

# Application of Formative Evaluation Based on WeChat-Wenjuanxing in the Teaching of Traditional Chinese Medicine Surgery

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**Abstract:** Objective: To analyze the value of formative evaluation based on WeChat-Wenjuanxing during the teaching of traditional Chinese medicine surgery. Methods: Students from the 2023 and 2024 grades of the traditional Chinese medicine surgery specialty were selected as samples. The 2023 grade students received regular summative evaluation to assist teaching, while the 2024 grade students received formative evaluation based on the WeChat-Wenjuanxing platform to assist teaching. Results: The average final score and excellent rate of the 2024 grade students were higher than those of the 2023 grade students ( $P < 0.05$ ). The teaching satisfaction of the 2024 grade students was higher than that of the 2023 grade students ( $P < 0.05$ ). Feedback analysis showed that students had a high acceptance of the formative evaluation based on WeChat-Wenjuanxing to assist teaching. Conclusion: The application of formative evaluation based on WeChat-Wenjuanxing in the teaching of traditional Chinese medicine surgery significantly improves students' performance, achieves excellent teaching quality, and results in high student satisfaction with the teaching of traditional Chinese medicine surgery.

**Keywords:** Traditional Chinese medicine surgery; Clinical teaching; WeChat-Wenjuanxing

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## 1. Introduction

Students of Traditional Chinese Medicine Surgery provide services to patients after graduation, which requires strong practical skills and high-quality teaching. However, the teaching quality of Traditional Chinese Medicine Surgery is affected by factors such as teaching duration and teacher proficiency. Additionally, most teachers are clinicians with heavy daily workloads, making it difficult to give attention to every student in class<sup>[1]</sup>. Furthermore, a minority of students in Traditional Chinese Medicine Surgery have weak self-control and unclear career plans, leading to poor study attitudes that may affect teaching quality. Therefore, it is crucial to implement teaching reforms in Traditional Chinese Medicine Surgery, focusing on stimulating students' interest in learning, urging them to study independently, and enhancing their mastery of theoretical and practical

knowledge. Timely and efficient teaching evaluation can improve teaching efficiency and measure the quality of teaching methods during the actual teaching process. However, there are still defects in evaluating teaching quality through a single midterm exam format. Thus, it is necessary to reform the teaching evaluation method of Traditional Chinese Medicine Surgery based on the “WeChat-Questionnaire Star” platform, integrating a question bank for Traditional Chinese Medicine Surgery <sup>[2]</sup>. Based on this, this article analyzes the value of formative evaluation using WeChat-Questionnaire Star, with students from the 2023 and 2024 grades of Traditional Chinese Medicine Surgery as samples.

## 2. Materials and methods

### 2.1. Materials

Students from the 2023 and 2024 grades of Traditional Chinese Medicine Surgery were selected as samples. The baseline data of 2023 grade students were compared with those of 2024 grade students, with  $P > 0.05$ . As shown in **Table 1**.

**Table 1.** Baseline data analysis table for 2023 and 2024 grade students

Group	n	Gender (%)		Age (years)	
		Male	Female	Range	Mean $\pm$ SD
2023 Cohort	30	17 (56.7)	13 (43.3)	22–25	23.81 $\pm$ 1.58
2024 Cohort	30	18 (60.0)	12 (40.0)	21–25	23.79 $\pm$ 1.61
$\chi^2$ /t-value	-	0.1623	0.0270		
P-value	-	0.6870	0.9785		

### 2.2. Inclusion and exclusion criteria

Inclusion criteria: (1) Instruction by the same teaching team; (2) Use of the same teaching materials; (3) Evaluation with the same examination paper.

Exclusion criteria: (1) Students who withdraw from the course midway; (2) Students who do not participate in the examination.

### 2.3. Methods

For the 2023 students, conventional classroom teaching and traditional final examination paper evaluation will be conducted. Before teaching, professional doctors will design teaching plans and prepare lessons. The total score will be calculated as follows: attendance accounts for 10% of the total score, homework accounts for 20% of the total score, and the final exam score accounts for 70% of the total score.

