Journal of Clinical & Experimental Ophthalmology
ISSN: 2155-9570

Mall et al., J Clin Exp Ophthalmol 2012, 3:6
DOI: 10.4172/2155-9570.1000231

Research Article Open Access

Does Video Enhance Student Learning Experience?

Sonia Poonam Mall*, Simon Dulku, Avinash Manna, Misha Darrad, Fiona Dean

University Hospitals of Coventry and Warwickshire, Coventry, UK

Abstract

Background: The use of video in medical education is increasing but to date no one has investigated student opinion on teaching direct ophthalmoscopy using video.

Aims: To assess two methods of teaching direct ophthalmoscopy (1) a practical demonstration of the technique and (2) an educational video.

Methods: 35 final year medical students were given a practical demonstration of direct ophthalmoscopy followed by a questionnaire on their opinions. At another session 24 students were shown a video followed by the same practical demonstration. This group was taught using both methods so that they would not be disadvantaged. The students were then asked to complete a questionnaire on their learning experience.

Results: Students preferred the practical demonstration over the video in a number of areas. Students felt that their understanding of ophthalmoscopy was better after the practical session ($p=0.024$), that they were more likely to recommend the session to another student ($p=0.0048$), and it was more helpful in improving their technique ($p<0.0001$). They were also more likely to attend the practical teaching session again ($p=0.037$). No significant differences were found with respect to content, delivery, fulfilling expectations and achieving learning objectives.

Conclusion: Our current practice of direct ophthalmoscopy teaching is highly regarded. Students felt the video may have a role as an adjunct to learning or a tool for revision.

Keywords: Direct ophthalmoscopy; Educational video; Practical demonstration; Student opinion

Introduction

The ability to perform direct ophthalmoscopy is a basic requirement of all medical students. It is an important skill and can enable a doctor to detect life-threatening pathology such as an intracranial tumour or malignant hypertension. Nevertheless, the teaching of direct ophthalmoscopy is often subject to considerable time pressure, with only a short time in the undergraduate curriculum dedicated to clinical ophthalmology. In some medical schools it may only be a few days in the department, with some students receiving no compulsory ophthalmic education [1]. Thus, the learning of direct ophthalmoscopy can sometimes be left for the medical student to acquire themselves or to learn from other doctors who may not be ophthalmologists.

An attractive option for the teaching of direct ophthalmoscopy may be with the use of video. Making a video requires substantial preparation and the information delivered may be more concise. It allows repetitive consistency in its deliverance of the learning material, methodically covering the learning objectives without the danger of loss of specific learning points, or of students being taught by individuals with different levels of expertise. Each student is more likely to receive the same teaching experience. A video also has the advantage that it can be distributed electronically via the internet, replayed to reinforce learning and can also aid revision prior to medical examinations [2]. Given the above, video may be a more accessible and useful way of learning.

Using video to learn is thought to aid with experiential learning (experience, reflection followed by formulation of theory) as the more sensory and real the learning experience the greater the potential for learning [3]. Video has also been used to facilitate Problem-Based Learning (PBL) which is increasingly being adopted in the undergraduate medical curriculum. A study performed at the University of Hawaii found that medical students shown a video-enhanced case during their PBL tutorial were increasingly confident at recognising abnormal physical examination findings in a newborn [4].

The use of video in medical education is increasing and is being used for a wide range of educational activities including demonstration of anatomy dissection [5], teaching clinical procedures [6], conducting online lectures and video conferencing. The use of video has been shown to supplement clinical teaching and has also been found to be as effective as traditional lectures for medical students [2]. Several studies have investigated satisfaction of lecture videos [7], effectiveness of videos in teaching clinical examinations [6] and utilisation of lecture videos [8]. However, to date there have been no studies conducted on teaching direct ophthalmoscopy using video.

The purpose of this study was to investigate student opinions regarding current teaching of direct ophthalmoscopy. In particular we wanted to ascertain whether students would prefer the use of video as a method for learning direct ophthalmoscopy compared with our normal practice which is to give a practical demonstration.

Methods

Participants were 59 medical students in their final year of a four year postgraduate MB ChB course at Warwick medical school. This sample size reflected a group of students undergoing an Ophthalmology rotation at the University Hospitals of Coventry and Warwickshire.

