Exploring the Knowledge and Utilization of Video-Based Surgical Learning Among Medical Students in a Teaching Hospital in Nigeria: A Mixed-Methods Study

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ABSTRACT

BACKGROUND: The incorporation of video-based resources into medical education has become common practice in many middle- and high-income countries. This study aimed to assess the knowledge, usage, and receptivity of video-based learning among medical students in a resource-limited setting in Nigeria.

METHODS: A mixed-method approach was utilized, involving both quantitative and qualitative data collection among fourth, fifth, and sixth-year medical students. Sampling was conducted via simple random selection, and data were collected using questionnaires and focus group discussions. Quantitative data were analyzed using SPSS version 21 for descriptive statistics, while thematic coding was applied to qualitative data using NVivo.

RESULTS: A majority (79%) were aware of video-based learning, with YouTube being the most used platform. However, barriers such as high data cost (79.7%) and poor internet connectivity (77.2%) limited utilization. Qualitative analysis highlighted the value of flexible, engaging content in learning and restructuring of existing curriculum to maximize the benefits of videos but raised concerns about standardization, patient privacy, and infrastructure.

CONCLUSION: Although students recognize the effectiveness of video-based learning, its integration into medical curricula requires addressing barriers such as internet access and content quality. Institutional support is critical for maximizing its potential.

KEYWORDS: instructional film and video, medical education, Nigeria, audiovisual aids, instructional technology

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Introduction

The use of video-based learning is increasingly prevalent in educational settings, effectively addressing practical limitations and expanding possibilities within digital environments. Videos can be seamlessly incorporated into online learning management systems and integrated with various educational tools,[1] which positively influences student satisfaction and academic outcomes. This enhancement is primarily attributed to the ability of video content to promote more active and engaged learning experiences.[2]

The use of audiovisual tools in education has historical roots, dating back to World War II when filmstrips were used for military training. These resources enhance learning by engaging students and increasing motivation. With the rise of digital technology and mobile devices, videos have become integral to students' lives, making their incorporation into educational settings, especially in surgical training, essential.[3] While video-based learning cannot entirely substitute for direct oversight by consultants in the workplace for surgical trainees, the integration of video-based learning with conventional educational approaches, referred to as blended learning, has demonstrated significant advantages and effectiveness.[4]

Research suggests that effective learning necessitates both visual and auditory stimuli, especially in the context of technology-enhanced education, to facilitate cognitive processing.[5] This approach is particularly relevant as students today benefit from diverse media formats and visually engaging presentations, which enhance their learning experience and comprehension.[6] In various regions globally, initiatives have been established to create databases featuring video libraries that are readily accessible to medical students and surgical residents. A notable example is *PASSIO* education, which was designed to offer access to instructional videos on peripheral nerve surgery.[7] Additionally, a study conducted among dental students across five dental schools in the United States from 2019 to 2020 revealed that 95% of participants found YouTube videos on

clinical procedures to be beneficial for their learning, while 89% expressed a desire for their dental institutions to upload tutorials to YouTube or other social media platforms.[8] This trend is not surprising, as many surgical techniques can be more effectively understood through these videos, which can be replayed multiple times for enhanced comprehension. Research indicates that a combination of multiple simultaneous techniques for information can significantly enhance comprehension and retention, making multimedia learning a powerful tool for education.[5,9] Furthermore, studies conducted in developed countries have demonstrated a gradual and consistent acceptance of video-based learning in training curricula.[10–13] However, there is a lack of research on the utilization of video-based surgical instruction in Nigeria. The level of receptiveness among instructors and students in a continuous training environment remains unknown, despite some evidence suggesting a certain degree of familiarity with online instructional tools.[14,15] Therefore, the objective of this study is to assess the extent of medical students' knowledge, usage, and receptivity toward video-based learning in surgery. By doing so, this research aims to provide insights into the informal practices in surgical education and pave the way for integrating video-based learning as a supplementary approach to the country's traditional mode of instruction and learning.

