

## Lecture Remains to be an Effective Method of Teaching in Dental Education

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### Abstract

Three components of the curriculum of dental education are: 1. Objectives 2. Teaching learning methods and 3. Assessment (Evaluation). Amongst the teaching methods employed in dental education, lecture method has an unquestionable place and it is very popular with both the students and teachers. Characteristics of lecture and its presentation are given in this article.

**Keywords:** Lecture; Advantages of Lecture; Disadvantages of Lecture; Attention; Retention; Flipped Classroom; Students Response to Lecture

### Introduction

The history of lecture can be traced back to the 5th century BC when it was popular with the Greeks. The latin root of the word lecture is 'legere' which means 'to read or read aloud'. In those days Bible or such authoritative books were read aloud. The books were made to fit on a podium or Cathedra as it was then called so that lecture could be undertaken conveniently. This method was followed in the Christian and Muslim universities of that time because books were scarcely available. Reading and lecturing were almost synonymous and the two were functionally equivalent. The idea of extempore speeches was unknown, and in fact, the lecturers used to get fined for deviating from the text at hand. Reading from the text and making copies of the text by the students worked as an efficient method of producing copies of texts in those days.

The noun "lecture" has become popular from the 14th century and the verb 'to lecture' has become popular in the 16<sup>th</sup> century and the purpose of 'instruction' was annexed to the word lecture. In the 1790's Fichte a German professor of the University of Jena began officially lecturing without a text. He said the principal concern is not what is printed in the text but what has stirred and transformed the spirit which he expected to enliven the audience. The intellectual contribution of the speaker has transformed the lecture from mere reading of a text and added a new dimension and perhaps that may be reason why lecture has sustained in spite of the onslaught of printing and the modern media [1].

### Characteristics of lecture

Lecture is a carefully organized verbal presentation of subject matter by a qualified person and very often exemplified by visual

aids. It is an accepted teaching method in higher education especially in dentistry and medicine. It is a didactic instructional method characterised by uninterrupted talk from a teacher who acts as a primary provider of information. The teacher typically stands in front of the students and may use visual aids, such as a PowerPoint presentation, writing board or handout. Students are expected to listen and take notes during the lectures, and there is limited scope for interaction and exchange between the teacher and the students. Predominantly lecture is a one-way communication from an active teacher to the more or less passive students.

A lecturer can send information in different ways viz, verbal, extra verbal, nonverbal and visual.

- **Verbal:** Verbal communication is the use of words to convey a message - through explanations, examples, descriptions or comments.
- **Extra-verbal:** This denotes the communication through the lecturer's vocal qualities such as clarity, audibility, fluency, intonation, cadence, or pace of saying words. It can also be the accent, a laughter or a pause.
- **Non-verbal:** Nonverbal communication refers to the ways in which beings convey information about their emotions, needs, intentions, attitudes, and thoughts without the use of verbal language. It is mainly through the body language that effectively uses gestures, facial expressions or body movements.
- **Visual:** Here the communication is achieved through the use of visual aids which make learning a multi-sensory experience.

During lectures, students learn by listening, observing, note-taking, discussing and restructuring information. The effectiveness of learning, however, is dependent on how well they receive and process the information, together with the quality of the message received (Table 1,2) [2,3].

**Table 1:** Advantages of the lecture method.

Effective lecturers can create interest in a subject through their enthusiasm.
Factual material is presented in a direct, logical manner
Good for introduction of new subject or topic to learners
Best method to make the students understand through oral presentation

Lectures present matter not available in prescribed textbooks.
Lectures can be designed to meet the needs of particular audiences.
Lectures can present large quantity of information.
Lectures can be presented to large audiences.
Lecturers can get maximum control of the learning experience.
Lectures present little risk for students.
Lectures are appealing to those who learn by listening.

**Table 2:** Disadvantages of the lecture method.

Conventional lectures fail to provide the instructors with feedback on the extent of student learning.
Students are often passive in lectures unless special effort is made by the lecturer.
Students' attention wanes after fifteen to twenty minutes.
Information tends to be forgotten quickly when students are passive.
Lecturers presume that all students learn at the same pace and are at the same level of understanding.
Lectures are not suited for teaching higher orders of thinking such as application, analysis, synthesis, or evaluation; for teaching motor skills, or for influencing attitudes or values.
Lectures are not well suited for teaching highly complex subjects.
The lecture method can stifle learners' creativity
Lectures emphasize learning by listening, which is a disadvantage for students who have other learning styles.

