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Learning gain in web (internet) sourced seminars versus textbook sourced seminars in postgraduate medical students

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Abstract:

BACKGROUND: In the past, textbook or printed material was the only source of information for medical students or post-graduate students. After the introduction of internet, knowledge can be accessed easily which is updated with various aids such as animation, videos which improve the learning efficiency. This study was conducted to compare the learning efficiency between textbook-based seminar to that of internet-based seminar in postgraduate students of the department of dermatology.

MATERIALS AND METHODS: It was a non-randomized controlled study. The postgraduate students in the department of dermatology, Jawaharlal Nehru Medical college, DMIMS(DU), Sawangi (Meghe), Wardha, Maharashtra, India were divided into two equal groups by simple randomization method by flipping the coin. Totally 20 seminar topics were divided into two groups (A and B) consisting of 10 seminars in each group. Postgraduate students assigned in group A were asked to prepare seminar solely from textbooks while in group B, students were asked to prepare seminar by referring internet. Feedback form which consists of 7 points, i.e. appearance, completeness of preparation, clarity of presentation, appropriate use of audio visual aids, understanding of subject, ability to answer questions, and overall performance were filled up from faculties and postgraduate students after completion of each seminar. Pretest and post-test were filled up from postgraduate students before and after each seminar respectively. Learning gain was calculated by comparing the scores of pretest and posttest. Paired *t*-test was used to compare results in the group and unpaired *t*-test was used to compare results between the two groups.

RESULTS: Faculties' feedback on overall performance was higher (4.59 ± 0.15) in web-based seminars as compared to in textbook-based seminars (3.85 ± 0.1) with significant $P = 0.008$. Furthermore, postgraduate students' feedback showed statistical significant value of 0.02 in web-based seminars (4.65 ± 0.06) compared to textbook-based seminars (3.2 ± 0.06). Learning gain was significantly higher in web-based seminar compared to textbook-based seminar with $P = 0.02$.

CONCLUSION: It can be concluded that web-based learning can improve the learning efficiency in postgraduate medical students.

Keywords:

E-learning, learning gain, medical postgraduates, textbook-based learning, textbook-based seminar, web-based learning, web-based seminar

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Introduction

Medical education is ever-changing which needs to be updated regularly

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and the method of learning has also been changed. In the past, the textbook was the main source of information. However, in today's era of internet, the textbook can

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have some drawbacks. Textbooks are generally updated after few years so the updated knowledge is included only when textbooks are revised.^[1] Textbook pages limit the information it contains. Textbooks depict the view points of the authors and student's opinion is not considered.^[1,2] Few textbooks are not affordable by all.^[3] Textbooks do not have sound, animation, video clips whereas the internet does.^[2,3] While reading textbook, students cannot ask any queries. These limitations can be overcome by the use of internet- or web-based sources.^[4]

Web-based information can be updated daily and printing errors can be corrected immediately.^[5] Online learning is not harmful to the environment as content is available digitally and does not require pages to print. Related additional information in various web sites can be linked together to gather detailed in depth knowledge. Every personal computer with internet connectivity acts as entire library whereas every book has limited content.^[6] Students can be interactive and permits to enter a discussion on different subjects.^[7] Internet have sound, animation and video clips, which can be more helpful in gaining knowledge.^[8] Cook *et al.*'s meta-analysis study in 2008 concluded that internet-based formats were equivalent to non-internet formats in terms of changes in knowledge, learner satisfaction, skills, and behavior.^[9]

Postgraduate students also need to be updated, more interactive and with clear concepts. This study have been carried out to compare the cognitive outcome of web sourced seminars from that of the textbook based seminars considering the above advantage of internet over textbook. Previous researches have studied mainly the efficiency of e-learning in medical students but have not compared it with textbook through seminars.^[10] This is the unique study carried out first time in postgraduate medical students to find out the impact of e-learning through seminars in improvement of cognition and understanding of subject.

Aims and objective

Aims

Comparison of web (internet) sourced seminars versus textbook sourced seminars in post graduate students

Objective

1. To study the cognitive outcome of textbook-based seminars
2. To study the cognitive outcome of web (internet) based seminars
3. To compare cognitive outcome between textbook-based seminars and web (internet)-based seminars.

Materials and Methods

Study design and setting

It was a non-randomized controlled study. The study was carried out between July and September 2019 for 4 months which was conducted in the Department of Dermatology.

