Health Professions Education

Manuscript 1342

# Acceptability, facilitators and barriers to video-based learning at a community health officers' training school in Nigeria

Mobolanle Balogun

Babatunde Akodu

Tope Olubodun

Victoria Yesufu

Anirejuoritse Chima-Oduko

See next page for additional authors

# Acceptability, facilitators and barriers to video-based learning at a community health officers' training school in Nigeria


## Authors

Mobolanle Balogun, Babatunde Akodu, Tope Olubodun, Victoria Yesufu, Anirejuoritse Chima-Oduko, Olabisi Oderinu, and Diane Shoemaker

ORIGINAL RESEARCH REPORTS

# Acceptability, Facilitators and Barriers to Video-based Learning at a Community Health Officers' Training School in Nigeria

Mobolanle Balogun [a,b,*], Babatunde Akodu [a], Tope Olubodun [c], Victoria Yesufu [d], Anirejuoritse Chima-Oduko [b], Olabisi Oderinu [e], Diane Shoemaker [f]

[a] Department of Community Health and Primary Care, College of Medicine University of Lagos, Lagos State, Nigeria
[b] Department of Community Health, Lagos University Teaching Hospital, Lagos state, Nigeria
[c] Department of Community Medicine and Primary Care, Federal Medical Center Abeokuta, Ogun State, Nigeria
[d] Department of Geography and Environmental Management, University of the West of England, Bristol, United Kingdom
[e] Department of Restorative Dentistry, College of Medicine University of Lagos, Lagos State, Nigeria
[f] Foundation for Advancement of International Medical Education and Research, Philadelphia, USA

**Abstract**

*Purpose*: **This study was conducted to assess the acceptability, facilitators and barriers to video-based learning (VBL) among community health officers (CHOs)-in-training and tutors in a Nigerian school, prior to the introduction of a video-based curriculum.**

*Methods*: **This was a mixed-methods, cross-sectional study conducted among CHOs and tutors at the CHO training school of the Lagos University Teaching Hospital (LUTH). A survey assessed students' acceptability of VBL using an adapted framework that integrated Diffusion of Innovation Theory and Technology Acceptance Model. Six key informant interviews and two focus group discussions were conducted among tutors and students respectively. Quantitative data was analysed descriptively with STATA version 15 while qualitative data was analyzed thematically using NVivo software version 14.**

*Results*: **The total acceptance score for VBL from the survey was 83.3 %, ranging from 52.9 % in the computer anxiety construct to 82.9 % in the behavioural intention construct. Didactic lectures were mostly used to teach in the school. VBL was acceptable to the students and tutors because it helps recall, can be referred to later, and is convenient. Students and tutors said the provision of electricity, electronic gadgets (laptops, projectors, video players), good Wi-Fi, and alternative electric power sources would facilitate VBL. Common barriers to VBL were poor internet connectivity, cost of data, inadequate supply of electricity, and the need to have good devices.**

*Conclusion*: **Ministries of Education and Ministries of Health need to integrate VBL into community health workers training due to its benefits in enhancing learning and memory. There should be adequate provision of electricity and stable internet connections to provide an enabling environment. Tutors should ensure engaging content of videos and develop relevant skills for VBL.**

*Keywords:* Acceptability, Facilitators and barriers, Video-based learning, Community health officers, Nigeria

## 1. Introduction

Globally, technology has become an essential tool in education for both teaching and learning [1]. Education technology, or 'EdTech,' includes the use of hardware, software, digital content, data, and information systems within the educational context [2]. It improves teaching and learning, as well as the management and delivery of education; it also builds new connections among

Received 12 December 2024; revised 5 February 2025; accepted 11 March 2025.
Available online 7 July 2025

* Corresponding author at: Department of Community Health and Primary Care, College of Medicine University of Lagos, Lagos State, Nigeria.
E-mail address: mbalogun@cmul.edu.ng (M. Balogun).

https://doi.org/10.55890/2452-3011.1342

teachers, students, parents, and communities, forming strong learning networks [2].

Similarly, incorporating EdTech in healthcare is increasingly essential for addressing health system challenges and enhancing the access and quality of health service delivery. In sub-Saharan Africa, various digital tools have been implemented for both education and health, including e-learning tools like videos for training health workers [3].

Video-based learning (VBL) refers to the knowledge or skills gained through instruction delivered via video [1,4]. A key aspect of VBL is the integration of both auditory and visual cues [5]. The visual components serve as the main source of information, while the audio provides additional details and context [1,5]. By integrating camera footage, animation, graphics, text, and audio, videos offer a multisensory learning experience that is both engaging and effective [4]. Educators and researchers worldwide have endorsed videos as a valuable and effective tool in the learning process [1,3–7]. Videos are considered to enhance and can partially replace traditional learning methods. This is because they offer clear illustrations through digitized images, text, and sound, which can be stored and shared over time. Videos can incorporate learning slides, supporting texts, and links to additional resources, forming a comprehensive virtual learning environment [1–7]. Additionally, videos are excellent for providing feedback, conducting assessments, and improving the quality of mentoring, among other benefits.

Healthcare systems have been bolstered by using VBL to train health workers, enhancing the delivery of healthcare services through telemedicine, reminder text messages, teleconferencing, data management, and information dissemination [3]. However, e-learning faces challenges such as goal setting, inadequate training and support for educators and students, inconsistent internet quality, and difficulties in teaching practical skills [7].

Community health officers (CHOs), the most senior community health practitioners, are central to the primary health care (PHC) system and play a crucial role in the health and well-being of populations. In India, they have successfully been trained using videos to enhance their knowledge of critical care management for COVID-19 patients [8]. In Nigeria, the schools that train CHOs are affiliated to tertiary health institutions with predominantly face-to-face [9] or didactic teaching methodologies [10,11]. However, there have been increasing demands by students for more interactive methods of teaching and the use of multimedia and videos beyond traditional didactic teaching methods [11,12].