***Corresponding author:** Sonia Poonam Mall, BM, BSc, University Hospitals of Coventry and Warwickshire, Clifford Bridge Rd, Coventry, CV2 2DX, Tel: ++44 2476964000; E-mail: soniamall@hotmail.com

Received December 17, 2011; **Accepted** June 28, 2012; **Published** July 03, 2012

Citation: Mall SP, Dulku S, Manna A, Darrad M, Dean F (2012) Does Video Enhance Student Learning Experience? J Clin Exp Ophthalmol 3:231. doi:10.4172/2155-9570.1000231

Fourth year medical students were chosen as this is the time that Ophthalmology and ophthalmoscopy is taught in the undergraduate curriculum. Prior to this most students would have had very little or no experience in the use of the direct ophthalmoscope and all need to be taught from the perspective of having never used it before. As part of the curriculum Warwick medical students undertake an afternoon session of didactic lectures followed by practical teaching covering direct ophthalmoscopy, pupillary examination, visual field testing and ocular movement examination. Following this medical students are then able to attend ophthalmology outpatient clinics on request.

The first cohort of students were given a practical demonstration alone (n=35). The second cohort of students (n=24) were shown a video clip demonstrating how to perform direct ophthalmoscopy followed by a practical demonstration. This group was taught using both methods so that they would not feel that they were disadvantaged by not receiving a practical demonstration. Following each session, the students were given a questionnaire designed to evaluate their learning experience with their informed consent. The students were not randomly allocated to either of the two groups.

During the practical session the students were shown a live demonstration by a single Consultant Ophthalmologist, one of the authors Fiona Dean (FD). The medical students were then split into pairs and performed direct ophthalmoscopy on each other under supervision. The practical demonstration was shorter in duration and provided less detail compared to the video, however there was more time provided to practice using the ophthalmoscope.

An educational video was devised by two of the authors Fiona Dean (FD) and Misha Darrard (MD). This covered the different types of ophthalmoscopes, how to obtain the right light source, how to correct for refractive errors, positioning of the patient, and a step by step guide of viewing different aspects of the fundus. The teaching method used in the video was developed over a year of testing stepwise incremental teaching segments in face-to-face ophthalmoscopy teaching, which were then combined to an overall method. This was tested on small groups of students with direct verbal feedback used to hone each step. The video was 10 minutes in duration and had the advantage of being replayed and distributed electronically (Table 1).

The questionnaire consisted of twelve identical questions designed to evaluate how useful they felt their learning experience had been (Table 2). The video group were asked one additional question not relevant to the practical demonstration group and that was if the video was better than the practical demonstration. Questions were scored on a Likert Scale [9] with 5 options (5 = Strongly agree, 4 = Agree, 3 = Neither agree nor disagree, 2 = Disagree, 1 = Strongly disagree). The 5 point scale measures attitude in terms of level of agreement/disagreement to a target statement and the sum of the scores for each respondent provides the rating average [10]. Students were also able to add additional comments.

The study was carried out as an audit of our teaching practice; institutional review board ethics was not required.

Statistical Analysis

Likert scores for each group on a question-by-question basis were compared using the median. Bootstrapping (100,000 samples with replacement) was performed to estimate the Standard Error (SE) of the median. It was also used to estimate the bias of the median (defined as the difference between the median of the sample and the mean of the medians of the 100,000 bootstrapped samples). Results were summarised as median + bias with the standard error of the median.

The Mann-Whitney U test was used to determine whether differences in response score for each question between groups were statistically significant. $P < 0.05$ was considered statistically significant.

Bootstrapping was performed using R^{64} for Mac OS X [11]. The Mann-Whitney test was performed using GraphPad Prism version 5.0 for Mac (GraphPad Software, San Diego California USA. www.graphpad.com).

Results

The results for each question are summarised in Table 2. There were no significant differences between the groups when asked whether the content was good (p=0.91) or whether the delivery was satisfactory (p=0.34). There were also no significant differences when asked whether the teaching helped to achieve my learning objectives (p=0.48) and whether the teaching fulfilled my expectations (p=0.150).

Students did, however, show a statistically significant preference for the practical demonstration over the video in a number of specific areas.

When asked whether the teaching session improved their understanding of ophthalmoscopy, there was a significantly higher score for the practical demonstration over the video (median + bias 4.0 versus 3.58, p=0.024). The practical demonstration also scored higher when the students were asked whether they would attend the session/watch the video again (4.0 versus 3.42, p=0.037).

When asked whether they would recommend this teaching session to another student, there was a highly significant preference for the practical demonstration over the video, but the effect size was very small (4.03 versus 4.0, p=0.0048). A small preference for the practical over the video was found when they were asked whether they found it easy to ask questions (4.0 versus 3.85, p=0.0031).

