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DISCIPLINE-BASED VERSUS COMPETENCY-BASED EDUCATION IN DENTISTRY

Suryakant C. Deogade, MDS*[1], Dinesh Naitam, MDS[2]

[1]Professor, Department of Prosthodontics, Hitkarini Dental College & Hospital, Jabalpur, Madhya Pradesh, India.
[2]Asso. Professor, Department of Dentistry, Government Medical College, Akola, Maharashtra, India.

***Correspondence for Author: Dr. Suryakant Deogade**
Professor, Department of Prosthodontics, Hitkarini Dental College & Hospital, Jabalpur, Madhya Pradesh, India.

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ABSTRACT
In the past, the traditional dental education (TDE) was structured in such a way that students mostly learned what their teachers chose to teach them and was, hence, considered as discipline-based learning. This approach was aimed to produce dentists with prescribed packages of knowledge and skills upon their graduation. Recently, a new trend of competency-based education (CBE) has evolved and brought a tremendous revolution in the existing dental curriculum. CBE provides a sequence of defined learning experiences to dental students so that on graduation they may be considered as qualified beginners in their independent clinical practice. However, this demands the re-assessment and re-structuring of the traditional dental and allied-dental curricula. Probably, the conceptual difference between a discipline-based and a competency-based education is the driving force towards the development of new curricula in dentistry.

KEY WORDS: dental education, undergraduate, knowledge, curriculum, competencies.

INTRODUCTION
Traditional dental education (TDI) is the example of an apprenticeship model and is considered mainly as discipline-based. In the past, this model had worked well, but unfortunately it predisposed dental students to mechanical approaches to learning, skills, judgments, and critical clinical decisions. The traditional dental curricula have failed to give exponential learning outcomes in terms of the ability of students to perform in a wider range of circumstances and to respond adequately to the situation. A competent dental graduate must be able to combine the appropriate supporting knowledge and professional attitudes and perform skills independently. Competency is the blend of knowledge, skills, attitudes, and values in an integrated response to the full range of circumstances encountered in general dental practice. Competency-based education (CBE) has provided the better opportunities for dental graduates enriching them with knowledge, skills, and clinical decisions, apart from choosing a good career. This article describes a brief review about discipline-based and competency-based education in dentistry and the necessary restructuring of the dental and allied-dental curricula.

TRADITIONAL DISCIPLINE-BASED EDUCATION
In the past dental education, the teachers used to deliver the increments of prescribed subject matter dictated by the traditional dental curriculum. This education is an apprenticeship model which is prominently discipline-based. Discipline-based educational practice has been offered in the hope of instilling and retaining knowledge to the learners. This type of education had worked well in the early days of dental education, but in the recent scenario it has led to a 'bloated curriculum'. Discipline-based education (DBE) predisposed dental graduates to mechanical approaches to learning, judgments, and clinical decisions. The traditional dental curriculum cannot provide learning outcomes whereby the students could reveal the ability to perform their best in a wider range of circumstances and to respond suitably to the clinical situation. The success of dental or allied-dental health curricula is judged in terms of its learning impact on students and is termed as competency outcomes. The movement towards competence and outcomes-based models of curriculum and assessment were initiated in the United Kingdom to support the development of youth training programs. CBE is based upon the early identification of clearly specified outcomes of learning. Assessment of performance and the demonstration of skill or competence are more emphasized, instead of only written evidence of knowledge. Statements of competence define what students are expected to learn and confirm that learning has actually been achieved. Outcome-based assessment must be a continuous and progressive assessment instead of having an end-of-course examination.[1]

WHAT IS COMPETENCY IN DENTAL EDUCATION?
New dental graduates are competent enough in their realistic clinical practice settings once they realize their

ability of functioning independently.[2] The competencies for dental licensure in Canada have been formatted, whereby the competency has been defined as the communication skills, through understanding, and professional values of an individual ready for beginning independent dental or allied oral health care.[3] Competency is related to an appropriate base of knowledge with a professional attitude, which is adjunct with a reliable performance in clinical settings without any dependence. A professional individual must pass through a predictable sequence of qualitatively different patterns of communicative skill, appropriate knowledge, and values.[4] Competency includes the development of behavior patterns that are open to broader evaluation protocols than are traditionally used in formal teaching. The teachers must be very clear about instructional and behavioral objectives of CBE so that they can help students achieve competence. The real challenge is the integration of certain specified objectives with key-task competency statements; in order to achieve the goals of CBE.[5] A survey was conducted in United Kingdom (UK) dental schools to confirm a general trend towards an integrated dental education. It was found that the courses carried towards competency-based teaching are mostly related to human disease subjects.[6]