Study participants and sampling

The study participants selected were postgraduate students in the department of dermatology. The post graduate students in the department of dermatology, Jawaharlal Nehru Medical college, DMIMS(DU), Sawangi (Meghe), Wardha, Maharashtra, India were divided into two equal groups by simple randomization method by flipping the coin. Totally 20 topics of seminar were selected from the postgraduate syllabus of equal difficulty level. Twenty seminar topics were divided into two groups of each consisting of 10 seminars. In group A, postgraduate students were asked to prepare seminars from textbook. In group B, students were asked to prepare seminars from web-based sources. These respective seminars were presented by the students on the assigned day of postgraduate activity.

Data collection tool and technique

Learner postgraduate students were instructed to fill up pretest before seminar and post-test after the seminar. Furthermore, seminar feedback on seven points from faculties and postgraduate learners with score of 5 being the maximum had been filled up. Learning gain was calculated after each seminar.

Data analysis was done using SPSS 16.0 software (IBM SPSS inc., Chicago, IL, USA) after completion of all 20 seminars and appropriate statistical tests were used to analyze the data. Chi-square test was used to analyze the descriptive data, paired *t*-test to compare pre and post test results in the group and unpaired *t*-test was used to compare results between two groups.

Learning gain was calculated by comparing the scores of pretest and post-test and compared between Group A and Group B.

Ethical considerations

Informed written consent was taken from each postgraduate student and faculty before enrolling in the study. The study was approved by institutional ethical committee.

Results

Faculties feedback showed significant improvement in the outcome of parameters, i.e., appearance, completeness of preparation, clarity of presentation, appropriate use

of audiovisual aids, understanding of subject, ability to answer questions, and overall performance in web-based seminars compared to textbook-based seminars [Table 1 and Graph 1].

Student’s feedback also showed significant improvement in outcome of parameters, i.e., appearance, completeness of preparation, clarity of presentation, appropriate use of audiovisual aids, understanding of subject, ability to answer questions, and overall performance in web-based seminars compared to textbook-based seminars [Table 2 and Graph 2].

Learning gain in pretest/post-test were significantly higher in web sourced seminars as compared to textbook based seminars with $P = 0.02$ [Table 3].

Discussion

E-learning is certainly has become an important breakthrough in delivering postgraduate medical education. It delivers the latest medical information by way of communications technology more effectively.

In our study, feedback of faculties and postgraduate students based on appearance, clarity of presentation, understanding of subjects, ability to answer questions showed significant impact in web-based seminars as compared to textbook-based seminars. Furthermore, learning gain from pretest/post-test from web-based seminars was significantly better than traditional textbook based seminars. Similar result has been mentioned by Bell *et al.*'s study in which they had found that web-based study material had greater learning efficiency and learners were more satisfied with learning.^[11] In another study, web-based tutorial have improved skill of pathologist to grade prostate carcinoma more precisely.^[12] Similar pretest/post-test studies concluded that web-based learning significantly improved the knowledge gains and concepts in medical students and practicing physicians.^[13-16] It can be explained by the fact that e-learning programs are

more interactive with the use of multimedia formats such as videos, images, animations which helps to

Table 1: feedback of faculties on outcome of seminars

Faculties’ feedback	Textbook	Web	P
Appearance	3.09±0.02	4.75±0.03	0.001
Completeness of preparation	3.31±0.1	4.82±0.06	0.007
Clarity of presentation	3.18±0.19	4.75±0.03	0.01
Appropriate use of AV aids	3.06±0.1	4.81±0.01	0.02
Understanding of subject	3.87±0.19	4.76±0.02	0.01
Ability to answer question	3.66±0.07	4.81±0.01	0.04
Time scheduling	3.85±0.1	4.59±0.15	0.07
Consulted all relevant references	3.21±0.13	4.81±0.03	0.007
Overall performance	3.12±0.12	4.81±0.01	0.008

AV=Audio visual

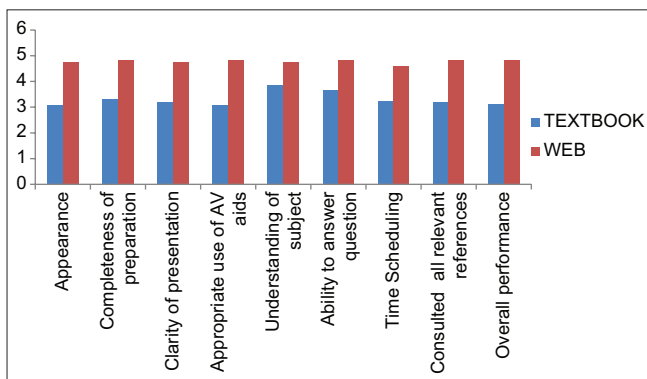
Table 2: Postgraduate student’s feedback on outcome of seminar

