

ORIGINAL ARTICLE

Effectiveness of Tik Tok Videos on Novice Physical Therapy Students' Clinical Reasoning Skills in Musculoskeletal Conditions - A Quantitative Analysis

Avanianban Chakkarapani¹, Priscilla Moses², Nadya Supian², Thaw Zin¹, Tan Eng Jing¹, Martin Ebenezer Chellappan³, Sathish Kumar Sadagobane¹

¹ Physiotherapy, Pre-Clinical Sciences, M. Kandiah Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, 43000 Sungai Long, Kajang, Malaysia.

² General Studies, Modern Languages, Faculty of Creative Industries, Universiti Tunku Abdul Rahman, 43000 Sungai Long, Kajang, Malaysia.

³ Physiotherapy Department, Global College of Physiotherapy, 629 165 Marthandam, Kanniyakumari, Tamil Nadu, India.

ABSTRACT

Introduction: This study explored the potential of TikTok as an educational tool to enhance clinical reasoning skills in undergraduate physical therapy students. We observed a decline in these skills, particularly during and after the Covid-19 pandemic, coinciding with increased social media use, including TikTok. **Materials and methods:** A quasi-experimental design involved 60 students (84.4% female, 15.5% male, mean age 21.6) divided into an experimental and control group. Baseline proficiency was established through pre-tests consisting of a theory-based clinical reasoning test and four objective structured practical examination (OSPE) stations. Both groups then participated in traditional classroom learning and self-directed learning for ten weeks. The experimental group accessed researcher-designed TikTok videos, while the control group chose their own learning materials. Post-tests mirrored the pre-tests. **Results:** While both groups showed significant improvement (p -value < 0.001), no statistically significant differences (p -value > 0.05) were found between the groups' theory and practical test scores. **Conclusion:** Despite this, the study highlights TikTok's potential as an engaging format for acquiring knowledge on musculoskeletal conditions, encompassing prevalence, pathophysiology, diagnostics, treatment, and home care. Further research is needed to refine and optimize the use of social media platforms like TikTok for enhanced clinical reasoning skills in physical therapy education.

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Corresponding Author:

Avanianban Chakkarapani, PhD
Email: avanianban@utar.edu.my
Tel : +60163749125

INTRODUCTION

The modern era has seen a substantial integration of advanced technology into the educational sphere, fostering the widespread adoption of e-learning among both educators and students (1). This shift has significantly transformed the landscape of learning processes (2). Learning via videos has gained immense traction, with a surge in interest across various platforms such as YouTube, Facebook, TikTok, and through multiple devices like desktops, phones, and tablets. Consequently, students now have convenient access to academic content via digital libraries and can partake in

online courses from the comfort of their homes (3).

E-learning has progressively taken precedence over traditional classroom methods, becoming the foremost approach in teaching, and fostering a lifelong vision and on-demand learning (4). It's considered one of the fastest-moving global trends, facilitating the integration of conventional learning tools into a cohesive solution for effectively disseminating educational content (5). Video-based learning (VBL) is the acquisition of knowledge or skills through instructional videos (6). The potency of videos as an e-learning medium lies in their ability to present information both engagingly and consistently (7). Videos incorporate auditory and visual cues, leveraging visuals as the primary source of information, complemented by audio for elaboration (8). These unique features make VBL a more effective learning method, capable of enhancing and partially

replacing traditional learning processes (9). The advent of smartphones, tablets, and social media platforms further facilitates the integration of video applications into education (10).

