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# Investigation and Analysis of the Experience and Satisfaction of "Blended Teaching" by Young and Middle-Aged Part-Time Teachers: Nursing Teaching Process in Affiliated Hospitals of Universities in Underdeveloped Areas Should Be Valued

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## Abstract

This study adopted a quantitative research method, aiming to investigate the experience of young and middle-aged teachers in underdeveloped areas on blended teaching, analyze the hindrance factors of blended teaching, and thus provide a reference for teaching reform. Data were collected from directly affiliated hospitals of universities in underdeveloped areas in Guangxi, China. A questionnaire survey was conducted among 161 young and middle-aged teachers using the convenience sampling method to obtain detailed information on a subtopic. This study identified the following major factors that prevent part-time nursing teachers from carrying out blended teaching. Namely, unclear sound, noise, stuck networks, and a noisy environment were considered to be the main obstacles for teachers to carry out online and offline blended teaching. Students' self-discipline, learning atmosphere, and teacher's teaching style and

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software application ability were considered to be related to the efficiency of online teaching. The decrease in teacher supervision, students' temptation to leave the screen to do other things, and less contact between teachers and students were considered to be the main disadvantages of online courses. Additionally, this study also found that teachers regarded the functions of the teaching platform software as more important. Teachers' satisfaction with the function of the platform and students' participation and cooperation were not high. These findings may have important implications for students as a whole and educational reform in underdeveloped regions in the future.

## Keywords

Online Teaching, Online Courses, Blended Teaching, Influencing Factors, Teaching Reform

## 1. Introduction

An underdeveloped region refers to an area characterized by a relatively low level of overall socioeconomic development. The productivity levels in these regions significantly lag behind those of developed and moderately developing areas, reflecting a substantial developmental gap. The underdevelopment manifests across multiple dimensions, encompassing not only economic stagnation but also deficiencies in living standards, education, healthcare, employment opportunities, and social security systems. Ensuring basic livelihood and well-being for residents remains a critical challenge and a fundamental aspect of addressing regional disparities.

"Blended teaching" mode is a teaching mode that organically combines traditional teaching mode and online autonomous mode, case teaching with a flipped classroom, the student's dominant position with the teacher's dominant position, and face-to-face classroom teaching with asynchronous and synchronous online learning elements (Shah et al., 2024). In recent years, with the popularity of the Internet, the blended teaching mode has been extensively applied in the classroom; online education has been greatly promoted, and classroom teaching is no longer limited to face-to-face teaching. With flexible courses, the blended teaching mode meets the needs of different students and increases the opportunities of acquiring knowledge for students (Wu et al., 2024). Some researchers have pointed out that teachers and medical education experts are interested in further investigating experiential or active learning models that can be applied to medical education (Kartoglu et al., 2023), Regardless of whether the delivery mode is face-to-face, online, or most likely blended mode, experiential, active, and virtual simulation learning design will undoubtedly become the development trend of education reform in the future (Kartoglu et al., 2023). Although digital approaches present opportunities for educational innovation, blended approaches that integrate virtual and traditional approaches seem to be the best option for maximizing learning outcomes. It has been shown that educators in low- and middle-income countries hope to harness the positive aspects of online learning and transition to blended learning models.

Part-time nursing teachers play a very important role as lecturers in directly affiliated hospitals of colleges and universities. The teaching quality of their clinical nursing practice courses is the basis of nursing practice and may directly affect students' nursing practice ability. However, according to previous experience, there are also challenges (Shah et al., 2024) and obstacles (Regmi & Jones, 2020) for part-time teachers in directly affiliated hospitals of medical universities in underdeveloped areas to carry out blended teaching.

Currently, most of the existing cross-sectional research focuses on full-time teachers and/or students. However, there are few reports on the investigation and research on the blended teaching experience of part-time nursing teachers in directly affiliated hospitals of universities in underdeveloped areas. Moreover, little is known about the satisfaction degree of part-time nursing teachers in directly affiliated hospitals of universities in underdeveloped areas with the teaching platform involved in blended teaching. There is no evidence of satisfaction with student participation and cooperation. In this study, young and middle-aged part-time nursing teachers in a directly affiliated hospital of a medical university in underdeveloped areas in western Guangxi, China, were taken as the research objects. A cross-sectional study was conducted using a questionnaire survey to investigate the experience of part-time teachers on blended teaching, as well as their satisfaction with the teaching platform and satisfaction with students' participation and cooperation. The hindrance factors affecting the teaching effect were analyzed and the corresponding suggestions were put forward. This study may provide a theoretical reference for the relevant management departments and personnel (such as teachers and students) to improve the quality and efficiency of "teaching" and "learning".