In Nigeria, the evolving paradigm in the education of healthcare professionals emphasizes the need for curriculum refinement to include modern educational technologies [13]. The scientific literature recognizes VBL for its effectiveness in enhancing knowledge acquisition, clinical skills and learner satisfaction and this role has been emphasized among medical learners [14]. As well as its role in improving interest, motivation to learn and positive outcomes among learners in health professions [15–17].

Despite its benefits, several barriers hinder the effective implementation of VBL. This include inadequate technological infrastructure [18], reluctance to adopt new technology [19], and insufficient digital literacy [20]. Similarly, some facilitators have been identified in literature such as institutional support [18], perceived usefulness and the flexibility VBL affords [21]. However, there are limited studies to assess user acceptability of VBL among health workers in Nigeria, and specifically within CHO training programmes. There is also a paucity of studies on facilitators and barriers to the use of VBL in Nigeria. It is important to study the Nigerian context as benefits, barriers and acceptability may differ across different cultural and resource settings.

This mixed method study assessed baseline acceptability of VBL and explored the facilitators and barriers to its use prior to the introduction of a video-based curriculum among CHO students and tutors at a training school in southwest Nigeria.

## 2. Methods

This section describes the methodology used in conducting the study, highlighting the study design and site, sampling, data collection and data analysis.

### *2.1. Study design and site*

This was a mixed-methods cross-sectional study, which used quantitative and qualitative methods of data collection. The study was carried out at the community health officers' training school of the Lagos University Teaching Hospital (LUTH) in May 2021. The school, situated in the LUTH annex in Pakoto, Ogun state, is about 50 km away from the teaching hospital. The school admits community health extension workers and trains them for a duration of two years to become CHOs. They acquire knowledge and skills in community outreach activities, provision of integrated PHC services, administrative and training responsibilities in clinic and community settings. The teaching at the school was predominantly face-to-face lectures and practical

sessions, with the introduction of Zoom lessons during the COVID-19 outbreak in Nigeria. This study was conducted at the baseline of an intervention study to assess the effectiveness of a blended curriculum on newborn infection prevention and control in improving competencies of student CHOs [22]. At the time of the study, there were 70 students enrolled and six tutors that teach topics related to maternal, newborn and child health.

### 2.2. Sampling

A total population of 70 students, 36 in year one and 34 in year two, were recruited for the quantitative survey. All six tutors participated in key informant interviews (KIIs), and 22 students (10 in and 12 in year two) were selected purposively based on interest, to participate in focus group discussions (FGDs).

### 2.3. Data collection

Students' acceptability of VBL was assessed quantitatively using an adapted framework that integrated the Diffusion of Innovation Theory and Technology Acceptance Model designed and validated by Teo et al. [16] This framework was used because the model developed by the authors was a good fit in predicting students' intention to use new technology in learning and it deepened the understanding of technology acceptance theories [16]. The original survey consisted of 37 items measuring 10 constructs and was used to assess the acceptance of Moodle among university students in Macau. The version adapted for our study measured eight relevant constructs using 30 items on a 7-point Likert scale. The constructs and post-data collection internal consistency using Cronbach's alpha were perceived usefulness (0.90), perceived ease of use (0.87), attitudes towards using videos (0.79), behavioral intention (0.80), subjective norm (0.81), perceived behavioral control (0.65), computer anxiety (0.62), and trialability (0.65). The complete 30-item acceptability scale had internal consistency of 0.91. We also collected personal characteristics of respondents such as age, sex, marital status, religion, ethnicity and year in school. In addition, we asked about their known methods of teaching and their usual mode of watching educational videos.

To explore acceptability, facilitators and barriers to VBL, KIIs were conducted among CHO tutors and two FGDs were conducted separately for years one and two students. The KIIs were facilitated by members of the research team including MB, BA and VY. They were conducted in the private offices of the tutors and lasted between 25 and 30 min. The FGDs were facilitated by MB and VY with research assistants as notetakers. The FGDs were conducted in the years one and two classrooms and lasted between 70 and 90 min.

Topic guides with open-ended questions developed by the research team were used to collect data focused on experiences with teaching/learning methods generally; experiences with video-based teaching/learning; opinions about videos versus face-to-face teaching/learning; facilitators and barriers to video teaching/learning; and recommendations for the institution regarding video-based teaching/learning. All KIIs and FGDs were audio-recorded.

### 2.4. Data analysis

Quantitative data: Personal characteristics of the respondents that were categorical were presented as frequencies and proportions while the continuous age distribution was presented as mean and standard deviation (SD).

Each item on the acceptability scale was scored on the 7-point Likert scale. Twenty-seven items were positively worded statements and were scored as follows: strongly disagree = 1, disagree = 2, somewhat disagree = 3, neutral = 4, somewhat agree = 5, agree = 6, and strongly agree = 7. The three items in the computer anxiety were negatively worded and reverse scoring was applied to them. The acceptability scale was presented as mean and SD, as individual items and also grouped within their constructs. Analyses were performed with STATA version 15 (Stata Corp, USA).

Qualitative data: Audio recordings were transcribed verbatim. Qualitative data was analysed with the aid of NVivo software version 14. Double coding was done by MB and TO using a deductive and inductive approach. We used the Braun and Clarks thematic analysis methods which include familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report [23].

## 3. Results

This section presents the results of the quantitative survey among CHO students as well as results of the qualitative data collected during KIIs with tutors and FGDs with students.

### 3.1. Quantitative results

The mean age of the students was 36.2 ± 7.0 years. Most respondents were female (85.7 %), married

(67.2 %), Christians (80.0 %), of the Yoruba tribe (82.9 %). Half of the students were in their first year (51.4 %), and the other half in their second year. The teaching method most known was lecture format in person (80.0 %). Forty-eight percent of respondents were aware of lecture format via Zoom, 38.6 % were aware of small group discussion with facilitator(s) and 21.4 %, video format at prescribed time/place. The most common modes of watching educational videos were online (52.9 %) and downloaded on phone (55.7 %) [Table 1].

