



Aids to Better Medical Education and Research at Undergraduate Level

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ABSTRACT

Assessment is an integral part of the teaching – learning process. Methods of assessment should be selected in conjunction with the teaching methods. The best of examination employ a mixture of a few devices of assessment.

The medical Education Unit works in the direction to help the medical Teaching Staff to be better teacher, research worker and clinician as well as to evaluate and assess the medical student in a better way. Medical Education unit also arrange for continuing medical education (CMEs) programs, medical workshops, publication of medical journals and magazines etc. thus Medical Education Unit has definite motives and its works in the direction to help the teacher to be more effective person, a classroom a practitioner of human and a facilitator of change.

Key words: CME, Blackboard, Overhead projector, Computer and Seminar.

INTRODUCTION

Setting the space for new trends in medical education is a vital segments for the development of excellence in all aspects the health care system. It is vital in itself and also strengths the other segments, viz. patient care and research.

In the others words of Sir William Osler, "A class of intelligent young men or a group of clinical clerk in the world is a stimulus to the attending physician, a great help to the house officers and an unmixed blessing to the patient. Between teaching and research also, there exists a mutually beneficial relationship."

A teacher is helped in his research by the periodic review of literature which is teaching responsibilities compel him to undertake. On the other hand, a research worker makes a better teacher because he retains a healthy curiosity. As Walter Cannon says, "Teachers who are investigators filled with an ardors for discovery and acquainted with ways to nature's hidden secrete arouse in young man, the qualities they themselves possess."

Teacher for medical science, in general, have no formal background of skills in education methods. They acquire some sort of art of teaching while they are students, and perhaps improve their methodology as they grow in the profession (Chandra, 1983).

These methods are essentially the ones inherited by them from their own teachers.

Explosion of information and technological advancements which have occurred during the past two decades or, so, have changed and broadened not only the contents of education but also the attitudes of students. The vastly increased information the needs to be imparted now requires technological innovations over and above the classical audio visual aids. A number of these emphasize the importance of self learning, for example, for example tape-slide sets and programmed texts. The usefulness of computer for stimulating education exercises/tutorials is now well recognized.

Changes in attitude are occurring at a rather rapid rate. Hence a discussion of education methods by the teacher of medical sciences is deemed opportune and that essentially an exercise in sharing our thoughts and pooling our experiences (Manchanda, 1983).

Lecture

The 'lecture' seem to be a very trivial topical to talk on 3. Lectures are of two kinds. One, in which we present research data, the other, in which we teach, the students, the lecture of undergraduate students should provide information tailored to the student's level. The lecture should identify and emphasized local norms, disease patterns etc. Simplicity of language, optimum volume, reasonable slow speed and a nature, conversational variation of tone is also helpful.

Lecture, can stimulate interest in subject by

1. Presenting the subject with proficiency,
2. Tailoring the subject matter to the needs the students,
3. Pointing out the relevance of the subject.
4. Altering the course in response to the student reaction.
5. Selective recall and repetition to ensure through grasp and
6. Appropriate showmanship.

Use of purposeful movements of body and hands are also helpful for emphasis the material for lecture should be prepared to create curiosity and interest to the students, having clear and relevant examples, and materials should be summarized periodically. Also it is very important that lecture should finish before time.

[A] Aids for Making Better Lectures

Visual aids, like picture, methods, charts, diagrams, aids have to kept pace with the scientific advances. The only legitimate use of aids is to make good lectures batter.

[I] Blackboard: of all education aids, blackboard is perhaps the oldest, and most widely used.

Advantages

1. Readily available in most of lecture rooms,
2. Electricity is not absolutely necessary for its usage,
3. Sequential development of a concept can be done effectively,
4. Initial and recurring expenditure is minimal,
5. Easy to use (and misuse!!),
6. Darkening in room is not necessary.

Limitations and Disadvantages

1. Eye to eye contact is lost while writing (momentarily)
2. The written material cannot be stored and reused,
3. Advance preparation of material is not possible.

