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Original Article

Education Section

Enhancement of Student Centered Learning using Video Based Practical Demonstration in First Year Medical Undergraduates

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ABSTRACT

Introduction: Recently, video demonstration or procedure video has been integrated into preclinical laboratory teaching and practical demonstrations. Although the computer assisted learning is introduced in to the medical institutions, there is no evidence that such move can improve student learning.

Aim: The present study was designed to compare the effectiveness of traditional physiology practical demonstration with computer assisted pre-recorded video demonstration of the same practical procedure.

Materials and Methods: Total 100 first year medical undergraduates participated in the study and was randomly assigned to two groups. The students in group 1 (n = 50) watched procedure video on the projector while students in group 2 (n = 50) attended a live demonstration of procedure performed by the same faculty for blood group determination. After completing the practical assignment, assessment was done for both groups according to pre-specified criteria. Subsequently student's perception of their ability to perform practical activities was assessed on Likert scale with the help of questionnaire. Student's t-test was used for statistical analysis.

Results: Statistically significant difference was seen for two groups. On Likert type scale the procedure video learners (group 1) reported higher average score (3.34) than traditional live demonstration learners (group 2) (3.06), also the percentage of score achieved by video learners for assignment was higher. A 80% or above percentage score was achieved by 32 (64%) of group 1 learners where as only 21 (42%) of group 2 learners were able to achieve it.

Conclusion: Thus, a video based practical demonstration for laboratory teaching enables teachers to reflect on their teaching and promotes student-centered learning.

Keywords: Computers, Procedure, Skill, Understanding, Video recording

INTRODUCTION

Current advances in information and communication technologies have allowed the educators and demonstrators to incorporate higher levels of technology into professional classrooms. Educators use technological advances as powerful pedagogical tools not only to present a plethora of information on a specific topic, but also to incorporate material that is not available in print or that require synthesis from multiple resources [1].

Computer Assisted Learning (CAL) uses the computer to present information with the ultimate goal to enhance students learning. CAL has become popular in educational settings, having revolutionized the education sector including medical education [2,3]. Recently, video demonstration or procedure video has been integrated into preclinical laboratory teaching and practical demonstrations [4,5]. Use of procedure video helps student for better visualization of laboratory steps and enhances the media rich audiovisual stimulation. Students can review the practical procedure at any point of time irrespective to the availability of faculty [6]. Live demonstrations of practical procedures are routinely used in preclinical subjects that increase student's confidence, improve communication skills, and provide a better understanding of procedures than didactic teaching [7]. Due to large number of students and small working stage for procedures, not all the students get to see the entire procedure and it is very time consuming. However the videos provide opportunity for students to learn the techniques at their own pace and repeat or review if necessary. Various studies have investigated the effect of traditional live demonstration with procedural video tape for preclinical laboratory practical and have come out with varied conclusions [8,9]. Some researchers found both methods equally effective [8], while others found the mixed result of the videotape of lecture and live demonstration [9]. Gallagher et al., revealed that a higher percentage of students preferred e-learning and had a positive perception towards it [10].

Most studies have been explanatory in nature and their result was based on the student's subjective view through self-report or questionnaires [11,12], providing limited evidence on how video can improve their learning. Although the CAL is introduced in to the medical institutions, there is no evidence that such move can improve student's learning.

The aim of present study was to compare the effectiveness of receiving computer assisted video tape of practical procedure with traditional live demonstration of same from the sage.

MATERIALS AND METHODS

The present cross-sectional comparative study was carried out at Department of Physiology, Government Medical College Nagpur in the month of December 2016. The study was approved by Institutional ethics and review board, and undergraduate curriculum committee. Out of total 200 first year medical undergraduate students, 100 (49 male & 51 female) in the age range of 18-20 years who were willing to participate were enrolled for the study. It was purposive sampling for the exploration of phenomenon of different teaching learning methods. Students were randomly assigned to two groups using random number table. During the practical class session students in group 1 (n = 50) watched procedure video on the projector. The video was created by faculty members showing one of the trained faculties demonstrating procedure for blood group determination using slide method, while students in group

2 (n=50) attended a live demonstration of procedure performed by the same trained faculty. Both the live demonstration and the procedural video described identical steps involved in blood group determination. The same material was provided to the both groups of student's for practical purpose.

After completing the practical assignment blinded faculty members performed the assessment for both groups according to pre specified criteria designed to evaluate student's practical competence in planned and objective manner, structured with good amount of control over variables like quality of student and mood of examiner [Table/Fig-1].

Assessment criteria's for practical	Maximum possible marks
Open an Alcohol swab, and rub it on the area from where the blood will be sampled (fingertip)	1
Open the Lancet cover, put pressure at the tip of the finger from where blood will be sampled.	1
Prick the fingertip with the opened Lancet.	1
Make 1 drop of blood fall on the three depressions of the glass slide	1
Place a cotton ball at the fingertip and discard the lancet	1
Place one Drop of the Anti-A (blue) in the 1st spot of the slide.	1
Place one Drop of the Anti-B (yellow) in the 2nd spot of the slide.	1
Place one Drop of the Anti-D (colour-less) in the 3rd spot of the slide.	1
Mixing of the content in each spot of the slide well	1
Observation of result	1
Total	10

[Table/Fig-1]: Institutional protocol for assessment of the blood group practical procedure.

