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Medical Education: Can we dare to change?

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Editorial

Medical education: Can we dare to change?

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"He who dares to teach must never cease to learn."

-Richard Henry Dann

Pedagogic approaches in medical schools have been changing and a variety of new courses, curriculum, and teaching/learning tools are used to promote competency-based education.[1] I would like to highlight a few innovative strategies to revamp the MBBS curriculum and usher in a fresh look to this socially important course.

Technology in education

Transformation using information technology in higher education will add educational value.[2] I would strongly recommend the implementation of the following in every medical school.

Learning Management System (LMS)

LMS is extensively used in higher education[3] It is a software application for the administration, documentation, tracking, reporting and delivery of educational materials. Universities, colleges, and schools use LMSs to deliver online courses and augment on campus courses.[4]

Advantages of implementing LMS for an MBBS program or across the deemed universities

- **Single roof:** All the information related to a course i.e. the timetable, teaching schedule, student brochure, syllabus/curriculum, etc. will be available to all the faculty, the students, and the staff concerned anytime (through their registered and secured password protected accounts) and from anywhere. All that is needed is a computer and internet connection. This facility can be extended to iPad/tablet/mobile devices too. In this way, students (and parents) have access to all the necessary academic information and learning materials round the clock.
- **Learning materials:** Under LMS, all the faculty need to upload their materials (lecture slides etc.) three to four days in advance. Providing learning materials in advance enhances a lecture and ensures that every student has access to the same material. Its major advantage is less note taking, thereby providing students more time to listen, think and interact with the lecturer. In one study, majority of students claimed that less attention would be given to lectures when hand-outs were not provided.[5]

Camtasia

It is a licensed software for creating video tutorials and presentations directly or indirectly via Microsoft power point. All materials created in this software can be easily integrated in the LMS.

Advantages of installing Camtasia

- Every faculty member will have an option to record his class lectures and upload on the LMS. This can also be made mandatory by the college authorities.
- Interested faculty member can record and upload their topics well in advance and then can carry out some active learning exercises in the classroom based on the videos and reinforce the basic concepts.
- Recording lectures (class lectures or otherwise) and uploading on the LMS can benefit poor learners who can understand some difficult concepts by watching the video anywhere, anytime, and any number of times.

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- Benefit a few students who could not attend a lecture because of genuine reasons (health reasons/family function).
- Blended learning, a form of education that takes place both online and in a face to face classroom location, can be introduced in a systematic way by the college.[6]
- Flipped classroom can also be introduced in a systematic and structured manner by the college.[7] It is a variant of blended learning wherein a student is first exposed to new material outside of class, usually in the form of an online presentation. Class time is then used to apply the material in the form of problem solving and discussion.

Problem Based Learning (PBL)

What is PBL and why PBL?

Working effectively within groups has been recognized by medical educators as an important competency for learners. Collaborative small group learning has been increasingly used in medical education to foster generic skills such as self-directed active learning, leadership skills, interpersonal relationships, communication skills etc.[8] PBL is a student centred but instructor/facilitator led method of learning. The predominant essential components of this strategy include advance case construction and vetting by a clinician, ideal formation of student groups i.e. every group must have an approximately equal distribution of average, above average and below average students, every student presenting a learning objective pertaining to the case and above all a fair grading by the facilitator based on predefined criteria. The primary purpose of PBL is to give an opportunity for students to learn on their own, make them independent thinkers and learners and give a break for the faculty member from the huge volume of monotonous didactic lectures delivered everyday throughout the duration of the course.

How to conduct an effective PBL?

PBL can be effective only if it is structured and graded i.e. the guidelines of the PBL process must be uniform, must be evaluated and the scores must be added to the internal assessment. Also, the PBL topic must be clinically relevant and must not be covered in the didactic lectures. No PBL must begin without an orientation session for both the students and the faculty members.

Where exactly to place PBL in the MBBS curriculum?

One PBL exercise per session in the pre and para clinical phase will be the best way to begin with. Initially, subject PBLs can be carried out. Later, when the students and the faculty members are quite familiar, the integrated PBL can be commenced.

'Gradeless' formative assessment

From a student's perspective, the relationship between the learning and the assessment is viewed predominantly in the form of 'grades.' In spite of 'grades' being criticized worldwide as inexact tools, whose overemphasis increases student stress, undermines student learning and negatively affects student wellbeing, they still continue worldwide to be the norm in the assessment of student learning.[9]

The student assessment involves balancing assessment aimed at making decisions about students and their progression (summative assessment) with assessment that provides students with feedback to enhance their learning (formative assessment). Formative assessment is performed keeping in mind 'assessment for learning' rather than 'assessment of learning'. By providing feedback and guidance to students, the formative assessment has positive effects on learning and performance.[10] However, the fact is that many teachers (including the so called senior and good teachers) get entangled in the formative or summative debate and do not understand the true meaning/utility of these terms. A strict textbook definition would suggest that the internal assessment is summative because the results are used to decide whether the student passes or fails.[11] Assessment (i.e. gradeless) at frequent intervals with immediate feedback is the need of the hour.