For use of blackboard, good quality of board and chalk should be used. Having chalks of different colors is helpful be appropriately used. Sufficiently large letters should be written on board. And we should never forget to clean the board at the end of lecture.

[II] Overhead Project

Though blackboard is still the commonest visual aid used for teaching, nowadays there is a trend to switch over to the overhead projector (**O.H.P.**)

The over head projector is a device for projecting matter (or downs) on transparent plastic sheets (25X20 cm) on to a screen. It uses a lamp, lens and mirror arrangement. Versatility of the O.H.P. has made it a powerful teaching tool and it has large replaced the blackboard in the classroom of affluent countries (Tandon, 1983).

O.H.P. has several advantages over the blackboard

1. Surface area is limitless,
2. Material (including illustration) can be prepared with in advance,
3. The teacher faces the class all the time and eye to eye contact is not lost,
4. The teacher transparencies can be preserved of future use.

The O.H.P. also has several advantages slides.

1. There is no need to darken room (the students may stay awake!!),
2. Progressive disclosure is very easy,
3. The services of a projectionist are not required,
4. Material can be prepared at short notice by the speaker,
5. The material on the stage of the O.H.P. can be manipulated, added or altered in way that is not possible with slides.

A little effort and imagination greatly improve the effectiveness of O.H.P. A few hints and suggestion are here;

1. The project screen arrangement has to be such that every student in the class can every part of the project image with ease. The screen may placed at a higher level than the speaker (directly behind him), or, in, one corner of the room with the projector diagonally in front of it.
2. Ensure that the smallest latter on the screen can be read comfortable by the person in the last rows. Each letter or character on the transparency should at least 8-10 mm high. There should be no more than six words in each line and no more than eight lines in each transparency. Normal handwriting is just not enough. The use of a template is strongly recommended.
3. It is best not to project the entire transparency at the very beginning. Optimal 'progressive disclosure' of information achieves the same objective as the sequential presentation of information on the blackboard.
4. There are four transparencies can be used as overlays on the original transparency. This technique is very effective methods of 'building up' or 'dissecting down' a complex diagram.
5. The pointer must be laid flat on the transparency and not waved around.

Felt-tipped pens specially made for use with O.P.H. transparencies should be used.

We should never leave a visual on the screen after a point has been made and equally important, we should turn off the projector light, keeping the running; when we are not actually projecting a transparency the bright screen can be distracter and the projector gets overhead if the light is left on for too long.

The best colors use to write on transparency are Black, Blue and Green use of red should be sparingly as it is not a color that projects well.

[III] Slide and Slide Projects

Slides are of the frequently used visual aids in communication.

Advantages of Slides

1. Can express clinical an Operative findings.
2. Easy to carry.
3. Can be preserved for long time

Disadvantages and Limitations

1. We have to darken the room,
2. Progressive discolors is difficult,
3. Not be manipulate the material,
4. We often need a projectionist,
5. Advance preparation is necessary,
6. Expensive.

A slide is a visual aid. It should complement our presentation and telegraph our message.

Slides should be

1. Legible (to those in the back row)
2. Simple and
3. Correct

After the Slide is ready

- a) We should be able to read the slide unaided at a distance of 8"
- b) We should place a 'dot' on the left corner of the slide.

[IV] Handouts

In many western universities, the craze is to distribute voluminous, Xeroxed handouts. Photocopying has increased the versatility of handouts (Dutt et al, 1983).

[V] Role of Computers in Teaching

Computer systems have made important contributions in the field of education and continue to play an increasingly significant role in teaching. Computers have been used to help in learning situation such as practice session, tutorials, games and simulation exercises (Agarwal, 1983).

Education through computers has come to known as Computer Assisted Instruction (CAI).