Students’ feedback	Book	Web	P
Appearance	3.96±0.1	4.46±0.1	0.04
Completeness of preparation	3.80±0.03	4.56±0.05	0.03
Clarity of presentation	3.65±0.12	4.51±0.1	0.04
Appropriate use of AV aids	3.71±0.02	4.57±0.05	0.01
Understanding of subject	3.83±0.12	4.58±0.06	0.03
Ability to answer question	3.30±0.05	4.57±0.05	0.01
Time scheduling	3.43±0.04	4.55±0.04	0.3
Consulted all relevant references	3.42±0.04	4.47±0.1	0.7
Overall performance	3.4±0.06	4.55±0.06	0.02

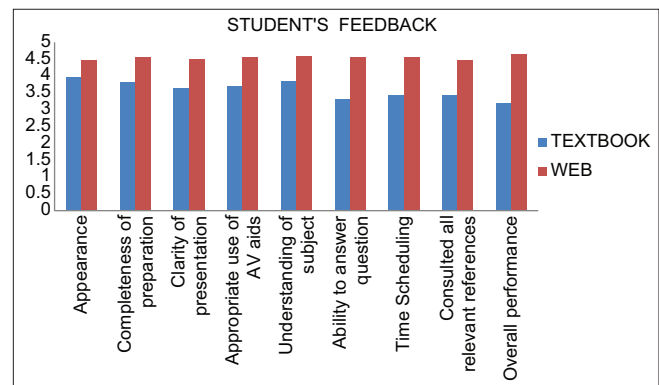
AV=Audio visual

Table 3: Learning gain

Seminar	Book	Web	P
1	0.48	0.58	0.02
2	0.37	0.56	
3	0.48	0.46	
4	0.17	0.61	
5	0.17	0.55	
6	0.11	0.51	
7	0.31	0.57	
8	0.49	0.31	
9	0.48	0.38	
10	0.21	0.58	



Graph 1: Faculties feedback on seminars outcome



Graph 2: PG student's feedback on seminar outcome

transfer knowledge more effectively with individual preferences^[17-19] and this also complement traditional medical teaching.^[5] More content knowledge was available for the students in the E-learning as compared to in-class knowledge or textbook.^[20]

The use of new information and communication technologies along with internet has transformed the way of communication between students and faculties which significantly affects the learning method of student.^[21] Harden concluded that e-learning is not just a passing fad or about knowledge transfer, e-learning facilitates to be a part of online community on preferred topic which makes them more effective and efficient to deliver the knowledge with more clarity of concepts.^[22]

E-learning introduced a new way to build content development which is more appropriate for postgraduate medical education. It has been suggested that students and learner must accept the shift from traditional classroom activities to e-learning approaches.^[23]

New trends of digital learning have been introduced include reusable learning objects (RLOs) and the semantic web. RLOs are part learning resources which include a single diagram to sequential aggregation of such various resources.

The semantic web is a futuristic ideas of the digital resources in which web-based materials related to similar content are automatically linked together on a single platform. This provides the content of the subject and metadata related to it. Davies described that semantic web technologies can allow smart searching of the web, to retrieve and share relevant information more effectively from the web.^[24] It also allows online collaborative learning between students from different geographical areas.

In contrast to our study, one assigned crossover study showed that e-learning was equivalent to traditional methods of learning in terms of knowledge gain.^[25] Few randomized controlled trials confirm no difference in web-based leaning and slide/tape groups.^[26,27] and another study showed equivalent to text-based methods.^[13] Out of three studies of traditional courses with and without web-based resources, one showed improved learning and two showed similar outcome in both groups.^[28,29]

In summary, it can be inferred that web-based learning can improve the outcome of postgraduate students in understanding the subject, retention of knowledge, and clarity of concepts.

Limitation and recommendation

The study was carried out only with postgraduate students of dermatology. The study was carried out at a single center.

Recommendation

It is recommended to carry out similar studies in postgraduate students of other specialties.

Conclusion

Web-based learning can improve the learning outcome of postgraduate students and enhance the learning efficiency of students because of easy accessibility, vast knowledge at a single click, improved audiovisual aids such as audio, animation, and video. This can help in significant improvement of educational outcome. Although we cannot replace traditional source and methods, it can of a valuable addition to education armory.

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Conflicts of interest

There are no conflicts of interest.

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