Extensive literature supports the benefits of VBL, including enhanced flexibility in learning time and location, cost and time savings for educational institutions, reinforcement of self-directed and self-paced learning, creation of collaborative learning environments, unlimited access to learning materials, and more effective knowledge retention and updates (11). In contrast, traditional teaching methods often follow the structure of semester syllabi, potentially leading students to passivity and reduced critical thinking abilities (12). Students may struggle to apply learned knowledge in real-life scenarios and might have difficulty understanding the material covered in class (13). Educational videos have revolutionized this by shifting from traditional teacher-centered settings to more learner-centered environments (14). A major challenge faced by instructors in academia is the dwindling attention spans of students (15). While various methods have been employed to keep students engaged, they often work effectively only in physical classrooms due to the strong impact of visual stimuli (16). This challenge was further exacerbated during and after the Covid-19 pandemic when schools and universities worldwide shifted to e-learning models (17). Using videos as a learning tool positively impacts both verbal and spatial intelligence in students. The ability to pause and replay videos aids in deepening understanding and engagement with the learning materials. Furthermore, it allows students to identify learning difficulties, allocate additional time for understanding complex topics, and engage in discussions with instructors. The accessibility and availability of videos aid in reinforcing concepts among students (18). Clinical reasoning is a critical skill for healthcare professionals, enabling them to make accurate diagnoses and develop effective treatment plans. In recent years, there has been a growing emphasis on the importance of clinical reasoning for modern-day students in various healthcare disciplines (19). The ability to think critically, gather relevant information, and apply knowledge to real-world patient scenarios is essential for providing high-quality care (20).

MATERIALS AND METHODS

Study Design

The study employed a quasi-experimental design and took place at Universiti Tunku Abdul Rahman, Sungai Long Campus, Malaysia, in May trimester of 2023.

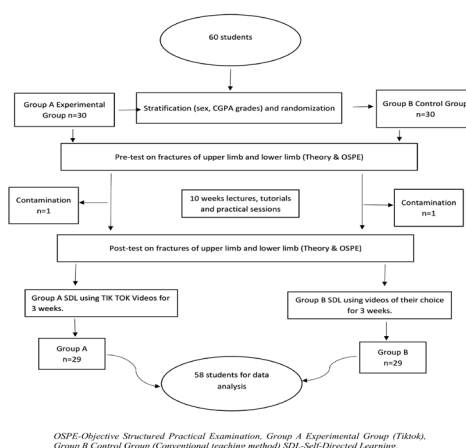
Ethical Clearance

Prior to commencing the study, ethics approval was sought and obtained from the university ethics committee, Re: U/SERC/224/2022. Subsequently, the researcher endeavoured to enlist student volunteers with their consent to partake in the study. Participants:

The study involved sixty undergraduate physical therapy students enrolled in the physiotherapy in musculoskeletal (PTMSK) conditions course. The participants were evenly divided into two groups: An experimental group (n=30) and a control group (n=30). Before the intervention, both groups underwent a pre-test consisting of a paper-based clinical reasoning test and an objective structured practical examination (OSPE) focused on the topic of upper limb and lower limb fractures. Subsequently, all students attended a 10 week lecture, and tutorial as well as practical sessions at lecture theatres and skills lab.

Following the teaching and practice sessions, students were encouraged to engage in self-directed learning (SDL). The experimental group pursued their SDL by watching tailor made TikTok short videos, while the control group engaged in SDL by watching videos of their choice throughout the ten weeks. Both groups accessed videos focusing on upper limb and lower limb fractures, covering various aspects such as introduction, prevalence, pathophysiology, signs and symptoms, special tests, physical therapy management, and home program. These videos were collaboratively created by the research team and the student volunteers participated in this experiment.

At the end of the ten weeks period, post-test was conducted which consisted of a paper-based clinical reasoning test and an OSPE focused on the topic of upper limb and lower limb fractures. to evaluate the students' clinical reasoning skills. The primary outcome of the study was the assessment of clinical reasoning skills using a paper-based clinical reasoning test and an objective structured practical examination (OSPE) at various stations. The question paper for the assessments was prepared as per standards of the blooms taxonomy and the difficulty level was maintained for both pre-test and post-post. To ensure this the question papers, marking scheme, OSPE scoring sheets was moderated by two independent content experts in order to ensure the consistency. The clear overview of the study is clearly as in the displayed Figure 1.



