Original Article

Student perception of Controlled Automated Lecture in comparison with the Traditional Lecture

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Abstract

Introduction: Traditional lecture (TL) is the predominant format of teaching content related to lower levels of cognitive domain. A large portion of the content in a lecture is factual and is repeated year after year. A modification of the traditional lecture format to deliver such repetitive content in an automated form would significantly reduce teacher effort. However, such a format should not compromise on the quality of content delivered. Also, it is important to obtain student perception regarding such a modified lecture format before implementing it on a regular basis.

Aims and objectives: The primary aim of this study was to develop a format of automated lecture delivery that would reduce teacher effort without compromising on quality and to obtain student perception about the effectiveness of this format.

Materials and methods: The authors designed a method called the 'Controlled Automated Lecture' (CAL) which involved presenting the lecture with the help of pre-recorded power point slides in the lecture class in the teacher's presence using an inherent feature of the power point software. After presenting the lecture in this format students perception was obtained using a feedback questionnaire having qualitative and quantitative responses.

Results: Students opined that the CAL format was either equivalent or more effective than the TL format on all except two counts viz. interaction with the teacher and doubt solving.

Conclusion: The CAL format would be well accepted by students if implemented by incorporating a high opportunity for teacher-student interaction and doubt solving.

Key words: Traditional Lecture, Controlled Automated Lecture, modified lecture, presentation with narration, student perception.

Introduction

Traditional Lecture (TL) is the principal method used for teaching undergraduate students when the content relates to lower levels of learning domains.[1] The TL is conducted in a standard pattern with the teacher presenting and explaining in a logical sequence the various concepts to be learnt. This is usually done using the popular software program Microsoft power point. A large part of the matter covered during a lecture is repeated year after year to succeeding batches of students. If such repetitive portion of information in a lecture could be delivered in an automated format it would considerably save the effort of the teacher. However such a format should

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not compromise on the quality of content taught and should be perceived positively by the students.

Aims and Objectives

Following were the aims and objectives of the study

1. To develop a modified lecture format to mitigate teacher effort yet retaining the quality of matter taught and

2. To obtain perception of students about such a format.

Materials and methods

Clearance from the institutional ethics committee was obtained for the study. The study was conducted at a medical college in Mumbai. Fifty students of first year MBBS participated in the study after their written informed consent.

To fulfill the first aim the authors designed a modified lecture format called "Controlled Automated Lecture (CAL)". Following is a description of the format.

This format requires

1. A computer with a mike to record a narration while preparing the power point slides and

2. A classroom fitted with speakers that could be plugged into the computer while presenting the slides.

This method can be divided into two parts.

1. Recording: The teacher prepares the lecture using the popular slide presentation software 'Microsoft Powerpoint'. While preparing the slides the teacher uses the function of **'adding a narration to power point'** which is an in-built feature of the software.[2] Using this function the teacher records a narration with each slide which is the explanation the teacher would have given with the slide.

2. Presentation: During the lecture class the teacher presents the slides (prepared as explained above) after connecting the computer to the speaker. As the teacher displays a slide in the 'slide show' mode, the narration recorded with the slide plays automatically on the speaker. The presentation and narration can be paused at any point and will continue once the next slide is displayed. One can also go back and forth in the 'slide show' mode and the narration associated with the slide displayed will play automatically. This helps in reducing the effort of the teacher to a large extent. The teacher remains in the classroom mainly to introduce periodic interactivity, to solve doubts of students and to maintain order in the classroom.

To fulfill the second aim the authors prepared 4 lectures to be delivered in the CAL format.

Author 1: Hemoglobin chemistry

Author 2: Mineral metabolism

Author 3: Immunoglobulin structure and function

Author 4: Environmental Biochemistry

Also a questionnaire was prepared to record the responses of students regarding their perception of CAL in comparison with TL. The questionnaire contained questions to be answered on a 5 point scale. It also contained open ended questions about both formats. This questionnaire was modified and validated by peer inputs and pilot runs. The questionnaire is given as table 1. The lectures mentioned above were delivered by the authors in the CAL format to a batch of 50 students of 1st year MBBS. Following this the response of students was taken using the questionnaire.

Table 1: Questionnaire for entering students' responses.