## 2. Methods

### 2.1. Study Design, Participants, and Setting

This is a cross-sectional study. From December 2023 to April 2024, a total of 170 young and middle-aged nursing practice teachers who had participated in online and offline blended teaching over the past 5 years were selected using a convenient sampling method from a directly affiliated hospital of a university in underdeveloped areas in western Guangxi, China. The inclusion criteria were: (1) young and middle-aged part-time teachers (all Chinese nationals) of nursing practice courses in directly affiliated hospitals of medical colleges and universities (based on WHO age classification standards, 18 - 44 years old: young; 45 - 59 years old: middle-aged); (2) informed consent and voluntary participation; (3) participation in online and offline blended practice classes in this affiliated hospital from January 2020 to March 2024. The exclusion criteria were: (1) people on leave (including people going out for further study, study, maternity leave, etc.), and (2) people with major stress events over the past 6 months.

## 2.2. Research Tools

### 2.2.1. General Information Questionnaire

The general information questionnaire was self-designed, including 10 items: gender, age, teaching experience, education, title, courses undertaken, frequency of participation in blended teaching training, teaching hardware use, teaching software use, and digital teaching resources production.

### 2.2.2. Questionnaire on Teachers' Experience of Online and Offline Blended Teaching Mode

The questionnaire was self-designed, including 41 items in 4 dimensions. Among them, there were 7 items on blended teaching experience, 12 items on platform function evaluation, 12 items on platform function satisfaction evaluation, and 10 items on students' participation and cooperation satisfaction evaluation. The question type of teachers' experience of blended teaching was single choice or multiple choice. Questions for platform function evaluation, platform function satisfaction evaluation, and students' participation and cooperation satisfaction evaluation were matrix scale questions, which were evaluated using the Likert 5-level scoring method. The importance degree was scored as 1, 2, 3, 4, and 5 points based on the evaluation of "very unimportant", "less important", "general", "more important", and "very important", respectively. The satisfaction degree was scored as 1, 2, 3, 4, and 5 points based on the evaluation of "dissatisfied", "basically dissatisfied", "general", "basically satisfied", and "satisfied", respectively. The scoring rate of each function of the teaching platform applied by teachers for blended teaching was calculated as follows: scoring rate = (average score of each item ÷ the highest score of the corresponding item) × 100%. Teachers' satisfaction with the functions of the blended teaching platform and/or with the participation of students was calculated as follows: satisfaction = (average score of each item ÷ the highest score of the corresponding item) × 100%.

### 2.2.3. Evaluation Tool

A questionnaire on teachers' experience of online and offline blended teaching mode was jointly designed by 3 professors and 2 associate professors with more than 10 years of teaching experience. Based on a literature review and consultation with experts for logical analysis, the final version of the questionnaire was formed. A total of 21 teachers were selected for pre-experiment, and the Cronbach α coefficient of this questionnaire was measured to be 0.886. The validity of the questionnaire was established through a systematic expert review process as described.

## 2.3. Data Collection

As a cross-sectional study, this study employed the "Questionnaire Star" platform software to issue the questionnaire QR code and the filling instructions. Two graduate students were recruited as investigators to issue questionnaires after unified training. In short, the investigators obtained the informed consent of the research subjects and provided them with guidance. After that, the survey subjects scanned the QR code to complete and submit the questionnaire independently within a limited time. Submission of the survey was not allowed by the system for any missing or incomplete questionnaire options, and there was a minimum time limit to ensure the completeness and validity of questionnaire data. Completion of the survey will take approximately 5 - 8 minutes.

### 2.4. Quality Control

Two rounds of logical tests were carried out on all the data. In the first round, the correctness and logic of the input data were automatically checked through the "Questionnaire Star" platform software. For the missing questionnaire options, the system automatically reminded the subjects to complete the questionnaire before they could successfully submit the questionnaire. In the second round, 2 members of the research group who received unified training would jointly check the correctness and logic of the questionnaire, and those questionnaires that did not conform to logic were eliminated. A total of 170 questionnaires were distributed, and 9 invalid questionnaires were eliminated due to the answer time limit and illogical options. Finally, 161 valid questionnaires were finally recovered, with an effective rate of 94.7%.

