

# Impact of 3-D animation assisted practical teaching in Nursing Students

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## **Abstract:**

To study whether 3D animation assisted physiology practical teaching is useful in nursing students. Beneficial effect of 3D animation has been studied in nursing students showing improvement in both short and long term retention of knowledge. We planned questionnaire based study and compared score before and after intervention. Recruited were 42 nursing students and were asked their understanding on likert scale about the practical topic 'Practical and applied aspect of electrocardiography' which was taught one week back by blackboard teaching and hands on session. Practical again taught by 3D animation video with same content and students were asked their level of understanding on same set of questions. There was significant improvement in level of understanding in questions related to cognitive and affective domain while no significance observed in psychomotor domain. 3D animation assisted briefing of the topic followed by hands on practical exercise improves learning in nursing students.

**Key words:** 3D animation, knowledge, practical, cognitive

## **Introduction:**

In Indian subcontinent due to parallel running of MBBS, MD and paramedical courses in same medical college, it is difficult for medical faculty to give enough quality time to paramedical students. So it is necessary to supplement their teaching with 3D animated videos, which they can also use while revising their theory and practical topics. Multimedia has important role in medical education<sup>1</sup>. Beneficial effect of 3D animated videos has also been studied in nursing education by some authors. Both short term and long term retention of information is improved by multimedia<sup>2,3</sup>.

In university of the west of Scotland, multimedia is being used for instructing nursing skills with good result<sup>3</sup>. Similarly another study concluded that streaming videos showing medication administration skills are well perceived by nursing students<sup>5</sup>. For improvement of nursing education there is also requirement of good physician- nurse relationship. In inter-professional simulation based program it was observed that stereotypes and attitudes between doctor and nurses could be reduced and healthy nurse- physician collaboration could be achieved<sup>6</sup>.

So multimedia project can be developed both for nursing and medical students for enhancing their learning which can further be made available on World Wide Web pages for the benefit of community.

There is dearth of studies showing the role of 3D animation for educating nursing students. So our study was planned to enquire the effect of 3D animation on nursing students perception of learning practical and applied aspects of electrocardiography in context to bloom's taxonomy.

## **Material and Methods:**

Study was conducted in department of physiology, Era's Lucknow Medical College after obtaining institutional ethical clearance. 42 Nursing students (10 female) were recruited in the study and were asked their view on likert scale about the topic 'practical and applied aspects of electrocardiography' which was taught in previous practical class in which first there was blackboard teaching of the topic and then hands on practice on peer subject followed by analysis of recorded ECG. Semi-structured questionnaire containing 12 questions on practical and applied aspect of electrocardiography, representing cognitive(6), psychomotor (3) and affective domain (3) was used. After 15 minutes paper was collected back. After this again the practical and applied aspect of ECG was discussed using 3Danimation video by same teacher. Content taught by 3D animation was kept similar to that of previous practical class. Now again same questionnaire was distributed and students were asked to respond their level of understanding on likert scale. Scale used has 6 responses from 0 to 5 ranging from no idea about the answer of particular question to complete knowledge of that part.

We routinely use multimedia and 3D animation for teaching medical and nursing students. We have dedicated 3D animation department having trained staff for modeling, rendering and compiling medical topics, guided by faculty from both basic and clinical science. Integration of basic and clinical science is used to compile medical topics starting from gross level to molecular detail and made freely available for students. Snapshot of video shown to students are shown in Fig. 1- 3.

After collecting the questionnaire data entered in excel sheet and further analyzed by using paired T-

test on SPSS 16 software. Level of significance considered when p value was less than 0.05.

**Table1: Comparison showing pre and post score after 3-D animation assisted practical teaching**

	Questions	Pre	Post	p- value
<b>Cognitive</b>				
1	Define Electrocardiography	3.02± 1.33	3.74± 1.23	0.028
2	Describe various leads for recording ECG	3.00±1.61	3.45±1.31	0.229
3	Discuss the benefit of using spirit and jelly before placing electrode	2.31± 1.92	3.40± 1.49	0.010
4	Indicate axis of ECG lead	1.90± 1.92	3.19± 1.55	0.005
5	Describe cardiac axis	2.19± 1.81	2.67± 1.67	0.267
6	Do you know about rhythm strip	0.88± 1.19	2.38± 1.59	0.001
<b>Psychomotor</b>				
1	Show how to record ECG of any patient	2.74±1.71	3.10±1.45	0.391
2	Demonstrate how to place electrodes in a given subject	2.98± 1.63	3.48± 1.37	0.170
3	Point to various waves in given electrocardiogram	2.36± 1.75	2.62± 1.66	0.539
<b>Affective</b>				
1	Calculate heart rate from given ECG strip	1.79± 1.77	2.74± 1.55	0.025
2	Discuss various intervals in ECG strip and their significance	1.62± 1.44	2.64± 1.43	0.003
3	Describe importance of ST segment	1.02± 1.52	2.52± 1.48	0.001