For 2024-level students:

- (1) Combined Offline and Online Teaching: Evaluation based on the WeChat-Wenjuanxing platform. Teachers utilize the WeChat group for Chinese Medicine Surgery to promote teaching information, encouraging students to learn based on the teaching progress and master the content of each chapter. Summarize existing problems during students’ learning and provide unified answers to their questions.
- (2) Teaching Quality Evaluation Methods: Classroom tests and oral questions, accounting for 20% of the total score. Determine phased test times based on course progress, with two phased tests accounting for 30% of the total score. Guide students to participate in the final exam, which is graded on a 100-point

scale and accounts for 50% of the total score.

- (3) Subjective Feedback Evaluation: Complete a questionnaire based on the characteristics of Chinese Medicine Surgery to evaluate the advantages and disadvantages of the formative evaluation system. After the exam, collect and record student feedback based on the WeChat-Wenjuanxing platform's survey results. Additionally, teachers fill out an interview outline to interview some students, obtaining reliable information about their satisfaction with the current teaching mode and suggestions for teaching method reforms.
- (4) Objective Evaluation System: Students with a total score exceeding 80 are considered excellent. Calculate the excellence rate.

## 2.4. Statistical analysis

SPSS 21.0 was used to analyze the data of students from the 2023 and 2024 batches. Count data for students from both batches were recorded using percentages ( $\chi^2$ -test), while measurement data were documented using mean  $\pm$  standard deviation (SD) (t-test). Comparative differences were considered statistically significant at  $P < 0.05$ .

## 3. Results

### 3.1. Final score analysis

The average final score and the rate of excellent performance among students from the 2024 batch were higher than those from the 2023 batch, with  $P < 0.05$ . See **Table 2** for details.

**Table 2.** Analysis of final scores ( $n$ , mean  $\pm$  SD)

Group	< 60	60–69	70–79	80–89	90–100	Mean $\pm$ SD
2023 ( $n = 30$ )	1 (3.33)	1 (3.33)	7 (23.33)	11 (36.67)	10 (33.33)	79.46 $\pm$ 1.88
2024 ( $n = 30$ )	0 (0.00)	0 (0.00)	2 (6.67)	13 (43.33)	15 (50.00)	85.16 $\pm$ 1.96
Stats ( $t/\chi^2$ )	-	-	-	-	-	11.4954
$P$ -value	-	-	-	-	-	0.0000

### 3.2. Teaching satisfaction analysis

Teaching satisfaction among students from the 2024 batch was higher than that of students from the 2023 batch, with  $P < 0.05$ . See **Table 3** for details.

**Table 3.** Analysis of student teaching satisfaction ( $n$ ,%)

Group	Satisfied (%)	Somewhat Satisfied (%)	Dissatisfied (%)	Satisfaction Rate (%)
2023 ( $n = 30$ )	14 (46.67)	10 (33.33)	6 (20.00)	24 (80.00)
2024 ( $n = 30$ )	21 (70.00)	8 (26.67)	1 (3.33)	29 (96.67)
$\chi^2$	-	-	-	4.0431
$P$ -value	-	-	-	0.0444

### 3.3 Feedback analysis

A questionnaire was distributed to students from the 2024 batch to gather their opinions on formative evaluation

in the teaching of Chinese medicine surgery. All 30 questionnaires were distributed and recovered, achieving a 100% response rate. 96.67% of students expressed their preference for incorporating formative evaluation into the teaching of Chinese medicine surgery. 83.33% of students wished to evaluate their learning effectiveness after each class. 90.00% of students desired additional assessments beyond the final exam to evaluate their learning outcomes. 96.67% of students believed that WeChat-Questionnaire Star could comprehensively evaluate their course learning, and the same percentage thought it could urge them to master and understand the learning materials. Compared to summative evaluation, 96.67% of students considered formative evaluation to be more objective and comprehensive. See Table 4 for the questionnaire details.