### 2.5. Data Analysis

SPSS25.0 software was used for statistical analysis. In this study, statistical analysis was limited to the examination of percentages derived from survey responses. All collected data consisted of count data without grouping, and no comparative or correlational analyses were required. Consequently, descriptive statistics were applied to all data, with count data presented as frequencies and percentages (%).

## 3. Results and Discussions

### 3.1. General Information on the Characteristics of Middle-Aged and Young Teachers

Table 1 shows general information of teachers. A total of 170 questionnaires were issued, and 161 valid questionnaires were finally recovered, with an effective rate of 94.7%. The study subjects were all part-time teachers (100%) in directly affiliated hospitals of universities. Most of them were female (96.89%), young (91.93%), bachelor (96.27%), and supervisor (86.96%), with 3 - 10 years of teaching experience (86.34%). In terms of courses undertaken, medical nursing (47.83%) and surgical nursing (43.49%) were the main subject courses. Additionally, 90.06% of the young and middle-aged teachers occasionally attended the blended teaching mode training. All of them used computers, mobile phones or tablets as teaching hardware, and 94.41% of subjects used projectors. All of them used communication software such as WeChat, QQ, and Office software as teaching software, and some used image processing tools (50.93%). Most research subjects used micro-class production screen recording software (90.06%), and a small number of people used video editing software (39.13%). The characteristics of the general data of the research objects suggested that the key objects of teaching quality improvement would be part-time nursing teachers, women, young and middle-aged teachers, and bachelor. The general data characteristics of the subjects in this study are similar to those of part-time teachers in a traditional Chinese medicine college in Changchun (Li, Zhang, & Li, 2021).

**Table 1.** General information of young and middle-aged teachers (n = 161).

| Items | Categories | Number (n) | Percentage (%) |
|---|---|---|---|
| Gender | Male | 5 | 3.11 |
| | Female | 156 | 96.89 |
| Age | 24 - 44 years old | 148 | 91.93 |
| | 45 - 59 years old | 13 | 8.07 |
| Teaching age | <3 years | 6 | 3.72 |
| | 3 - 10 years | 139 | 86.34 |
| | >10 years | 16 | 9.94 |
| Educational background | Bachelor | 155 | 96.27 |
| | Master | 6 | 3.73 |
| The title of a professional post | Nurse practitioner | 5 | 3.11 |
| | Supervisor nurse | 140 | 86.96 |
| | Associate chief nurse and above | 16 | 9.94 |
| Undertake a course | Medical nursing | 77 | 47.83 |
| | Surgical nursing | 70 | 43.49 |
| | Pediatric nursing | 8 | 4.97 |
| | Nursing in obstetrics and gynecology | 6 | 3.73 |
| Frequency of participation in blended teaching training | Occasionally attend | 145 | 90.06 |
| | Regularly attend | 16 | 9.94 |
| Teaching Hardware Use (multiple choices) | Computer | 161 | 100 |
| | Phone or tablet | 161 | 100 |
| | Projector | 152 | 94.41 |
| | Electronic whiteboard | 0 | 0 |
| | VR equipment | 0 | 0 |
| Use of instructional software (multiple choices) | Wechat, QQ and other communication Software | 161 | 100 |
| | Office software | 161 | 100 |
| | Image processing tool | 82 | 50.93 |
| | Other | 0 | 0 |
| Digital teaching resources production (multiple choices) | Video editing software | 63 | 39.13 |
| | Micro class production screen recording software | 145 | 90.06 |
| | Web creation software (Dreamweaver, etc.) | 0 | 0 |
| | Other | 0 | 0 |

### 3.2. The Integration of Online and Offline Teaching Has Encountered Numerous Challenges

Table 2. The experience of young and middle-aged teachers in the blended teaching mode (n = 161).