Methods and Materials

Study design

This was a mixed-methods study carried out over a period of two months from January 2024 to February 2024 using online administered questionnaires and focus group discussions (FGDs). The mixed-methods approach was selected to capture both numerical data and in-depth insights, which allowed for triangulation toward a holistic understanding of the factors influencing video-based learning in surgical education. The reporting of this study follows the Good Reporting of A Mixed Methods Study used to assess the quality of reporting in mixed-methods research. The completed checklist is provided as Supplemental Material.[16]

Study setting and population

The study population consisted of fourth-, fifth-, and sixth-year undergraduate medical students in the clinical arm of Ambrose Alli University, Ekpoma, Edo State, Nigeria, totaling 327 students.

Sampling and sample size

Quantitative sampling. The sample size was estimated using Cochran's formula for cross-sectional surveys.[17] Parameters included the 93% of residents who used video-based education resources to prepare for operation from a previous study conducted in United States,[18] as no similar study has been conducted in Nigeria to the best of our knowledge. While this study's context may differ, its parameters were deemed sufficiently comparable. A 5% margin of error and 10% attrition rate were applied, resulting in a calculated sample size of 100. A simple random sampling technique was used to ensure an unbiased representation of students across the study years.

Qualitative sampling. Participants were purposively selected based on prior exposure to video-based learning. Focus group discussions were moderated by a trained facilitator and guided by a semistructured protocol to ensure consistency; these discussions were organized into two groups, one comprising six participants and the other consisting of five.

Researcher characteristics and reflexivity

The research team comprised physicians and public health researchers with expertise in qualitative and quantitative methodologies. The lead interviewer, AD is a male and physician, with experience in qualitative research. There were no preexisting relationships with the study participants, and nonparticipation was not tracked.

Data collection methods

Quantitative data collection. Data were collected using a Google Form containing a structured questionnaire. Pretesting was done with 10 participants to refine its content and ensure clarity. The online Google form comprised questions that have been modified and adapted from previous study examining students' perceptions toward video-based and video-assisted learning scenarios in journalism and communication courses, with a Cronbach alpha of 0.933, indicating high reliability.[19] Pretesting was conducted with 10 participants to refine the content and ensure clarity. Invitations to participate were distributed via email and WhatsApp, including unique links to the survey.

Qualitative data collection. Focus group discussions were used to gather qualitative data. Discussions were conducted via Telegram, chosen for its video conferencing capabilities, which fostered a relaxed atmosphere. WhatsApp and Telegram were also used for participant recruitment and organization. Two FGDs were done, with group 1 containing six participants and group 2 having five participants. A semistructured interview protocol guided the discussions. The study adopted a phenomenological approach to understand the lived experiences of medical students regarding video-based learning. This orientation was chosen to explore participants' perceptions of video-based learning, current usage patterns, perceived benefits and challenges, and attitudes toward its integration into the curriculum. Each discussion lasted an average of 60 to 75 min, facilitated by a physician and trained moderator. Audio recordings of the discussions were transcribed

verbatim for analysis, and data saturation was achieved during analysis, ensuring comprehensive qualitative insights and sufficient coverage of the study themes.

Statistical analysis

Quantitative data were analyzed using IBM SPSS Statistics Version 21. Continuous variables such as age were described using means and standard deviations, while categorical variables such as sex, level of study, and marital status were presented using frequencies and proportions. The statistical level of significance was set at $P < .05$ and 95% confidence interval.

For the qualitative data, a thematic analysis was conducted to assess the medical students' perceptions regarding video-based learning, following the framework outlined by Braun and Clarke, supported by NVivo 12 software for coding.[20]

Ethical consideration

Ethical approval for the study was obtained from Irrua Specialist Teaching Hospital Health Research Ethics Committee (Protocol no: ISTH/HREC/20232012/522). Informed consent was obtained from all participants prior to data collection. Separate informed consent was obtained for participation in the focus groups and for audio recordings. Confidentiality was ensured through the anonymity of transcripts and secures storage of audio recordings on password-protected devices accessible only to the research team. They were also explicitly informed that their responses would have no effect on their academic standing or performance, ensuring stress-free and unbiased participation.

Results

A hundred completed questionnaires were analyzed for this study. The results are as shown below.

From Table 1, the majority were in the 25 to 33 age group (55, 55.0%), and the gender distribution was almost equal, with 52 (52.0%) female and 48 (48.0%) male students. Most students were in their fourth year (62, 62.0%), followed by sixth-year students (25, 25.0%) and fifth-year students (13, 13.0%). Nearly all participants were single (99, 99.0%).

