologies such as cloud computing, mobile Internet, and video technology, more and more activities are presented in the form of live broadcasts, and watching live broadcasts has become a normalized online information behavior. Live broadcasting is popular in various fields, and it has played a key role in the field of education and teaching. Since 2020, with the outbreak and spread of the COVID-19 in various parts of China, the Ministry of Education put forward the requirement of "stop class, but no stop teaching nor stop learning" [4, 5], and universities have opened online teaching. Online live teaching is to compress the audio and video information captured in real time and transmit it to a specific video server, and provide

services on the Internet. Through the new technology of online video live broadcast, a brand-new live broadcast platform can be built for teachers, which expands the teaching method. Teachers and learners from different regions and countries use webcast software to teach at the same time, and conduct two-way interaction and collaboration on the network [1]. OBS is the abbreviation of Open Broadcaster Software, there are two versions of OBS Classic and OBS Studio. OBS Studio is a new upgraded version based on inheriting the functions of OBS Classic. In this article, OBS software refers to OBS Studio. As a free and open source video recording and live streaming tool, OBS Studio supports Windows, Mac OS, and Linux operating systems. It can efficiently capture, synthesize, encode, record and stream video content, and supports most streaming media. The platform has the characteristics of maturity and stability, powerful functions, open source and free, and rich data interfaces, which can meet the needs of "diversified" teaching information transmission, such as video, audio, text, PPT, pictures and other media files and signal sources. Therefore, this study attempts to apply it to the live broadcast practice of the experimental teaching group. In the context of normalized epidemic prevention and control, it is in line with the needs of the times to integrate online live broadcast into the teaching of medical nursing. This paper aims to apply and evaluate the live online teaching mode of medical nursing, and provide theoretical basis for diversified teaching of medical nursing.

2 Information and Methods

2.1 General Information

In this study, 200 nursing students who participated in the medical nursing course in 2020 were selected as the experimental group, and the teaching was conducted in a live broadcast mode, including 26 males and 174 females, aged 18–22 years old, with an average age of (19.93 ± 0.771) years old. A total of 210 nursing students who participated in the medical nursing course in 2019 were selected as the control group, and the traditional on-site teaching mode was adopted, including 22 males and 188 females, aged 18–23 years old, with an average age (20.29 ± 1.05) years old. There was no significant difference in gender and age between the two groups $(P > 0.05)$, and they were comparable. All students completed the teaching effect evaluation questionnaire of this course.

2.2 Teaching Method

The traditional on-site teaching mode is based on teaching materials, teachers as the main body, classrooms as the center, and large-class teaching is adopted. Teachers use multimedia courseware, blackboard writing, models, to systematically explain basic theoretical knowledge according to the syllabus. Students ask questions and discuss the teaching content, and finally the teacher summarizes.

The experimental group set up a four-in-one online course teaching team of "college leaders, teaching teachers, counselors, and academic supervisors", focusing on the three key links of pre-class, in-class, and after-class, optimizing teaching content and

innovating online network teaching mode. 1) Before the class, the teacher organized the network quality resources around the curriculum syllabus, and uploaded them to the online teaching platform of the course. Then, combined with the teaching objectives of the course, the guidance information and learning resources were released, and the pre-class preview tasks were arranged. 2) In class, the main content of the course was taught in the form of live webcasting. During the online teaching process, teachers comprehensively used a variety of information technology means to display clinical cases in a variety of forms such as multimedia courseware, video, and audio. In addition, teachers focused on course knowledge points and organized students to conduct real-time online interactive exchanges through online discussions, interactive Q&A, summary and other forms, to encourage students to think and analyze independently, and to promote students' participation and enthusiasm in learning. The live broadcast work based on OBS mainly includes three parts: scene setting, network traffic settings, and scene switching control. "Scene setting" refers to setting the scene picture to be output in advance, mainly including adding media signal source and setting effect. "network traffic settings" means to fill in the address and key of the target server to which the live broadcast signal is to be pushed in OBS, including the settings of the push stream address key and the basic parameter settings of the output stream. "scene switching control" refers to switching between different scenes during the live broadcast. OBS provides a function similar to the scene switching of the director station, and can switch between different scenes according to the teaching needs. Scene setting and network traffic settings usually need to be completed before the live broadcast starts. The workflow of the live broadcast system: The front-end speaker's picture is captured by a high-definition camera and then transmitted to the control terminal. The control terminal then mixes the local media resources and the signal source received from the front-end and pushes it to the cloud live broadcast server. Finally, the cloud broadcast The server then transmits the live broadcast signal to the access device through the network. 3) After class, teachers released homework through the course platform according to the learning situation in the classroom. Students could mark each other's homework and teachers mark comments, which further would help students to firmly grasp the basic concepts and complete the construction of the knowledge system. In addition, in the after-school extension and expansion section, teachers uploaded learning resources (such as academic literature, new clinical technologies, etc.) that reflected the cutting-edge achievements of the discipline, which would help guide students to carry out more autonomous learning activities based on their own interests. The above key points can be sketched as the Fig. 1, Seen as Fig. 1.