Regarding the acceptability scale, the mean values of the 30 items ranged from 3.0 to 6.0 with standard deviations varied from 1.1 to 2.0, indicating positive perception of the items generally. The least score of 3.0 was for item 24 with the statement "I feel apprehensive about using videos in learning", while the highest score of 6.0 was for item 15 with the statement "I expect that I would use videos in learning in the future." (Table 2).

The mean scores of each construct varied from 11.1 to 27.9. The mean score percentage ranged from 52.9 % in the computer anxiety construct to 82.9 % in the behavioural intention construct. This indicates a positive perception across the constructs though least within the computer anxiety construct. The total acceptance mean score percentage was 83.3 %, indicating a generally high level of acceptance of VBL by the students (Table 3).

*Table 1. Personal characteristics of student community health officers.*

| Variables | Frequency (%) N = 70 |
|---|---|
| **Age group (years)** | |
| <35 | 25 (35.7) |
| 35–44 | 32 (45.7) |
| ≥45 | 10 (14.3) |
| Missing | 3 (4.3) |
| **Mean age (SD)** | 36.2 ± 7.0 |
| **Sex** | |
| Female | 60 (85.7) |
| Male | 10 (14.3) |
| **Marital status** | |
| Married | 47 (67.2) |
| Single | 22 (31.4) |
| Missing | 1 (1.4) |
| **Religion** | |
| Christianity | 56 (80.0) |
| Islam | 14 (20.0) |
| **Ethnicity** | |
| Yoruba | 58 (82.9) |
| Igbo | 6 (8.6) |
| Others | 6 (8.6) |
| **School year** | |
| Year 1 | 36 (51.4) |
| Year 2 | 34 (48.6) |
| **Known methods of teaching** | |
| Lecture format in person | 56 (80.0) |
| Lecture format via Zoom | 34 (48.6) |
| Small group discussion with facilitator/s | 27 (38.6) |
| Video format at prescribed time/place | 15 (21.4) |
| Video format–asynchronous | 4 (5.7) |
| Others | 9 (12.9) |
| **Usual mode of watching educational videos** | |
| Online | 37 (52.9) |
| Downloaded on phone | 39 (55.7) |
| Downloaded on laptop or computer | 15 (21.4) |
| Using CD or DVD | 9 (12.9) |
| Using flash drive | 7 (10.0) |
| On television | 21 (30.0) |

### 3.2. Qualitative results

Six tutors were interviewed with their age range from 40 years to 57 years. Mean age was 47.7 ± 7.0 Five (83.3 %) of the tutors were female, three (50.0 %) had a master's degree, one (16.7 %) had a doctorate degree and two (33.3 %) had a bachelor's degree. Four (66.7 %) of the tutors had been teaching for less than five years, while the other two (33.3 %) had been teaching for seven years.

Twenty-two students took part in the FGDs. Ten (45.5 %) were year one students and twelve (54.5 %) were year two students. The age of the students ranged from 22 years to 47 years, with a mean age of 35.3 ± 7.3. Fifteen (68.2 %) of the students were females. Nineteen (86.4 %) had a national diploma and three (13.6 %) had a BSc degree.

Nine key themes emerged from the discussions with students and tutors, which are outlined below.

#### 3.2.1. Theme 1: opinion on teaching methods used in school

The methods of teaching used in the school were didactic lectures, group discussions, teaching online using Zoom and voice recordings, use of audiovisuals, demonstration methods using models, and practical sessions. Didactic lectures were the most common method of teaching used. Video teaching was mostly used by students in Year 2, though Year 1 students used video teaching occasionally.

> *"The school is basically ehmm use of lectures that is most common here, which is in the classroom where you teach them collectively." [KII, tutor 2]*

Regarding the conventional method which was face-to-face lectures, many students and teachers found it a good method of teaching. It allowed for asking questions and receiving clarifications. Some opined that the lecture method is okay, however there is need for upgrade/improvement, by introducing video teaching.

*Table 2. Participants responses on Acceptance of video-based learning using Diffusion of Innovation Theory and Technology Acceptance Model.*

| Item | Mean score (SD) |
|---|---|
| 1. Using videos enables me to learn more quickly | 5.6 (1.6) |
| 2. Using videos improves my performance in learning | 5.5 (1.6) |
| 3. Using videos increases my productivity in learning | 5.4 (1.7) |
| 4. Using videos enhances my effectiveness in learning | 5.5 (1.5) |
| 5. Using videos is useful to learning | 5.9 (1.0) |
| 6. It is easy for me to use videos in learning | 5.6 (1.4) |
| 7. My interaction with videos in learning is simple | 5.5 (1.3) |
| 8. It is easy for me to become good at using videos in learning | 5.7 (1.4) |
| 9. I find videos easy to use in learning | 5.3 (1.4) |
| 10. Once I start using videos in learning, I find it hard to stop | 4.2 (2.0) |
| 11. I look forward to those aspects of learning that require the use of videos | 5.6 (1.4) |
| 12. I like to use videos in learning | 5.5 (1.4) |
| 13. I have positive feelings towards the use of videos in learning | 5.7 (1.4) |
| 14. I intend to continue to use videos in learning in the future | 5.8 (1.4) |
| 15. I expect that I would use videos in learning in the future | 6.0 (1.2) |
| 16. I plan to use videos in learning in the future | 5.7 (1.2) |
| 17. People who influence my behavior think that I should use videos in learning | 4.7 (1.8) |
| 18. People who are important to me think that I should use videos in learning | 4.7 (1.9) |
| 19. The people whose views I respect support the use of videos in learning | 5.0 (1.6) |
| 20. I have control over videos at learning | 5.4 (1.4) |
| 21. I have the resources necessary to use videos in learning | 4.4 (1.7) |
| 22. I have the knowledge necessary to use videos in learning | 5.3 (1.5) |
| 23. Given the resources, opportunities and knowledge, it is easy for me to use videos in learning | 5.8 (1.2) |
| 24. I feel apprehensive about using videos in learning | 3.0 (1.7) |
| 25. I hesitate to use videos in learning for fear of making mistakes I cannot correct | 3.7 (2.0) |
| 26. Using videos in learning is intimidating to me | 4.4 (2.0) |
| 27. Before using videos, I can use it on a trial basis for learning | 5.1 (1.6) |
| 28. Before using videos, I can test the functions properly for learning | 5.6 (1.2) |
| 29. Before using videos, I can ensure that it meets my needs in learning | 5.9 (1.1) |
| 30. Before using videos, I can ensure that it matches my expectations in learning | 6.0 (1.2) |