From Table 2, of the 100 students, 79 (79.0%) had heard of video-based surgical learning. Among them, the primary source of information on surgical procedures was video-based resources (65, 82.3%), followed by textbooks (43, 54.4%) and lectures (38, 48.1%). A majority, 64 (81.0%), knew platforms where video-based learning resources could be accessed. Most participants accessed these videos through educational apps (77, 97.5%) and online platforms like YouTube (76, 96.2%), with fewer using institutional libraries (12, 15.2%) or peer-reviewed journals (1, 1.3%).

From Table 3, among the 79 respondents, 77 (97.5%) believed that video-based learning should be incorporated into medical training as a learning tool. Additionally, 75 (94.9%) felt that the teaching hospital should actively promote the use of video-based resources among students in surgery. All respondents (79, 100.0%) expressed a willingness to encourage others to utilize videos for learning in surgical areas.

Table 1. Sociodemographic characteristics of respondents.

VARIABLE	FREQUENCY (N = 100) (%)
Age group (years)	
16-24	45 (45.0)
25-33	55 (55.0)
34-42	0 (0.0)
43-51	0 (0.0)
Mean age ± S.D	25.08 ± 2.7
Sex	
Male	48 (48.0)
Female	52 (52.0)
Marital status	
Single	99 (99.0)
Married	1 (1.0)
Year of study	
Fourth year (400 level)	62 (62.0)
Fifth year (500 level)	13 (13.0)
Sixth year (600 level)	25 (25.0)

From Table 4, among the 79 respondents, 4 (5.1%) used video-based resources daily, 28 (35.4%) weekly, and 34 (43.0%) rarely, with most accessing videos primarily at home (68, 86.0%). The majority preferred videos of 10 min or less (54, 68.4%). Most students found video-based learning effective (78, 98.7%) and helpful, with 71 (89.9%) believing it enhanced their retention of information. Additionally, 78 (98.7%) expressed a willingness to use video-based learning more if integrated into the curriculum, although only 9 (11.4%) reported that it was routinely utilized in lectures.

From Table 5, among the 79 respondents, the primary benefits of video-based surgical learning included better understanding (72, 91.1%) and improved knowledge (54, 68.4%). Other noted benefits were improved performance in class (43, 54.4%), saving time when studying (42, 53.2%), and helping to catch up on missed lectures (26, 32.9%). Key hindrances to utilizing video-based learning were high data costs (63, 79.7%) and poor internet connectivity (61, 77.2%). Other challenges included the length of available videos (29, 36.7%) and poor quality (19, 24.1%). Disadvantages of using video-based learning included susceptibility to online distractions (63, 79.7%) and watching unrelated videos (55, 69.6%).

Table 2. Assessment of knowledge of video-based learning among medical students in surgery.

VARIABLE	FREQUENCY (N = 100) (%)
Had you heard of video-based surgical learning before this survey	
Yes	79 (79.0)
No	21 (21.0)
Where do you usually find information about surgical procedures and techniques (n = 79)	
Video-based resources	65 (82.3)
Textbooks	43 (54.4)
Lectures	38 (48.1)
Online articles	26 (32.9)
Journals	3 (3.8)
Others	8 (10.1)
Do you know any platforms where video-based surgical learning resources can be assessed (n = 79)	
Yes	64 (81.0)
No	15 (19.0)
Where do you access these videos[a] (n = 79)	
Educational apps	77 (97.5)
Online platforms, eg, YouTube, Medical education websites	76 (96.2)
Social media forums or groups focused on surgery	21 (26.6)
In-house training programs at your institution	19 (24.1)
Institutional libraries or databases	12 (15.2)
Peer reviewed journals with video content	1 (1.3)

[a]Multiple responses,

Table 3. Assessment of receptiveness of video-based learning among medical students in surgery.

VARIABLE	FREQUENCY (N = 79) (%)
Do you believe video-based learning should be incorporated into medical training as a learning tool?	
Yes	77 (97.5)
No	2 (2.5)
Do you believe that the teaching hospital should actively encourage and promote the use of video-based resources among students in Surgery?	
Yes	75 (94.9)
No	4 (5.1)
Would you encourage others to utilize videos in learning areas or aspects of surgery?	
Yes	79 (100.0)
No	0 (0.0)

Additionally, varied video quality (27, 34.2%) and overreliance on edited procedures (39, 49.4%) were significant concerns.

