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Medical Education- Teaching and Learning

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Introduction:

"The knowledge which a man can use is the only knowledge which has life and growth in it and coverts itself into practical power. The rest hangs like dust around the brain or dies like rain off stone". Froude (1818-1894).

Practice without theory is blind. Theory without practice is sterile. Lenin (1870-1924).

The prime goal of medical education is to ensure the graduation of doctors who are equipped with knowledge, skills and attitudes that enable them to manage health problems in individuals, families and the community; as well as to help in creating a healthy environment at these levels.

Factors that necessitated curriculum planning:

- Curriculum planning and modification should be an on going process. It should incorporate the global, national and local changes that include among other things the explosion of medical information technology and easily accessable media. Patients are becoming more know ledgable about the health problems and can discuss approach and management.
- Also the increasing number of medical schools and other health professionals that make team work and cooperation a necessity.

Guidelines to Curriculum Planning:

It is now accepted and mandatory that careful planning and structuring is necessary for any programme of adult teaching and learning, whether at the undergraduates' level or the postgraduates. At any moment the teachers and learners should know where they are at that moment and where they will be going next. They should also ensure that they are going in the right direction to meet and fulfil the set outcomes. Harden and his group have put forward ten general and practical steps useful in the planning of any curriculum. [(1)]

The Ten Steps of Curriculum Planning:

1. Needs Assessment: Curriculum planning rarely starts from a vacuum, most is developed from already existing programmes.The changes are usually considered when there is policy development and changes in the institute, especially when there are considerations of new educational processes- that come out of research findings, and are evidence- based. Feedback from teachers and learners and the community are also very important in this aspect as well as external evaluaters.

2. Establishing the Learning Outcomes: There has been strong disputes and criticism of the value of written objectives which are adopted mainly in problem based learning (PBL). They are written in a detailed

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manner- (action verb, content, condition, measurements) for each of the problems studied in each system. This is time consuming and results in volumes of written material that are rarely utilized by staff or students. They are also written separately for each of the main domains- knowledge, skills and attitudes, giving the impression that these are not related. In such a way they do not really reflect and do not lead to integrated clinical practice, where these objectives from the three domains need to be incorporated. What matters is not the learning of the individual objectives but their resulting, integration and utilization. [2]

All these factors put together have led to preference and adoption of Outcome-Based Objectives, what matters in what is achieved.

3. Deciding on the Content: Up to the early years of the twentieth century there was no clear system or curriculum of teaching medicine, especially in the widely separated medical schools such as in USA. In 1910 The American Senate formed the Flexner Committee with the task of coming up with a curriculum model to be taught in all USA medical schools. This is what has now become known as the Tradional Curriculum, which is essentially teaching in three phases. Preliminary phase of general sciences; followed by preclinical phase; anatomy, physiology, biochemistry, pathology bacteriology and finally the clinical phase.

This discipline-based teaching (Tradional Curriculi) dominated medical education for more than fifty years and is still practiced is some medical schools.

Criticism of this system increased in the sixties of the last century. The criticism was directed mainly to the fact that too much non-utilized information is taught in the basic sciences- each discipline on its own and without reference to coming clinical teaching.This lead to voluminous amount of knowledge being pushed on to students. In addition there was no integration or correllation among these different disciplines. Furthermore the students do not play active role in their learning; they are mainly recepients.

This led to other learning methods appearing:

-Teaching body systems rather than disciplines- e.g (CVS, CNS, Resp, ect).

-Life cycle- continuum teaching- from childhood to old age (from birth to earth) as is practiced in Maastricht (Holland).

- Problem-Based learning (PBL) [3]

-Task-Based learning (TBL) [4]

- Outcome- Based curriculum [5, 6]

- Core-Curriculum [7, 8, 9, 10]

4. Organizing The Content: This depends primarily on first establishing the learning outcomes and then the process of learning. The process of learning also governs whether a horizontal, vertical, spiral, web or mixed learning process will be followed. The horizontal organization is mainly practiced when the tradional-disciplines- based programme is followed, but the innovative programme use the new methods of learning.

5. Educational Strategies: As most of medical schools are going away from the Tradional Learning Programme-*+, there is more adoption of PBL and Outcome-Based Programme. The SPICES model essentially is a simplified mixture of the two. [11]

The letters is the word SPICES are just utilised to remind of the important educational concepts:

S- Student centred; P- Problem- based learning (PBL)/Task- Based learning (TBL); I- Integrated/ Interprofessional; C- Community oriented; E- Electives; S - Systematic.

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This model allows for variation in the application that suites the different schools and situations.

5. S- Student Centred Learning: In student centered learning, the student takes an active role in his own learning. What matters is not what the student has been taught, but what he has learned and can demonstrate and apply, when applicable or needed. Student centred learning is not an alterative to other forms of teaching, but an addition that is useful and required in any teaching programme. The formal teaching acts as guide to direct the student. An important advantage of student centred learning, if well practiced and if mind- maps are made will enhance storage in deep memory and recall; this in its turn will help in linking, adding new learning and recall.