There was an even more highly significant preference for the practical over the video with the following questions: the teaching session improved my technique of ophthalmoscopy (4.57 versus 3.58, p<0.0001), the video/presentation was audible and understandable

	Video	Practical demonstration
Detail covered	Detailed (more detail on types of ophthalmoscopes, obtaining the right light source, correcting for refractive errors, step by step guide on positioning the patient and viewing different aspects of the fundus).	Less detail
Length of time	10 mins	7 mins practical demonstration 23 mins practising in pairs
Active Student participation	No	Yes
Hands on contact	No	Yes
Distribution electronically & ability to be replayed	Yes	No

Table 1: A comparison of the contents of the educational video on direct ophthalmoscopy vs practical demonstration.

	Question	Median (bias) SE of median video group (n=25)	Median (bias) SE of median Practical demonstration group (n=35)	*p* value (Mann-Whitney U test)
1	The content of the presentation was good.	4 (0) 0	4 (0) 0	p=0.909
2	The delivery of the presentation was satisfactory.	4 (0) 0	4 (0) 0	p=0.344
3	The video/practical demonstration improved my understanding of ophthalmoscopy.	**4 (-0.42) 0.49**	**4 (0) 0**	**p=0.024***
4	The video/practical demonstration improved my technique of ophthalmoscopy.	**4 (-0.42) 0.49**	**5 (-0.43) 0.50**	**p<0.0001*****
5	I would recommend this video/teaching session to another student.	**4 (0) 0.0**	**4 (0.03) 0.16**	**p=0.0048****
6	I would watch this video/attend this teaching session again.	**3 (0.42) 0.49**	**4 (0) 0.03**	**p=0.037***
7	The video/practical demonstration was audible & understandable.	**4 (-0.42) 0.49**	**4 (0) 0.03**	**p<0.0001*****
8	I found it easy to ask questions.	**4 (-0.15) 0.36**	**4 (0) 0.02**	**p=0.0031****
9	The teaching fulfilled my expectations.	4 (-0.01) 0.10	4 (0) 0.01	p=0.150
10	The teaching helped me achieve my learning objectives.	4 (0) 0	4 (0) 0.01	p=0.483
11	In future, only the video/this form of teaching should be used to teach ophthalmoscopy.	**1 (0.08) 0.26**	**3 (0.01) 0.10**	**p<0.0001*****
12	The video/practical demonstration was thorough.	**3 (0) 0.14**	**4 (0) 0.01**	**p<0.0001*****
13	The video was better than the practical demonstration.	2 (-0.01) 0.10	n/a	n/a

Table 2: Median Likert scores with bias and SE of Median, for each question in the video and practical demonstration groups respectively. Bias and SE of mean were estimated by bootstrapping. Positive bias indicates the median is underestimating the population median, while negative bias implies the median is overestimating the population median. The Mann-Whitney U test was used to compare groups for differences in response score. P<0.05 was taken to be statistically significant (marked with *). p≤0.01 was considered highly significant (**) and p≤0.001 very highly significant (***). SE, Standard Error.

(4.0 versus 3.58, P<0.0001), the video/presentation was thorough (4.00 versus 3.00, p<0.0001).

The greatest preference for the practical over the video was found when students were asked if only this form of teaching should be used to teach ophthalmoscopy (3.01 versus 1.08, p<0.0001).

When the students in the video cohort were asked whether the video was better than the practical demonstration, the median Likert score was 2, indicating low agreement with this statement.

Students commented that they found it "useful for someone to observe their technique of ophthalmoscopy." Other comments were video "should be used as an adjunct," "video should be longer," " include some pathologies commonly seen," "should not substitute practical exposure" and that video was helpful as an introduction."

Discussion

This is the first study to our knowledge that has compared student opinions on learning direct ophthalmoscopy, and in particular whether students prefer video to a practical demonstration. Our results demonstrate that students prefer a practical demonstration of ophthalmoscopy to a video demonstration. However, the students' comments suggest that they do consider video to be a useful adjunct to learning.

There could be a number of reasons for this:

1. Ophthalmoscopy is a practical skill. With a practical demonstration one is able to handle the ophthalmoscope and follow the steps required to elicit the signs.

2. With a practical demonstration there is dynamic interaction between the student and teacher. It is possible to ask questions if there is any uncertainty over technique. This is supported by our results which showed that students found it easier to ask questions in the practical versus the video (p=0.0031).

Our study seems to be consistent with two recent studies [8,12]. The first study showed that students tended not to use videos in replace for attending lectures, revealing that students made deliberate decisions about lecture attendance (e.g. experience with particular teachers, subject of lecture) and their attendance was not influenced by the availability of electronic resources [12]. The second study showed that students tend to view videos alone for clarifying their knowledge or revision prior to exams and students who accessed lecture videos more frequently had significantly lower exam scores [8].

An important aspect of our study is that it focussed on students' attitudes to the type of teaching they had received rather than the knowledge that they gained from it. Although students may prefer a practical demonstration over a video, it may be that the knowledge gained from both is similar.