Table 6 presents the qualitative data analysis results, organized into three columns: themes, codes, and verbatim statements. Themes represent the overarching categories identified during the analysis, summarizing key areas of focus from the discussions. Codes are subcategories within each theme that capture specific ideas or concepts shared by participants. Verbatim statements are direct quotes from participants, used to illustrate the themes and codes and provide insight into their perspectives on video-based learning in surgical education. It is worth mentioning that across both FGDs, a few participants were more vocal, providing in-depth perspectives and shaping the discussions. For instance, Participants 1A, 1B, and 2A frequently engaged with the moderator, offering detailed responses and reflecting on their experiences with video-based learning. Other participants, such as 1D, 1E, and 1C, contributed periodically, often responding to cues from the moderator rather than initiating discussions. Some participants were less engaged, offering brief responses when directly addressed by the moderator. Participants 2D, 2E, and 2F had minimal contributions, mainly affirming points raised by more active participants rather than presenting new insights. This pattern suggested a reliance on structured prompting rather than spontaneous peer-to-peer engagement. Notably, side discussions were limited due to the structured nature of the FGDs. When they did occur, they were brief and typically involved clarifying a point raised by another participant rather than independent exchanges between participants. Overall, the discussions were moderator-centered, with engagement patterns reflecting a structured yet varied level of participation among respondents.

Discussion

The study reveals a strong foundation of knowledge about video-based surgical learning among medical students in the institution. Specifically, 79 (79.0%) of students had heard about video-based learning prior to the survey, indicating widespread awareness. Among those familiar with video-based surgical learning, 65 (82.3%) reported using video-based resources for information on surgical procedures, showing a clear preference for modern, accessible platforms. This reliance on video-based resources was notably higher than traditional sources such as textbooks (43, 54.4%) and lectures (38, 48.1%). Only 3 (3.8%) of students reported using journals, reflecting a shift toward more visually engaging learning methods. Moreover, fewer students accessed institutional video databases or peer-

Table 4. Assessment of level of utilization of video-based learning among medical students in surgery.

VARIABLE	FREQUENCY (N = 79) (%)
Frequency of using video-based resources for learning	
Daily	4 (5.1)
Weekly	28 (35.4)
Monthly	12 (15.2)
Rarely	34 (43.0)
Never	1 (1.3)
What settings do you primarily access video-based surgical learning	
Home	68 (86.0)
At clinical rotations	6 (7.6)
During lectures	2 (2.5)
Others	2 (2.5)
Preferred length of videos	
≤10 min	54 (68.4)
>10 min	25 (31.6)
Do you find video-based learning effective	
Yes	78 (98.7)
No	1 (1.3)
Helpfulness of video-based learning	
Excellent	16 (20.3)
Very good	37 (46.8)
Good	25 (31.6)
Poor	1 (1.3)
Video-based learning enhances your ability to retain information	
Yes	71 (89.9)
No	8 (10.1)
Video-based learning is routinely utilized in lectures	
Yes	9 (11.4)
No	70 (88.6)
Would you use video-based learning more if it was integrated into curriculum	
Yes	78 (98.7)
No	1 (1.3)

Table 5. Factors relating to the use of video-based learning among medical students in surgery.

VARIABLE	FREQUENCY (N = 79) (%)
Benefits of video-based surgical learning[a]	
Better understanding	72 (91.1)
Improved knowledge	54 (68.4)
Improves performance in class	43 (54.4)
Saves time when studying	42 (53.2)
Helps in catching up on missed lectures	26 (32.9)
Others	2 (2.5)
Hindrances to utilization of video-based learning[a]	
High cost of data	63 (79.7)
Poor internet connectivity	61 (77.2)
Poor knowledge of video-based learning	15 (19.0)
Poor quality of available videos	19 (24.1)
Available videos are too long	29 (36.7)
Lack of suitable digital devices to access videos	12 (15.2)
Lack of interest in video-based learning	8 (10.1)
Lack of funds to access video databases	20 (25.3)
Others	3 (3.8)
Disadvantages to use of video-based learning[a]	
Proneness to online distractions	63 (79.7)
Varied video qualities	27 (34.2)
Watching unrelated videos	55 (69.6)
Lack of personalized feedback	25 (31.6)
Overreliance on edited and idealized procedures	39 (49.4)
Others	7 (8.9)

