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Review Article

COMPETENCY-BASED MEDICAL CURRICULUM: A RESURGENT PARADIGM FOR MEDICAL AND DENTAL GRADUATES

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ABSTRACT

Present society is characterized by its growing complexity, dynamics and knowledge intensity, which requires professionals who are able to face new situations and problems confidently and expertly. Education faces the problem that knowledge acquisition does not necessarily mean the successful application of the same knowledge. In case of academic professionals, they should possess a broad and profound domain-specific knowledge and skills, the capability to acquire knowledge expeditiously and know-how where and when needed. Learning in a professional context has, therefore, become more important and general academic education is becoming more professional oriented. Medical education is changing to meet the demands of ever evolving health care system. One of these changes is the development and implementation of competency-based medical education (CBME). Competency-based learning and training is an approach to teaching and learning more often used in learning concrete skills than abstract learning. It differs from other non-related approaches in that the unit of learning is extremely fine-grained. Rather than a course or a module, every individual skill or learning outcome (known as a competency) is one single unit. Learners work on one competency at a time, which is likely a small component of a larger learning goal. The student is evaluated on the individual competency and can only move on to other competencies after they have mastered the current skill being learned. After that, higher or more complex competencies are learned to a degree of mastery and are isolated from other topics. Another common component of competency-based learning is the ability to skip learning modules entirely if the learner can demonstrate mastery. This can be determined through prior learning assessment or formative testing. This article pertaining to the discipline of medical education gives a broad overview and elaborates on this emerging competency based medical education approach and its related concepts.

Keywords: Attitudes, Competency based curriculum, Knowledge, Skills.

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INTRODUCTION

The medical/dental graduate, at the end of the undergraduate training program, should be able to recognize "health for all" and should be able to fulfill his/her social obligations towards realization of this goal. To fulfill the mandate of the undergraduate medical curriculum which is to produce a clinician, who understands and is able to provide preventive, promotive, curative, palliative and holistic care to his/her patients, the curriculum must enunciate clearly the competencies the student must be imparted and must have learnt, with clearly defined teaching-learning strategies and effective methods of assessment. The medical student should be trained to effectively communicate with patients and their relatives in a manner respectful of the patient's preferences, values, beliefs, confidentiality and privacy.[1]

There is a necessity to relook at all aspects of the various components in the existing curriculum (Table 1) and adapt them to the changing demography, socio-economic context, perceptions, values and expectations of patients and their families. Emerging health care issues particularly in the context of emerging diseases, impact of advances in science and technology and shorter distances on diseases and their management also need consideration. Therefore, there is a necessity of updating medical curriculum for undergraduate MBBS and BDS students in consonance with the changing health needs of the society.[1-4]

SHIFTING FROM TRADITIONAL TO COMPETENCY-BASED EDUCATIONAL PARADIGMS

Unlike the old days, when everyone used to force the students to learn in a particular way or choose a definite career path, today they are motivated to do what their passion and interests allow to. This way, traditional learning eventually and gradually is taking a back seat in the education arena and competency-based learning is coming into the picture and getting more recognition in the education world.[5] Table 1 illustrate the difference between competency-based learning and traditional system of education.[6-10]

Table 1: Comparing traditional and competency based education

	Traditional education	Competency based education
Building block of academic program	Course	Competency (Knowledge, skill, ability)
Content delivery	Course based- lecture, discussion, lab. Usually in-person (face to face); can be online. Fixed time.	Varied and includes lectures, projects, use of publicly available resources developed by experts (Open educational resources). Online or face to face. May be self-paced. Flexible and personalized.
Assessment of learning	Course based exams and projects.	Assessments designed to determine mastery of competencies. Multiple methods of assessment may be used.
Culture of learning	Students go to class or virtually attend online sessions for a set number of hours per day and participate in faculty-led lectures or activities.	Varies by institution and student population served. Flexible, personalized learning environment with regular interaction with faculty and may include classes, projects or learning outside of the class room or learning wherever it occurs.
Measuring progress	Students pass or fail based on overall course grade which combines class work, projects, homework, tests, etc. Students can fail and have to retake the entire course.	Students advance by demonstrating mastery of competencies.
Expectations	Students take a series of courses or classes in a prescribed time period.	Students' progress depends on mastery of competencies.
Faculty role	A single faculty member may perform multiple roles and serve as subject matter expert, instructor, advisor, curriculum designer, etc.	Roles may be unbundled and have specific curriculum designers, assessors, coaches, subject matter experts, etc.

