RESEARCH ARTICLE

Students' feedback about "Physiotherapy of orthopaedic diseases" with full-time online teaching

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Abstract

Objective: To evaluate the perceptions of physiotherapy students regarding the effectiveness of full-time online teaching in the Physiotherapy of Orthopaedic Diseases course, focussing on satisfaction levels, theoretical knowledge acquisition, and practical skill development during the later stage of the coronavirus disease-2019 pandemic.

Method: The mixed-methods study was conducted at the Fifth Clinical College of Guangzhou Medical University, China, from October 2022 to January 2023, and comprised students from the 2020 cohort of the four-year physiotherapy major who had attended the Physiotherapy of Orthopaedic Diseases course from September 2022 to January 2023. Quantitative data was collected through pre- and post-online course surveys. Qualitative data was gathered through semi-structured interviews. Quantitative data was analysed using SPSS 25, while qualitative data was subjected to thematic analysis.

Results: Of the 61 subjects with mean age 21.41±0.72 years, 40(65.6%) were females and 21(34.4%) were males. Post-course ratings score 13.77±4.03 showed a significant decline in satisfaction with the course and teaching effectiveness compared to pre-course ratings 15.28±2.65(p=0.02). While sharing qualitative insights, the students appreciated instructors' enthusiasm, but expressed concerns about the absence of practical online activities and direct interaction essential for physiotherapy skill development. However, online practical sessions provided a conducive environment for skill demonstration, and fostered student-teacher engagement.

Conclusion: Well-designed online educational methods are necessary that are tailored to the practical demands of physiotherapy education. Strategic enhancements are essential to bridging the gap in practical skills training through online teaching.

Keywords: Distance education, Student satisfaction, Educational methods, Practical skills, Educational technology.

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Introduction

The 7th National Census of China in 2020 identified a significant shortfall in the number of physiotherapists available in mainland China, with only 50,000 physiotherapists serving a population, which, according to national needs assessments, requires 211,800.[1] This disparity is even more pronounced when compared to international norms that suggest a standard of 15 physiotherapists per 100,000 people, whereas China has only 1-2.[2] This shortage underscores a critical demand for both enhanced training and an increase in qualified physiotherapy (PT) professionals, incorporating comprehensive theoretical and clinical education.

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Since the outbreak of coronavirus disease-2019 (COVID-19) more than three years ago, the resultant lockdowns and social isolation have necessitated a swift pivot to online teaching modalities. This shift has been fraught with challenges, particularly in fields requiring intensive hands-on training, like PT, which have traditionally relied heavily on in-person instruction. These challenges are not only technical, but also pedagogical, as instructors and students grapple with the limitations of remote learning in effectively conveying practical skills.[3,4]

The pandemic necessitated frequent and abrupt transitions between online and offline educational formats, disrupting traditional learning and teaching methodologies.[5,6] While some aspects of online education, such as its flexibility and the ability to provide immediate feedback remotely, are celebrated globally,[7-12] significant concerns persist about its effectiveness in engaging students and enabling the acquisition of complex practical skills. Critics argue that the lack of direct interaction with instructors and peers can lead to decreased student engagement and hinder the learning of practical skills critical to medical professions, like PT.[6,13-15]

However, by the end of 2022, with the widespread adoption of advanced electronic teaching aids and improved Information Technology (IT) proficiency among educators and students, there was a notable shift in the preparedness for and reception to online learning. This period also marked the final major phase of COVID-19 outbreak in China, presenting a unique opportunity to study the impacts of sustained online teaching and to assess its efficacy in the context of PT education, which has stringent practical requirements.[16]

Despite favourable initial feedback on online teaching during the pandemic, discrepancies have been noted between student assessments and actual competencies, particularly in courses like Physiotherapy of Orthopaedic Diseases (PTOD) that demand rigorous practical training. PT for musculoskeletal problems similar to this course is extensively practised in PT education globally. A survey in 2022 revealed that while a majority of PT graduates in China work in musculoskeletal PT, aligning with the PTOD curriculum,[17] many may not have the practical skills their degrees would suggest.

The current study was planned to evaluate the perceptions of PT students regarding the effectiveness of full-time online teaching in the PTOD course, focussing on satisfaction levels, theoretical knowledge acquisition, and practical skill development during the later stage of the COVID-19 pandemic. It was hypothesised that online teaching negatively impacts practical skill satisfaction compared to theoretical learning.