There is some evidence that this can occur. Paegle et al. [2] who compared video with traditional lectures, for teaching pathology to medical students found that the cumulative mean score on a multiple choice exam, showed no statistically significant difference between the groups. However the students rated the lecture format more highly. These results are similar to a study on the use of videotape versus traditional lectures on teaching medical students emergency medicine which found no significant difference in exam scores. However, students disliked the lack of personal interaction and the inability to ask questions [7].

Other studies have shown video to be better than traditional lectures. For example Romanov and Nevgi [13] found that video-watchers achieved better course grades when video was used to teach medical students a medical informatics course. Another study compared videotape with personal teaching of physical examination to medical students. This study demonstrated that video demonstrations can be as effective as personal teaching of clinical methods [14].

It is therefore possible that video can provide a better educational experience even though it may be less preferred by students. However, in the case of direct ophthalmoscopy, it may be that video is a poor method of teaching due to the fact that there is not much to see when watching someone else perform the skill, in contrast to watching someone perform a physical examination. Ophthalmoscopy is something that requires trial and error on the part of the examiner until the correct alignment of the instrumentation is achieved and the fundus comes into view. Once the view is acquired, the examiner knows that they are in the correct position and can then use muscle-memory

to try to attain the same view in future. This sort of learning experience cannot be achieved with video. On the other hand, performing, for example, a chest examination does not require such precise positioning and muscle memory.

To determine how effectively each method teaches the skill of ophthalmoscopy, the students could be given a short practical exam whereby they are observed performing ophthalmoscopy and a multiple-choice exam to assess factual learning. This would give an objective method for assessing the effectiveness of both learning methods. The students could also be followed up to see how they perform in their final examinations.

In our study the students were not randomly allocated to either of the two groups and this could potentially create bias however, as we are asking an opinion rather than assessing the direct effect of the teaching to their clinical skills we feel that any bias would be limited.

For future studies a larger number of students could be recruited with random allocation to practical demonstration and video groups to reduce bias and also the video could be improved by including fundal pathology.

Conclusions

The results from this study demonstrate that students prefer direct ophthalmoscopy to be taught in a hands-on fashion under the supervision of an Ophthalmologist rather than by video. However, video may have a role as an adjunct to learning, an introduction to a practical session or a tool for revision.

References

1. Baylis O, Murray PI, Dayan M (2011) Undergraduate ophthalmology education-A survey of UK medical schools. Med Teach 33: 468-471.
2. Paegle RD, Wilkinson EJ, Donnelly MB (1980) Videotaped vs traditional lectures for medical students. Med Educ 14: 387-393.
3. Beard C, Wilson JP, McCarter R (2007) Towards a theory of e-learning: Experiential e-Learning. Journal of Hospitality, Leisure, Sport and Tourism Education 6: 3-15.
4. Lee MT, Jacobs JL, Kamin CS (2006) Video-enhanced problem based learning to teach clinical skills. Med Ed 40: 459-489
5. Neider GL, Nagy F (2002) Analysis of medical students' use of web-based resources for a gross anatomy and embryology course. Clin Anat 15: 409-418.
6. Kneebone R, Kidd J, Nestel D, Asvall S, Paraskeva P, et al. (2002) An innovative model for teaching and learning clinical procedures. Med Educ 36: 628-634.
7. Kline P, Shesser R, Smith M, Turbiak T, Rosenthal R, et al. (1986) Comparison of a videotape Instructional Program with a Traditional Lecture Series for Medical Student Emergency Medicine Teaching. Ann Emerg Med 15: 16-18.
8. McNulty JA, Hoyt A, Gruener G, Chandrasekhar A, Espiritu B, et al. (2009) An analysis of lecture video utilisation in undergraduate medical education: associations with performance in the courses. BMC Med Educ 9: 6.
9. Likert R (1932) A Technique for the Measurement of Attitudes. Arch Psychol 22: 55.
10. Uebersax JS (2006) Likert scales: dispelling the confusion. Statistical Methods for Rater Agreement.
11. R Development Core Team (2010) R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.
12. Billings-Gagliardi S, Mazor KM (2007) Student decisions about lecture attendance: do electronic course materials matter? Acad Med 82(10 Suppl): S73-S76.
13. Romanov K, Nevgi A (2007) Do medical students watch video clips in eLearning and do these facilitate learning? Med Teach 29: 484-488.
14. Mir MA, Marshall RJ, Evans RW, Hall R, Duthie HL (1984) Comparison between videotape and personal teaching as methods of communicating clinical skills to medical students. Br Med J (Clin Res Ed) 289: 31- 34.