HISTORY

Ralph Tyler, an educational psychologist proposed outcome based learning of education in 1949, which differed from education practice before.[11] Since then, many educationalists have expanded on his ideas. Benjamin Bloom's taxonomy of educational objectives, including a cognitive (Knowledge), a psychomotor (Manual skills), and an affective (Attitudes) domain, has dominated most of the world's thinking of educational objectives.[12] In 1963 Carroll observed that, given equivalent learning time, students with different aptitudes diverge in their learning performance; some do not acquire the required performance goal and to avoid variable outcome

of education time, each learner must be allowed the learning time he or she needs to attain a specific learning goal.[9] This view revolutionized the educational thinking by recognizing that a similar mastery of skills requires flexibility and individualization. This focus on outcomes led to Bloom's personalized systems of instruction and mastery learning to ensure that as many students in a class as possible to meet a required learning criterion.[12,13] The vast technological and scientific changes and globalization since the 1980s led schools to introduce employment competencies, to increase levels of skills and flexibility to serve a competitive economy.[14,15]

COMPETENCY BASED MEDICAL EDUCATION/CURRICULUM

Competency-based medical education (CBME) is an outcomes-based approach to the design, implementation, and evaluation of a medical education program using an organizing framework of competencies where competency is defined as "the ability to do something successfully and efficiently". In essence, a competency-based curriculum is one that focuses upon what learners are expected to carry out rather than on what they are expected to know. CBME focuses on outcomes: upon completion of the program, students must be able to perform certain task. This approach produces applied scientists rather than mobile encyclopedias.[16-22]

Competency-based education is an approach to designing academic programs with a focus on competencies (knowledge, skills, abilities, attitudes, values and behaviors) rather than time spent in a classroom. By definition, Competency-based learning refers to systems of instruction, assessment, grading, and academic reporting that are based on students demonstrating that they have learned the knowledge and skills they are expected to learn as they progress through their education.[23,26]

Competency based curriculum emphasizes the complex outcomes of a learning process (i.e. knowledge, skills, abilities, attitudes, values and behaviors to be applied by learners) rather than mainly focusing on what learners are expected to learn about in terms of traditionally-defined subject content. In principle such a curriculum is learner-centered and adaptive to the changing needs of students, teachers and society. It implies that learning activities and environments are chosen so that learners can acquire and apply the knowledge, skills and attitudes to situations they encounter in everyday life. Competency-based curricula are usually designed around a set of key competences/competencies that can be cross-curricular and/or subject-bound (Fig 1).[27-30]

Competency-based learning is an approach to teaching and learning more often used in learning concrete skills than abstract learning. It differs from other non-related approaches in that the unit of learning is extremely fine-grained. Rather than a course or a module, every individual skill or learning outcome (known as a competency) is one single unit. Learners work on one competency at a time, which is likely a small component of a larger learning goal. The student is evaluated on the individual competency and can only move on to other competencies after they have mastered the current skill being learned. After that, higher or more complex competencies are learned to a degree of mastery and are isolated from other topics. Another common component of competency-based learning is the ability to skip learning modules entirely if the learner can demonstrate mastery. This can be determined through prior learning assessment or formative testing.[31,33]

The thrust in this competency based medical curriculum is continuation and evolution of thought in medical education making it more learner-centric, patient-centric, gender-sensitive, outcome-oriented and environment appropriate. The result is an outcome driven curriculum. There is a fundamental shift in the curriculum from teacher-centered to learner-centered orientation. Competency outcomes drive curriculum objectives; curriculum does not drive outcomes (Fig 1). Emphasis is made on alignment and integration of subjects both horizontally and vertically while respecting the strengths and necessity of subject-based instruction and assessment. This has necessitated a deviation from using broad competencies; instead phase subject (sub) competencies were used.[34-38]

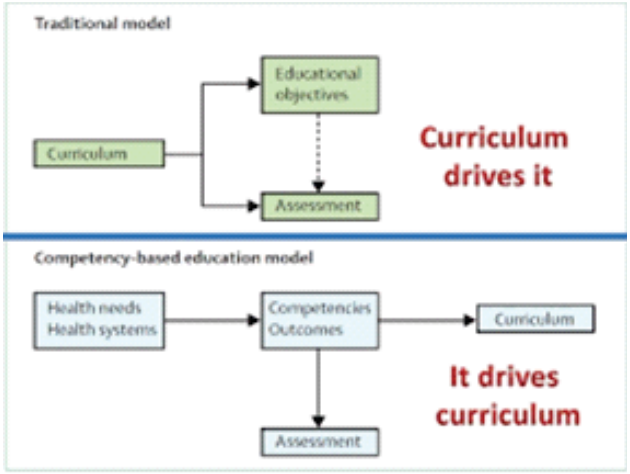

Figure 1: Competency outcomes drive curriculum[18]