2.3   Assessment Methods

Questionnaire survey was used to evaluate the teaching effect of Medical Nursing. Questionnaires were distributed and data collection was carried out through the Questionnaire Star platform. The course teaching evaluation mainly included the situation of learner's learning equipment, learner's learning situation, classroom management satisfaction and teaching effect satisfaction.
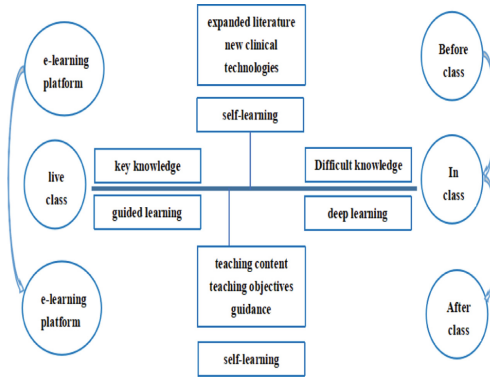
Fig. 1. Framework of informatization teaching mode.

2.4 Data Analysis

SPSS 20.0 statistical software for data analysis was used for the analysis. The chi-square test is used to compare the enumeration data expressed in rate (%), the test standard is $\alpha = 0.05$.

3 Results

3.1 Live Online Teaching Learners' Learning Equipment

The learning equipment of learners included the form and stability of the network used by the learners, and the tools and platforms used for online live classes. The details are shown in Table 1.

3.2 Comparison of Students' Learning Situation Between the Experimental Group and the Control Group

There was no significant difference between the experimental group and the control group in terms of learning attitude, learning enthusiasm, seriousness of listening to lectures, and completion of homework ($P > 0.05$). The details are shown in Table 2 and Fig. 2.

3.3 Comparison of Classroom Management Satisfaction of Students in Experimental Group and Control Group

The students in the experimental group were significantly more satisfied with the arrangement of classroom time, teaching content, and teaching progress than the control group, and the differences were statistically significant ($P < 0.01$). The details are shown in Table 3 and Fig. 3.

Table 1. Live online teaching learners' learning equipment.

Variables		n	Rate(%)
Network Formats for Online Live Classes	WIFI	145	72.5%
	mobile traffic	50	25%
	Hot spot to share	1	0.5%
	wired network	4	2%
Tools used for webcast classes	mobile phone	120	60%
	Pad	7	3.5%
	computer	73	36.5%
Will the network freeze during the webcast learning process?	always	4	2%
	frequently	24	12%
	Occasionally	146	73%
	never	26	13%

Table 2. Comparison of learning situation between two groups of students[cases(%)].