*Table 3. Aggregate of responses from the construct domains of Diffusion of Innovation Theory and Technology Acceptance Model.*

| Constructs | Mean score (SD) | Mean score % |
|---|---|---|
| Perceived usefulness (Items 1–5) | 27.9 (6.3) | 79.7 |
| Perceived ease of use (Items 6–9) | 22.1 (4.7) | 78.9 |
| Attitude towards using videos (Items 10–13) | 21.0 (4.9) | 75.0 |
| Behavioral intention (Items 14–16) | 17.4 (3.2) | 82.9 |
| Subjective norm (Items 17–19) | 14.4 (4.5) | 68.6 |
| Perceived behavioral control (20–23) | 20.9 (4.0) | 77.4 |
| Computer anxiety (24–26) | 11.1 (4.3) | 52.9 |
| Trialability (27–30) | 22.5 (3.6) | 80.4 |
| Total acceptance score (Items 1–30) | 157.4 (22.1) | 83.3 |

*"I'm participant 5, our current lecture now is ok by us because we have access to the lecturer coming to the class, taking us, then asking questions, then if there's a way we are not clear, the lecturer will take his or her time to explain better but when the COVID-19 era is around now, we think they can improve in giving us another method like all these video method so that everybody can improve on it." [FGD, P5, Year 2]*

### 3.2.2. Theme 2: opinion on video method

Many students and tutors felt video method of teaching is a very effective way of learning. They believed that seeing helps memory and makes recall easier. Some students also said that they like video teaching because they can watch the video several times, which aids learning. Convenience of learning was also reported by both students and tutors. The tutors can teach in the comfort of their homes and the students can also have lectures at more convenient times in the evenings.

*"Ehmm using video to learn is good because ehh it gives me the opportunity to see exactly what is happening. So, you will see and once you have seen it, it sticks because you will remember. Because what you see, you will remember it more, so that's the experience I have." [FGD, P8, Year 1]*

Video teaching was said to be good for learning topics that include practical application e.g. examination techniques. Some students explained that learning topics like essential newborn care, stages of labour, circumcision and anatomy using videos

helped them gain better understanding of the topics and enabled them to do better in exams. Some other students however felt that videos can be used for theoretical topics while physical sessions are organized for practical topics. A tutor felt after video teaching is done, physical classes can follow to clarify grey areas. Some tutors said that video teaching should be encouraged as it will help improve the ICT skills of students and help them to adopt teaching methods used in more developed climes.

> *"For me it was very good because that essential newborn care that we did within [among] ourselves, I used the experience to write in the exam, so it has been helpful and I can never forget it."[FGD, P2, Year 2]*

> *"But with the video, I found out that I can always ehmm arrange [a class] and then do that at a time that is convenient for me. Like, I will say okay, the lecture is this and I will give them time to get home, relax and rest. What do you think about 6–7pm? Is that okay? And I know that then I would have been home, relaxed and taken some refreshments before taking them, so it is at my convenience. And even the students too, it is convenient for them." [KII, tutor 2]*

The disadvantages of video teaching mentioned include inadequate electricity supply, cost implications of getting a good device and data, poor network, and poor concentration and unseriousness by students during Zoom meetings. In addition, video teaching reduces rapport between students and tutors and some students are not conversant with the new technology.

> *"Ok, I'm participant number 9, the only disadvantage I see in this video learning and teaching is just that it reduces rapport between the learner and the teacher and that is one. Then two, it won't give me as a student the time and the space to ask questions. Whenever the teaching is going on, I won't be able to ask question at that point when I have the question in mind so I think we should just strike [a] balance, do one-on-one and do video." [FGD, P9, Year 2]*

#### *3.2.3. Theme 3: opinion on combining video teaching with other methods*

Students and tutors alike agreed that video teaching should be used in combination with other methods such as lectures and practical sessions. Some participants mentioned that video teaching method is not ideal for all topics. For example, some clinical topics will require hands on learning/practical sessions. Hence, video teaching should be used in combination with other methods. There was a suggestion that after watching videos, a face-to-face session can be organized to make clarifications, assess understanding and answer questions. Tutors that use video teaching in the school combine it with other methods and say this approach is more effective.

> *"Ehnnn video watching is good, it also help[s] us to retrieve or to go back even though you are not there, but we need to balance with one-on-one in terms of practical aspect, we need to see the patients and then touch, inspect them. That's where we need to balance up, not only video throughout because we are dealing with lives." [FGD, P8, Year 2]*

> *"Face-to-face should be the practical like in terms of the use of standing order, that one is face-to-face and it shouldn't be for video. Then the theoretical aspect should be for the video." [FGD, P7, Year 1]*

#### *3.2.4. Theme 4: experience teaching with video*

The COVID-19 pandemic brought about teaching with videos and WhatsApp voice notes, and students performed very well in board exams. Most times, Zoom teaching took place at the students and tutors convenience in their homes. Some tutors used video lectures outside school hours to cover the curriculum due to backlogs from the pandemic. Students generally preferred Zoom lectures to WhatsApp voice notes as they preferred seeing their tutors on screen. A challenge tutors had with Zoom lectures was students not comporting themselves well during online lectures and being unruly.

Zoom lectures when used by some tutors, was accompanied with sending lecture notes via email. Some courses taught with video include Care and management of HIV, Maternal and Child Health, Reproductive Health, Population Dynamics and Family Planning, Anatomy and Physiology. Most tutors taught for an average of 1 h or less. There was no mention of sending videos to students via CD or flash drive.