5. P-Problem Based/ Task- Based Learning: One of the most important features of (PBL, TBL) is that students take an active role in their learning. They learn in small groups. In PBL, students are given written problems on organ/system basis. In TBL the learning is focused round a series of tasks which the doctor is expected to do. The initiating task or problem should be carefully designed to stimulate the students to solve the problem. Students first read and discuss the problem or task in small groups of about ten each. They start by making use of their collective previous knowledge. Then they have to think critically and identity new information that is needed to help them to reach a solution. They will then collectively agree on the new information needed. Students will then go and search individually for the required new information. This search and identifying the required new information will give the students the sense of discovery, and so promotes learning and recall through linking to deep memory. All these are important contributors to learning. Each student will bring his collected new information and discuss it with the group under the facilitation of the tutor. The students will then agree on the relevant collected information that will help solve the studied problem or task. This experience will enhance the learning through the discussions, use of previous knowledge, integration and relating of new knowledge. The key in PBL/TBL is to use a problem or task to drive the learning activities on a need- to- know basis. An important goal of this student centred, problem- based learning approach is to develop physicians who practice integrated science in action when they graduate.

5. I- Integration/Interprofessional: Medical practice begins with learning scientific literature and ends with being able to care for patients and deal with health problems. Every health- care practitioner has to be able to apply the relevant knowledge, skills, and professional attitudes in order to be able to solve individuals or communty health problems or diseases. The best way to create interest in a subject is to render it worth knowing- to make the knowledge useable in one's thinking beyond the situation in which learning has occured.

There are many different common presentations of health and disease, every person presents this in his own way. All these different presentations can not be taught or learned; practioners have to be aware of this and reconstruct their assessment of a new health problem depending on their cumulative previous experience of relevant knowledge, skills and attitudes.

The process of developing flexible, changing and adaptable knowledge can be described in educational terms as integrated learning. This has led many schools to shift away from the traditional curriculum in which the basic sciences are taught separately in the preclinical courses, and then followed by the clinical programme. In fact this division is compounded by the physical separation of university campus and the teaching hospital

and by the tension between the practical and vocational requirements of training.
There is also a move to interprofessional and multiprofessional teaching when relevant where the students look at a subject from the perspective of other relevant professions. This breads the spirit of team work later in real practice.

5. C- Community Oriented: There are strong educational and logistical arguments for placing less emphasis on hospital- based programmes and more emphasis on the community as a context for student learning. This is more near to real practice situations in the professional life. This is one of the factors that lead to changes in medical curriculum mentioned earlier. Fewer patients are available in hospital as more conditions are treated on outpatient basis. Inpatient stay in hospital is reduced; patients are less available for teaching. Ambulatory care in the community is becoming more practical and relevant. Added to this is the reluctance of patients or attendants to allow the students to examine them.

5. E- Electives: Student- centred learning and the different needs of individual students has led to electives being an important learning activity. They are more or less similar to the special study modules (SSM) of the Core curriculum (will be discussed later) because of the increased number of medical schools and so in read groups and number of students. Adaptive curriculum is an extended form of electives where the teaching and learning can be planned to suite the varying needs of individual students' aspirations.
Elective can be designed to suite students who opt to work in certain countries or areas with dominant special health problems, or are interested in certain subspeciality.

5. S- Systematic approach: Systematic approach will reduce the increasing complexities and variations of medical teaching and training and ensure that all students have comparable training.
As innovative programmes like Outcome- Based education, Core Curriculum and others are becoming more and more popular, the curriculum content is being planned, designed with integration of the preliminary, intermediate and clinical objectives. Collectively they would lead to the expected exit outcomes.

6-Deciding the Teaching Methods: There is no ideal or perfect method of teaching. The teacher should make use of a range of methods, applying each method to the situation where it is most suitable and appropriate. The various methods of teaching used are:
Lectures- they are mostly used in the traditional system. Their great disadvantage is its passive nature; the student does not play an active role in his learning. The ironic definition of a lecture "words pass out of the mouth of the teacher to the ears of the student without passing though the brain of either" is an expressive one. But if the lecture is well structured, well conducted and actively involving the students by asking them to read about the subject before the lecture, and keeping them allert, it can be useful. Specially when introducing a new subject or in review.
Small group learning is specially useful and applicable in PBL and TBL. Small group learning helps in discussion and facilitates interaction between students and learning from each other; it cultivates the team work spirit. Small groups are ideal for learning skills and competencies and so most useful in practical and clinical teaching.
Independent learning is important in any method of teaching and learning, but it is more applicable in PBL/ TBL and in other innovative methods of learning; because the student has to be prepared for interactions.
New teaching technologies, computers E-libarary, clinic-pathological museiums, professional skills

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laboratories and other technologies have helped a lot in individual and group learning and are a must in any respectable medical school.