Variables	experimental group (n = 200)	control group (n = 210)	χ^2	P
	YES	YES		
Preview before class	173 (86.5)	178 (84.8)	0.251	0.616
Listen carefully and take notes in class	193 (96.5)	195 (92.9)	2.677	0.102
Review after class	183 (91.5)	180 (85.7)	3.379	0.066
Finish homework on time	175 (87.5)	192 (91.4)	1.684	0.194
Take classes on time	195 (97.5)	207 (98.6)	0.615	0.433
Do anything else during the class	66 (33.0)	33 (15.7)	16.711	0.000

3.4 Comparison of Teaching Effect Satisfaction Between Experimental Group and Control Group

Comparing the teaching satisfaction of the two groups of students, the satisfaction of the students in the experimental group in terms of learning resources, learning methods and learning evaluation is higher than that of the control group, and the difference is statistically significant ($P < 0.05$). The details are shown in Table 4 and Fig. 4.
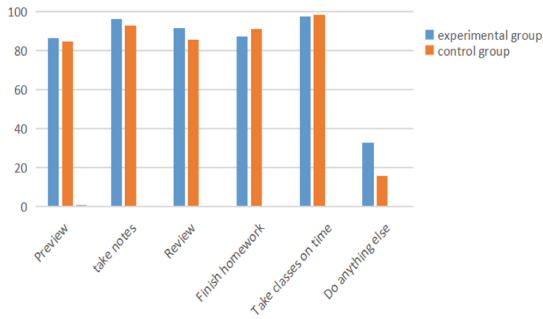
Fig. 2. Comparison of the learning situation data of the two groups of students.

Table 3. Comparison of classroom management satisfaction between two groups of students[cases(%)].

Variables	experimental group (n = 200)	control group (n = 210)	χ^2	P
	Satisfied	Satisfied		
Capacity of the teaching content	192 (96.0)	129 (61.4)	72.040	0.000
presentation of the teaching content	155 (77.5)	131 (62.4)	11.099	0.001
Classroom teaching progress	193 (96.5)	178 (84.8)	16.398	0.000
Class schedule	182 (91.0)	167 (79.5)	10.653	0.001
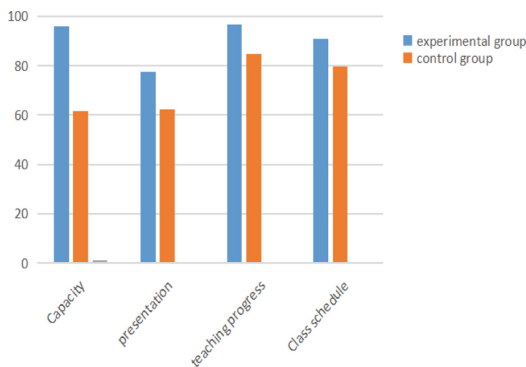
Fig. 3. Comparison of the classroom management satisfaction data of the two groups of students.

Table 4. Comparison of teaching effect satisfaction between two groups of students[cases(%)].

Variables	experimental group (n = 200)	control group (n = 210)	χ^2	P
	Satisfied	Satisfied		
learning resources	177 (88.5)	147 (70)	21.151	0.000
learning methods	159 (79.5)	144 (68.6)	6.344	0.012
learning environment	164 (82.0)	180 (85.7)	1.046	0.306
learning evaluation	175 (87.5)	156 (74.3)	11.499	0.001
teaching interaction	152 (76.0)	172 (81.9)	2.155	0.142
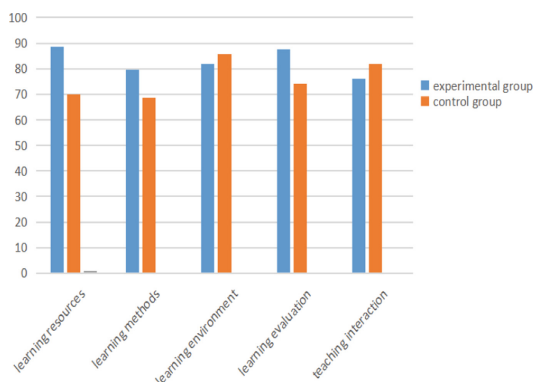
Fig. 4. Comparison of the teaching effect satisfaction data of the two groups of students.