**Lecture in the classical format**

There is no doubt lecture is an effective method to transmit information but to be precise not more effective than other prevailing methods. The rationale for extensive lecturing is not fully endorsed by the neurobiology scientists especially in the context of digital technology which has transformed the human communication. The efficacy of lectures is greatly depended on the expertise of the teacher and the learner participation. One of the criticisms is that lecture cannot stimulate thinking or to inspire interest in a subject. Unless innovatively modified, behavioural skills cannot be taught through lecture; neither it is capable to make attitudinal changes in students. However, lecture is a good tool to introduce a new subject

or topic. From the point of view of staff time, lecture is highly economical. A well-prepared lecture can present the information from sources other than textbooks which interested students would like because of the uniqueness of the content and the scope it provides in getting more marks in examinations. If students are given a chance to raise questions in the classroom, difficult concepts can be clarified and along with that importance of some points can be highlighted. Lectures can provide a good summary of the topic and a similar summary can be made by the student only through laborious time-consuming reading.

Two types of limitations interfere with the application of lectures: individual limitations and pedagogical limitations. Individual limitations include presentation skills of the lecturer, subject knowledge, teaching experience and confidence. Deficits in any of these areas can limit the learning and probably undermine the enthusiasm of the students. Limitations in these areas can affect the faculty too leading to fear, lack of fulfilment and which finally ends up in negative teacher ratings. Pedagogical limitations which are innately related to lecture are difficult to overcome. From the early beginnings of dental education, lecture is perceived as an effective and efficient way to transfer information. However, evidence reveals that it has suboptimal potential for the development of attitudes, skills and higher levels of knowledge application. That is why lecture is experimented widely to advance its potential.

### Learners' attention and lecture

The effectiveness of lectures greatly depends on the learners' attention. In a lecture of one hour duration, the attention falls considerably after around 15 to 20 minutes. A break or respite intentionally made will improve the attention of students. (Figure 1). It gets recovered towards the end of the lecture, probably with a feeling of relief. Two factors are related to the maintenance of student attention: arousal and motivation. Arousal is the physiological and psychological state which mediates wakefulness and refers to the overall energy level of learners. In a lecture arousal is maintained through variations in stimulation (presentation style, learning activities, audio-visual material) and environmental factors such as seating, temperature and lighting. Motivation refers to the energy directed towards achieving specific goals. In other words, motivation is a state that energizes, directs and sustains towards the goal. In a lecture, the way in which the instructor engages the students, promotes student motivation and attention [4].

**Figure 1:** Attention curve of the students in lecture  
(<https://mandalas.life/2020/mother-of-all-asana-tadasana/>).

### How to increase attention in lecture

To improve the attention of the students, the following methods are tried by lecturers.

- Drab presentation of slides should be avoided and appropriate figures and charts are included for a difference. Font size should not be less than 28 for easy visibility. Bright contrasty letters will give better impact. Either white or dark background can be used but the projector should have a brightness of 2500 to 5500 lumens.
- Speaking pace and tone should be varied to avoid monotony and boredom of students. It is a bad practice to include the entire matter of the lecture in slides and read from them. The matter that appears in the slide should serve as a frame work on which descriptions are built up through the creativity of the lecturer.
- In the course of lecture respite or intermissions should be introduced. The teacher can ask the students to stand up and stretch or do yoga (Thadasana). There is evidence that after the respite, the attention gets enhanced and the retentivity also improves [5]. (Figure 2)

- The teacher should move within possible limits and make eye contacts with a greater number of students and try to engage a few students in conversation. Students like such teachers who engage them very well. Short questions if asked in between will also motivate the students.
- Humour is appreciated and can raise attention but if your nature is not temperamentally suited it is better to avoid jokes. Jokes can act as a double-edged sword and can hurt the cultural feeling. Lecturers should be cautious about it.
- Lecturers should come early and familiarise with the hall and the facilities. AV equipment should be tested for functioning and the power availability should be checked.

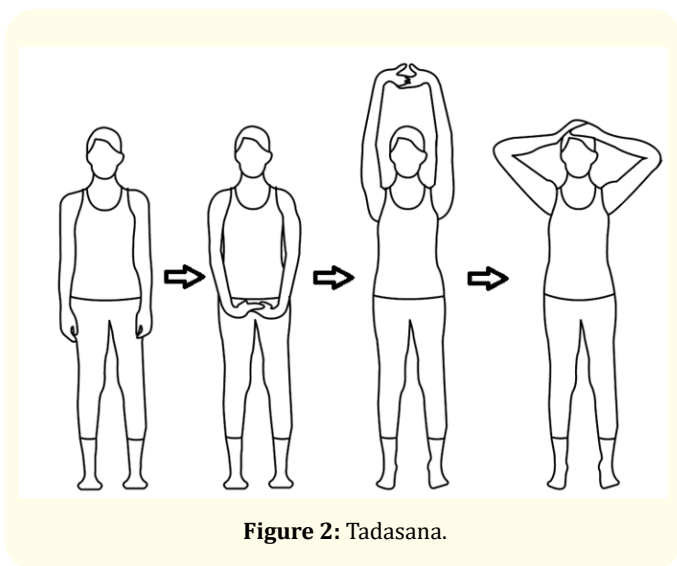


Figure 2: Tadasana.

