Efficacy of a Training Module for Self Study of Regional Anatomy of Head and Neck for Undergraduate Students

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ABSTRACT

The introduction of multimedia technology into teaching has brought important changes in teaching. This study seeks to evaluate whether the use of a structured teaching module on gross and applied anatomy of the head neck and brain improves students' understanding and performance.

This study compares the results obtained in the scores of an objective test, conducted for the 1st MBBS students. All the students were taught gross and applied Anatomy as per the conventional teaching pattern. After conclusion of the curriculum, a pre test was conducted to assess the students understanding of the subject. The students were then divided into two groups by simple random sampling. Study Group were exposed to the prepared software. Control Group were not exposed to the new methodology, their revision was conducted by traditional methods and thus acted as controls. A post-test was conducted to assess the enhancement of subject understanding by the students.

Comparison of the results and statistical evaluation revealed that students receiving prepared software input performed slightly better. It highlighted the importance of the new teaching material and its use both as a teaching aid as well as a self learning module.

In conclusion, it was found that the prepared software is an important teaching/learning module on gross and applied anatomy of the head and neck region.

Keywords: *Teaching Aids, Anatomy, Computers*

INTRODUCTION

Medical Education in India has been constantly evolving hence the MBBS curriculum has been revised to suit current trends. The time frame for teaching basic subjects like Anatomy & Physiology has been reduced from three terms of six months each to just two terms. Thus the medical student has to grasp various anatomical concepts in a much shorter time and this has brought about a need to re-look traditional teaching methods.

Traditionally Gross Anatomy has been taught by didactic lectures, using blackboard, dissections and short group teaching for osteology and soft parts. Students and teachers had adequate time to complete the course as specified. However with the introduction of the reduced time frame in the curriculum traditional teaching methods though time tested were found inadequate. This is where educators sought the help of modern teaching aids[1]

Introduction of computers in the past few years have brought a sea change in traditional blackboard teaching. The promises of computer-assisted learning for the educator include: more freedom to present visual anatomic information in interesting ways, less effort and more flexibility in lecture preparation over time, and easier dissemination of knowledge within a more user-interactive environment [2]. This has enabled faculty to prepare power point presentations which are then used as an adjunct to blackboard. Further various software have been produced and marketed, to help medical educators to rise up to the challenges of teaching modern medicine. A few software releases over the globe are available to teach Anatomy, but they are very expensive for the average Indian medical student. Certain attempts[3,4,5] have been made by Department of Anatomy AFMC to introduce software developed in house to teach Anatomy and also help students have a quick revision. The present paper reviews the development and efficiency of interactive software developed by the authors.

Materials and Methods

The Software DVD was developed as an interface read by popular browsers like Internet explorer, Opera, Fire fox (html format) When inserted into any PC running windows it automatically starts. The first page displayed has multiple tabs labeled Head & neck, Brain, Presentations, Test etc on the left. Clicking on the appropriate tab takes the user to the table of contents, chapters for that region. Each chapter when clicked then opens up the

concerned page which gives text and appropriate labeled figures. The text has been prepared for clear and easy understanding. Clicking on the back button takes the user one level back. User can go back to the Home page by clicking home. Hence the design enables the user to quickly navigate to the topic being studied.

Each lesson has been given side headings and appropriate labeled diagrams. The clinical correlations are given at the end of each chapter. Each topic has been covered as a PowerPoint presentation also. MCQ section and a question bank incorporated.

The subjects were students of 1st MBBS at a reputed Medical College in India. All the students were taught Gross Anatomy as per the conventional teaching pattern. After conclusion of head and neck region a Pre test which consisting of 50 MCQs and spot Identification of structures as seen on prosected specimens was taken. The students were then randomly divided into two groups consisting of 68 students each.

Study Group was then exposed to the Software for two hrs per week for six weeks after classes. Revision was held with the help of the software prepared. Control Group was not exposed to the software. They were given normal revision as per the earlier planned schedule for two hrs per week for six weeks

A post-test was conducted consisting of 50 MCQs and spot identification of specimens, to assess the enhancement of subject understanding by the students.

The results of the pre and post-tests were analysed All the tests were conducted by the faculty of the department. The data was analysed by conducting the following statistical tests on statistical software SSPS version 14.

OBSERVATIONS

To assess the satisfaction level of the students, faculty and peer group a Questionnaire was given to students at the end of the examinations. The highlights recorded were as shown in table 1.

Table 1.

	Subject interest				Appropriateness of teaching materials			
Students' feedback	+	++	+++	++++	+	++	+++	++++
	10	22	70	34	12	19	67	40

	Overall Student satisfaction with teaching received				Effectiveness as self learning module			
Students' feedback (cont'd)	+	++	+++	++++	+	++	+++	++++
	11	21	72	32	12	21	71	32

+   - Bad

++   - Average

+++   - Good

++++ - Excellent

To see whether the use of the prepared software effectively increased students understanding of the subject the study population was randomly allocated into the intervention (study) group and the control group. The control and study groups had 68 students each. Both the groups were administrated a test prior to exposing the study group to the prepared software. The results of this initial test are given in Table 2.

Table-2 Baseline scores of the Pre test for the two groups

Baseline Groups	N	Mean	Std Deviation	Std error of mean
Control Group	68	21.07	1.769	0.221
Study Group	68	21.19	1.843	0.235

Table-2 Baseline scores of the Pre test for the two groups

An independent samples test was carried out to assess the similarity of the two groups prior to the interventions (Table 3).