| Item | Categories | Number (Percentage) |
|---|---|---|
| Students ask questions after class during Blended teaching (single option) | Never | 109 (67.7) |
| | Now and then | 50 (30.06) |
| | Frequently | 2 (1.24) |
| Difficulties in developing blended teaching processes (multiple options) | The Internet often runs out | 77 (47.83) |
| | It is difficult to find a quiet environment for class | 69 (42.86) |
| | Computers sometimes crash | 33 (20.50) |
| | The voice is unclear and often loud | 100 (62.11) |
| | The picture quality is not clear | 32 (19.88) |
| | There was no difficulty. I got along very well | 54 (33.54) |
| What do you think is related to the efficiency of online teaching? (multiple choices) | The degree of self-discipline of the students themselves | 161 (100) |
| | Whether there is a learning atmosphere in the student's learning environment | 158 (98.14) |
| | The way the teacher taught | 159 (98.76) |
| | Teacher's ability to use teaching software | 159 (98.76) |
| | There are other reasons (e.g., The influence of roommates) | 1 (0.62) |
| How many students are serious about learning in blended teaching process (single choice) | Minority | 7 (4.35) |
| | One half | 14 (8.7) |
| | More than half | 140 (86.96) |
| What are the advantages of online courses over offline courses (multiple choices) | Not limited by time and space | 161 (100) |
| | Intelligent grading of assignments and tests | 159 (98.76) |
| | Can grasp the clicks and attention level of students | 159 (98.76) |
| | Lessons can be saved for repeated learning | 160 (99.38) |
| | Education can be more widespread | 158 (98.14) |
| | Can save a lot of test operation paper, energy saving and environmental protection | 108 (67.08) |
| | Other (fill in the blanks) | 0 (0) |
| What are the disadvantages of online courses compared to offline courses (multiple choices) | Teachers' supervision is declining, and students' learning efficiency is low | 146 (90.68) |
| | Rely on electronic devices and network hardware | 123 (76.40) |
| | Some teachers are not comfortable with the development of online courses | 100 (62.11) |
| | It is not convenient for teachers to demonstrate physical examination | 123 (76.40) |
| | There is less contact between teachers and classmates | 130 (80.75) |
| | Students scattered, it is difficult to have a good learning atmosphere and environment | 120 (74.53) |
| | Other (e.g., students leave the screen to do something else) | 146 (90.68) |
| Your acceptance of blended online and offline teaching (single choice) | Very receptive | 54 (33.54) |
| | Comparative acceptance | 92 (57.14) |
| | Be uncertain | 8 (4.97) |
| | Less acceptable | 8 (4.97) |
| | Very disaccept | 0 (0) |

Table 2 shows the experience of teachers on blended teaching. Most teachers (67.7%) shared that students would never ask questions after class during blended teaching. This indicated that students were not active in asking questions after class and had insufficient learning initiative. The difficulties encountered in developing a blended teaching process in order of score from high to low were unclear voice and frequent noise (62.11%), frequent network delay (47.83%), difficulty in finding a quiet environment for online teaching (42.86%), sometimes crashed computer (20.5%), unclear picture (19.88%), etc. Only 33.54% of the teachers said that the development of blended teaching was smooth and there were no hindrance factors. The above findings suggested that the teachers may encounter many hindrance factors in the process of carrying out blended teaching, and they should strengthen preparation before class, conduct trial broadcasts or trial lectures and charge the computer in advance, and pay attention to high-definition processing of the pictures displayed in the lecture when making PPT. The teachers considered that factors that can affect students' learning efficiency were students' self-discipline (100%), teachers' teaching methods and ability to use teaching software (98.76%), and learning environment and atmosphere (98.14%). The above 3 factors were the key points to improve students' learning efficiency. Additionally, 86.96% of the teachers believed that more than half of the students were serious about learning in the blended teaching process. It's suggested that most students' learning attitude is recognized by teachers. The advantages of online courses (multiple choice) in descending order of score were: not limited by time and space (100%); lessons can be saved for repeated learning (99.38%); intelligent grading of assignments and tests (98.76%); ability to grasp the clicks and attention of students (tied for third place, 98.76%); education can be more widespread (98.14%); and energy conservation and environmental protection as it saves a lot of test homework paper (67.8%). These indicated that online courses have many advantages. The top 3 disadvantages of online teaching were teachers' declined supervision of students and students' low learning efficiency (90.68%)/the possibility of students leaving the screen to do other things (90.68%); less contact between teachers and students (80.75%); and relying on electronic devices and network hardware (76.40%). The above aspects are suggested to be the focus of improvement of online teaching in the future. Moreover, 90.68% of the teachers can accept the online and offline blended teaching mode, showing that young and middle-aged part-time nursing teachers have a high degree of acceptance of the blended teaching mode.