**Table 4.** Analysis of survey results from 2024 batch students (*n*,%)

Item	Yes (%)	No (%)
Willingness to adopt formative assessment in TCM surgery teaching	29 (96.67)	1 (3.33)
Preference for learning evaluation in every class session	25 (83.33)	5 (16.67)
Need for additional tests besides final exams	27 (90.00)	3 (10.00)
WeChat-QuestionStar's comprehensiveness in course evaluation	29 (96.67)	1 (3.33)
WeChat-QuestionStar's effectiveness in promoting knowledge mastery	29 (96.67)	1 (3.33)
Formative assessment's objectivity/comprehensiveness vs summative	29 (96.67)	1 (3.33)

## 4. Discussion

The teaching of Traditional Chinese Medicine (TCM) surgery is an important subject for cultivating professional and technical talents in clinical practice. However, due to its diverse content, some students show low interest in learning <sup>[3]</sup>. The current situation of TCM surgery teaching is analyzed as follows:

- (1) Based on the analysis of teaching modes, a few teachers still follow conventional teaching methods, namely the “indoctrination” approach, where they try to cover as much knowledge as possible within the limited classroom time, while students passively receive it. This results in poor overall teaching quality, known as LBL (Lecture-Based Learning). Although this mode is still used as a common teaching method in some colleges and can impart knowledge, it restricts students’ learning locations and limits teachers’ teaching time. With the development of internet technology, the rise of online teaching modes has further highlighted the defects of conventional teaching.
- (2) Based on the analysis of supervision and assessment modes, the teaching of TCM surgery still mainly relies on final examination papers, which cannot stimulate students’ interest in learning <sup>[4]</sup>. Therefore, it is extremely important to actively carry out teaching reforms in TCM surgery to improve its teaching quality and provide clinical talents in TCM surgery. Due to the limitations of conventional teaching, this paper introduces WeChat-Wenjuanxing, a platform that integrates questionnaires, exams, and voting, to assist in the teaching of TCM surgery. Teachers can use this platform to send out exam papers and create exam content, thereby improving classroom teaching efficiency. Based on this, carrying out staged tests and in-class evaluation tests for students of TCM surgery can dynamically track students’ mastery of TCM surgery knowledge and adjust teaching content and progress accordingly.

Furthermore, the formative evaluation based on WeChat-Wenjuanxing has the characteristic of sustainability, which can integrate feedback-related formative evaluation throughout the entire teaching process, helping to identify and address the deficiencies of conventional classroom teaching <sup>[5]</sup>.

Based on a summary analysis, the advantages of using WeChat-Wenjuanxing for formative evaluation in the teaching of Traditional Chinese Surgical Science are as follows:

- (1) Higher efficiency in teaching evaluation and more convenient student feedback: WeChat-Wenjuanxing is an online platform, a modern new questionnaire tool with a simple interface that is easy for students to fill out. Additionally, teachers of Traditional Chinese Surgical Science can design classroom follow-up questionnaires on the Wenjuanxing platform, including multiple-choice and true/false questions related to the classroom content, and distribute them via WeChat groups. This reduces the time teachers spend distributing paper questionnaires, allows students to answer and submit questions at any time, and is characterized by high efficiency and convenience.
- (2) Timely feedback on teaching issues in Traditional Chinese Surgical Science and targeted analysis of student dissatisfaction with teaching: During teaching, emphasis is placed on formative evaluation, with dynamic and continuous collection of student learning information as the focal point. This facilitates teachers' timely discovery of deficiencies in teaching methods and prompt adjustment of teaching strategies, thereby specifically meeting the needs of modern students of Traditional Chinese Surgical Science.
- (3) Stimulating student enthusiasm and encouraging classroom participation: During the WeChat-Wenjuanxing formative evaluation, students can choose to anonymously express their opinions, which can reduce their psychological pressure and encourage more active participation in the classroom evaluation process. Additionally, the WeChat-Wenjuanxing platform has functions such as data visualization on a large screen and statistical chart display, which can provide intuitive feedback on student evaluation results and recent learning situations. This helps to enhance students' confidence and sense of achievement, thereby stimulating their enthusiasm.
- (4) Continuous improvement of teaching quality: WeChat-Wenjuanxing's formative evaluation for Traditional Chinese Surgical Science focuses on both student learning outcomes and learning experiences. Continuously summarizing and analyzing student feedback is conducive to teachers' in-depth analysis of student needs and methods to stimulate student interest, thereby continuously optimizing teaching methods, improving teaching quality, and facilitating innovative development in Traditional Chinese Surgical Science.
- (5) Analysis of the effectiveness of practical teaching: During the period of assisted teaching on the WeChat-Wenjuanxing platform, teachers can design multi-faceted assessment papers, including collecting medical histories of surgical patients, writing cases of surgical patients, summarizing clinical operation methods, etc. Through regular analysis and collection of various information, doctors can quickly identify and address students' weaknesses in learning, and then take targeted remedial measures. For example, if it is found through the WeChat-Wenjuanxing platform that students have omissions or errors in writing medical records, relevant knowledge teaching can be strengthened, and students with weaknesses in this knowledge point can be required to practice more; if it is found that students have poor performance in clinical operation assessment, targeted guidance can be provided to strengthen theoretical knowledge teaching and practical knowledge teaching<sup>[6]</sup>. Teachers of Chinese medicine surgery can use WeChat-Wenjuanxing to assist teaching and improve teaching plans, which can enhance students' learning level and practical abilities.

Based on the data analysis in this article, the average final exam score of students in the 2024 grade ( $85.16 \pm 1.96$ ) is higher than that of students in the 2023 grade ( $79.46 \pm 1.88$ ), and the excellent rate of 93.33% is

higher than the 70.00% of students in the 2023 grade, with  $P < 0.05$ ; the teaching satisfaction rate of 96.67% for students in the 2024 grade is higher than the 80.00% for students in the 2023 grade, with  $P < 0.05$ . Feedback analysis shows that students have a high acceptance of WeChat-Wenjuanxing formative evaluation as an auxiliary teaching tool. The reasons for this are analyzed as follows: The WeChat-Wenjuanxing platform has characteristics of equality and interactivity. When used as an auxiliary teaching tool in the classroom of Chinese medicine surgery, teachers do not need to master programming skills or develop new software, and only require wireless network coverage in the classroom, making it easy to promote. Teachers guide students to learn independently online and develop the habit of exploring independently, which is beneficial for improving students' thinking in dialectical treatment of Chinese medicine, thereby improving their final exam scores and teaching satisfaction. Additionally, the WeChat-Wenjuanxing platform is environmentally friendly and simple, which can cultivate "multi-skilled" talents in the information age. The formative evaluation of the WeChat-Wenjuanxing platform can also urge teachers to prepare high-quality lessons, enabling them to innovate their teaching methods after understanding students' learning needs, which is conducive to good teacher-student interaction and thereby improves teaching efficiency<sup>[7]</sup>. However, it should be noted that there are still deficiencies in the research on the application value of formative evaluation based on WeChat-Wenjuanxing in the teaching of Chinese medicine surgery, such as the small number of students included in the study. In the later stage, it is necessary to increase the number of students in Chinese medicine surgery, avoid internal interfering factors, and comprehensively analyze the feasibility of formative evaluation using WeChat-Wenjuanxing.

## 5. Conclusion

In summary, the use of formative evaluation based on WeChat-Wenjuanxing as an auxiliary teaching tool in Chinese medicine surgery results in high student satisfaction with teaching, improved exam scores, and an increased excellent rate, indicating its value for promotion.

## Disclosure statement

The author declares no conflict of interest.

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