International student perceptions of online medical education during the COVID-19 epidemic

Juejin Wang | Yujie Zhang | Tianxiang Xia | Yingbin Ge | Lei Chen | Ying Han | Yu Sun | Jun Du

Abstract
This study aimed to investigate how international students enrolled on medical and surgical bachelor’s degree programs (MBBS) in China perceived online medical education course, compared to native Chinese students during the Covid-19 pandemic. The perceptions of 38 MBBS and 31 Chinese sophomores were surveyed using the Chaoxing platform. The international student group's mean satisfaction with online teaching was 2.737 on a 5-point scale, much lower than the Chinese students' mean score of 4.355 ($p < 0.05$). Similarly, the international students expressed less satisfaction than the Chinese learners with other aspects of the course, including the teacher's level, at 3.964 ± 0.818 versus 4.445 ± 0.548 ($p < 0.05$); curriculum organization, at 3.651 ± 0.848 versus 4.333 ± 0.568 ($p < 0.05$); and self-learning level, at 3.686 ± 0.996 versus 3.686 ± 0.949 ($p > 0.05$), respectively. There were also noteworthy differences between the progress made by the international students in Chinese language learning, which was positively correlated with satisfaction with teaching on the online medical education ($p < 0.05$). The results suggest that, while online teaching was a necessary response to the Covid-19 pandemic, satisfaction with this mode of education is lower among international students than their Chinese counterparts.

KEYWORDS
Chinese student, COVID-19 epidemic, international student, online teaching practice

1 | INTRODUCTION

The Covid-19 pandemic required many countries to take measures to reduce the spread of the virus and relieve the panic it caused. A Many international students studying in China have returned to their homelands due to the epidemic, and are now unable to return. With clinical medicine highly popular among international students, online teaching has become the “new normal” in medical colleges across the country. B C This unprecedented challenge has turned the attention of the global medical education community toward online teaching, and might profoundly impact the future delivery of medical education.

Covid-19 has posed an unprecedented challenge to global education, while highlighting the disadvantages and advantages of online teaching. Students in one study reported significant increases in their study workload, to the extent they were concerned about their ability to complete the academic year. D In addition, online education
does not provide the same opportunities to interact with teachers and classmates, lowering students’ enthusiasm for and interest in learning. Nonetheless, there are positive aspects to online learning. For instance, international students are no longer limited by geography and access to learning resources. Also, online education allows such students to watch difficult classes repeatedly, which can enhance their understanding. Furthermore, owing to the greater flexibility of scheduling, it is reasonable to think that international students may have more freedom to arrange their time.

Nanjing Medical University has ranked among the top 500 world universities for the past 5 years. The university now cooperates with the Chaoxing platform, a professional learning platform for smartphones, tablet computers, and other mobile terminals. Before classes begin, course information such as the syllabus is imported, and students view the courseware on the screen. Student feedback can be sent to teachers, who can promptly adjust their teaching content. The platform also allows students to submit homework online after completing a course module. At present, the platform is widely used to deliver theoretical courses to international students, with lab-based programs suspended until the students return to school.

Since online medical education in Chinese colleges and universities is a relatively novel development, measuring the satisfaction of foreign students will guide interventions to improve the quality of online teaching. In view of this, the authors randomly selected international undergraduates taking degrees in medicine and surgery (MBBS) at Nanjing Medical University and investigated the online medical education effects, with the results informing the work of colleagues at the university.

2 | MATERIALS AND METHODS

2.1 | Study participants

Among the 69 sophomores voluntary participants, 38 were international students, 31 were international students, and all were between 18 and 21 years old.

2.2 | Instrumentation

A modified self-administered questionnaire was prepared, including 27 closed-ended questions using a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree). The first section of the two-part questionnaire recorded basic personal information about the international students, including their gender, learning purpose, the benefits when study in China and the teaching mode they prefer. The students also asked to give the main reason why they are not satisfied with online course. The second and main section focused on international student satisfaction with their teacher, the organization of the curriculum, and their own learning.

To measure the students’ satisfaction with their teacher, three subdomains were developed, including (1) the teacher’s level of English, (2) his academic level, and (3) his use of teaching methods/skills. Satisfaction with the organization of the curriculum was measured using four items, including (1) curriculum setup; (2) study time; (3) assessment; and (4) effect on learning. For the self-learning level, the students assessed (1) their academic performance; (2) their previews and reviews of classes; (3) their classroom performance. In addition, their progress of Chinese proficiency was appraised by their performance in Chinese class.