### 3.3. The Functionalities of the Platform Are Considered Critical, and the Selection of a Teaching Platform Should Be Conducted with Due Diligence

Figure 1 shows teachers' evaluation of the importance of the platform functions. The functions in descending order of importance from high to low were: can be issued in advance on the platform guide case (94.6%), able to check students' homework (93.2%), testing and visual analysis (93%), intelligent grading and feedback (89%), view and download material (88%), quick attendance (87.8%), clear sound without noise (87.6%), can randomly check students (87.4%), can show the lecturer's facial expression (86.8%), announcement and discussion function (86%), recording and broadcasting function (85.6%), and easy to learn and to operate (85.2%). All the score rates were above 85.2%, indicating that teachers considered the functions of the platform to be relatively important, and teachers should pay attention to confirm whether these important functions of the teaching platform are perfect before carrying out blended teaching. Educational applications should provide an appropriate platform to create and maintain an ongoing intrapersonal and interpersonal dialogue for the students, helping them regularly and consistently engage in the learning process (Zou, Li, & Jin, 2021).

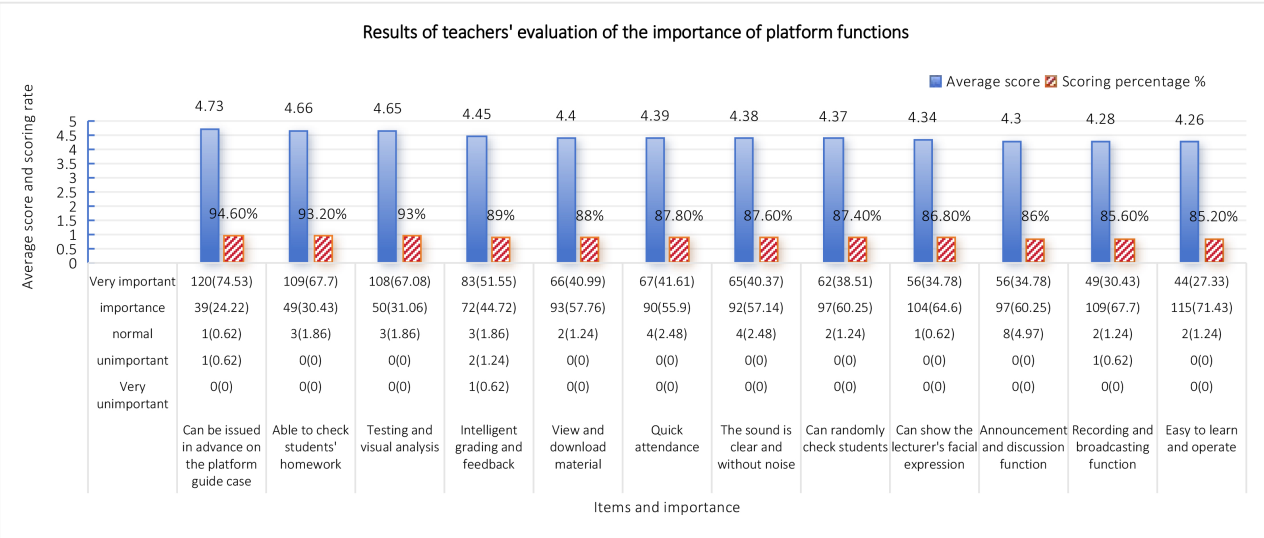
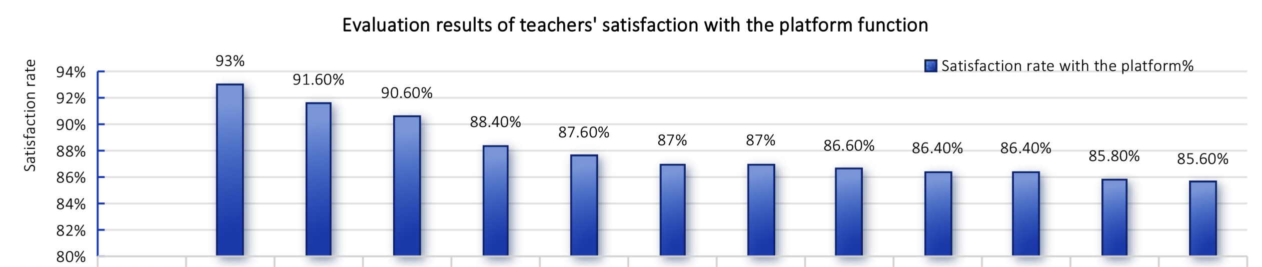