[a]Multiple responses.

reviewed content (12, 15.2% and 1, 1.3%, respectively), suggesting a reliance on informal platforms like YouTube, which may raise concerns about content quality and accuracy. A study conducted in Iowa, United States, by Rapp et al[21] similarly found that 90% of medical students and residents used videos for online learning of surgical procedures, with 86% of them using YouTube, but only about 25% accessed peer-reviewed video resources. In terms of receptiveness, students overwhelmingly endorsed the inclusion of video-based learning in their curriculum. Of those aware of video-based surgical learning, 77 (97.5%) believed it should be formally incorporated into medical education, while 75 (94.9%) felt teaching hospitals should actively promote its use in surgery. This high level of support reflects a broader recognition of the benefits of video-based learning, such as improving understanding, offering flexible learning opportunities, and accommodating various learning speeds and styles. Moreover, 79 (100.0%) expressed

Table 6. Qualitative analysis of medical students' perceptions and experiences with video-based learning in surgical education.

THEMES	CODES	VERBATIM STATEMENTS
Perceptions and Understanding	Visual aid, Enhanced comprehension	*"Video-based learning in surgery is the use of visuals in learning about surgery….to gets the organs, the arteries, and all of that stuff."* – Respondent 1A
	Educational purpose, patient privacy	*"The act of surgeons recording their surgery…..while completely blurring out the patient so we don't trample on their rights."* – Respondent 2D
	Platforms used (e.g. YouTube, Telegram)	*"I use YouTube most of the times and then I also use MSD manuals (medical science directory)"* – Respondent 2A
Perceived Benefits and Advantages	Flexibility, Improved retention	*"It helps with better assimilation and retention….and it also makes it more interesting and fun to do"* – Respondent 1B
	Accommodates diverse learning styles	*"The ability to pause and play accommodates for the different learning speeds of different people such as slow learners and all that."* – Respondent 2F
	Reduces fatigue	*"When you're exhausted……it takes time to assimilate things but when you watch it in a video, it's so much easier."* – Respondent 1D
Implementation Preferences	Video length (short vs long)	*"I like 20 min maximum…. I don't like watching long videos, so I fast forward them to the end."* – Respondent 2E
	Integration into curriculum	*"Video-based learning should be implemented in schools…..it's not the same as the real human body."* – Respondent 1A
Implementation Challenges	Documentation systems, Technology access	*"Improper documentation of these procedures may be the biggest challenge…. no centralized place where students can have access to these videos."* – Respondent 2C
	Standardization	*"Videos lack standardization, which makes it difficult for students to trust their content"* – General observation
	Patient privacy	*"Recording surgeries requires ensuring that patient rights are not violated"* – General observation
Impact on Learning Experience	Visualizing procedure and anatomy	*"It will go a long way to help in medical learning"* – Respondents 1C
	Overdependence on videos	*"Overdependence….. students might ask, 'what's the need of going to the theatre since I've already watched this online?"* – Respondents 2B
	Real-life limitation	*"Video-based learning may not teach you how to handle complications… or the difficulties that arise when you actually cut a person in the theatre"* – Respondent 2A
Infrastructure and Resource Needs	Technological facilities	*"It would be very nice if schools could implement private systems like functional libraries"* – Respondent 1A
	Locally relevant content	*"Watching videos created by, for example, indians….. their intonations and language could put a strain on understanding"* – Respondent 2E
	Curriculum integration	*"Links synced to lecture notes would break the barrier of looking for where to watch videos online"* – Respondent 1C

willingness to encourage others to use videos for surgical learning. This mirrors findings from Selten et al,[22] where medical students in the Netherlands supported the use of standardized videos in surgical clerkships. Despite this enthusiasm, institutional support and infrastructure, as well as clear guidelines on video resource use, remain barriers to full integration into formal education.