> *"I think the COVID-19 pandemic in a way indirectly introduced different methods of teaching that we had to adopt. During that time there was lockdown, we couldn't meet the students physically, so we had to adopt to ehmm use of social media like the WhatsApp discussion, ehmm use of video through using Zoom and Google Classroom. So, the COVID-19 pandemic made us to kind of test-run these other methods of teaching that generally in Nigeria we would look at*

*those methods of teaching as not being practicable." [KII, tutor 2]*

### 3.2.5. Theme 5: experience learning with video

For the year 1 students, Zoom lectures were not a frequent occurrence. Video learning was more common with year 2 students. Some year 1 students however learn with YouTube videos and find it very good for learning. In some instances, students downloaded videos online on topics they needed more understanding on, mostly practical topics and watched the videos together, using a projector. Poor network and lack of data were recurrent barriers mentioned by many students, experienced during video learning. Unseriousness demonstrated by fellow students during Zoom lectures was also mentioned by some students. One student mentioned that during Zoom lectures, students were able to ask questions which the lecturer answered, and the recording of the Zoom lecture was sent to the class thereafter.

Some of the courses/topics learnt using video teaching were Epidemiology, Communication in English Language, Child Health, Management of HIV/AIDS, Entomology and Information Education Communication. Some students learnt other courses/topics like nutrition, child health sociology, essential newborn care, stages of labour using videos, during their own personal learning online. Students reported that most Zoom lectures lasted about 40–45 min.

*"The particular one I enjoyed was…..has to do with maternal and child health and the topic that deals with stages of labour. I've been taught theoretically before, I've read it over and over again but I did not really get the sense of it until I now watched it on YouTube, stage one, stage two, stage three, the 3D animation, the way it was demonstrated. It makes me to be able to understand it such that if you ask me anytime, any day I can recall without any difficulty." [FGD, P10, Year 2]*

### 3.2.6. Theme 6: preferred ways for delivering or receiving of video teaching

Some students want to watch the videos in the classroom with their other classmates, while others say the videos should be available to watch anywhere, whether at home or in school. Zoom was preferred to WhatsApp voice note, as noted by a tutor when she sampled her students' opinion. Students also mentioned that they would like videos to be presented in CDs, or forms that could be downloaded on their phones, as this will reduce the problems of poor network and cost of data. One student said the videos should be in the form of PowerPoint slides.

Many students wanted the duration of videos to be less than 1 h i.e. 30–45 min. Some students, however, said the videos can last the normal duration of their class periods which is 2 h. One student felt the duration of the video will be dependent on the course/topic content while another felt long videos can even be welcome, if the topic/tutor is interesting.

*"I prefer the one to download on our phone, so that anytime you can go through it." [FGD, P8, Year 1]*

*"Now if we are going to adopt that method of video teaching, I'll be of the opinion saying that we should put it in either a flash or a VCD, because we are in a situation whereby all hands are not equal, because I may not have the money to go and buy data, and without data if you put it online I will not have the ability to access it but if you do it a flash that at least every Nigerian can afford to buy a flash and that flash will always be there, it would be like, ok bring your flash, copy it, take it home and watch, so I think if it's being put in that aspect it goes a long way." [FGD, P6, Year 2]*

### 3.2.7. Theme 7: acceptability of video teaching

Video teaching was acceptable by almost all the students and tutors. Video teaching was acceptable for various reasons - helps recall, one can refer to it later, it is convenient, amongst others. Some respondents said video teaching is acceptable by them, given some conditions – availability of electricity and gadgets, affordability of data, and provided the tutor is available to make clarifications. One student mentioned that video teaching is not acceptable to her because it does not allow for communication between student and teacher.

*"It is acceptable because, easily, you can remember what you've seen." [FGD, P8, Year 2]*

*"It is acceptable to me being that both on the part of the lecturer, I said it earlier on that, it is more convenient and to the students too, what they learn sticks because it is a kind of teaching aid when you show videos. So, to them too, it ehmm sticks better and they will remember better knowing that they are adults." [KII, tutor 3]*

*"I'm sure the response will be positive because they've been used to it before now. And we are trying to make it part and parcel of them. So, I think the response will be positive." [KII, tutor 5]*

*"Because you know one of the most difficult things about life is change. They are used to a particular pattern so initially there may be a little resistance but when they enjoy it, having taught them with it and then, it's easy for them to recollect, definitely they will embrace it." [KII, tutor 6]*

*"Video in this school is not acceptable because the communication will not be there." [FGD, P5, Year 1]*

*"Yes, it will be good but unless we have the money to buy the data." [FGD, P4, Year 1]*

*"Video teaching is acceptable to me because ehmm like the courses we are doing here is more of practical. So, you intend to learn and you see, so when you learn and see, it enhances your knowledge when dealing with patients in your various facilities". [FGD, P6, Year 1]*

*"It is acceptable once all the materials have been provided. You know things that we need has been provided like electricity and all the things we need." [FGD, P4, Year 2]*

*"It's acceptable, participant 7, it's acceptable because even especially when the lecturer is around for more explanation. To me it's acceptable." [FGD, P7, Year 2]*

*3.2.8. Theme 8: facilitators of video-based learning*

Students and tutors said provision of electricity, electronic gadgets e.g. laptops, projectors, video players and good Wi-Fi, provision of standby generators and back-up inverters which should be well maintained, would serve as facilitators of video learning. Some students also mentioned the importance of a comfortable and serene environment to aid learning. Other facilitators of video teaching mentioned include training on how to use the electronic gadgets and platforms and having a technician to support tutors with handling electronic equipment when the need arises. Some students also said there is a need to have good and interesting content in the videos which can be easily understood.