**Figure 1.** Evaluation results of young and middle-aged teachers on the importance of teaching platform functions.

### 3.4. The Teaching Platform Should Be Enhanced to Improve Teaching Quality and Increase Teacher Satisfaction with the System

**Figure 2** shows the evaluation results of teachers' satisfaction with the functions of the teaching platform. The platform functions in descending order of satisfaction rate from high to low were: can be issued in advance on the platform guide case (93%), able to check students' homework (91.6%), testing and visual analysis (90.6%), data view download function (88.4%), quick attendance (87.6%), easy to learn and operate (87%), can randomly check students (87%), intelligent grading and feedback (86.6%), recording and broadcasting function (86.4%), can show the lecturer's facial expression (86.4%), announcement and discussion function (85.8%), and clear sound without noise (85.6%).

The above results indicated that the teachers' satisfaction with the teaching platform functions ranged from 85.6% to 93%, suggesting that the teaching platform functions should be improved, and teachers should be careful when choosing the blended teaching platform. It is recommended to conduct trial lessons first, select multiple platforms for trial teaching or broadcast, and finally select the platform with clear sound and picture quality, instant fluency, and no noise as the teaching media of blended teaching. Therefore, multiple measures should be taken to improve the teaching quality and teachers' satisfaction with the platform functions.




| | Can be issued in advance on the platform guide case | Able to check students' homework | Testing and visual analysis | Data view download function | Quick attendance | Easy to learn and operate | Can randomly check students | Intelligent grading and feedback | Recording and broadcasting function | Can show the lecturer's facial expression | Announcement and discussion function | The sound is clear and without noise |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quite satisfied | 108(67.08) | 99(61.49) | 94(58.39) | 78(48.45) | 69(42.86) | 64(39.75) | 58(36.02) | 59(36.65) | 59(36.65) | 57(35.4) | 61(37.89) | 61(37.89) |
| satisfaction | 50(31.06) | 56(34.78) | 60(37.27) | 75(46.58) | 85(52.8) | 90(55.9) | 101(62.73) | 97(60.25) | 95(59.01) | 99(61.49) | 87(54.04) | 92(57.14) |
| normal | 3(1.86) | 6(3.73) | 6(3.73) | 6(3.73) | 6(3.73) | 6(3.73) | 2(1.24) | 4(2.48) | 7(4.35) | 4(2.48) | 12(7.45) | 3(1.86) |
| dissatisfy | 0(0) | 0(0) | 1(0.62) | 2(1.24) | 1(0.62) | 1(0.62) | 0(0) | 1(0.62) | 0(0) | 1(0.62) | 1(0.62) | 2(1.24) |
| Far from satisfied | 0(0) | 0(0) | 0(0) | 0(0) | 0(0) | 0(0) | 0(0) | 0(0) | 0(0) | 0(0) | 0(0) | 3(1.86) |

**Figure 2.** Satisfaction evaluation results of young and middle-aged teachers on various functions of the platform.

### 3.5. Teachers' Satisfaction with Students' Participation and Cooperation Is Not High, and Students Should Strengthen Their Participation and Cooperation

Figure 3 shows the evaluation results of teachers' satisfaction with students' participation and cooperation. Students' participation and cooperation in descending order of teachers' satisfaction rate were listed as follows: be able to check in on time during class (91.1%), actively complete class tests (90.3%), actively complete homework and tests after class (88.32%), participate in the test before class and complete the guide plan (86.21%), team leaders and group leaders supervise the situation (85.5%), take the initiative to preview before class (84.8%), actively participate in class discussion (83.73%), classroom discipline and self-discipline (82.86%), respond positively to teacher interactions (80.62%), and actively answer questions (80.37%).