7-Assessment: Assessment is an extremely important area to all the parties in the college. The important thing is to have ideas about the areas and value of assessment to students, staff and the curriculum itself. The purpose is mainly for promotion and graduation. It assesses knowledge, skills and attitudes.

Emphasis is on the importance and relevance to the situation. The main tools for assessment are written, practical and continious assessment.The assessment is usually done at the end of course and end of year. The examiners should be a mixure of teaching staff and external assessors.The value and role of assessment should be clearly made known to the students. Ideally formative examinations should be properly being introduced into the teaching and both students and staff should be given feedback.

8-Curriculum Publication: The Curriculum document should be clear and transparent. The teachers have the responsibility to ensure that students have a clear understanding of what they should be learning and the range of learning experiences and opportunities available.The students should be able to know how and when they can assess the efficiency and the effectivity of their learning, how they can match the learning experiences to their own needs, and whether they have mastered the topic or not- and so can judge whether further studies and experiences are required.

To improve communications clear curriculum documentation with learning outcome, timetables and list of learning resources should be available.These should be coupled by study guides, curriculum maps relating these to where they stand then in their learning.

9-Promoting an Appropriate Education Environment: The learning environment should be a collaborative one, rather than a competitive one. Students should work as a team and be supportive to each other. This would even be of more importance in colleges which have multiprofessional or interprofessional training.

Tools to assess learning environment have been recently described by Raff- the Dundee Ready Educational Environment Measure (Dreem). [(12)]

10-Management, Evaluation of Curriculum and Feedback: The increasing complexity and variations of curriculi have made it mandatory and necessary to manage and supervise the curriculum. This begins with the advertisement of college entry and ends with graduation. This will include among other things buildings, resources, staff training, entertainment and environment and most important is the proper and timely excusion of the curriculum- teaching, learning and assessment. Responsibilities of resources will be at the faculty level. Undergraduate medical education committee will be responsible for planning and implementing the curriculum with the help of the departments. One should not expect to get right from start, unpredicted problems would appear, and good management would lead to early discovery of these problems and their correction. Harden recognised a number of approaches to curriculum development and management [(12)]. The most favourable now are Outcome-Based Curriculum and Core-Curriculum. Of course these can be mixed together.

Outcome-Based Education: There is no simple definition of Outcome-Based Education; There is no simpler or more describtive definition than the name itself. I have given more space to Outcome- Based Curriculum because I think the outcomes of this curriculum should be the model of any curriculum. As

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opposed to the input-output traditional teaching, the outcome- based learning specifies the exit outcomes students should be able to demonstrate upon graduation. Outcomes relate to answering who and what is a graduate. The emphasis is not only on what the graduates know, but more important on what they can do as a result of learning. The main concern is on what the student can do and not on what the teacher teaches.

Characteristics of Outcome-Based Education: The Outcome Objectives should be clearly identified and stated. Multiple instructional strategies and authentic assessment tools are used. Achievement determines progress. The students play a big role in their learning. They are given time and assistance to reach their potentials. In generation of Exit Outcomes**,** College staff will take leading role in this, but stake holders, senior doctors and other health- care professionals working in hospitals and the targeted community are also involed. Also recent graduates and students should be involved.

The Design Down process to plan the curriculum starts with Exit outcomes that are expected on graduation. These should be specified first. Once Exit outcomes have been specified then the work down for intermediate and then primary outcomes should be identified. This curricular map would be completed.

The Curriculum Map: Elements are identified by Spady [13]. Exit outcomes should be clear statements of progression of learning towards set exit outcomes.

Curriculum content will be structured in courses or modules, constructed by contribution of departments. Then an agreement on time table will be made and instructional delivery will be set by types of learning opportunities. Teachers who may deliver the teaching will be identfied and they would work as an integrated team and in a co-operation manner.

Student assessment will be in stages in a manner that relates to the exit outcomes. Student placement and advancement is judjed by their performance. The progression to exit outcomes is judged by feed back from staff and students. The development of an Exit outcome- based curriculum and the curricular map have the advantage of making explicit the outcome expected and thus increasing transparency and accountability.

Core Curriculum: Core curriculum was the key recommendation of the United Kingdom General Medical Council (UKGMC) in their 1993 report to all UK medical schools. The main objective is to meet the explosion of health information. Harden put forward the seven Cs to help memorizing the important concepts of Core Curriculum.

- *Certification/credibility.Capability/competence*
- *Comprehensiveness/communication.*
- *Consistency.Constructivism/continuum.Choice/career.*
- *Compacted curriculum.*

Core curriculum is divided into two main parts.The first takes 2/3 of training time. It should be taken by all students. It covers competencies essential for practice of medicine. So it requires high standard of mastery- with a pass mark of 80-90% for the essentials.

The second is Special Study Modules (SSM) which takes 1/3 of study time. It gives an optional- opportunity to study an area in- depth. It can contribute to core achievement in core learning- e.g use of information of technology to consolidate their core learning. It also can be utilized to promote independent learning and so can help the student to pursue the subspeciality he is interested in on graduation and specialization.

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