### How to promote retention

Human beings actively process the information they receive through their senses. Learning is what is happening when our brains receive information, record it, mould it and store it. Received information is first briefly stored in sensory storage; then moved to the short term or working memory. Then it is either forgotten or transferred to the long-term memory. 3 to 7 pieces of information can be stored in sensory storage for 0.5 to 3 seconds. In the working memory, 7 to 9 pieces of information can be stored for 5 to 15 seconds. If the number of pieces of information crosses the range of 7 to 9, there will be cognitive over load, which demand an attention of too many factors at the same time. Social media and text messages can distract the student from learning and make it nearly impossible to process the information related to learning. That is why students are discouraged from excessive usage of the

social media. Most of the factors in the working memory are forgotten because of the overload. From working memory, the information has to be passed on to long term memory which has infinite capacity and the information is stored permanently. In the long-term memory information is stored as semantic memory (words, concepts and general information), procedural memory (processes) and images. The information from long term memory can be retrieved when required. This factor is known as retention [6].

Information is stored into our memory system through a process of encoding and it is retained there. This can be an automatic process or an effortful process. The retained information can be retrieved in examinations. The word retention encompasses the whole process of storage and retrieval. Lecture should help the student in the process of retention. Three factors related to retention are: content density and pacing, note taking and retrieval practice. Too much content in a lecture is a common mistake committed by lecturers in an anxiety to complete the portions. Inclusion of 90 to 100 slides into a one-hour lecture is slated to fail. Students will find it difficult to prioritize the numerous subjects and will gain only superficial knowledge. Finally, the students may end up in abandoning the attempts to learn the whole subject matter.

Content overload compels even the experienced teacher to commit mistakes in pacing. The pace should be such that students get adequate time to process the information and transfer it from short-term memory to their existing long-term memory; thereby constructing new meaning. In the meantime, the cognitive process of repetition (rehearsal) happens and that helps the students in memorising and learning. If the pace is too fast, the student will be overwhelmed because of the interference of too many topics and learning will cease. Conversely, if the pace is too slow also, learning may cease because of decreased arousal and loss of attention. 2 minutes per slide for description will be a reasonably good norm for lecturers [7].

Note taking improves retention and pacing of the lecture should not interfere with it. Pacing of the lecture should be slow enough to allow the student to complete note taking and thereby learning. The instructor should closely follow a predetermined outline, emphasizing important points through examples, summaries and reiteration. Handouts enhance the process of note taking. Handout should depict the lecture organization, charts and graphs while leaving space for active work for the learner to complete during the class [4].

Short assessments conducted during the lecture can boost the process of retention. While considering the importance of storage and its retention in memory, the importance of retrieval should not be minimised. Retrieval practice can significantly enhance the learning process through repeated reconstruction of knowledge and which serves learning stimulus. The decay of knowledge that may happen towards the end of the lecture can be reduced by immediate testing. Short answer assessments done in between and at the end of the lecture helps in the retrieval practice [8].

**Presenting the lecture (Table 3,4)**

Three things are to be done in a lecture

- Tell them what you are going to tell
- Tell them
- Tell them what you have told.

This saying is by Aristotle, the master rhetoric. In the introduction the lecturer should mention what he is going to tell, what is its importance, how the listeners will be benefitted in future and which the students have to listen carefully. In the second portion, the main body is delivered and which is the content of the lecture. It should be well organised and suit the needs of the listener. In the third portion the lecturer should reiterate the major points already told and along with that a relevant summary should also be included.

Lecture receives its negative remark because it is a one-way communication, mainly from the teacher to the students. To make the lecture two-way, appropriate questions should be asked and this will make the students alert. Open ended questions are preferred rather than simple recall questions. Open-ended questions typically begin with words such as “why” and “how”, or phrases such as “Tell me about -.” These types of questions encourage a more in-depth and lengthy response.

“Can you tell me why dental stone gets more strength than dental plaster?” (Open ended)

“What is the colour of dental stone?” (Testing recall - one word answer)

Students should be made to think and find an answer either individually or in small groups. Classroom assessment, Brain storm-

ing, problem solving, games and role plays can be appropriately included so that students can be engaged successfully to sustain interest throughout the lecture.