Subjects and Methods

The mixed-methods study was conducted at the Fifth Clinical College of Guangzhou Medical University, China, from October 2022 to January 2023, and comprised students from the 2020 cohort of the four-year PT major who had attended the PTOD course from September 2022 to January 2023. The PT programme achieved a remarkable second place in the 2023 Chinese University Major Rankings, demonstrating its esteemed standing within the country.[18] The programme has been offering the PTOD course for seven years. After approval from the institutional ethics review committee, the sample size was calculated using Cohen's effect size standards utilising G*Power 3.1 software. The effect size (dz) was established at 0.5 (medium effect size), the significance level (α) at 0.05, and the statistical power (1-β) at 0.95. A two-tailed paired-sample t-test was conducted. The sample size was inflated by about 15% to increase the statistical power.[19] Written informed consent was obtained from all the participants. Those who failed to complete the PTOD course or were absent for >20% of the course duration were excluded, and so were those who were unable to participate due to technical issues, like lack of internet connectivity or incompatible equipment, and those not willing to participate. Also, individuals diagnosed with anxiety or depressive disorders by a psychiatrist were excluded to reduce confounding factors in self-reported satisfaction. The third year of the PT programme offers the PTOD course, which emphases clinical case teaching and the development of assessment and treatment planning skills for musculoskeletal diseases. Prior to this advanced course, students complete foundational courses, including Functional Anatomy, Sports Science, Physical Agents and Manual Therapy. The PTOD course consists of 80 class hours, divided into 16 theoretical and 64 practical hours. Course content focusses on the aetiology, pathophysiology, examination, evaluation and treatment of joint dysfunctions, particularly of the cervical spine, shoulder, elbow and wrist, culminating in comprehensive case analyses using the Subjective, Objective, Assessment and Plan (SOAP) approach.[20]

Instructional videos detailing practical skills are pre-recorded and hosted on the Chaoxing Online Teaching Information Platform (http://i.mooc.chaoxing.com) for asynchronous learning.[21] These videos provide theoretical insights and clinical case demonstrations, enhancing students' clinical reasoning and practical skills. Additionally, instructors pre-record bite-sized theoretical lectures for preliminary student review.

Theory classes are conducted live using Tencent Meeting or DingTalk, featuring real-time interactions similar to Zoom.[7] Practical sessions involve live demonstrations by instructors, followed by small group discussions (SGDs) (5-6 students) to analyse case studies and address any concerns. Regular interactive teaching moments are scheduled every 10-15 minutes to engage students actively. Teachers demonstrate operations at each stage of the SOAP process, and intersperse this with targetted questions to stimulate students' problem-solving and collaborative skills. After each SOAP demonstration, students engage in a 10-minute question-and-answer (Q&A) session in small groups. Text-based case studies are analysed at the end of the class to foster clinical thinking. Students operate at home or work with friends and family as simulated patients in the final step. During practical classes, the assistant helped adjust the camera angle to focus on the demonstration area and provided relevant rehabilitation tools such as elastic bands or joint mobilization belts when needed.

Students complete and upload case discussions to the e-learning platform after each class. Instructors review these submissions to encourage further discussion and provide feedback on complex topics through platforms, such as WeChat.

A requirement set at 80% attendance, which was determined by our teaching team as necessary to ensure student engagement and learning outcomes, based on our observations in previous online courses.

The study used quantitative pre- and post-online course surveys were conducted to measure changes in student satisfaction and knowledge acquisition. Additionally, semi-structured interviews examined participants' emotions, perspectives, and experiences with the course.

The survey questionnaire was developed by PT faculty members with over a decade of experience in collaboration with a statistician. The questionnaire underwent three rounds of revisions by 10 students and three teachers to clarify any ambiguous items. A preliminary survey tested its reliability and validity, yielding a Cronbach's alpha of 0.953 and a Kaiser-Meyer-Olkin (KMO) value of 0.784 for the entire scale, indicating high internal consistency and suitability for the study.[22] The complete survey is provided in Appendix 1.

Post-course, semi-structured interviews were conducted to complement the survey data. The sample for the interviews was raised using snowball sampling technique to ensure capturing diverse perspectives. Each interview lasted 30-50 minutes. Tencent Meeting was used to conduct the online interviews, and each interview was recorded. All the interviews were transcribed verbatim into Word documents, and the data was analysed using Braun and Clarke's six-phase reflexive thematic analysis, conducted independently by a single researcher.[23] This approach puts emphasis on maintaining interpretive consistency.[24] To enhance transparency and mitigate bias, the researcher maintained a detailed reflexive journal throughout the analysis using NVivo 12.

The analytical process comprised six steps,[23] including familiarisation, initial coding, theme development, theme review, theme definition and naming, and report writing.

Although the analysis was conducted by a single researcher, multiple strategies were employed to ensure rigour. Triangulation was achieved by comparing qualitative findings with quantitative survey results. The researcher also maintained an ongoing reflexive log to critically examine assumptions and analytical choices. In addition, member checking was conducted with three interviewees to verify the accuracy and resonance of the interpreted themes, thereby strengthening the credibility of the findings.

Appendix 1:

Hello everyone, this questionnaire is about a satisfaction survey for the course of Physical Therapy of Orthopedic Diseases (PTOD). We sincerely invite you to participate in this survey. Your participation is entirely voluntary, and the questionnaire results will be kept strictly confidential. The data will be used only for educational research and may appear in academic publications, without disclosing any of your personal information. You can refuse to answer any questions or withdraw from the study at any time. If you are willing to participate, please fill out this questionnaire anonymously based on your real experiences. Please provide honest feedback about your online class experiences to further enhance the quality of this course. Thank you for your feedback!

A 5-point scale is used to rate your satisfaction, with 1 representing very dissatisfied, 2 representing dissatisfied,
3 representing neutral, 4 representing satisfied, and 5 representing very satisfied.