*"For my own and I don't know of others. So, if they can train us, give us what we need to use, all of us are flexible to change and we should embrace change. So, I believe I will do well." [KII, tutor 1]*

*"Facilitators like I said the light, the equipment then sometimes we may need a technician. You know not all of us are very vast in the use of this erm technologies. If you have any hitch, somebody should be available to really put you through on time so that you don't waste time." [KII, tutor 4]*

*"Like I have said, since it is power-dependent and in the school here if we have to be doing some of the sessions, we shouldn't kind of depend on ehh electricity alone, I mean power holding company. We should have a standby generator or power supply that will be used to augment you know that and then we need to have our usually aids, we need to have them and ehmm that is that." [KII, tutor 3]*

*"Provision of all the gadgets needed for this video stuff. Like the, the, the projector, the camcorder. The materials that will be needed and the conducive environment." [KII, tutor 5]*

*"Wow. Availability of light one. Then two, the internet connection. Once the two is settled, the rest is history." [KII, tutor 6]*

*"What will make video learning easier for me to engage in is if they are interesting stuffs. Maybe like there should be a video that is ehmm self-explanatory, that does not require more questions, if they could break it down to the smallest bit and we the students will not need to be asking questions since it is recorded." [FGD, P10, Year 1]*

*"If I need a WiFi to watch it and it's available, I need light to access my laptop it's available, I need a flash it's available, then why won't I?...So, if I see that it's available I'll show the interest." [FGD, P6, Year 2]*

*3.2.9. Theme 9: barriers to video-based learning*

Common barriers to video teaching mentioned were poor network especially in remote areas, cost of data, poor supply of electricity, and the need to have good devices. Other barriers mentioned were

lack of technical know-how on how to operate gadgets, boring videos, and poor funding of the educational system by the Government.

*"Yes, there are disadvantage[s]. Anything that has advantage must have disadvantage because the video teaching and we all know that we don't have stable network. The general thing is that some may not have enough money for data, the network is not stable, so those things too could make it ehh discouraging and then the materials too they need to use. You need to have a phone or a device that will present the video well, that is going to be clear, explicit and then for others to watch. If it is blurred and it is not looking well, they will not also enjoy watching it. So those things and you know finance is a problem in Nigeria, so it is not everybody that will have a device that will be able to access ehmm such method or allow that person to use that method of teaching." [KII, tutor 2]*

*"No, it is just that here electricity is a challenge and at-times too the ehmm if it is laptop or ehmm video player or whatever. They are all dependent on electricity and power is not really stable here or the gadgets you are using maybe faulty. Those are the challenges I see, otherwise this method is very good." [KII, tutor 3]*

*"The experience of the lecturer also counts. If a lecturer doesn't know how to use the internet, he doesn't even know how to use a laptop, he doesn't know how to use the gadgets and of course he won't be able to. Lack of experience is a factor, ehmm it is not everybody that ehmm is used to webinar Zoom. They have to learn and they have to install it and know how to ehmm use it. If you don't know how to use it to teach and how to maneuver it, of course it will not be an option at all. So that is that." [KII, tutor 6]*

*"Why I said it is not advisable is that firstly, our power supply is not very accurate, sometimes for like a month we don't use to have light and secondly, sometimes we don't use to have data and the network is always poor here." [FGD, P3, Year 1]*

*"When the video is boring people will not be able to concentrate." [FGD, P5, Year 1]*

*"Just as I have said earlier on that ehmm the facilitator coming should have ehmm prepared himself or herself that I am coming to do a video teaching. Not that when he or she comes, he or she is not organised, he or she is just doing one thing or the other. To set-up a gadget is taking he or she like 2 hours to set-up things and it can hinder the students from learning." [FGD, P6, Year 1]*

*"One of the hindrances I see is ehmm technological know-how, some people may not really know how to operate these things especially when it comes to the issue of online, not everybody has this computer knowledge and not everybody is used to going online. So that's one of the challenges." [FGD, P10, Year 2]*

*"Sometimes if they send it online you know network fails sometimes and they will not be able to access it on time like me, I'm from a remote area and network is our major problem and you know those network service providers, you know how they fail people. So, as regards the institution we have here we are expecting more from the government side as my colleague has said, participant number 5, as he has said, the ICT unit here ehnnn is nothing to write home about. If it is improved, modernized, rehabilitated, I mean rehabilitated at least, this issue we are talking about will just be an easy thing for us. Thank you so much." [FGD, P8, Year 2]*

## 4. Discussion

Here, we interpret salient results, compare them with previous studies, make inferences, identify study strengths and limitations, and make recommendations to guide future practice.

In this study, didactic lecture was the most common teaching method used in the school. This is not surprising as didactic lectures is the most popular teaching method used in schools in Nigeria, from elementary school to higher education [9]. Traditional lectures is also one of the most common teaching methods in medical education.[10,11.] Students in our study opined that face-to-face lecture is a good method of teaching as it allows for asking questions and making clarifications. However, it was said that traditional teaching can be improved upon by introducing video-based teaching. Other studies have shown students proposing more interactive methods and the use of multimedia and videos in teaching [11,12]. This may be attributed to the positive effect of visual aid on cognition.

Students and tutors alike felt video-based teaching is an effective method of teaching as it aids

assimilation and comprehension, it aids recall, and videos can be watched several times over. In a study carried out among slow learners, students felt video-based teaching improves visual clues, assists memory process, and aids the recall of new knowledge [24]. In our study, students and tutors reported video learning could also be done at convenient hours for both tutors and students, and also in the comfort of one's homes. Stain et al. in a study among medical students also demonstrated that videoconferencing allows students to receive interactive lectures at distant clinical sites, which is more convenient [25].

In our survey, the construct 'perceived usefulness of video teaching', had a high proportion score of 79.7 %. This goes to show that the students found video teaching very useful in learning. In the KIIs, tutors also attested to video-based teaching being effective as it helped students perform well in board exams when introduced during the COVID-19 pandemic. On the contrary, in a study where students were exposed to in-class and video teaching for a psychology course, very few students felt they learnt better with video teaching [26]. The students felt classroom teaching helped them avoid distractions better and interact with tutors better. Students in our study also attested that there could be distractions and poor student–tutor interactions.