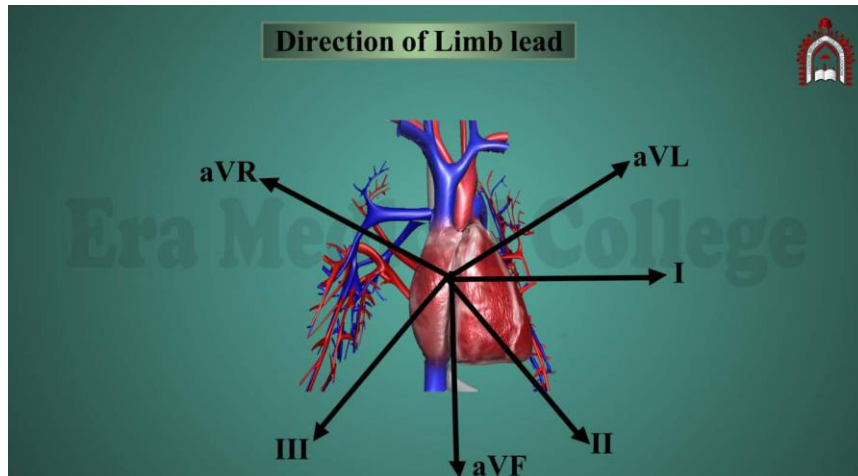
Level of significance, p value < 0.05



**Fig. 1: Snap shot depicting site of electrode placement**



**Fig. 2: Traditional ECG machine**



**Fig. 3: Direction vectors of limb lead**

**Results:**

Table 1 shows the comparison of mean score before and after the discussion of practical and applied aspects of electrocardiography by using 3D animation. Same topic was taught one week back by traditional method in which there was first discussion of the topic on blackboard, then hands on training on peer subject followed by analysis of ECG strip obtained.

Result shows that in questions related to cognitive domain post intervention score was significantly higher in 4 out of 6 questions.

In psychomotor domain there was no statistically significant difference of scores obtained. While in affective domain there was significant improvement in the score after using 3D animation assisted discussion of the topic.

By enquiring satisfaction score (Fully satisfied 58%, satisfied 40% neither satisfied nor unsatisfied 2%) and their view on usefulness of 3D animation assisted education there was unanimous positive response by students.

**Discussion:**

Our study was done to evaluate the role of 3D animation video in physiology practical class of nursing students. For this we chose electrocardiography practical which is frequent investigation in many clinical situations. So working knowledge of electrocardiography will give them extra advantage for their future career in nursing.

Student's satisfaction rating shows that students were satisfied by 3D animation assisted teaching. We did pre and post questionnaire base study after intervention. Questions in the questionnaire were grouped in 3 domains (cognitive, psychomotor and affective) based on revised Bloom taxonomy<sup>7</sup>. This is also the need of today's nursing education to impart knowledge such that it could be applied in real scenario<sup>8</sup>. Comparing the score of items on cognitive and affective domain revealed that 3D animation

assisted discussion of practical and applied aspect of electrocardiography was more useful than that of traditional practical teaching. While items related to psychomotor ability there was no statistically significant difference after intervention showing the importance of hands-on aspect of practical knowledge cannot be denied.

Most reported drawback of 3D animation video is lack of interaction with students<sup>9</sup>. This has been taken care while teaching students with 3D animation video by stopping the video when and where required and clarifying and discussing the message given by video with students in our setup. Another drawback is that available animation video on World Wide Web may not fulfill the need of students and may not enhance cognition<sup>10</sup>. In our setup we instruct the professional animators to tailor made the videos for need of students.

**Conclusion:**

3D animation assisted briefing of the topic followed by hands on practical exercise improves learning in nursing students.

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