Sr. No.	Parameter	Grade from 1 to 5 (1:poor, 5: excellent)	Grade from 1 to 5 (1:poor 5:excellent)
1	Systematic presentation of subject matter		
2	Comprehension of subject matter		
3	Interaction with teacher during the session		
4	Doubt solving		
5	Attentiveness		
6	Order or discipline in the classroom		
7	General comfort level		
8	Any other point in the context of this study about traditional lecture:		
9	Any other point in the context of this study about controlled automated lecture:		
10	Any other comment:		

For the purpose of data analysis students were divided into three groups based on marks obtained in their term-end exam which was held prior to undertaking this study. Students were listed in the decreasing order of their marks. The upper twenty students formed the high achiever group (H) while the lower twenty students formed the low achiever group (L). The third group was all fifty students taken together (T). Analysis of quantitative data (scores given by students on the 5 point scale) was done by using the paired t test and a p value of less than 0.05 was considered as significant. The quantitative data analysis was performed separately for the three groups mentioned above. Qualitative

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data (responses to open ended questions) was analyzed by identifying the common points in students responses followed by noting the unique responses. Qualitative data was presented for the entire group as a whole.

Results

Results of Quantitative data analysis are presented separately for the H, L and T groups in table 2, table 3 and table 4 respectively

Table 2: Mean, SD and p value of grades given by high achiever group (n=20). for TL and CAL

Question number		Mean	SD	P value
1	TL	3.600	0.754	0.046
	CAL	4.050	0.605	
2	TL	3.350	0.813	0.530
	CAL	3.150	0.875	
3	TL	4.050	0.826	0.000
	CAL	2.550	1.050	
4	TL	3.750	0.639	0.014
	CAL	3.150	0.875	
5	TL	3.550	0.945	0.529
	CAL	3.300	1.342	
6	TL	3.450	0.605	0.755
	CAL	3.550	1.050	
7	TL	3.850	0.671	0.330
	CAL	3.550	1.050	

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Table 3: Mean, SD and p value of grades given by low achiever group (n=20). for TL and CAL

Question number		Mean	SD	P value
1	TL	3.450	0.826	0.072
	CAL	3.850	0.813	
2	TL	3.650	0.875	0.591
	CAL	3.500	0.889	
3	TL	3.800	0.894	0.083
	CAL	3.050	1.356	
4	TL	3.700	0.865	0.120
	CAL	3.250	1.070	
5	TL	3.400	1.095	0.612
	CAL	3.600	0.995	
6	TL	3.750	0.851	0.853
	CAL	3.800	0.768	
7	TL	3.400	0.883	0.049
	CAL	4.000	0.918	

Table 4: Mean, SD and p value of grades given by total group (n=50) for TL and CAL

Question number		Mean	SD	P value
1	TL	3.510	0.767	0.001
	CAL	4.000	0.707	
2	TL	3.479	0.825	0.364
	CAL	3.347	0.879	
3	TL	3.958	0.874	0.000
	CAL	2.837	1.196	
4	TL	3.792	0.743	0.000
	CAL	3.184	0.950	
5	TL	3.531	0.981	0.617
	CAL	3.417	1.182	
6	TL	3.592	0.762	0.377
	CAL	3.729	0.917	
7	TL	3.625	0.815	0.562
	CAL	3.776	1.046	

Following is a summary of the results of analysis of quantitative data.

1. High achievers and the total group felt that presentation of subject matter was significantly more systematic in the controlled automated lecture as compared to the traditional lecture while the low achiever group did not feel any significant difference.

2. Interaction with the teacher and doubt solving was significantly less in controlled automated lecture as compared to the traditional lecture as perceived by the high achiever group and the overall group while the low achiever group did not perceive a significant difference.

3. There was no significant difference between the controlled automated lecture and the traditional lecture regarding comprehension of subject matter, attentiveness of students and order or discipline in the classroom for all three groups.

4. Over all comfort level was perceived to be better for the controlled automated lecture by the low achiever group while the high achiever and the overall group did not feel any significant difference.

The results of qualitative data analysis for the entire group of students (T) are summarized in table 5

Table 5: Replies of students to open ended questions in favor and against both the formats and any other comments

Format	Comments
TL	**In favor** 1. Pace can be altered based on difficulty level of the topic 2. We can learn more things beyond the syllabus 3. Better retention than automated lecture 4. Teacher can give personal attention to students
	Against 1. Can get Monotonous. Teacher is talking and stopping at predetermined points to solve doubts
CAL	**In favor** 1. Never gets boring due to audio visuals 2. Extremely precise and to the point (required for exam point of view). 3. Teacher performance (lecture quality) will not be affected due to indiscipline in the classroom 4. Combination of automation and explanation by the teacher results in revision and better learning. 5. Stands above traditional due to something different. 6. Teacher can pause at any point to solve doubts without losing pace
	Against 1. Students can easily get zoned out 2. There is difficulty in noting down points 3. Sometimes may seem monotonous, Recorded voice may not be clear, No repetition possible.