OSPE: Objective Structured Practical Examination. Group A: Experimental Group (TikTok). Group B: Control Group (Conventional teaching method) SDL: Self-Directed Learning.

Figure 1: Flow Chart of the Participants Through the Study.

Data Analysis

The data collected were then analysed using Paired Sample T-test and Independent Sample T-test using IBM SPSS software statistics version 29.0.

RESULTS

A total of fifty-eight of sixty eligible participants' data was processed due to the similarity between the answer scripts and other errors. The students consisted of 15.5% males and 84.4% females, and the mean age of the participants was 21.60 ± 1.02.

Section A: Theory Scores

The first section of analysis, the data of students' performance was collected as a pre-test in theory test and then, a descriptive statistic such as, mean, median, variance and standard deviation was calculated. The overall students' result of pre-test in experimental group and control groups for theory tests are shown in Table I. The t-value of 0.341 suggests a minimal difference between the means of the two teaching methods. The p-value of 0.0735 suggests that there is no significant difference in Theory Scores between the TikTok and Conventional teaching methods at a significance level of 0.05. It is clearly indicating that both the experimental and control groups are the same at the beginning of the experiment.

Table I: Result of student t-test of Theory Test Overall Scores on Pre-Test of Experimental (TikTok) and Control (Conventional) Groups

	Teaching method	N	Mean	Std. Deviation	t-value	DF	Sig.(2 tailed)
Theory test Score	Tiktok	29	46.00	11.084	.341	56	.0735
	Conventional	29	45.03	10.482			

*Significance at α=0.05.
DF-Degree of freedom
Sig-Significance

The second section of analysis, the data of students' performance was collected as a post-test in the theory test and then, a descriptive statistic such as, mean, median, variance and standard deviation was calculated. The overall students' result of post-test in experimental group and control groups for theory tests are shown in Table II. The t-value of 3.662 suggests that there is a difference between the means of the two teaching methods. The p-value of .082 is relatively higher than significance level of 0.05. Hence, there are no statistically significant differences between the groups.

Table II: The Results of t-test of Theory Test Overall Scores on the Post-test of Experimental and Control Group

	Teaching	N	Mean	Std. Deviation	t-value	DF	Sig.
Theory Score	TikTok	29	69.52	12.947	3.662	56	.082
	Conventional	29	58.55	9.912			

*Significance at α=0.05.
DF-Degree of freedom
Sig-Significance

In essence, based on these statistics alone, it appears that there might be a noticeable difference in theory Scores between the TikTok and Conventional teaching methods.

Section B: Practical Scores

The third section of analysis, the data of students' performance was collected as a pre-test score in practical test and then, a descriptive statistic such as, mean, median, variance and standard deviation was calculated. The overall students' result of pre-test in experimental group and control groups for practical tests are shown in Table III. The t-value of 2.482 suggests a moderate level of difference between the means of the two teaching methods. The p-value of 0.01 indicates that there is a statistically significant difference in practical Scores between the TikTok and Conventional teaching methods at a significance level of 0.05. It is clearly indicating that both the experimental and control groups the mean values are almost the same at the beginning of the experiment.

Table III: Result of student t-test of Practical Test Overall Scores on Pre-Test of Experimental (TikTok) and Control (Conventional) Groups

	Teaching method	N	Mean	Std. Deviation	t-value	DF	Sig.(2 tailed)
Practical Test Score	Tiktok	29	59.0690	14.06853	2.482	56	.016
	Conventional	29	50.6207	11.75164			

*Significance at α=0.05.
DF-Degree of freedom
Sig-Significance

The fourth section of analysis, the data of students' performance was collected as a post-test score in practical test and then, a descriptive statistic such as, mean, median, variance and standard deviation was calculated. The overall students' result of pre-test in experimental group and control groups for practical tests are shown in Table IV. The t-value of 1.626 suggests a relatively small difference between the means of the Practical Scores for the TikTok and Conventional teaching methods. The p-value of 0.85 is much higher than the conventional significance level of 0.05 suggests that there is no statistically significant difference between the groups.