When assessing the actual utilization of video-based learning, a clear gap between receptiveness and practice becomes apparent. Only 4 (5.1%) of students reported daily use of video-based resources, while 34 (43.0%) used them rarely, and 12 (15.2%) accessed them monthly. This discrepancy suggests that external factors like accessibility and institutional support significantly influence the use of video-based learning. The

majority of students (68, 86.0%) accessed videos at home, with just 2 (2.5%) using them during lectures and 6 (7.6%) during clinical rotations, signaling an underutilization of video resources in formal educational settings. The significance of this finding is underscored by the limited support that institutions provide to students in terms of access to facilities for video-based learning, which results in a majority resorting to utilizing these resources at home instead at a greater cost. Additionally, 54 (68.4%) preferred shorter videos, under 10 min in length, aligning with findings from a study by Yee et al,[23] where shorter video content was favored for its focused, concise nature in surgical training. This is in agreement with a study carried out by Hassanien and Abou-Kamer,[24] which showed that the average length of medical education videos viewed by medical students was less than 20 min.

The barriers to video-based learning were significant. Among respondents, 63 (79.7%) cited the high cost of downloading or accessing videos, and 61 (77.2%) pointed to poor internet connectivity as a major challenge. These infrastructural limitations severely restrict students' ability to regularly engage with video-based learning. Other obstacles included the length of available videos (29, 36.7%) and the poor quality of some content (24.1%). Additionally, 63 (79.7%) expressed concern over distractions from unrelated online content, a common issue with platforms like YouTube, which while widely used, pose challenges in maintaining focus and accessing relevant materials. A similar pattern was reported in Malaysia by Azlan et al,[25] where high data costs, poor internet connectivity, and online distractions limited the regular use of educational videos. The combination of these barriers and the lack of structured institutional resources hamper the full potential of video-based learning in this context. This study highlights the need for integrating video-based learning into medical education. Institutional support, such as subsidized internet access and curated video libraries, can address barriers such as high data costs and poor connectivity. Findings align with global trends, including high receptivity to video-based learning, as seen in studies from Malaysia and the Netherlands.[21,23] The emphasis on standardization and infrastructure reflects universal challenges in video-based education.

Integrating video-based learning into the medical curriculum cannot be overemphasized, by providing students with institutional access to curated, high-quality video libraries and subsidized internet facilities. Formalizing its inclusion within the curriculum allows for the alignment of video resources with specific course objectives, structured learning schedules, and evaluation frameworks. Faculty training on effective use of video-based tools in teaching and the development of standardized instructional videos can further enhance the learning experience.

These findings underscore the global relevance of video-based learning and the urgent need for curriculum reforms, particularly in resource-limited settings. Institutional commitment to infrastructure development, standardization, and access can transform video-based learning from an informal supplement to a formalized, integral component of medical education. Future research should focus on strategies to overcome barriers, evaluate the impact of integrated video-based learning on academic outcomes, and explore innovative ways to incorporate this approach into clinical training.

Limitations of study

The study has several limitations that should be considered when interpreting the findings. First, it was conducted among medical students from a single institution, which may limit the generalizability of the results to other institutions or regions with different curricula, resources, and demographic characteristics. Additionally, while the sample size was sufficient for analysis, it was relatively small, particularly for the qualitative component, which may have restricted the diversity of perspectives captured during the FGDs. Another limitation is the reliance on self-reported data for both the quantitative and qualitative components, which introduces the potential for response bias. Participants might have overestimated or underestimated their knowledge, usage, or attitudes toward video-based learning. Furthermore, the use of online platforms, such as Google Forms, Telegram, and WhatsApp, for data collection, though convenient, may have excluded students with limited internet access or technological proficiency, potentially introducing selection bias.

This study's cross-sectional design provides only a snapshot of students' perceptions and usage of video-based learning at a single point in time. A longitudinal study could offer deeper insights into how these perceptions and practices evolve over time. Moreover, while the study explored barriers such as data costs and poor internet connectivity, it did not delve deeply into institutional or faculty-level factors that might influence the integration of video-based learning into the curriculum. In the qualitative analysis, although efforts were made to achieve data saturation and reliability, some nuances of individual experiences might have been lost during the coding and thematic synthesis. The use of an adapted and pretested questionnaire, while helpful, involved a lack of fully validated measures specifically tailored to video-based learning in surgical education, which might have influenced the precision of the quantitative findings. Finally, focus group dynamics may have also affected the qualitative results. Certain participants might have dominated the discussions, limiting input from quieter individuals. Additionally, conducting the discussions virtually may have restricted the observation of nonverbal cues, which are typically captured in in-person FGDs.