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	4. Points beyond the syllabus may not be covered
	5. If students miss something they cannot interrupt the teacher in between the session
	General
	Quality of lectures depends on ability of the teacher and impact is same with either method of teaching

Discussion

The present study was carried out to obtain student perception about the effectiveness of a modified lecture format called the Controlled Automated Lecture developed by the authors in comparison with the Traditional Lecture format. Results showed that students perceived CAL as being at par or better in some aspects while expressed concern regarding effectiveness of CAL in some other aspects. Main areas of concern in CAL were

1. Monotony, lack of interaction, and lack doubt solving: This could be rectified by introducing frequent planned breaks in the recorded lecture for introducing interactivity and encouraging students to get their doubts clarified. Also students may be given freedom to interrupt the recording at any point and ask their doubts which would also address concern no.5 of the qualitative response.

2. Inability to note down points: The need to take down notes can be obviated by making the entire recorded lecture available to the students in a suitable format like a web-link for their future reference.

3. Inability to cover points beyond the syllabus: This could also be a limitation of the traditional format. The teacher could include some advanced (desirable to know and nice to know) concepts in the recorded lecture and pose an appropriate challenge to the students by giving self study assignments for these "out of syllabus" areas of the subject.

To the best of our knowledge this is the first format of its kind which combines the methods of traditional lecture and recorded lectures. Hence an exact comparison of this study with published literature may not be possible. However a comparison of our study with past studies comparing traditional lecture and recorded lecture held outside the classroom setting are presented below. Cardall S et al conducted a study involving first and second year students from Harvard Medical School and Harvard School of Dental Medicine. They compared students' perception about viewing live lectures versus accelerated video recorded lectures and concluded that though live lectures remains the preferred format that students attend, students find viewing accelerated video recorded lectures equally or sometimes more beneficial due to advantages like accelerated pace of learning, flexibility of time and scope for revision.[3]

In a study involving students of first year of clinical medicine conducted by Schreiber BE et al, the researchers compared student perception and grades after attending live lectures versus video podcasts. Students opted to view live lectures over video podcasts although there was no significant difference in the grades between the two groups of students. Students appreciated podcasts for their convenience and flexibility to revise content matter but found them less involving compared to live lectures. [4]

A study conducted by Franklin DS et al on first and second year medical students studied the impact of providing web based lecture recordings. Majority students reported no reduction in attendance at live lectures even with availability of web based lectures and perceived a positive impact of this tool on their performance in examinations. However, analysis of

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marks obtained in most cases showed no significant positive or negative impact on student performance. The authors concluded that recorded lectures can be a good adjunct to traditional lectures and impart flexibility and an opportunity for self-directed learning.[5]

Rae MG et al sought to analyze whether provision of prerecorded lecture video podcasts (VODcasts) to first-year Graduate Entry to Medicine (GEM) students, affected their attendance during live lectures. They found that students' attendance at live lectures was not significantly affected and students regarded VODcasts as supplemental tool for revision and not as a substitute for live lectures. [6]

The above studies reiterate that a live lecture in the presence of the teacher is preferred by students over listening to a recorded lecture outside the classroom. The recorded lecture is perceived as an add-on to live lectures and is appreciated for flexibility of timing and convenience of revision. However, there seems to be no significant difference in marks of students when exposed to either forms of teaching.

Our CAL format retains the basic format of a live lecture with the teacher being present in class while the recorded lecture is being played. Also addressing the concerns raised by the students as mentioned at the beginning of the discussion would improve the effectiveness of CAL. This format would mitigate and optimize teacher effort without compromising on the quality of the content delivered. No additional infrastructure is required other than the standard audiovisual aids used in classrooms. The student can listen to the explanation given by the teacher while revising the presentation at a later time.

One limitation associated with the study is that there was no objective assessment of the impact of CAL and TL by using parameters like test scores of students after exposing them to both formats for the same topic. To conclude, if the CAL format is implemented with frequent opportunity for teacher-student interactions and doubt solving activity it would be perceived by the students to be as effective as the traditional lecture format. A further study involving assessment of test scores obtained by students by exposing them to both formats for the same topic can give an objective evidence of the comparative effectiveness of both the lecture formats.

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