Table IV: The Results of t-test of Overall Practical Test Scores on the Post-test of Experimental and Control Group

	Teaching	N	Mean	Std. Deviation	t-value	DF	Sig.
Practical Test Score	Tiktok	29	66.69	11.314	1.626	56	.853
	Conventional	29	61.66	12.248			

*Significance at α=0.05.
DF-Degree of freedom
Sig-Significance

DISCUSSION

To our knowledge this is the first study to explore the use of TikTok videos as an adjunct to the students' teaching

learning. It is also the first study to specifically addressing in enhancing clinical reasoning skills among the novice undergraduate physical therapy students.

The findings suggest that TikTok may have a beneficial impact on theoretical learning outcomes compared to conventional teaching methods. However, its effectiveness in improving practical skills appears less pronounced, with no statistically significant difference observed between the two methods.

Several factors could contribute to these outcomes. TikTok's engaging multimedia format may enhance theoretical understanding through visual and auditory stimuli, thereby facilitating knowledge retention and comprehension (21). Additionally, its popularity among the younger demographic, might have contributed to increased engagement and motivation (22).

However, the lack of significant improvement in practical scores could stem from the nature of the content delivery. Practical skills often require hands-on experience and interactive guidance, which may not be effectively conveyed through short-form video content like TikTok (23). Additionally, the assessment methods employed may not have fully captured the nuances of practical skill acquisition, potentially limiting the ability to detect significant differences between the two teaching approaches.

Studies investigating the efficiency of using video as an instructional tool found that video-based teaching for advanced clinical skills was as effective as or even more effective than traditional face-to-face methods. It is also highlighted that video usage led to enhanced skill acquisition (24) which is consistent with our present study as the students participated in Tiktok video-based learning displayed a promising result especially in theory examination, whereas not very promising results in the practical examination. Numerous studies comparing video instruction to traditional methods in health science education supported the effectiveness of videos in improving performance outcomes, student confidence, and satisfaction (25). Students found videos especially useful for revision and preparation due to their flexibility and repetition (26). Due to manpower and time constraints our present study was not planned to explore the usefulness and student's perceptions of TikTok videos in teaching and learning clinical reasoning skills. However, in expansion of this present study in future, studies can be planned to explore the students' perception and satisfaction of TikTok videos as a useful teaching learning method in improving clinical reasoning skills.

This study the researcher created video content which was realistic and specifically emphasized on enhancing clinical reasoning skills. Moreover, the videos are created a sense of social presence to enhance learning

outcomes (27). Engaging learners through narratives and social connection can improve knowledge application (28). In comparison our present study results contradicts with the outcomes on hands on skills scores based on the results student performance in hands on skills is same in both TikTok and conventional face to face teaching methods. Students prefer using videos for learning, especially for hands on skills, as they offer a safe and repeatable way to visualize clinical scenarios (29). Mobile technology usage for accessing educational videos is an area ripe for exploration (30), our present study utilized mobile technology.

Video learning supports not only clinical skills but also technological skills crucial in clinical practice (31). Students creating their own clinical skills videos found it valuable for enhancing technological competency (32) based on this our study encouraged the students i.e. the students participated in this study also volunteered in creating the TikTok videos that was used in the study.

Ensuring quality and accuracy of educational videos, especially those available online, remains a challenge (33). Students often lack the skills to assess the accuracy of online videos (34), emphasizing the need for quality control mechanisms and improving students' critical appraisal skills (35) this could be the reason for not much improvement in the control compared to TikTok group in our study.

CONCLUSION

While TikTok shows promise as a supplementary tool for enhancing theoretical learning outcomes, its effectiveness in practical skill development may be limited. Future research could explore alternative instructional strategies or combine TikTok with hands-on learning experiences to maximize its educational impact across diverse domains.

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