Subsequently, the questionnaire was given to both groups of students consisting of 7 questions designed to assess the student's perception of their ability to perform practical activities on Likert scale. The questions were framed by authors and modified after peer group discussion before finalization. Likert type scale consisted of five scores from 0 to 4; where 0 is strongly disagree to 4 strongly agree. The student's t-test was used for the statistical evaluation of results; with $p \leq 0.05$ is considered as significant. Data was analysed with the help of data analysis tool pack inbuilt in Microsoft excel.

RESULTS

Group 1 consisted of 26 male and 24 female learners with mean age of 18.90 years and group 2 consisted of 23 male and 27 female learners with mean age of 18.88 years. As shown in [Table/Fig-2], procedure video learners (group 1) performed better in post practical assessment score than live demonstration learner (group 2).

Sr. no.	Percentage scores for assessment	Group 1(n=50) Total number of students achieved the particular percentage	Group 2(n=50) Total number of students achieved the particular percentage
1	90-100%	10	09
2	80-89%	22	12
3	70-79%	10	15
4	60-69%	08	14

[Table/Fig-2]: Assessment scores obtained by both group of students for practical procedure.

As described in [Table/Fig-3], mean and confidence interval was calculated for the answers given as per Likert scale by learners from both groups. Statistically significant difference was observed between two groups. The procedure video learners (group 1) reported higher average score than traditional live demonstration learners (group 2).

S. no.	Questions	Video demonstration (Group 1)		Live demonstration (Group 2)		p-value
		Mean	95% CI	Mean	95% CI	
1	Satisfied with a learning method	3.22	2.99-3.44	2.94	2.70-3.17	0.04
2	Investing time in developing own practical skill	3.48	3.28-3.67	3.16	2.95-3.36	0.01
3	Encouraged self-directed learning	2.58	2.35-2.80	2.29	2.10-2.48	0.02
4	Such learning method is helpful for final exam revision	3.53	3.33-3.72	3.28	3.06-3.50	0.04
5	Better understanding of procedure	3.48	3.28-3.67	3.16	2.95-3.36	0.01
6	Enhanced my active participation in laboratory practical and improved performance	3.53	3.33-3.72	3.28	3.06-3.50	0.04
7	Such learning method can be used for regular teaching	3.58	3.37-3.78	3.34	3.15-3.52	0.04

[Table/Fig-3]: Comparisons of two groups based on student's perception as per questionnaire on likert scale.

DISCUSSION

Present study compared and objectively assessed the effectiveness of computer assisted video based practical demonstrations with traditional practical demonstrations. Based on questionnaire responses both video and live demonstrations were valuable learning tool for the students.

When compared with traditional method, video learners were most satisfied with learning method (p-value 0.04). Videos can improve the attention to the procedure carried out in the laboratory and has a positive impact on the learners' motivation level. Similar findings were observed in previous studies [11,12], which state that 'intrinsic motivation to learn the subject matter make significantly positive effect on the satisfaction of learners with availability of video presentations'. In our present study, video learner's stated that, their practical skill was enhanced as compared to traditional learners (p-value 0.01). Even the grading of video learners was high as compared to traditional learners. Video might be superior for learning complex skills because it can expose learners to events that cannot be easily demonstrated [13]. In agreement with other researcher [14] video based learning enhances active participation in laboratory practical and improve their performance. The advantage of such learning is that teachers can record their own teaching, watch what they did in the laboratory, think about it, and reflect on the performance using both individual and collaborative reflection. So, video recording of the laboratory teaching enables teachers to reflect on their own teaching [15,16].

If a recording of practical procedure video done and made accessible to students, then such recordings can be used for revision prior to examination. This helps students to reflect and make connections between their academic learning and their own practical learning. These methodologies are work integrated learning programs, inquiry-based learning designs, and simulation. Dalgarno et al., recognized the role of rich media technologies such as video conferencing, web conferencing and mobile videos that connect university classrooms to sites of professional practice [17]. In the present study video based learning found to be more enjoyable, interesting and would welcome it if made available on a regular basis. These findings are similar to the observations done by El-Sayed et al., [18]. Another

advantage of video based learning is that, learning content can be shown to a large number of students at same time. Remaining time can be utilized for developing their practical skills and improving learning outcome. Video based learning enables teachers to spend more time in discussing only difficulties, problems, and practical aspects of the learning course. Although we can show such procedure video to massive students at a time but it's impossible to give feedback to large groups of students.

Students with low motivation or bad learning habits do not pay full attention to the video. As a solution, educators recommended assigning a pre-class test or quiz on the video material in order to increase the learners' motivation. In present study, significant enhancement of active participation is seen in video based learners as compared to traditional learners. So, such method promotes student-centered learning that provides the space for students to be active participants in their learning environment, interact to build and construct knowledge, and gets mutual support to make decisions using reflection and critical judgment. A similar result was interpreted by other authors [19,20]. In less developed world limited numbers of trained faculties are available and it is challenging to maintain optimal faculty to student ratios for teaching practical procedure skills [21]. The use of prerecorded videos for practical procedure can substitute for live demonstration of procedures by trained faculty. Although the results of our study clearly show a difference in students' performance after exposure to video learning, these results cannot be considered conclusive because the sample used was limited to the two groups of students taking the same course. Comparable studies with other groups of students, other medical colleges, and other courses could provide a more distinct picture of the effectiveness of the use of video based procedure learning.

CONCLUSION

In present study, we critically analysed the educational benefits of computer assisted video based demonstration on teaching and learning. This study has concluded that video recording of the laboratory teaching enables teachers to reflect on their teaching and promotes student-centered learning.

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