Subcategory 1: Online teaching satisfaction

Questions 1: Learning experience
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Questions 2: How much you learn
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Questions 3: Motivation of online teaching
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Questions 4: Online teaching environment
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Questions 5: Teachers' passion
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Subcategory 2: Curriculum teaching

Questions 6: The content of the online teaching
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Questions 7: The suitability of the teaching strategy
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Questions 8: The suitability of curriculum settings
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Questions 9: Accomplishment of teaching objectives
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Subcategory 3: Consciousness and behaviour change

Questions 10: The important of communication and feedback
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Questions 11: The changes of learning attitude
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Questions 12: Positive behaviour impact on classmates
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Questions 13: Management of study plans and goals
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Questions 14: Applying knowledge to analyze or deal with musculoskeletal problems
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Other questions

Questions 15: Gender
Male or female

Questions 16: Age
Year of birth ____________

Quantitative data was analysed using SPSS 25. Data was expressed as frequencies and percentages. Shapiro-Wilk test was used to assess data normality. Paired t-tests were used to compare pre- and post-online course scores. Where necessary, Wilcoxon signed-rank test was used. $P<0.05$ was considered statistically significant.

Results

Of the 61 subjects with mean age 21.41 ± 0.72, 40(65.6%) were females and 21(34.4%) were males. The comparison of scores for curriculum settings (Q-8) before and after the course revealed a statistically significant difference (*p*=0.01), while no significant difference was observed for the remaining items (Figure).

Prior to the online course, only a few students expressed dissatisfaction primarily with their overall learning experience 9(14.8%), and motivation for online learning 10 (16.4%). In contrast, students were generally satisfied with the online teaching content 35(57.4%), the instructors' enthusiasm 32(52.5%), the appropriateness of curriculum settings 31(50.8%), and the effectiveness of communication and feedback mechanisms 29(47.5%).

After completing the course, increased levels of dissatisfaction were noted, particularly in relation to the curriculum settings 17(27.9%), online learning motivation 14(23%), and perceived learning outcomes 13(21.3%). The areas of extreme dissatisfaction were curriculum settings 7(11.5%), online learning motivation, environmental factors, and teaching strategies 5(8.2% each) (Table 1). While the appreciation for communication and feedback 32(52.5%) and instructors' passion 29(47.5%) remained relatively high, there was a significant drop in satisfaction regarding curriculum settings 15-12 (from 50.8% to 19.7%) and teaching strategies 28-9 (from 45.9% to 14.8%).

Paired t-test revealed that the score for teaching

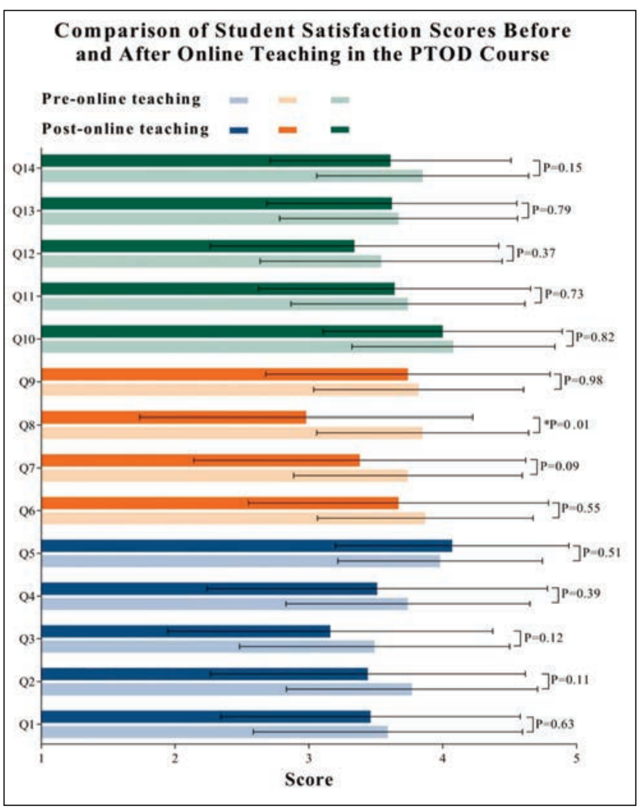

Figure: Comparison of student satisfaction pre- and post-online course scores.
POTD: Physiotherapy of Orthopaedic Diseases.

effectiveness significantly decreased from pre-course (15.28±2.65) to post-course (13.77±4.03). The mean decrease was 1.51 (95% confidence interval [CI]: 0.28-2.74; *p*=0.02). However, no significant change was observed in overall satisfaction with the online learning experience (*p*=0.25) (Table 2).

The qualitative data identified three major themes: lack of hands-on engagement; insufficient teacher-student interaction; and structural scheduling challenges.

The representative quotes from students' qualitative feedback on online teaching are as follows:

"*… when it comes to practical sessions, based on my experience last semester, I barely learned anything useful.*" (Student 1).

"*… in terms of theory, they might provide some recorded sessions, which we can watch repeatedly … and it can really leave a lasting impression and enhance our understanding. But for the practical side, even though they do online teaching with the camera focussing on the teacher's actions, it was just not quite the same. There is a bit of a missing element when it comes to the hands-on experience* (Student 4)."