Advantages

1. Basically the classical method of teaching namely the 'lecture' is a passive method of teaching usually the teacher talks and students listen. There may be some discussion. There is practically no participation by the students. During CAI session, the student is constantly interacting with the teaching material.
2. Second advantage is 'adaptive teaching'. If several different presentations are available in the computerized form of teaching, the student himself can discover the method which is most suited to his attitude to learning.
3. Third advantage is of CAI is that teacher can create many experience, put them in a computerized form and make them available to students.
4. Another aspect of CAI is that learning through a computer is itself a learning experience.

[VI] Self learning Exercises: Self instruction performances or independent learning system mean that a student is given independence, responsibility and freedom while he learns, with the help of audio tutorial system, tape slide programs, etc (Sarin, and Nayar, 1983).

[VII] Small group teaching

Teaching in small group is widely acknowledged to be an idea method of teaching (Dutt, and Chhina, 1983).

Objectives

1. To teach difficult or peripheral issues not dealt with in lecture,
2. To discuss experimental methods or research data,
3. To teach practical skills,
4. To develop analytic thinking
5. To develop an intimate interpersonal relationship etc.

[VIII] Seminar

Strictly speaking, a seminar is a small group activity, the size of the group being somewhat intermediate between that of a tutorial group and a classroom lecture. The essential difference between a tutorial and a seminar is that while a tutorial is student centered, a seminar means a short lecture delivered by a student to his classmates. The topic is assigned beforehand. The students who benefit from seminar the most are those who speak. They learn how to search for literature on a subject. The students who listen also benefit (Ramanarayan, and Nayak, 1999).

[IX] Field trips

If student are taken on a day's trip to some neighboring institute, it breaks the monotony of routine teaching and also broadens the horizon of students beside, of course, teaching them some medical topics.

[X] Free time

Learning during 'free' time may appear a contradiction of terms. All what it means is time during which a student has greater freedom to do what he really than in a structured course.

[XI] Research

Research is more intimately related to teaching than is commonly realized. Research forms a component of most postgraduate courses and it has yet to find its due place in undergraduate education. Firstly, the teachers who teach undergraduates should spend part to their time on research. This would keep their minds sharp, open and free from dogmatism and arrogance. Secondly, undergraduates, particularly some selected ones, should have an opportunity for engaging themselves in research.

Research has been variously defined; Experimental research is only one type of research. Any activity that leads of disciplined gratification of scientific curiosity is research. A comprehensive definition of research is diligent examination in seeking facts, keen observation with argue to explore and to know the truth and discovery of new facts with carefully devised experiments. According to Sir Ralph Smith, "In the association of teaching with research lies the essential difference between education and training."

Thus it is obvious that the classes at college levels must have a research component. A climate of science and temper, generated by research, is the Foundation of Indian renaissance, as visualized by Nehru, The World Medical Education Conference at London, in 1953, recommended that undergraduate medical education shall be imparted in an atmosphere of research. This applied naturally, to all branches of learning. The young are inspired by elders whom they would wish to emulated. That is why an atmosphere of research helps catch talented students young. Where there is an inquiring mind, there is potential for discovery. Coming to brass tacks, here is some concrete example. At Pondicherry, Prof. S.K. Lal et al, 1983 in classes on simple experiments like determination of hemoglobin or erythrocyte count asked the students at the end to practical class to come to the board and write their observation.

The results were tabulated and statistically analyzed. This is training, in research a similar approach is adopted at the All India Institute of Medical Sciences, New Delhi., while conducting experiments on measurement of blood pressure, effect of exercise or exposure to cold or hot environment, pulmonary functions tests etc. By a suitable modification of the format of out teaching, it may even be possible to get local norms established by undergraduates by doing such experiments on large numbers.

Apart from giving the research orientation to ordinary practical and providing an atmosphere of research, undergraduates can anybody be involved in real research as well. All India Institute of Medical Sciences offers fellowships to its undergraduates for participating in any research project in any department of their choice during summer vacation. Associations formed during the summer often continue beyond it and so does the research work. Indian Council of Medical Research also offers fellowships to undergraduates for working on research project during vacations. If we provide an atmosphere of research in our institutions of higher learning, familiarize our undergraduates with what is going on, and provide them opportunities for doing some of it themselves, we can hope to catch them early enough and shall continue having a band of dedicated research workers to advance the frontiers of knowledge.