One of the main benefits of video learning is the flexibility it affords. Students can view the course material many times, when and where they like, they can rewind, slow down or speed it up, and can revisit the videos prior to examinations [27]. This was noted in our study when students believed videos aid learning because the videos can be watched repeatedly. In a study carried out among medical students in Jordan, participants who preferred video teaching cited that it aids repetition as one of their reasons [21]. In this study, students also said that video teaching is good for learning topics that include practical application e.g. examination techniques or courses that require visualizations like anatomy. Similar to our study, anatomy students in Sydney reported better learning experiences after being taught musculoskeletal anatomy with short videos, as it aided their knowledge of anatomy and their preparation for practical sessions [28].

Disadvantages of video teaching mentioned in our study include poor electricity supply, cost of a good device and data, poor internet connectivity. Similarly, in an intervention study among primary health workers in Nigeria which provided online training videos on maternal, newborn, and child health, barriers that affected the adoption and use of the video training resources included poor internet connection, and poor electricity supply to charge devices [3]. Poor internet connectivity and poor electricity supply is still a concern in many low- and middle-income countries like Nigeria. This can remarkably hinder effective learning using videos.

Students and tutors agreed that video teaching should be combined with other methods like classroom teaching, practical sessions and group discussions for better effectiveness. In a study that combined video and practical sessions to teach medical students about pediatric cardiopulmonary arrest, students in the intervention group scored higher than students who received traditional lecture [29]. Also, a study among students in Uganda showed that the group with combined video and traditional teaching methods had better test scores than those who received only traditional teaching [30].

Regarding the preferred way of receiving video lectures, many students wanted the videos to be in formats downloadable on their phones or on compact disks (CDs) to reduce the problem of poor network and cost of data. Unlike our study, in a study among nursing students in New Zealand, students preferred videos that were posted online compared to those which were offline and recorded in CDs or digital video disks (DVDs) [31]. For the New Zealand students, internet connection and getting data was most likely not a problem as more developed countries often have better internet network and institutional Wi-Fi. Regarding the duration of the videos, many of the students wanted the videos to be less than 1 h, i.e. 30–45 min. In a study among students in Ghana, students complained about long videos, and preferred videos to be of shorter duration [32]. Keeping videos short is important in keeping them engaged [33].

When asked about facilitators to VBL, some conditions that will favor learning with videos mentioned include, provision of steady supply of electricity and electronic gadgets, training on how to use electronic gadgets and online video learning platforms and having a technician to support when needed. Addressing barriers will go a long way to encourage video-based learning and optimize the advantages of video learning. It is also important to build skills of students as well as tutors, in using online platforms such as Zoom and Google classroom to benefit optimally from video teaching. This is important as in the quantitative survey, 'computer anxiety' was the construct that had the least proportion score of 52.9 %.

### 4.1. Strengths and limitations

This study is one of the few studies carried out among health workers in training in Nigeria to assess the barriers, facilitators and acceptability of VBL. It thus adds considerably to the body of knowledge and provides evidence to guide use of videos in teaching in higher education. The responses in this study are prone to social desirability bias as interviews were conducted within the school environment. To mitigate against this, interviewers avoided asking leading questions and maintained a neutral perspective throughout the discussions. Participants were also informed that their responses are confidential and would be kept anonymous.

## 5. Conclusion

VBL was well accepted by most of the students and tutors. Barriers to VBL include poor internet connectivity, cost of data and electronic gadgets, inadequate electricity supply, lack of technical know-how to operate gadgets, boring videos and poor government funding. Facilitators of video teaching mentioned include provision of steady supply of electricity, electronic gadgets, good Wi-Fi, having a technician to support tutors with handling electronic equipment, and having videos with interesting content. Relevant government agencies should ensure steady supply of electricity and provision of good Wi-Fi. Grants could be given to students to aid purchase of smart phones, tablets and other devices to promote learning. The provision of an e-library will also aid learning with videos. Tutors should ensure engaging content of videos, avoid lengthy videos, and acquire relevant skills for video teaching.

## Ethical approval

The Health Research and Ethics Committee of LUTH exempted the study proposal from review. Respondents of the survey and interviews provided written informed consent prior to data collection. Confidentiality was assured by not using identifiers.

### Conflicts of interest

The authors declare that they have no competing interests.

## Acknowledgements

We appreciate Dr Sola Pitan for collecting some of the qualitative data used in this study. We are indebted to the students and tutors who participated in this study.

## Data availability statement

The data that support the findings of this study are available on request from the principal investigator, MB. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

## Other disclosure

None.

## References

[1] Sablic M, Mirosavljević A, Sablic M, Škugor A. Video-Based Learning (VBL)—past, present and future: an overview of the research published from 2008 to 2019. Technol Knowl Learn 2021;26(4):1061–77. https://doi.org/10.1007/s10758-020-09455-5.
[2] World Bank. Reimagining human connections: technology and innovation in education at the world bank. Washington, DC: World Bank; 2020. Available from: https://www.worldbank.org/en/topic/edutech/publication/reimagining-human-connections-technology-and-innovation-in-education-at-world-bank. [Accessed 3 May 2024].
[3] Hicks JP, Allsop MJ, Akaba GO, Yalma RM, Dirisu O, Okusanya B, et al. Acceptability and potential effectiveness of ehealth tools for training primary health workers from Nigeria at scale: mixed methods, uncontrolled before-and-after study. JMIR Mhealth Uhealth 2021;16(9):e24182. https://doi.org/10.2196/24182.
[4] Edem NB, Ekon EE. The extent of use of video clip for teaching and learning in Nigerian universities: a case study of faculty of education, University of Calabar. Educ Res Rev 2021;16(7):289–95. https://doi.org/10.5897/ERR2020.3937.
[5] Majumdar A. Getting started with video-based learning. Available from: https://elearningindustry.com/video-based-learning-getting-started. [Accessed 30 March 2023].
[6] Donkor F. Assessment of learner acceptance and satisfaction with video-based instructional materials for teaching practical skills at a distance. IRRODL 2011;12(5):74–92. https://doi.org/10.19173/irrodl.v12i5.953.
[7] Ngampornchai A, Adams J. Students' acceptance and readiness for E-learning in Northeastern Thailand. Int J Educ Technol High Educ 2016;13(34). https://doi.org/10.1186/s41239-016-0034-x.
[8] Wahda Nia H, Sudarman S, Rahayu VP. The effectiveness of using video-based learning media on learning motivation of students of Class X SMA Negeri 3 Samarinda. Educ Stud: Conference Series 2023;2(2):268–75. https://doi.org/10.30872/escs.v2i2.1619.
[9] Obi ZC. The need for innovative instructional strategies in the teaching and learning of science in Nigeria: the role of school administrators. COOUJOSEAD 2016;1(1).
[10] Alaagib NA, Musa OA, Saeed AM. Comparison of the effectiveness of lectures based on problems and traditional lectures in physiology teaching in Sudan. BMC Med Educ 2019;19(1):365. https://doi.org/10.1186/s12909-019-1799-0.
[11] Wolff M, Wagner MJ, Poznanski S, Schiller J, Santen S. Not another boring lecture: engaging learners with active learning techniques. J Emerg Med 2015 Jan;48(1):85–93. https://doi.org/10.1016/j.jemermed.2014.09.010.
[12] Puranik S. Innovative teaching methods in higher education. BJEDU 2020;9(1). https://doi.org/10.51767/je0907.
[13] Balogun JA. Healthcare education in Nigeria: evolutions and emerging paradigms. Routledge; 2020.
[14] Hurtubise L, Martin B, Gilliland A, Mahan J. To play or not to play: leveraging video in medical education. J Grad Med Educ 2013;5(1):13–8.