What exactly is formative assessment?

The formative assessment in its strictest sense is a type of 'gradeless assessment' i.e. assessment when carried out in a nonthreatening atmosphere at regular intervals without reward/punishment (i.e. awarding grades) and with immediate feedback/

reinforcement. It is assessment 'for' learning (unlike the sessional/university which is assessment 'of' learning). Only the formative assessment promotes significant, deep learning, and lifelong learning.

How to do a 'true' formative assessment?

Every faculty, after a gap of four to six days from his/her lecture, must conduct a multiple choice question (MCQ) based test (15-20 questions) with the help of 'keypads' (which gives instant results i.e. percentage of students selecting the various options) and discuss the answers (depending on the response) to clarify the concepts. This will, in a true sense, complete the duty of the faculty member (lectures followed by a formative assessment) and also the students will get a feel of the type of questions that will be asked in the sessional examinations/final university examinations and eventually this exercise will reduce the stress/anxiety level of the students to a great extent. Many foreign universities regularly carry out formative assessments.[9, 12] Students will eventually develop a desire to learn beyond the grade and this can make them learner oriented, rather than grade oriented, thus promoting the concept of lifelong learning. Regular conduct of gradeless assessment reduces anxiety and depression, and increases positive wellbeing and vitality.[9]

Where is the time to conduct formative assessment?

Obviously, this is the question asked by every faculty member. If the curriculum is updated regularly and unwanted things are removed, then time will not be an issue to carry out this important exercise. The respective college managements must provide 'keypads' without which, it will be a futile exercise.

100% integrated curriculum and assessment

A well planned completely integrated curriculum can significantly streamline the basic science stream. It is practically quite simpler to bring clinical relevance to basic sciences than to reinforce basic science in the clinical years.[13] The integrated teaching offers several advantages and could play a key factor in the delivery of an effective educational program.[14]

How to integrate the curriculum?

To integrate completely i.e. horizontally and vertically, the traditional system based approach must be forfeited. Instead, 'modular' approach must be explored. A few examples for modules could be 'haematology' module, 'tissue, injury and neoplasia' module, etc. The relevant subject experts i.e. for haematology module a physiologist, a pathologist, must teach each module and a pharmacologist can be involved. In addition, all modules can end with a case discussion by the clinician either alone or in an integrative fashion (appendix 1).

Advantages of a completely integrated curriculum

- Students will clinically relate every topic/concept from day one of the course
- Basic science subjects will be taught for most part of the pre and para clinical years (example: pharmacology may be taught in year 1, 2, and 3)

How to carry out an integrated assessment?

A single integrated question paper will be developed at the end of every year. This can have two parts: part A – multiple choice questions and part B – key feature paper (KFP). Both parts will have predominantly 'case based' questions. In KFP, a case will be followed by a short answer question from different subjects pertaining to the case. Long essay questions must be withdrawn totally.

Clinical skills

Most medical schools abroad especially in the west have courses on medical interviewing, interpersonal skills, and physical diagnosis, which usually take place in the initial two years of medical school.[15] This is practically feasible only through a full-fledged clinical skills department with a good database of simulated patients.

Logistics of a full-fledged clinical skills department

A separate clinical skills department with qualified faculty members can incorporate several basic skills to undergraduates during the pre and para clinical years with the help of simulated patients. Instead of students going to clinical postings every day, they can carry out a number of essential activities in this department, like history taking, general physical examination, communication skills, interpersonal skills, human ethical issues etc. Early clinical exposure[16] is an important concept but this

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does not mean that students are physically visible in the hospital wards without acquiring the basic generic skills in the clinical skills department. Just like anatomy, physiology, and biochemistry belong to the first MBBS curriculum and, pathology, microbiology, pharmacology and forensic medicine are subjects in second MBBS. Hence, these subjects must be prioritized along with several activities in the clinical skills department. Hospital visit if at all required can be organized twice a week in a systematic way.

Clinical skills on real patients

Direct observation by an expert assessor and providing immediate authentic feedback is considered an important tool for the development of basic clinical and procedural skills for final year students, interns, and junior residents.[17] These simple and feasible tools (explained below) take less time and hence a large number of students can undergo this. The major advantages of these tools are the immediate feedback that is provided to the assesse and the learning that follows. These are very good for formative rather than summative purposes.