[XII] Programmed Texts

The situation created by increasing number of student in medical colleges and relatively few teachers have provided the impetus to seek effective alternatives of supplements to the traditional class room lectures and classical text books. Programmed text books specially necessary because of the factors

Lack of good teachers is felt by all institutions.

[XV] Integrated teaching

Teaching with integration with different department is very useful for the students. One topic (disease) is decide and student learn anatomy physiology, biochemical aspects, pathological changes, community problem drugs (pharmacology), treatment (medicine, surgery), prognosis and prevention with help of teachers from different departments at one time and the teacher also get benefited and get the knowledge of different aspect of same topic by their colleagues from different departments. It can be started in the form of symposium with the cooperation of different departments.

[XVI] Community based learning Student may have a trip to different communities, villages along with their teacher. Different families are allotted to students who study about the medical problem of members of those families this type routine pattern of life. Also students come in closer to community and may feel different type of problem the community by their studies.

[XVII] Extracurricular Activities

Quiz, programs, debate competition, art competition (making charts on medical topics) etc. also help in learning of students. Sports facilities, cultural programs etc. help the students to get recreation and make the mind of student more fresh and sharp for their studies (Bhinde, 1962).

Comparison of students learning in traditional education with problem based tutorial learning

Traditional Learning	
<i>Schedule prepared by fairly tight</i>	<i>Students largely responsible for own schedule, individually or in group</i>
<i>Competition with peers for "honors"</i>	<i>Encouragement to work cooperatively sharing experience resources</i>
<i>Main learning events, lecture labs recommended reading with most to students doing same thing</i>	<i>Wide range of learning resources and events</i>
<i>Manageable "chunks" of information small enough to be mastered for an examination</i>	<i>Endless amount of information, with emphasis not on management of information per se but on the management of information appropriate to each individual and its application to problems</i>
<i>Evolution to be end of course examination limited to defined "knowledge" objectives determined by professor</i>	<i>Ongoing assessment to board range of goods (including both personal and program objectives) with students as main evaluation of own progress</i>
<i>Classroom environment, with large groups of students</i>	<i>Few "class wide" events; close associations with small group of classmate in tutorials</i>
<i>Predominantly lecture, based role for faculty</i>	<i>Several faculty education roles, "resources person" and the student advisor roles</i>

[B] Assessment and Evaluation System

Though our tradition examination test only a narrow range of skills especially those of memory the gravest deficiency in our evaluation system lies in the complete lack of agreement between examiners on what constitutes a good or a mediocre paper (John Kurrien in 'The Times of India') Assessment forms the nucleus of our educational system. The student wants to be taught from the examination point of view and the teachers are often willing to oblige; in the competition for admission and employment, great emphasis is placed on performance in the examination. The equality of examination therefore, has repercussions on the entire educational frame of work.

[I] Assessment of theoretical teaching

There are many ways of teaching knowledge available to the teacher. The criteria guide the choice of the instrument, and uses are

1. Reliability
2. Validity
3. Feasibility and
4. Effect on students

A student's achievement can be expressed in two ways

1. **Criterion – referred assessment** – This assessment is in reference how well a student does in relation to some pre-determine criteria.
2. **Norm – referred assessment** – This assessment is based on the performance of some reference group, usually the class taking the examination.

There are three major varieties of assessment depending on their purpose and time in relation to course.

1. **Diagnostic assessment** – Its purpose is found out the suitability for a course or a job, to determine the proficiency of a class at the beginning of a course.
2. **Formative assessment** - Its purpose is to provide the feedback to students and teacher. Its results may form a part of the internal (continuous) assessment.
3. **Summative assessment** – This is final or end assessment at the end of unit, term or course. Its purpose is to rank – order students, and award mark grades or certificates.