Table - 3 Independent samples test

	Levene's Test for Equal variances		t-test for equality of mean						
	F	Sig	T	Df	Sig. (2 – tailed)	Mean difference	Std error of difference	95% confidence interval of the difference	
								Lower	Upper
Equal variances assumed	3.250	0.065	-0.422	115	0.659	-0.145	0.376	-0.876	0.548
Equal variances not assumed			-0.441	120.624	0.651	-0.152	0.361	-0.842	0.526

Table - 3 Independent samples test

As can be seen from the results shown in Table 3 there was no statistically significant difference between the results of the two groups. (P >0.05)

Table-4 Paired samples statistics

	Mean	N	Std Deviation	Std error of Mean
Control Pre test	21.19	68	1.781	0.226
Control Post test	23.67	68	2.427	0.332
Subject Pre test	21.07	68	2.160	0.251
Subject Post test	24.35	68	2.102	0.223

It was seen that the mean scores for the control group increased marginally from 21.19 to 23.67 while the mean scores of the study group increased from 21.07 to 24.35 after exposure to the prepared software. This prompted the further statistical analysis by paired sample test.

After the study group was exposed to the indigenously prepared software. The results of the post intervention test are shown in Table 4.

A paired samples test to compare the change in scores of the two groups was carried out and the results are depicted in Table 5.

Table - 5 Paired samples Test

	Paired differences					t	df	Sig.(2-tailed)
	Mean	Std deviation	Std error of Mean	95% confidence interval of the difference				
				Lower	Upper			
Control Pre test - Control Post test	-0.193	2.450	0.326	-0.805	0.423	-0.652	66	0.551
Subject Pre test - Subject Post test	-1.243	1.752	0.208	-1.652	-0.872	-5.203	66	0.003

The results shown demonstrates that the study group has a statistically significant improvement in score as compared to the control group. (P <0.01)

DISCUSSION

The newer media (DVD, CDROMs) have become widely used tools in medical instruction today. But are they regarded as useful by students training to become medical doctors? This is an important question which keeps cropping up time and again. How does it affect Anatomy teaching, and what benefit will the students and teachers have? Various studies have been conducted to answer these queries [6-12].

Anatomy has over the years seen introduction of new methods for theoretical, practical and clinical training. However with the changes also incorporated in the time frame of 1st MBBS teaching by reduction from three to two semesters medical educators need to reassess all aspects of their teaching methods to compress the course and enhance understanding in a short time.

There are many advantages of the use of computer and education software to supplement theoretical teaching. First and foremost is it attracts the students' attention, It also facilitates easy understanding of complex anatomical relation-ships because of improved graphics. It enables teachers to incorporate other media (graphics, audio, animation) as teaching supports. It helps in quick and easy evaluation. In addition the present generation of students are more comfortable with computers. They find computers lively and more

interactive than books. Also with the increase of automation by all teaching departments and rise of internet students are more aware of the present developments.

The arguments against the use of computer and LCD projector are that they may lead to a lack of attention due to environmental features (dimmed classroom lights, viewing difficulties and language problems). Other points given against them are that there is requirement of expensive equipment and supporting software, and that they are not good enough for explaining abstract concepts. Also with increasing dependence on newer teaching methods there is a decrease of basic skills of teaching with chalk and blackboard. Another potential disadvantage is that learning something as essential and as extensive as Gross and Applied Anatomy by computers is that the thought processes of the learner tend to be narrowly directed by the program. Computer programs feeds someone else's logic, instead of encouraging the students to develop their own; real learning means inventing our own ways of solving problems. Moreover, computer assisted instruction software are a relatively recent phenomenon and tend to designed with less peer review than traditionally produced textbooks and articles. Further older generation of experienced teachers are not well versed with the technology shift and are intimidated by new computer programmes.

The use of structured software to supplement theoretical lectures goes a long way in increasing students' comprehension of the subject. The work done to date may not be sufficient to clearly demonstrate the superiority of this method over traditional methods. Nor has there been any clear-cut proof of additional learning benefits[10].

In our study the students selected had comparable age, and academic background as has been reflected from table 1. The pre test results of the randomly allocated groups were very similar indicating that both the groups had by and large similar level of competency (Table 2). An independent samples test to assess the similarity of the two groups prior to interventions showed no statistical difference between the results of the two groups. (P>0.05) (Table 3)

On comparing the effectiveness of incorporating the software for teaching and self learning, it was seen that the mean scores of the study group increased from 21.19 to 23.67 where as that for the control group increased from 21.07 to 24.35 (Table 4). When the paired samples test was done to compare the changes in the scores of the two groups (Table 5) it clearly demonstrated a statistically significant improvement in the understanding of the subject as compared to the control group taught by traditional methods. (P <0.01).

Thus it was shown that there has been clear benefits in terms of academic performance and this could be attributed to changes in teaching methodology that is by the interactive software. There has been more improvement in scores among students exposed to the software as compared to the traditional methods. Also there has been slight increase of student satisfaction. This proves that the software can now be used by the teachers as a complement to routine instruction. Moreover, it can also be used by the students for self study and revision on their own since students expressed their satisfaction to the appropriateness of the content and ease of understanding.

CONCLUSIONS

The introduction of multimedia technology into teaching has brought important changes in teaching. This study seeks to evaluate whether the use of the prepared structured teaching module on gross and applied anatomy of the head neck and brain improves students' understanding and performance.

Comparison of the results and statistical evaluation revealed that students using the prepared software performed slightly better. It highlighted the importance of the new teaching material and its use both as a teaching aid as well as a self learning module.

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