"*… when it comes to practical classes, it is better not to take them online … It really has a significant impact on us, especially for myself* (Student 6).

"*The biggest challenge with online learning is that when you watch videos that require hands-on practice, it can be difficult to actually perform the practical exercises … the major challenge definitely lies in the practical aspect* (Student 8).

"*… when it comes to online practical courses, I find the effectiveness very low.* ("Student 10).

"*Now, when it comes to practical hands-on training, the effectiveness of online teaching is definitely not that great*" (Student 12).

"*In the case of in-person practicals, you are hands-on, and students tend to be more committed, with the teacher there to provide personal guidance. We can actually practise on one another. Thus, when we had to stick to online practicals only, we found that we quickly forget what we have learned, or that we never truly grasped the knowledge. In the end, we would not know how to apply it*" (Student 3).

"*Without the teacher's face-to-face or hands-on guidance, there are often issues with certain aspects, such as the position of the patient, precise points of contact, the right techniques, or the thought process for assessment. I cannot grasp these key points, and it affects the quality of my learning*" (Student 10).

Table-1: Comparison of pre- and post-online course scores of the surveyed questions [n (%)].

Questions	Very unsatisfied		Dissatisfied		Fair		Satisfied		Extremely satisfied		Mean	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Learning experience	0	3(4.9)	9(14.8)	9(14.8)	21(34.4)	18(29.5)	17(27.9)	19(31.1)	14(23)	12(19.7)	3.59	3.46
How much you learn	1(1.6)	2(3.3)	4(6.6)	13(21.3)	17(27.9)	17(27.9)	25(41)	14(23)	14(23)	15(24.6)	3.77	3.44
Motivation for online teaching	1(1.6)	5(8.2)	10(16.4)	14(23)	18(29.5)	19(31.1)	22(36.1)	12(19.7)	10(16.4)	11(18)	3.49	3.16
Online teaching environment	0	5(8.2)	6(9.8)	10(16.4)	17(27.9)	11(18)	25(41)	19(31.1)	13(21.3)	16(26.2)	3.74	3.51
Teachers' passion	0	1(1.6)	2(3.3)	2(3.3)	12(19.7)	9(14.8)	32(52.5)	29(47.5)	15(24.6)	20(32.8)	3.98	4.07
The content of the online teaching	1(1.6)	3(4.9)	2(3.3)	8(13.1)	12(19.7)	9(14.8)	35(57.4)	27(44.3)	11(18)	14(23)	3.87	3.67
The suitability of the teaching strategy	0	5(8.2)	5(8.2)	8(13.1)	17(27.9)	23(37.7)	28(45.9)	9(14.8)	11(18)	16(26.2)	3.74	3.38
The suitability of curriculum settings	0	7(11.5)	3(4.9)	17(27.9)	15(24.6)	16(26.2)	31(50.8)	12(19.7)	12(19.7)	9(14.8)	3.85	2.98
Achievement of teaching objectives	0	3(4.9)	2(3.3)	4(6.6)	19(31.1)	14(23)	28(45.9)	25(41)	12(19.7)	15(24.6)	3.82	3.74
The importance of communication and feedback	0	2(3.3)	1(1.6)	1(1.6)	12(19.7)	9(14.8)	29(47.5)	32(52.5)	19(31.1)	17(27.9)	4.08	4
The changes of learning attitude	0	2(3.3)	4(6.6)	5(8.2)	21(34.4)	19(31.1)	23(37.7)	22(36.1)	13(21.3)	13(21.3)	3.74	3.64
Positive behaviour impact on classmates	1(1.6)	3(4.9)	4(6.6)	10(16.4)	27(44.3)	20(32.8)	19(31.1)	19(31.1)	10(16.4)	9(14.8)	3.54	3.34
Management of study plans and goals	1(1.6)	2(3.3)	4(6.6)	3(4.9)	19(31.1)	21(34.4)	27(44.3)	25(41)	10(16.4%)	10(16.4%)	3.67	3.62
Applying knowledge to analyse or deal with musculoskeletal problems	0	1(1.6)	2(3.3)	5(8.2)	18(29.5)	20(32.8)	28(45.9)	26(42.6)	13(21.3%)	9(14.8%)	3.85	3.61

Table-2: Comparison of total and subscale pre- and post-online course scores.

Dimension	Group	Mean±SD	DV (95%CI)	t-test	*p*-value
Online teaching satisfaction	Pre	18.57±4.04	0.93(-0.68-2.55)	1.16	0.25
	Post	17.64±5.05			
Teaching effect	Pre	15.28±2.65	1.51(0.28-2.74)	2.46	0.02
	Post	13.77±4.03			
Consciousness and behaviour change	Pre	18.89±3.44	0.67(-0.72-2.07)	0.97	0.34
	Post	18.21±4.15			
Total scores	Pre	52.74±9.46	3.11(-0.84-7.07)	1.58	0.12
	Post	49.62±12.4			

DV: Difference value; CI: Confidence interval; SD: Standard Deviation.

"*Regarding the course structure, I would suggest increasing the proportion of in-person classes. It would make a real difference*" (Student 11).