4   Discussion

In 2020, due to the impact of the COVID-19 epidemic, the traditional teaching mode based on face-to-face teaching has been limited to a certain extent. At this special time, live online teaching has appeared in front of the public as an emerging teaching method. The results of this study shown that 86.5% of the students in the webcast teaching group wold preview before class, 96.5% of the students could listen carefully and take notes in a timely manner during the online live class. 87.5% of students could complete their homework on time, and more than half of them would review after class. 97.5% of students could take live online classes on time every day. Overall, students' online learning was doing well, and their learning autonomy was comparable to on-site teaching. On the other hand, students in the webcast teaching group believed that the content of classroom teaching was richer and the presentation of teaching content was more diverse. The core

software OBS Studio used in this research is a permanent free open source software that supports the interactive integration of related technologies. It can capture almost all signals transmitted by common video and audio interfaces, and supports the addition of rich media resources. There are no special restrictions on the live broadcast platform, and the system is more open. Compared with on-site teaching, students in the online live teaching group can interact with teachers and students by sending barrages, connecting microphones, which increases the interest of the classroom, and the classroom is no longer a one-way transmission of teachers. The results of this study also showed that 91% of the students in the online live teaching group believed that the classroom time arrangement was reasonable, and 96.5% of the students could keep up with the classroom teaching progress. The online live broadcast has the function of recording and broadcasting, and students can strengthen it through recording and broadcasting for doubts, and keep up with the teaching progress in time. In terms of teaching effect satisfaction, the webcast teaching group is more satisfied with learning resources, learning methods, and learning evaluation, which is consistent with the research results of Wu [8]. The teaching mode of network live broadcast is not limited by time and region, which can minimize the aggregation of personnel. In special periods, network live broadcast can be used as one of the main teaching methods of medical courses.

However, in this study, we also found some shortcomings in the live teaching mode, which need to be improved in future teaching. This study found that the effect of online live teaching is greatly affected by network conditions and learning environment. In the webcast teaching group, 73% of students think that the network during live broadcast is unstable, and 14% of students think that it is very bad. The unstable network situation will lead to the decline of teaching quality. 33% of students in the webcast class occasionally do other things, such as watching mobile phones and eating. It can be seen that in this mode, students lack supervision, have weak learning persistence, and are easily affected by the surrounding environment. Previous studies have shown that simple live classes lack a sense of presence, students are easily distracted, and the learning effect is not the best choice [3]. In the future, it will be a powerful way to improve the effect of online teaching by carrying out online and offline blended teaching, strengthening interactive discussion and cooperative learning in online teaching and maximizing the enthusiasm of students 'autonomous learning [2, 7].

5   Conclusion

Online live teaching of professional courses is a special teaching mode in a crisis situation, and the real experience of offline classrooms cannot be replaced by online live teaching [6]. However, the successful experience of online live classrooms suggests that in the future, it is necessary to innovate the combination of online and offline teaching mode to improve the effectiveness of information-based teaching.

References

1. Bao HY. (2021). Current Situation and Analysis of the Teaching Mode of Live Chinese Network under the Epidemic Situation. Journal of Educational Institute of JiLin Province. 37(5): 155-158.
2. Ding SL. (2020).Main Principles and Implementation of School Online Teaching during Epidemic Prevention and Control.Experiment Teaching and Appa-ratus. (3):3-7.
3. Huang ZH, Zhang XL. (2018). Research on the Influence Mechanism of Self-regulated Learning on Online Learning Outcomes--Concurrently Discuss the Mediation Effect of Online Learning Interaction.Modern Educational Technology. 28(3):66-72.
4. Ministry of Education. (2020). Notice of the Ministry of Education on the postponement of the 2020 spring semester.[EB/OL](2020–01–27).
5. Ministry of Education. (2020). Guidance on the organization and management of online teaching in colleges and universities during the epidemic prevention and control.[EB/OL](2020–02–05).
6. Xu GH, Bai YM, Huang F. (2020). Online teaching reform and practice of "San Quan Education System" for nursing. Chinese Nursing Management. 20(07):975-978.
7. Wang HF. (2020). Online Teaching and Learning of Instrumental Analysis Course under the New Coronavirus Pneumonia Situation: Taking the Introduction as an Example.Univ. Chem. 35 (5): 75−80.
8. Wu GX , Gao MY. (2021).Teaching Effect Evaluation of Webcast Classroom Teaching Mode in Obstetrics and Gynecology.Hunan Journal of Traditional Chinese Medicine.37(8):117-119.