Both Biochemistry and Molecular Biology and Physiology are compulsory sophomore courses for all MBBS at Nanjing Medical University. MBBS students’s score in Biochemistry and Molecular Biology and Physiology at 2019 and 2020 was collected to investigate foreign students’ performance on online and offline courses. In 2020, the lectures took the form of interactive video demonstrations online, while there was the offline teaching in 2019. The classes in 2019 and 2020 were delivered by the same teachers.

2.3 | Data analysis

The statistical testing of the two groups used t-tests or modified t-tests for data with normal distributions, and the Wilcoxon Rank Sum test for other data. The variance within three or more groups of data with normal distributions and homogenous variation was analyzed, with the Kruskal-Wallis h test used for data without a normal distribution or whose variance was uneven. When the differences among the three groups and above were statistically significant at p < 0.05, further pairwise comparison was conducted using the LSD method. R 4.04 was used for all analyses.

3 | RESULTS

In total, 69 questionnaires were sent out and all were returned fully completed. Among the international student respondents, 13 (34.21%) were males and 25 (65.79%) were females (Figure 1a. The results showed that the main
The purpose of most of these international students was to improve their medical knowledge and obtain their degrees in China, which required them to complete their studies in the country (Figure 1b,c). Overall, 81.6% of the international students felt they benefited more from offline than online education (Figure 1d). We noticed that the international students were less satisfied with the online teaching than their native Chinese counterparts (2.737 ± 1.223 vs. 4.355 ± 0.608, \( p < 0.05 \); see Table 1). The main reasons for this were the delays in teachers' responses to students' questions, the failure of teaching content to satisfy the students' learning needs, and the insufficient attention that teachers provided to students (Figure 2).

The descriptive statistics for the survey are shown in Tables 2 and 3. In general, most international student participants expressed satisfaction with the quality of their teacher. The mean score of 3.964 on the 5-point scale indicated upper-medium satisfaction with their teacher's level of English, academic level, teaching content, and teaching attitude. However, this was substantially lower than the Chinese group's mean score of 4.445 and represented a much more critical attitude to the teachers among the international students (\( p < 0.05 \)).

The mean score for the international students' satisfaction with the online curriculum was 3.651. They were slightly more satisfied with curriculum setup (3.763) than...
the mode of assessment (3.632), study time (3.526), and learning effect (3.684). However, these scores were significantly lower than those of the Chinese students \((p < 0.05)\). Interestingly, the impact of the international students’ attitude toward self-learning was similar to that recorded for the Chinese students \((p > 0.05)\).

About 3/4 (73.68%) of the international participants believed that their Chinese level had been poor before they came to China but had considerably improved following 18 months of study in the country (Table 4). We were interested to note that, among those students with poor Chinese level before coming to China, the strong correlation between progress in Chinese and satisfaction with online classes (Table 5). Participants with more advanced Chinese showed more positive attitudes toward online teaching while those whose Chinese had progressed less displayed lower levels of satisfaction \((r = 0.51; p < 0.01; \text{see Figure 3})\).

As shown in Figure 4, the scores obtained by international students after Biochemistry and Molecular Biology online teaching in 2020 were significantly lower than those having offline class in 2019 year \((p < 0.05)\).
There was no significant change of scores in Physiology course between online and offline teaching.

4 | DISCUSSION

Chinese higher education is attracting ever-higher numbers of international students, with 492,185 such learners from 196 countries and regions enrolled in Chinese colleges and universities in 2018. Medicine has been a particularly popular choice in recent years, and in this study, we collected students’ subjective feelings about medical teaching in Nanjing Medical University. The results showed that 81.6% of international students believed that online teaching was less effective than in-person classroom instruction. Interestingly, compared with Physiology, better performance of international students in Biochemistry and Molecular Biology seems more depends on offline teaching. To determine whether the attitudes of Chinese and international students to online education differed, we compared both groups in our preliminary survey-based investigations of the possible mechanisms involved.