Despite these limitations, the study provides valuable insights into the perceptions, usage, and barriers to video-based

learning among medical students in a resource-limited setting. Future research should address these limitations by adopting a multisite, longitudinal approach with larger and more diverse samples, while also exploring institutional factors and validating measures tailored to video-based learning.

Conclusion

Most medical students are aware of the existence and benefits of video-based surgical learning, though they primarily rely on informal platforms like YouTube. This emphasizes the need for more structured, high-quality video resources within the formal educational system. The strong receptiveness to video-based learning suggests that students see it as a valuable tool for enhancing their surgical education. However, institutional support and formal integration into the curriculum are essential to realize its full potential. While students recognize the effectiveness of video-based learning, its actual utilization remains low due to infrastructural challenges such as high data costs and poor internet connectivity. Addressing these barriers is foundational to increasing the frequency of use and fully integrating video-based learning into their studies.

Author Contributions

AD conceived the study, wrote the first draft, and performed the quantitative statistical analysis. OO handled the qualitative data analysis. AJ and AP revised the first draft and made intellectual contributions. VO and FU prepared the tables and figure. SAS handled data curation, collection, edited, and thoroughly reviewed the revised manuscript. All authors reviewed the final manuscript.

Availability of Data and Material

The datasets utilized and analyzed during the study are available from the corresponding author upon reasonable request.

Consent for Participation

Written informed consent was sought from all participants before undertaking the study.

Ethics Approval and Consent to Participate

Ethics approval for the study was obtained from Irrua Specialist Teaching Hospital Health Research Ethics Committee (Protocol no: ISTH/HREC/20232012/522). The research was conducted in accordance with the declaration of Helsinki and other relevant guidelines. Informed consent was obtained from all participants prior to data collection.

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Supplemental Material

Supplemental material for this article is available online.