The above results indicated that teachers' satisfaction with students' participation and cooperation ranged from 80.37% to 91.1%, which is adequate but not high. Students should actively complete the teacher-assigned homework and actively answer the questions; class leaders and group leaders should strengthen the supervision of students and complete the course test. With the promotion of the blended teaching model, how to accurately evaluate the effect of teacher-student interaction learning "anytime, anywhere" has become one of the current hot topics. Some researchers have proposed an emotion analysis method based on a hierarchical attention mechanism, which is called HAN, and this model has been proven to be effective (Su & Peng, 2023). Additionally, some researchers have pointed out that the bullet screen in online courses is one of the most important ways of interaction between teachers and students. In class, students can interact with teachers, actively participate in class discussions, and respond to the interaction proposed by teachers using the bullet screen. Students should also actively participate in the test and complete the guide plan before class, take the initiative to preview, improve classroom discipline and self-discipline, and check in on time. The existing research results have shown that adopting the peer learning and assessment model is suitable for knowledge expansion learning and comprehensive practice learning where teachers cannot be present all the time. This model can promote collaborative learning among students and improve their learning enthusiasm (Yang & Wang, 2023). This peer learning and assessment model can provide a reference for curriculum design to promote student participation and cooperation.

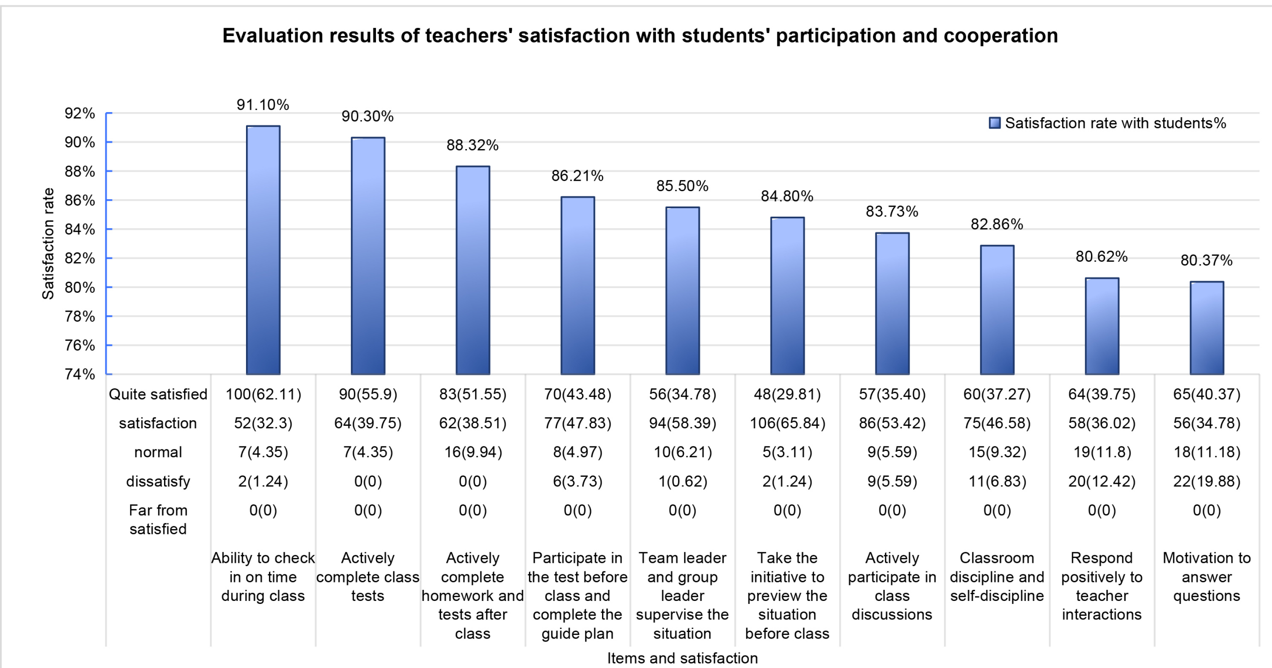



**Figure 3.** Evaluation of young and middle-aged teachers' satisfaction with students' participation and cooperation.

## 4. Summary

The teachers considered that the obstacles to online and offline blended teaching included the following aspects. (1) Students' inadequate preparation before class, few questions after class, insufficient self-discipline and low enthusiasm in answering questions in class, insufficient supervision of classmates by class leaders, and scattered students without a learning atmosphere during online teaching. (2) Not smooth teaching platform signal, unclear voice with noise, stuck network, and sometimes crashed computer. (3) Declined teachers' supervision of students, inconvenience in demonstrating skills such as physical examination, and difficulty in finding a quiet environment for online teaching.