Instruments of assessment are**[I] Essay Type Questions**

The much maligned essay type of questions has been with us the longest, and are still very much with us.

Essay type questions can be conveniently classified in two types

1. **Extended response essay questions:** Provide freedom to the pupil to respond over a wide range. This type is very difficult to evaluate and has a dubious role in evaluation.
2. **Restricted response essay questions:** tend to limit both the content and the form of the pupil's response. This type of essay questions is recommended for student's evaluation.

Advantage of Essay Question

1. Provide a measure of complex leaning outcomes which cannot be measured by other means.
2. Have desirable influence on student's habits. Pupils tend to direct their attention towards integration and application.
3. Essay of construction.

Disadvantage of Essay Question

1. Unreliability of scoring,
2. Amount time required for scoring,
3. Limited sampling of the subject
4. Questions encourage the student of bluff and
5. Do not provide adequate feedback on the quality of teaching.

[II] Short Answer Question: are an important step forwards compared to essay type of questions.

Merits of SAQ

1. For more reliable
2. Appropriate structuring allows asking exactly what the examiner expects the student to know. Validity is also high
3. Proficiency in language does not play an important
4. Permit the assessment of coherence of an argument and correct sequencing of facts in the developing of the argument.
5. The bits of knowledge are retrievable form the memory store outside of the situation of recognition.
6. No possibility of change success. Student has no strong temptation to guess.

Demerits of SAQ

1. Take considerable time and effort to frame
2. Correction is not very quick either. But the effort is worth the benefits raped.

[III] Objectives tests

Belong to the following categories

- a) **Competition Items:** more commonly called "fill in the blank" type of questions
- b) **True or False type questions**
- c) **Multiple choice questions:** Items is used more or less synonymously with the 'questions' the 'stem' is the statement which precedes the four or five suggested answers or competition which following it. The term 'distracters' is used for all the suggested answers in an MCQ except the correct one.

There can be framed different type of MCQs

1. Single response correct type,
2. Multiple responses correct type,
3. Machine type,
4. Comparison type and
5. Programmed test.

Merits of MCQs

1. Reliability is extremely high,
2. High validity. A large area of syllabus can be sampled,
3. Results are not affected much by proficiency in language
4. Provide detailed feedback for both student and teachers
5. Very easy to correct and
6. Particularly suitable when the group tested is very large

Demerits of MCQs

1. Require a lot of time to construct,
2. Encourage student to guess,
3. MCQ format provides substantial clues,
4. Expensive to arrange and
5. In spite of all precaution, the questions may be ambiguous, or its answer controversial.

[II] Assessment by Oral Examination

Oral examination (viva- voce) is a face to face interview between examiner and the examinee. Oral tests can be used for assessing the student both in theory and practical. In theory oral exam is conducted by few teachers simultaneously. In practical the teacher interviews the candidate at the end of every practical. For oral examination, the examination should be preparing a long list of questions sorted out in term of difficulty. A convenient way to do so is to take three cards (card system of viva-voce). One card may be used to jot down easy questions, the second for questions of intermediate difficulty level, and the last for the most difficult ones. The candidate's score should depend upon whether the candidate answers all the questions, asked, and to what difficulty level he can be taken. Even with this method the element of subjectivity remains but its severity gets minimized.

[III] Assessment by Practical Examination

During the practical examination, the students spend three hours during an experiment. The examiner spends three minutes assessing him, and this brief encounter usually degenerates into a theoretical discussion. In such an experiment, the evaluation of the candidate becomes merely a matter of chance. That is why 'spotting' is introduced as a component of the practical examination. Spotting introduces

Considerable objectivity into the practical examination

Objectives of practical examination

At the end of practical course, the student should be able to

1. Demonstrate certain practical skills,
2. Make correct observation,
3. Analyze and interpret data,
4. Demonstrate the spirit of enquiry,
5. Explain logically unexpected observations and,
6. Detect and correct minor faults in the equipment

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