Appendix 1: A Sample of Modular Integrated MBBS Curriculum

Week	Module1: III (Infection, inflammation, immunology)	Module 2: TIN (tissue, injury and neoplasia)	Module 3: PAS (Preventive Medicine and Addictive studies)	Integrative session
1	Innate and adaptive immune responses **Immunologist**	Basic principles of tissue injury **Pathologist**	Introduction to PAS **PSM/Public health faculty**	Study design and literature searching **Statistician**
2	B cells and immunoglobulin **Immunologist**	Tissue injury: Cancer (neoplasia) **Oncologist/Pathologist**	Motivational interviewing **Clinical Psychologist**	Drugs in sport **Orthopedician/Pharmacologist**
3	T-cells and effector cell function **Immunologist**	Carcinogenesis, oncogenes, and Tumor suppressor genes **Oncologist/Pathologist**	Mental Health **Psychiatrist**	"Not sure how to manage patient's wound – call the OT **Clinician**
4	The MHC Complex **Immunologist**	Molecular ways to cancer **Pathologist**	Population approach to cancer **Oncologist**	Cervical Cancer **Oncologist**
5	Immune system in the health of disease (practicals: immunodiagnostics) **Immunologist**	Cancer stem cells and cancer profiling **Pathologist**	Life style factors and Chronic disease 1 **PSM/Public health faculty**	Living with ovarian cancer **Oncologist**
6	Transplantation and immunosuppression Immunologist	Principles of Clinical Oncology **Oncologist**	Life style factors and Chronic diseases 2 **PSM/Public health faculty**	Organ donation **Clinician**
7	Mucosal Immunology **Immunologist**	Principles of Cancer Chemotherapy **Pharmacologist**	Applied Prevention: Injury Prevention **PSM/Public health faculty**	Persistent Pain is a Chronic condition **Clinician**
8	Immune responses in Infections **Immunologist**	End of Life Issues **Clinician**	Applied Prevention: Immunisation **Immunologist**	Hyperbaric Medicine **Clinician**
9	Immune responses in infections **Immunologist**	Principles of radiobiology and radiology **Radiologist**	Applied Prevention: Strategies for Chronic Disease **PSM/Public health faculty**	Nuclear Medicine **Clinician**
10	Immunopathology: Autoimmunity **Immunologist**	Acute Inflammation and Repair **Pathologist**	Addiction 1 – Introduction **Psychiatrist**	Chronic Disease and Transplantation:Practical Issue for patients **Clinician**
11	Immunopathology: Hypersensitivity **Immunologist**	Chronic inflammation and Repair **Pathologist**	Addiction 2 – Intoxication, assessments and interventions **Psychiatrist**	Zika Virus **Microbiologist**
12	Immunopathology: Immunodeficiences **Immunologist**	Anti-inflammatory Drugs **Pharmacologist**	Addiction 3 – Treatment and withdrawal management overview of addiction **Psychiatrist**	Red and Hot **Clinician (surgeon)**
13	Revision	Revision	Review Session	

Direct Observation of Procedural skills (DOPS)[17]
In this exercise, the faculty member (i.e. the clinician) directly observes and assesses the resident's skill performance (e.g. pleural tap, intravenous cannulation, endotracheal intubation etc.) using a checklist or global rating scale. However, the assessors need to be initially trained by the qualified and experienced faculty member for direct observation and to develop the ability to discriminate between various levels of performance. Depending on the quality of training, senior residents or sometimes senior nursing staff can also function as assessors.

Mini Clinical evaluation exercise (Mini-CEX) [17]
Unlike DOPS this is a direct observation of clinical, analytical, and counselling skills (e.g. history taking, physical examination, etc.) in a clinical setting lasting not more than 20 minutes. It uses a different assessor and a different case for each encounter. Annually, each resident can be assessed by approximately six to eight assessors on around six to eight different cases. Unlike objective structured clinical examination (OSCE), Mini-CEX looks holistically at the complete clinical task rather than breaking it into components. This exercise has a value in it by way of immediate genuine feedback, making it more acceptable. Also, it can contribute to enhanced learning in the workplace.

Are there medical schools in India and abroad with a different curriculum?
Yong Loo Lin School of medicine in Singapore, College of Medicine and Dentistry in James Cook University, Australia, Melaka Manipal Medical College, Manipal and Kasturba Medical College – International Centre (2005-13) in India are a few examples which have or had something different from the traditional medical schools.

How exactly to introduce all the above changes?
Any change management needs methodical planning and execution. This requires the unconditional support of the management and the head of the institution. Also, the medical education unit must play a major role by highlighting the significance of these important tools and thereby providing hands on training to all the concerned faculty member. Above all, necessary committees (e.g. DOPS committee, PBL committee, curriculum committee etc.) have to be set up and a deadline has to be setup for incorporating this into the regular MBBS curriculum.

How to overcome the regulatory challenges?
Regulatory authorities (e.g. MCI, MQA, UGC, NAAC etc.) would welcome innovative changes in the curriculum to keep things at par with the global standards. In fact, the vision 2015 document[18] of the medical council of India (MCI) clearly mentions the urgent need to introduce drastic reforms in medical education, like horizontal and vertical integration, introduction of soft skills in the curriculum, active learning strategies such as case based and problem based learning, skills lab, e-learning, simulated exercises etc.

Finally, I hope the respective management/ administrators will also realise the urgent need to change the redundant curriculum and support the innovative faculty members and the medical education units to incorporate a 100% integrated (vertical + horizontal), case based, competency based and a clinically relevant short and sweet curriculum in a nonthreatening student friendly atmosphere with a thrust on collaborative small group learning exercises, and thereby try to incorporate what Albert Einstein said – "Education is not learning of facts but the training of the mind to think"

"Awareness is the first, important step to any academic change." – anonymous

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