## 5. Some Suggestions from the Author

There were some suggestions from the author. (1) For students: (A) students should strengthen the pre-class preview, log in to the learning platform in advance, watch the operation video and courseware, get access to information, and upload the group simulation exercise video, to promote the classroom learning efficiency; (B) students should ensure that the listening device is fully charged and the network is stable before class to improve teaching efficiency and learning effect (Wang et al., 2020); (C) it is suggested that group leaders should be responsible for supervising students to strengthen classroom discipline; students should not walk around freely during class, and their eyes should not leave the screen of electronic devices. Students should respond actively to the teacher's interactions, and watch the online lessons in groups to create a classroom learning atmosphere. (2) For teachers: (A) teachers should select a teaching platform with good network quality as the teaching tool to ensure the stable and smooth signal of the learning platform, and strengthen pre-class preparation, such as applying open educational resource platforms to serve as a medium for the distribution and promotion of teaching materials and innovative educational methods, with patients' information protected (Degen et al., 2024); (B) teachers should strengthen the supervision of learning, interact frequently and irregularly with students in class, and ask students to answer questions by roll-call, to check whether students are listening carefully online; (C)Teachers should adopt various teaching methods to demonstrate the operational skills of physical examinations and communication skills for case data collection to students (Degen et al., 2024). For example, the scenario simulation teaching method can reflect students' teamwork and problem-solving ability, increase the classroom atmosphere, and focus students' attention, contributing to forming a good learning atmosphere and enhancing students' interest and motivation. Regarding the detection of students' attention, some researchers have used the Internet of Things and convolutional neural networks to detect learners' attention in connected intelligent classrooms (Degen et al., 2024). In this way, teaching activities would adapt to learners' individual needs and identify areas where they have difficulties and need additional help (Riad et al., 2024). (3) For teaching hardware and teaching platform: (A) schools should provide teachers and students with a good "teaching" and "learning" site and a stable network environment; (B) schools should strengthen the maintenance of electronic network equipment and formulate the relevant use steps by referring to the relevant online teaching platform use guide. Schools should also assess the digital ability of nurse educators and determine their development needs via applying tools, strengthen the training of teachers on the use of online teaching platforms and related teaching issues (Zou, Li, & Jin, 2021), conduct corresponding training assessment after the training to test the training effect, thus promoting the continuous development of educators (Pajari et al., 2024); (C) schools should select and construct a teaching platform suitable for online and offline blended teaching for teachers, conduct practical training to enhance their skills and confidence and provide adequate organizational support, encouragement, and guidance based on individual needs (Kulju et al., 2024).

In underdeveloped regions with limited resources, particularly in clinical nursing education, the integration of Internet technology to implement blended online-offline teaching models, or the utilization of alternative digital platforms, holds significant value for both educators and learners. Moving forward, when implementing blended teaching approaches, practitioners are encouraged to align with the evolving demands of artificial intelligence by thoughtfully incorporating AI-driven tools and methodologies to enhance instructional effectiveness.

## 6. Limitations of This Study

This study is a single-center survey, and the research results only represent the current situation of the regional blended teaching mode. Furthermore, this study employed a convenience sampling method to select participants, which may introduce selection bias and affect the generalizability of the findings. Future research in this area can adopt multi-center investigation and research to explore more influential factors of blended teaching, thus providing a reference for future nursing teaching reform measures.

## 7. Conclusion

To sum up, part-time nursing teachers in directly affiliated hospitals of medical colleges in underdeveloped areas encounter many obstacles in carrying out online and offline blended practice classes, and teachers are not satisfied with the platform functions involved in blended teaching and students' participation and cooperation.

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## Authorship Contribution Statement

Yijuan LI, Shuxian WANG: proposed research ideas and designed research schemes; Yijuan LI, Liu Yun: Conducting experiments and investigations; Huang Zhen, Weiping XIE, Liwei HUANG: Data collection, data sorting and statistical analysis; Yijuan LI, Shuxian WANG, Liwei HUANG, Liu Yun, Huang Zhen, Weiping XIE: Paper writing. Liuxue LU, Liwei HUANG: Overall check and review papers.

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## Conflicts of Interest

None of the authors have a conflict of interest.

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