[15] Choi HJ, Scott DJ. The effect of context-based video instruction on learning and motivation in online courses. AJDE 2005;19:215–27.
[16] Teo T, Zhou M, Fan ACW, Huang F. Factors that influence university students' intention to use Moodle: a study in Macau. ETR& D. 2019;67:749–66.
[17] Kyaw BM, Posadzki P, Paddock S, Car J, Campbell J, Tudor Car L. Video-based approaches in health education: a systematic review and meta-analysis. Sci Rep 2019;9(1):1–11.
[18] O'Doherty D, Dromey M, Lougheed J, Hannigan A, Last J, McGrath D. Barriers and solutions to online learning in medical education – an integrative review. BMC Med Educ 2018;18:130. https://doi.org/10.1186/s12909-018-1240-0.
[19] Borges do Nascimento IJ, Abdulazeem H, Vasanthan LT, Martinez EZ, Zucoloto ML, Østengaard L, et al. Barriers and facilitators to utilizing digital health technologies by healthcare professionals. NPJ Digit Med 2023;6:161. https://doi.org/10.1038/s41746-023-00899-4.
[20] Regmi K, Jones L. A systematic review of the factors – enablers and barriers – affecting e-learning in health sciences education. BMC Med Educ 2020;20:91. https://doi.org/10.1186/s12909-020-02007-6.
[21] Ashour O, Alkhatib AM, Zureikat QA, Al-Shaikhli M, Ata BB, Massad T, et al. Investigating medical students' satisfaction towards video-based learning versus face-to-face lectures: a Jordanian tertiary teaching hospital experience. Korean J Med Educ. 2023 Mar;35(1):21–32. https://doi.org/10.3946/kjme.2023.246. Epub 2023 Feb 28. PMID: 36858374; PMCID: PMC10020058.
[22] Balogun M, Akodu B, Shoemaker D, Yesufu V, Onyenwenyi A, Udeh R, et al. Blended curriculum to improve student community health officers' competencies in newborn infection prevention and control. Ann Med 2023 Dec;55(1):2205167. https://doi.org/10.1080/07853890.2023.2205167.
[23] Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol 2006;3(2):77–101. https://doi.org/10.1191/1478088706qp063oa.
[24] Tayade AT, Tayade SA, Chalak A, Srivastava TK. The impact of Video Assisted learning (VAL) on slow learners. Int J Biomed Adv Res 2018;9(1):13–8.
[25] Stain SC, Mitchell M, Belue R, Mosley V, Wherry S, Adams CZ, et al. Objective assessment of video conferenced lectures in a surgical clerkship. Am J Surg 2005;189(1):81–4. https://doi.org/10.1016/j.amjsurg.2004.04.012.
[26] Jensen SA. In-class versus online video lectures: similar learning outcomes, but a preference for in-class. Teach Psychol 2011;38(4):298–302. https://doi.org/10.1177/0098628311421336.
[27] Dinmore S. Beyond lecture capture: creating digital video content for online learning – a case study. JUTLP 2019;16(1). https://doi.org/10.53761/1.16.1.7.
[28] Strkalj G, Hulme A, El-Haddad J, Luo K, Crafford D, Rampe M. Students' perceptions and usage of short anatomy videos: a preliminary study. Int J Morphol 2018;36(2):493–9.
[29] Drummond D, Arnaud C, Thouvenin G, Guedj R, Grimprel E, Duguet A, et al. An innovative pedagogic course combining video and simulation to teach medical students about pediatric cardiopulmonary arrest: a prospective controlled study. Eur J Pediatr 2016;175(6):767–74. https://doi.org/10.1007/s00431-016-2702-1.
[30] Cai T, Abbott E. Using video as a replacement or complement for the traditional lecture/demonstration method in agricultural training in rural Uganda. J Appl Commun 2013;97(4). https://doi.org/10.4148/1051-0834.1127.
[31] Montayre J, Sparks T. As I haven't seen a T-cell, video-streaming helps: nursing students' preference towards online learning materials for biosciences. Collegian 2018;25(5). https://doi.org/10.1016/j.colegn.2017.12.001.
[32] Boateng R, Boateng SL, Awuah RB, Ansong E, Anderson AB. Videos in learning in higher education: assessing perceptions and attitudes of students at the University of Ghana. Smart Learn. Environ 2016;3(8). https://doi.org/10.1186/s40561-016-0031-5.
[33] Guo PJ, Kim J, Rubin R. How video production affects student engagement: an empirical study of MOOC videos. In: Proceedings of the first ACM conference on learning@ scale conference. New York, NY: Association for Computing Machinery; 2014. p. 41–50. https://doi.org/10.1145/2556325.2566239.