A significant attempt is made in the outcome driven undergraduate curriculum to provide the orientation and the skills necessary for life-long learning to enable proper care of the patient. The importance of ethical values, responsiveness to the needs of the patient and acquisition of communication skills is given importance by providing dedicated curriculum time in the form of a longitudinal program based on attitude, ethics and communication competencies. Great emphasis has been placed on collaborative and inter-disciplinary team work, professionalism, altruism and respect in professional relationships with due sensitivity to differences in thought, social and economic position and gender.[39-42]

Minor tweaks to the formative and internal assessments and summative assessments have been made to achieve the objectives of the curriculum. (Figure 2). Curricular governance and support have been strengthened, increasing the involvement of curriculum committee and medical education department.[17,32,43]

The attainment of highest level of competency may be obtained through steps spread over several subjects or phases and not necessarily in the subject or the phase in which the competency has been identified. Subject-wise outcomes so called sub-competencies that must be achieved at the end of instruction in that subject. It is important to review the individual outcomes (competencies) in the light of the topic outcomes as a whole. For each competency outlined – the learning domains (Knowledge, skill, attitude, and communication) are identified.[16,17] The expected level of achievement in that subject is defined as knows (K), knows how (KH), shows how (SH), perform (P).[19,32,44]

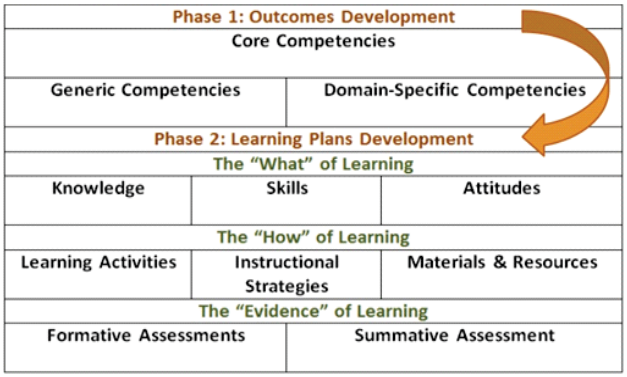

Figure 2: Methodology for competency based curriculum development[20]

COMPETENCY

The word 'competency' literally means the ability to do something successfully or efficiently. A competent professional shows a satisfactory (Superior) performance. Competencies are integrated systems of knowledge, skills, attitudes, values and beliefs developed through formal and non-formal education that allow individuals to become responsible and autonomous persons, able to solve a diversity of problems and perform in everyday life-settings at the quality level expressed by the standards. In other words, competency represents the integration and application of learned facts, skills and affective qualities needed to serve the patient, the community and the profession.[31-33,45,46]

Competencies are a collection of trainable skills, knowledge, abilities, behavior, attitude, aptitude, confidence, experience, talent, and proficiency. Competencies may or may not include values, morals ethics, beliefs, attributes, qualities or other more personal characteristics.[34]

The categories of competencies in CBC may be domain specific, relating to clusters of knowledge, skills and attitudes within one specific content domain related to the profession or generic, because they are needed in all content domains and can be utilized in new professional situations (Fig 1).[26,30,34]

Competencies, milestones and entrustable professional activities (EPAs) are three important pillars which are inter-related inter-dependent and inter-linked for the successful

implementation of CBME (Fig 3).[18] Milestone is a marker (or series of markers) denoting progress toward achieving competence. Entrustable professional activity (EPA) refers to a task that a physician performs every day in clinical environment.[18,47,48]

Figure 3: Competencies, milestones and entrustable professional activities (EPAs)- the three important pillars of CBME[18]

CBME is also known as skill-based learning, proficiency-based learning, mastery-based learning, outcome-based learning, performance-based learning, and standards-based education.[49-51]

CONCLUSION

Novel trends within medical education over the last two decades have seen the emergence of innovative learning initiatives. One such initiative is competency based medical education (CBME), a resurgent paradigm, has the potential to transform contemporary medical education. Competency based learning would include designing and implementing medical education curriculum that focuses on the desired and observable ability in real life situations. The CBME is organized around competencies or predefined abilities as outcomes of the curriculum. The undergraduate medical and dental CBME program is designed with a goal to create a medical/dental graduate (Doctor) possessing requisite knowledge, skills, attitudes, values and responsiveness, so that she or he may function appropriately and effectively as a physician of first contact of the community while being globally relevant. CBME holds great promise along with many challenges for doctors' training worldwide, and is likely to be here for the foreseeable future.

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