The present study recorded high levels of international student satisfaction in the three aspects of teaching, that is, the teacher’s levels of English and academic knowledge, as well as their teaching methods and skills. Since MBBS education was established 14 years ago at the university, these results—alongside high levels of satisfaction with the online course curriculum—are unsurprising. The main sources of dissatisfaction were the failure of teachers to respond promptly to student queries, the failure of the teaching content to meet students’ learning needs, and the insufficient attention they received from teachers. While teaching must respond to changing classroom dynamics, multimedia presentations delivered online allow for a much less responsive and

| TABLE 4 | Chinese level of international students |
|--------|-------------------------------|
| Chinese level | Number | Percentage (%) |
| Before coming to China | | |
| Excellent | 0 | 0 |
| Good | 1 | 2.63 |
| Average | 9 | 23.68 |
| Poor | 28 | 73.68 |
| Current level | | |
| Excellent | 6 | 15.79 |
| Good | 20 | 52.63 |
| Average | 10 | 26.32 |
| Poor | 2 | 5.26 |

| TABLE 5 | Descriptive statistics for the progress of Chinese proficiency and the overall teaching satisfaction |
|---------|---------------------------------|
| Progress of Chinese proficiency | Number | Mean ± SD | F value | p Value |
| ++++ | 5 | 3.800 ± 0.837 | 9.16 | 0.006 |
| ++ | 14 | 2.929 ± 1.141 | | |
| + | 7 | 2.429 ± 0.976 | | |
| − | 2 | 1.500 ± 0.707 | | |

FIGURE 3  The relationship between the progress of Chinese proficiency and the overall teaching satisfaction

FIGURE 4  The examination score of MBBS students at biochemistry and molecular biology or physiology in 2019 (offline) and 2020 (online)
flexible teaching process. The teacher was only able to describe the contents of the pre-prepared courses and could not manage issues that students might unexpectedly raise in class. The background knowledge and attitudes of international students differ considerably from their Chinese counterparts: international students demonstrate greater willingness to get involved in campus management work and student services, and are more active and willing to ask questions in class time. Thus, when online teaching centers on textbook-based explanations of the course program, the curriculum setup may appear relatively one-dimensional to international students. Online teaching produced less discussion and interaction compared to traditional classroom teaching, and this appears to be a more significant issue for international students. While the decision for medical students to attend a lecture, whether live or recorded, is primarily based on course content and lecturer quality, it seems reasonable to believe that international students might be less engaged by online teaching. Their participation and learning depend on providing additional hours to Chinese teachers to develop teaching materials that particularly appeal to overseas learners, such as micro-lectures. Experimental session is an important component of medical education. Our school have purchased the computer and camera equipment, interactive online experimental classes will be present to students soon.

Interestingly, the survey suggests that the positive responses toward online teaching may be positively associated with their progress of Chinese proficiency, but not their examination scores in main medical course such as Biochemistry and Molecular Biology or Physiology (data not shown). On the one hand, more advanced levels of Chinese may point toward greater diligence, and more willing to study and live in China. Such students, we believe, will be more satisfied with the online teaching of most medical courses. On the other hand, it is widely known that the language level of international students influences their perception of the quality of their educational experiences. Although course communication generally takes place in English, local students on campus or local residents usually speak Chinese. To establish powerful bonds with their Chinese classmates and teachers, international students should spend sufficient time studying the local language. Moreover, the practical courses and clinical internships offered to MBBS students are based in Chinese hospitals, so they will need to communicate closely with local patients. It seems reasonable to suggest that studying Chinese, passing standardized Chinese tests, and learning Chinese customs and culture will enable international students to adapt to medical education programs more quickly.

The limitations of this study lie in its small sample size, which means the results cannot be generalized to all international medical students in China. The limited research period also restricted our ability to test interventions that might improve international student satisfaction with teaching. Since such interventions typically take a long time to implement and verify, additional research is required to investigate these areas of practice.

5 | CONCLUSION

While the online medical courses at Nanjing Medical University delivered essential knowledge of the subject to participants, satisfaction levels among international MBBS students were lower than for Chinese learners. Increasing levels of interaction between teachers and international students proved challenging, with the Chinese language proficiency of students might be the main problem to be resolved.

AUTHOR CONTRIBUTIONS

Jun Du, Juejin Wang, Lei Chen, Yingbin Ge, Ying Han designed and drafted the manuscript. Yujie Zhang, Tianxiang Xia, Yu Sun helped in conducting this study. Jun Du, Tianxiang Xia performed statistical analysis. All authors read and approved the final manuscript.

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CONFLICT OF INTEREST

There is no conflict of interest and authors are solely responsible for the content and writing of the article.

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