"*We have adopted this Case-Based Learning (CBL) model, which combines theory, practical skills and problem-based learning. And I must say, it is really effective because it seamlessly marries theory with clinical practice, and it is incredibly helpful for our future*" (Student 5).

" *choosing practical and effective learning platforms is crucial. It is essential to … pre-screen platforms that offer courses with a strong track record of effective teaching. In addition, when teachers record their lessons, they should aim for thorough and detailed explanations"* (Student 6).

"*Sometimes, there is a lag in the content, and it can also be challenging to manage time properly. When it comes to students, if you are juggling a full schedule of classes and have evening commitments, it is pretty likely you will face some difficulties with online learning*" (Student 9).

"*I feel like online teaching lacks a lot of interaction between teachers and students, as well as among students themselves*" (Student 2).

"I*t does not seem quite appropriate, because with online teaching, you are missing out on that direct communication with the teacher and your fellow students*" (Student 4).

"*Online teaching is not like live teaching, so lack of real-time interaction with the teacher can affect the effectiveness of learning*" (Student 12).

"*If both theory and practical sessions are conducted online, the factors affecting the effectiveness of teaching really have a few key aspects. First of all, it is our self-discipline … Once you enter university, your self-discipline tends to take a hit, and without the traditional classroom structure and the constant watchful eye of a teacher, it is like a free-for-all*" (Student 5).

"*If students lack motivation and willpower, it can seriously hinder their learning*" (Student 4).

Discussion

The study highlights the strengths and limitations of full-time online teaching for the PTOD course. From a cultural perspective, students in Chinese higher education often face condensed course schedules and intensive academic pressure. These factors may exacerbate the challenges of self-directed online learning and reduce overall satisfaction. The current findings suggest that while online teaching effectively supported theoretical learning through asynchronous materials, it failed to meet the practical training needs of PT students, particularly due to lack of interaction, increased workload, and compressed scheduling, as commonly encountered in Chinese higher education. The significant decline in student motivation underscores the importance of interactivity and real-time feedback in maintaining engagement during online learning.

According to the findings, students' perceptions of the PTOD course prior to online instruction were generally negative, with dissatisfaction regarding the learning experience (14.8%) and learning motivation (23%). Post-online education surveys showed a decline in ratings for most items compared to pre-intervention questionnaires, and student interviews further revealed dissatisfaction with online practical training. This finding suggests that the application of online teaching in PTOD courses still needs to be approached more cautiously, and that online learning did not satisfy students as much as in-person instruction.[25] All the 12 interviewees had unfavourable opinions about online learning, which was consistent with research published worldwide.[26,27] Even worse, according to a study done in the United Kingdom, the majority of students (79%) thought that online learning had a negative effect on them (4.14±1.06),[28] a result that was quite comparable to the current findings.

A systematic review found that PT students' satisfaction and performance in distance online and face-to-face teaching were similar,[15] but they investigated websites and discussion boards that correspond to the daily teaching process of live or recorded videos. Another recent systematic review reported that a distance learning design is comparable to traditional classroom instruction in PT education in terms of knowledge and practical skills acquisition,[9] but this summary provided more of a blended learning method in which the advantages of online and offline teaching are combined and can balance the advantages and disadvantages of online and face-to-face teaching.[29] In the early and middle stages of the pandemic, many students were satisfied with online instruction, probably because they had the technology to address any sudden obstacles,[8,30] so they could embrace online instruction as a suitable alternative for addressing the current pandemic-related challenges.

Although online resources, such as recorded videos, were perceived to enhance learning,[31] they could not act fully as substitute for hands-on experiences that are vital in PT education. This underscores the preference of most medical students for face-to-face learning to acquire more comprehensive clinical experience.

Since 2021, China has promoted the accelerated integration of higher education with digital technologies through policies that marke a significant breakthrough in educational reforms and development. These include the introduction of advanced technologies, such as 5G, artificial intelligence (AI), big data, internet and the metaverse, providing broader platforms for knowledge-sharing, teaching, and educational resources. The eastern region exhibits the highest level of collaboration, facilitating a comprehensive digital transformation in higher education. High-quality online courses, micro-courses, virtual simulation experiments, and other digital teaching and research methods can promote the sharing and effective integration of educational resources, laying a solid foundation for the seamless fusion of information technology and higher education.[32] However, the COVID-19 pandemic forced universities to adopt online platforms to sustain education systems, highlighting the global need for digital integration in education.[33,34] Additionally, multiple studies indicate that online teaching, without workshops or face-to-face interaction, is unsuitable for teaching practical skills.[34,35]

These findings have implications for the future of PT education, particularly in integrating digital tools with hands-on practice. Hybrid teaching models combining online theoretical instruction with in-person practical sessions may offer a viable solution. Additionally, adopting virtual reality (VR) and simulation-based training could address the gap in practical skill acquisition.