REFERENCES

1. Giannakos M, Chorianopoulos K, Ronchetti M, Szegedi P, Teasley S. Video-based learning and open online courses. *Int J Emerg Technol Learn*. 2014;9(1):4. doi:10.3991/ijet.v9i1.335
2. Bordes SJ, Walker D, Modica LJ, Buckland J, Sobering AK. Towards the optimal use of video recordings to support the flipped classroom in medical school basic sciences education. *Med Educ Online*. 2020;26(1):1-2. doi:10.1080/10872981.2020.1841406
3. MacNeill H, Masters K, Nemethy K, Correia R. Online learning in health professions education. Part 1: teaching and learning in online environments: AMEE guide No. 161. *Med Teach*. 2023;46(1):4-17. doi:10.1080/0142159x.2023.2197135
4. Youssef SC, Aydin A, Canning A, Khan N, Ahmed K, Dasgupta P. Learning surgical skills through video-based education: a systematic review. *Surg Innov*. 2023;30(2):220-238. doi:10.1177/15533506221120146
5. Abdulrahaman MD, Faruk N, Oloyede AA, et al. Multimedia tools in the teaching and learning processes: a systematic review. *Heliyon* 2020;6(11):1-2. doi:10.1016/j.heliyon.2020.e05312
6. Nicolaou C, Matsiola M, Kalliris G. Technology-enhanced learning and teaching methodologies through audiovisual media. *Educ Sci*. 2019;9(3):196. doi:10.3390/educsci9030196
7. Yee A, Padovano WM, Fox IK, et al. Video-based learning in surgery. *Ann Surg*. 2019;272(6):1012-1019. doi:10.1097/sla.0000000000003306
8. Burns LE, Abbassi E, Qian X, Mecham A, Simeteys P, Mays KA. YouTube use among dental students for learning clinical procedures: a multi-institutional study. *J Dent Educ*. 2020;84(10):1151-1158. doi:10.1002/jdd.12240
9. Ramlatchan M. *Multimedia Learning Theory and Instructional Message Design. Instructional Message Design: Theory, Research, and Practice*. Digitalcommons, 2019. Accessed November 2, 2023. https://digitalcommons.odu.edu/cgi/viewcontent.cgi?article=1002&context=instructional_message_design
10. de Sá VHLC, Pazin GS, Elias PE, Achar E, Pereira Filho GV. How to do it: teaching surgical skills to medical undergraduates. *Ann Med Surg (Lond)*. 2022;82(82):104617. doi:10.1016/j.amsu.2022.104617
11. Augestad KM, Butt K, Ignjatovic D, Keller DS, Kiran R. Video-based coaching in surgical education: a systematic review and meta-analysis. *Surg Endosc*. 2019;34(2):521-535. doi:10.1007/s00464-019-07265-0
12. Palmon I, Brown CS, Highet A, et al. Microlearning and social media: a novel approach to video-based learning and surgical education. *J Grad Med Educ*. 2021;13(3):323-326. doi:10.4300/jgme-d-20-01562.1
13. Fan T, Workman AD, Koch G, Rathi VK, Scangas GA, Metson R. Educational utility of an online video-based teaching tool for sinus and skull base surgery. *Laryngoscope Investig Otolaryngol*. 2021;6(2):195-199. doi:10.1002/lio2.551
14. Ekenze SO, Okafor CI, Ekenze OS, Nwosu JN, Ezepue UF. The value of internet tools in undergraduate surgical education: perspective of medical students in a developing country. *World J Surg*. 2016;41(3):672-680. doi:10.1007/s00268-016-3781-x
15. Farounbi TT, Salawu IO, Gabriel C. Effects of video-based learning and conventional instructional strategy on 100 level mathematics students' performances in distance learning education institutions in Oyo State, Nigeria. *Fuoye J Educ Manag*. 2024;1(2):300-304. Accessed November 4, 2023. https://fjem.fuoye.edu.ng/index.php/fjem/article/download/72/55
16. O'Cathain A, Murphy E, Nicholl J. The quality of mixed methods studies in health services research. *J Health Serv Res Policy*. 2008;13(2):92-98.
17. Nanjundeswaraswamy TS, Divakar S. Determination of sample size and sampling methods in applied research. *Proc Eng Sci*. 2021;3(1):25-32. doi:10.24874/pes03.01.003
18. Sell NM, Cassidy DJ, McKinley SK, et al. A needs assessment of video-based education resources among general surgery residents. *J Surg Res*. 2021;263(263):116-123. doi:10.1016/j.jss.2021.01.035
19. Galatsopoulou F, Kenterelidou C, Kotsakis R, Matsiola M. Examining students' perceptions towards video-based and video-assisted active learning scenarios in journalism and communication courses. *Educ Sci*. 2022;12(2):74. doi:10.3390/educsci12020074
20. Clarke V, Braun V. Thematic analysis. *J Posit Psychol*. 2016;12(3):297-298. doi:10.1080/17439760.2016.1262613

21. Rapp AK, Healy MG, Charlton ME, Keith JN, Rosenbaum ME, Kapadia MR. YouTube is the most frequently used educational video source for surgical preparation. *J Surg Educ.* 2016;73(6):1072-1076. doi:10.1016/j.jsurg.2016.04.024
22. Selten JW, Nazari T, Andriessen EH, Konings S, Wiggers T, De Jonge J. Standardized videos in addition to the surgical curriculum in Medical Education for surgical clerkships: a cohort study. *BMC Med Educ.* 2022;22(1):7-9. doi:10.1186/s12909-022-03314-w
23. Yee A, Padovano WM, Fox IK, et al. Video-based learning in surgery: establishing surgeon engagement and utilization of variable-duration videos. *Ann Surg.* 2020;272(6):1012-1019. doi:10.1097/SLA.0000000000003306. PMID: 33177415.
24. Hassanien MA, Abou-Kamer RA. YouTube videos as a tool for faculty development in medical education: a learning analytic overview. *MedEdPublish*. 2018;7(7):82. doi:10.15694/mep.2018.0000082.1
25. Azlan CA, Wong JHD, Tan LK, et al. Teaching and learning of postgraduate medical physics using internet-based e-learning during the COVID-19 pandemic—A case study from Malaysia. *Phys Med.* 2020;80(80):10-16. doi:10.1016/j.ejmp.2020.10.002