**Table 3:** Presenting the lecture.

Greet the students with a smile
Adopt a comfortable posture
Be confident, friendly, enthusiastic
Control gestures
Maintain eye contact
Provide an outline of the lecture
Be audible, modulate the voice
Do not orate, do not read
Visual aids
Sequential presentation
Do not be sensitive to yawns, whisper
Repeat and reinforce

**Table 4:** On the matter of slides.

No more than 5-7 lines of text
No more than 7 words per line
Avoid excess number of slides
Avoid excess dazzle

Every teacher should rehearse the lecture well in advance. While speaking, use a natural tone of voice in a conversational style. It is not advisable to imitate a style which is not innate to the lecturer. Artificial styles are difficult to sustain throughout the lecture. Power point slides properly made with readable, large fonts and letters of good contrast, clear pictures with minimal labelling will be a useful adjunct to any lecture. Handouts should also be used in lectures which should promote student activity. Utility of the lecture gets illuminated, only if the lecturer believes in the subject he teaches and earnestly considers that he is there to help the students. Students should feel that the intentions of the teacher are genuine and everything will fall into place.

**Flipped classroom (FC)**

In the recent past, many novel teaching methods have been tried because of the advancements in technology and flipped classroom

(FC) is one amongst that. Flipped learning approach works both in and out of the classroom. Conventional lecture class is followed by homework and in flipped classroom, homework precedes lecture class. This pedagogical model gets the name because of the flipping of the components.

**Figure 3:** Flipped classroom

(<https://teaching.washington.edu/topics/engaging-students-in-learning/flipping-the-classroom/>).

**Figure 4:** Concept of flipped classroom

(<https://www.researchgate.net/post/Flipped-Class-Room-Education-can-inspire-the-modern-teaching-sytem-for-Fashion-How-in-the-context-of-a-middle-incoming-country-like-Bangladesh>).

Initial implementation of the flipped classroom requires considerable preparation time of the instructor. However, this decreases in subsequent years. Planning a flipped classroom consists of four stages: 1. designing the homework, 2. developing the activity to monitor the progress during the homework, 3. running the lecture session with active participation from students like group discussions and 4. evaluation.

Before giving the lecture, the teacher sends homework which consists of podcasts or videocasts, reading from an assigned text, handouts, or other materials created by the teacher. Online content like YouTube can also be used. Lesson objective should definitely be included in the homework because it improves the readiness of the students. The advantage of the sent videos is that students can leisurely watch, repeat it as many times as he wants till, he understands it and it can generate questions on reflecting about it.

The monitoring activity is implemented through readiness assurance tests consisting of questions set by the teacher. The most difficult areas to understand can be raised by the students and it will be used as evidence of completion of the work.

The class will be divided into groups and groups are asked to discuss on topics raised both in homework and in the classroom. Answers found out will be subjected to further questioning to explain the logic behind the found answer.

Evaluation should include measurements of student learning, students' reactions to the session and faculty peer evaluation. Students will be subjected to a summative evaluation to evaluate the level of learning. Students' response on the session will also be included in the evaluation. Faculty peer evaluation is also an important component.

The change from a traditional lecture-based programme to an FC delivery resulted in positive student feedback as evidenced in published data. However, debate is still going on the effectiveness of FC against conventional classroom teaching and the time economy factor [7,9].

#### Students' view on lectures

Very few studies have been conducted on the student preferences towards lecture method of teaching. Nearly 45% of the dental students preferred the lecture duration to be 45 minutes. Majority of the students wanted the classes to be conducted in the morning hours. Use of power point attracted nearly 80% of the dental students. Lecturers should carefully use AV aids like power point to

ensure enhanced attention. Students preferred the lecture schedule to be announced sufficiently early so that they can prepare well before attending the class. However, all the students do not endorse the idea of making the attendance compulsory for lecture classes. 86% of the students required a handout. Dental students in India and abroad have similar views about the lecture method of teaching. The perception is that students still prefer the classroom teaching [10,11].

### Conclusions

Students learn better through auditory and visual senses. Voice quality of the lecturer and power point presentations are good adjuncts to lecture to make it a multisensory experience. Handouts provide enough scope for student activity and act as good lecture guidance documents. Handout should serve as a partial note only. Lecture with the following attributes are considered as worth listening

- Which is informative, interesting and engaging.
- Which is delivered with authenticity
- Which has organised content.
- Which is easy to follow.
- Which gives time to take down notes.
- Where students feel involved through some type of active participation.
- Where students are allowed to ask questions.
- Where students leave wondering where the time has gone.
- Where students leave knowing that they have learned something.
- Where feedback is solicited and action is taken accordingly.

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