The study highlighted a significant drop in satisfaction with the curriculum and teaching strategies as the course progressed. This was particularly evident in practical sessions, where the lack of direct interaction and hands-on practise hindered effective learning. This aligns with research suggesting that remote instruction might not adequately address the tactile and interactive demands of PT training.[36,37]

The current results suggest a need for a more dynamic approach to online PT instruction, incorporating multimodal teaching strategies that cater to diverse learning preferences and needs. Enhanced digital tools and methods, such as VR and interactive simulations, may provide more engaging and effective ways to teach complex physiotherapy skills. One study found that over 60% of students preferred video-based psychomotor skills learning over traditional instructor-led demonstrations, valuing the personalised learning pace, playback control, and opportunities for individualised feedback during on-site training.[38]

Students are unhappy when lessons are scheduled on weekends or evenings since it cuts into their spare time. The hassle of scheduling classes can make students dislike online learning. The condensing of course material into a short time for the entire semester without equivalent changes in course number, objectives or instructional hours leads to intense daily learning. This increases student effort and stress, which lowers academic performance[39] and is certainly a major reason students dislike course scheduling. This structural compression reflects a broader pattern in the Chinese medical education where curriculum is often accelerated without proportional adjustment to learning outcomes or workload.

Similarly, a study in South Korea found that during the COVID-19 pandemic, compacted online course schedules for nursing students led to decreased satisfaction due to limited time for skill consolidation, particularly in practical training.[40] These findings align with the current study, underscoring the importance of balanced course scheduling. Unlike Western contexts, where flexible schedules are generally accepted, East Asian students, including those in China, prioritise predictability and dedicated study periods.[41] To address these structural challenges, the PTOD programme could adopt a hybrid model, extending the duration of practical components, as successfully trialled in Hong Kong's PT programmes, which prioritise in-person practical skills training.[42]

Feedback and interaction emerged as critical components of student satisfaction and learning efficacy.Fourty three studies have underscored the importance of structured, timely feedback and active interaction in online learning environments to maintain student engagement and facilitate deeper learning.[43-45] This is in line with the current findings.

Self-discipline is considered one of the influencing factors for success.[46] Unfortunately, some students finish their study activities in a hurry. They also play videos of lectures absentmindedly, often skimming through them quickly.[47] Although the flexibility of online teaching is considered challenging in terms of student self-discipline and time management, it also allows students to choose when and how to engage with course materials according to their individual learning needs, thus further promoting self-regulated learning.[48] However, based on student feedback, it is crucial for online teaching strategies to provide real-time feedback and to have interactive tools.

The current study has limitations as the sample was from one batch of a single institution, potentially restricting the generalisability of findings. Additionally, the study focussed on self-reported data, which may have introduced bias. Future research should explore multi-institutional studies and objective measures of learning outcomes to validate the findings.

Despite the limitations, the current study's findings stress the need for enhanced efficacy of online PT education. This can be done through integration of advanced digital technologies, optimisation of communication platforms, reform of course frameworks by incorporating online communication skills to enhance students' engagement and peer interaction in VR environments[49] and though enhancement of multimedia resources.

Conclusion

While online PT education has shown potential, its effectiveness is currently limited by its inability to fully replicate the interactive and hands-on nature of traditional PT training. By addressing these shortcomings and implementing strategic improvements, there is a significant opportunity to enhance the overall quality and effectiveness of online PT education, making it a viable alternative or complement to traditional methods, especially in times of global crisis, such as a pandemic.

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References

1. National Bureau of Statistics (NBS). Bulletin of the Seventh National Census (No. 2). [Online] 2021 [Cited 2021 May 13]. Available from URL: https://www.gov.cn/guoqing/2021-05/13/content_5606149.htm
2. Meng F, Mo X, Tang X, Bao W, Ao L. Comparative Study and Reflection on Competence of Physical Therapists at Home and Abroad. Chin J Rehabil Med 2021;36:462-5. doi:10.3969/j.issn.1001-1242.2021.04.013.
3. Plummer L, Belgen Kaygısız B, Pessoa Kuehner C, Gore S, Mercuro R, Chatiwala N, et al. Teaching Online during the COVID-19 Pandemic: A Phenomenological Study of Physical Therapist Faculty in Brazil, Cyprus, and the United States. Educ Sci 2021;11:130. doi:10.3390/educsci11030130.
4. Lassoued Z, Alhendawi M, Bashitialshaaer R. An Exploratory Study of the Obstacles for Achieving Quality in Distance Learning during the COVID-19 Pandemic. Educ Sci 2020;10:232. doi:10.3390/educsci10090232.
5. Chilton JK, Hanks S, Watson HR. A blended future? A cross-sectional study demonstrating the impacts of the COVID-19 pandemic on student experiences of well-being, teaching and learning. Eur J Dent Educ 2024;28:170-83. doi:10.1111/eje.12934.
6. El-Sayad G, Md Saad NH, Thurasamy R. How higher education students in Egypt perceived online learning engagement and satisfaction during the COVID-19 pandemic. J Comput Educ 2021;8:527-50. doi:10.1007/s40692-021-00191-y.
7. Su B, Zhang T, Yan L, Huang C, Cheng X, Cai C, et al. Online Medical Teaching in China During the COVID-19 Pandemic: Tools, Modalities, and Challenges. Front Public Health 2021;9:797694. doi:10.3389/

fpubh.2021.797694.
8. Rossettini G, Geri T, Turolla A, Viceconti A, Scumà C, Mirandola M, et al. Online teaching in physiotherapy education during COVID-19 pandemic in Italy: a retrospective case-control study on students' satisfaction and performance. BMC Med Educ 2021;21:456. doi:10.1186/s12909-021-02896-1.
9. Ødegaard NB, Myrhaug HT, Dahl-Michelsen T, Røe Y. Digital learning designs in physiotherapy education: a systematic review and meta-analysis. BMC Med Educ 2021;21:48. doi:10.1186/s12909-020-02483-w.
10. Jarry Trujillo C, Achurra Tirado P, Escalona Vivas G, Crovari Eulufi F, Varas Cohen J. Surgical training during COVID-19: a validated solution to keep on practicing. Br J Surg 2020;107:e468-9. doi:10.1002/bjs.11923.
11. Pei L, Wu H. Does online learning work better than offline learning in undergraduate medical education? A systematic review and meta-analysis. Med Educ Online 2019;24:1666538. doi:10.1080/10872981.2019.1666538.
12. McCutcheon K, Lohan M, Traynor M, Martin D. A systematic review evaluating the impact of online or blended learning vs. face-to-face learning of clinical skills in undergraduate nurse education. J Adv Nurs 2015;71:255-70. doi:10.1111/jan.12509.
13. Forde C, OBrien A. A Literature Review of Barriers and Opportunities Presented by Digitally Enhanced Practical Skill Teaching and Learning in Health Science Education. Med Educ Online 2022;27:2068210. doi:10.1080/10872981.2022.2068210.
14. Huddart D, Hirniak J, Sethi R, Hayer G, Dibblin C, Meghna Rao B, et al. #MedStudentCovid: How social media is supporting students during COVID-19. Med Educ 2020;54:951-2. doi:10.1111/medu.14215.
15. Mącznik AK, Ribeiro DC, Baxter GD. Online technology use in physiotherapy teaching and learning: a systematic review of effectiveness and users' perceptions. BMC Med Educ 2015;15:160. doi:10.1186/s12909-015-0429-8.
16. Rossettini G, Turolla A, Gudjonsdottir B, Kapreli E, Salchinger B, Verheyden G, et al. Digital Entry-Level Education in Physiotherapy: a Commentary to Inform Post-COVID-19 Future Directions. Med Sci Educ 2021;31:2071-83. doi:10.1007/s40670-021-01439-z.
17. Wang W, Wang Y, Lin W, Feng B, Shi L, Wang Y. Survey and Analysis of the Current Situation of Physical Therapy Practitioners. Chin J Rehabil Med 2022;37:361-5. doi:10.3969/j.issn.1001-1242.2022.03.013.
18. ShanghaiRanking Consultancy. 2023 China University Major Rankings. [Online] 2023 [Cited 2025 September 24]. Available from URL: https://www.shanghairanking.cn/rankings/bcmr/2023/101009T
19. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods 2007;39:175-91. doi:10.3758/bf03193146.
20. Tomberlin JP, Eggart JS, Callister L. The use of standardized evaluation forms in physical therapy. J Orthop Sports Phys Ther 1984;5:348-72.
21. Chaoxing Inc. iMooc Platform. [Online] [Cited 2025 September 24]. Available from URL: http://i.mooc.chaoxing.com
22. Streiner DL. Starting at the beginning: an introduction to coefficient alpha and internal consistency. J Pers Assess 2003;80:99-103. doi:10.1207/S15327752JPA8001_18.
23. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol 2006;3:77-101. doi:10.1191/1478088706qp063oa.
24. Braun V, Clarke V. Thematic analysis: a practical guide. London, UK: Sage; 2021.
25. Elshami W, Taha MH, Abuzaid M, Saravanan C, Al Kawas S, Abdalla ME. Satisfaction with online learning in the new normal: perspective of students and faculty at medical and health sciences colleges. Med Educ Online 2021;26:1920090. doi:10.1080/10872981.2021.1920090.
26. Bączek M, Zagańczyk-Bączek M, Szpringer M, Jaroszyński A, Wożakowska-Kapłon B. Students' perception of online learning during the COVID-19 pandemic: A survey study of Polish medical students. Medicine (Baltimore) 2021;100:e24821. doi: 10.1097/MD.0000000000024821.
27. Dost S, Hossain A, Shehab M, Abdelwahed A, Al-Nusair L. Perceptions of medical students towards online teaching during the COVID-19 pandemic: A national cross-sectional survey of 2721 UK medical students. BMJ Open 2020;10:e042378. doi: 10.1136/bmjopen-2020-042378.
28. Chesterton P, Richardson M, Tears C. Student physiotherapists' perceptions of online curriculum delivery during the COVID-19 pandemic. BMC Med Educ 2022;22:440. doi: 10.1186/s12909-022-03486-5.
29. Ng L, Seow KC, MacDonald L, Correia C, Reubenson A, Gardner P, et al. eLearning in physical therapy: lessons learned from transitioning a professional education program to full eLearning during the COVID-19 pandemic. Phys Ther 2021;101:pzab082. doi: 10.1093/ptj/pzab082.
30. Ranganathan H, Singh DKA, Kumar S, Sharma S, Chua SK, Ahmad NB, et al. Readiness towards online learning among physiotherapy undergraduates. BMC Med Educ 2021;21:376. doi: 10.1186/s12909-021-02803-8.
31. Van Duijn A, Swanick K, Donald E. Student learning of cervical psychomotor skills via online video instruction versus traditional face-to-face instruction. J Phys Ther Educ 2014;28:94-102. doi: 00001416-201410000-00015.
32. Xie Y, Zhang M. Synergy of higher education resources and digital infrastructure construction in China: Regional differences, dynamic evolution and trend forecasting. PLoS One 2024;19:e0304613. doi: 10.1371/journal.pone.0304613.
33. Seale J, Colwell C, Coughlan T, Heiman T, Kaspi-Tsahor D, Olenik-Shemesh D. 'Dreaming in colour': disabled higher education students' perspectives on improving design practices that would enable them to benefit from their use of technologies. Educ Inf Technol (Dordr) 2021;26:1-33. doi: 10.1007/s10639-020-10329-7.
34. Bdair I. Nursing students' and faculty members' perspectives about online learning during COVID-19 pandemic: a qualitative study. Teach Learn Nurs 2021;16:220-6. doi: 10.1016/j.teln.2021.02.008.
35. Gamage KAA, Wijesuriya DI, Ekanayake SY, Rennie AEW, Lambert CG, Gunawardhana N. Online delivery of teaching and laboratory practices: continuity of university programmes during COVID-19 pandemic. Educ Sci 2020;10:291. doi: 10.3390/educsci10100291.
36. Casacchia M, Cifone MG, Giusti L, Fabiani L, Gatto R, Lancia L, et al. Distance education during COVID-19: an Italian survey on the university teachers' perspectives and their emotional conditions. BMC Med Educ 2021;21:335. doi: 10.1186/s12909-021-02780-y.
37. Gaur U, Majumder MAA, Sa B, Sarkar S, Williams A, Singh K. Challenges and opportunities of preclinical medical education: COVID-19 crisis and beyond. SN Compr Clin Med 2020;2:1992-7. doi: 10.1007/s42399-020-00528-1.
38. Luginbuehl H, Nabecker S, Greif R, Zuber S, Koenig I, Rogan S. Transforming traditional physiotherapy hands-on skills teaching into video-based learning. BMC Med Educ 2023;23:624. doi: 10.1186/s12909-023-04556-y.
39. Villagrán I, Rammsy F, Del Valle J, Gregorio de Las Heras S, Pozo L, García P, et al. Remote, asynchronous training and feedback enables development of neurodynamic skills in physiotherapy students. BMC Med Educ 2023;23:267. doi: 10.1186/s12909-023-04229-w.
40. Choi S, Kim B. Impact of distance learning in nursing education amidst the COVID-19 pandemic: a systematic review and meta-analysis. Teach Learn Nurs 2024;19:e585-601. doi: 10.1016/j.teln.2024.04.008.

41. Bonneville-Roussy A, Bouffard T, Palikara O, Vezeau C. The role of cultural values in teacher and student self-efficacy: evidence from 16 nations. Contemp Educ Psychol 2019;59:101798. doi: 10.1016/j.cedpsych.2019.101798.
42. Li KC, Wong BTM, Kwan R, Chan HT, Wu MMF, Cheung SKS. Evaluation of hybrid learning and teaching practices: the perspective of academics. Sustainability 2023;15:6780. doi: 10.3390/su15086780.
43. Elshami W, Abuzaid M, Abdalla ME. Radiography students' perceptions of peer assisted learning. Radiography (Lond) 2020;26:e109-13. doi: 10.1016/j.radi.2019.12.002.
44. Gómez-Rey P, Barbera E, Fernández-Navarro F. Measuring teachers and learners' perceptions of the quality of their online learning experience. Distance Educ 2016;37:146-63. doi: 10.1080/01587919.2016.1184396.
45. Kwon K, Park SJ, Shin S, Chang CY. Effects of different types of instructor comments in online discussions. Distance Educ 2019;40:226-42. doi: 10.1080/01587919.2019.1602469.
46. Hagger MS, Hamilton K. Grit and self-discipline as predictors of effort and academic attainment. Br J Educ Psychol 2019;89:324-42. doi: 10.1111/bjep.12241.
47. Btoush MH. Online courses quality and distance education amid COVID-19 pandemic: Al-Balqa applied university-IT faculty students' perceptions. Int J Knowl Learn 2022;15:1-15. doi: 10.1504/IJKL.2021.10041282.
48. Kovacs C, Jadin T, Ortner C. Austrian college students' experiences with digital media learning during the first COVID-19 lockdown. Front Psychol 2022;13:734138. doi: 10.3389/fpsyg.2022.734138.
49. Eccott L, Moulson A, Atkinson K, Livatino S, Lewis J, Cairns M. Lessons learned from the digital transformation of physiotherapy education: a phenomenological study. Int J Osteopath Med 2025;56:100759. doi: 10.1016/j.ijosm.2025.100759.

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RZ, TH, YW, ZZ, KS and YW: Concept, design, data acquisition, analysis, interpretation, drafting, revision, final approval and agreement to be accountable for all aspects of the work.