COMPETENCY-BASED EDUCATION

Competency may be defined as "behavior expected of beginning independent practitioners", which "incorporates understanding, skills, and values in an integrated response to the full range of circumstances encountered in general professional practice".[2] CBE provides a sound method for the design of instruction and assessment for undergraduate dental education.[7] It is considered as a method of acquisition of the knowledge, communication skills, and values related to the cognitive, psychomotor, and affective domains. This method of education includes an integrated mechanism for evaluation and assessment.[8] In TDE, the teachers used to teach their students within a prescribed package of knowledge which was solely discipline-based. However, a competency-based dental curriculum identifies the courses or training essential for dental practice providing a sequence of defined learning experiences. Thus a CBE reforms the dental student who may graduate as a qualified beginner. There are conceptual differences between a discipline-based and a competency-based education in dentistry. The adoption of competency-based learning requires the re-assessment and revision of old dental curricula.[9]

The understanding, skills and professional values required for a dental student are essential for initiating the unsupervised practice of dentistry.[3] Several authors[10, 11] proposed the need of a competency-based curriculum in dental education. They recommended that the conceptual differences between a traditional discipline-based and a competency-based education must be considered while planning and developing curricula that are intended to provide the dental practice need of the future. Competence is an integrated approach whereby the goal of competency is achieved by defining the essential knowledge and by assessing the required skills and attitudes of students. The CBE is a way forward in the development of traditional courses and trainings.[5]Some authors[12, 13] felt the importance of instructional objectives in developing CBE in students. Certain instructional objectives may help students more quickly to acquire the mental attitudes for learning. The process is simplified by addressing the statement "the mind's journey from novice to expert: if we know the route, we can help students negotiate their way".[12] The statements of competence must define about the learner's ability and the standards required achieving these abilities. Once the outcomes of learning are specified with clear ideas, the further assessments must be based directly on these outcomes. These assessments must be continuous and comprehensive instead of end-of-course examinations. Further, more emphasis must be placed on assessing performance and demonstrations of skill or competence.[1] The CBE programs for dentists have been intended to develop specific formative and summative evaluations, which are found to be more effective in demonstrating an increase in cognitive, psychomotive, and affective learning domains.[14] Pedagogy implementation as competence-based method in British Universities Studies in Higher Education was found beneficial. It reduces passive dependence of students on lectures and enhances their performance as they are actively participating in learning process through problem-solving. It also encourages their critical assessment towards competing theory and evidence and serves to improve their interdisciplinary understanding. Encouragement towards literature searches and writing-up of clinical case reports are appreciable advantages offered by CBE. It helps in establishment of closer links with private practice settings and community-based clinical settings for educational purposes.[15] The competency statements are not enough to cope up practicalities of instructional objectives. However, continuous, consistent, and progressive assessments of competencies are required for developing and enriching dental education.[2, 16] The self-perceived competency was investigated in two classes of graduating dental students and reported that graduates from a competency-based learning (CBL) school felt more competent when compared to graduates from a traditional curriculum school.[17] CBL school graduates felt more competent in communication skills, critical evaluation of existing clinical condition and identifying oral and dental related problems. CBL, as a close link to dental competencies, served to help in certain domains such as diagnosis and judgment, treatment planning, and patient management. The action research of CBL was studied in operative dentistry branch and found that CBL serves to reduce passive dependence on lectures and teachers. Instead, this kind of learning focuses on active student-centered learning with the encouragement of teamwork and critical self-appraisal.[18]

ROLE OF TEACHING AND LEARNING FOR CBE

The competency is not achieved at one step, but is gained in successive stages. The primary objective of CBL is for the student to make him progressively independent and for discipline-based learning to take over from teaching.[11] Several stages of competency are as follows:
1. Novice: The first of the learning steps on the learning path can be confusion and rote mimicking of instructors in the simulation laboratory or diagnostic clinic.

2. Beginner: With further instruction and practice, students gain some control of parts of a competency and become able to demonstrate this control in ideal, simulated situations when asked to do so. This signifies the transition from novice to beginner. Students master foundation knowledge and performance at this stage.
3. Competent: Now able to understand the basis for their decisions, and possess appropriate professional values and the ability to provide the dental needs of most patients.

Certain specified instructional objectives may help dental students to modulate and prepare their mental processes required for CBL.[12;13] The cognitive theory for instruction in problem-solving can be followed in successive steps including cognitive and metacognitive aspects and informed instructions.[19]

1. Cognitive- practicing on specific task-appropriate skills.
2. Metacognitive-instructions regarding acquiring skills (like how to undertake and monitor skills).
3. Informed instruction- giving explanations of their acquiring skills (like why and how the skills work).

CURRICULAR AND INSTRUCTIONAL IMPLICATIONS OF COMPETENCY-BASED DENTAL EDUCATION

The three important elements of competency have been described in dentistry such as intellectual competence, physical-technical competence, and interpersonal competence.[20] It has been suggested not to focus exclusively on the evaluation aspect of competency-based education rather than addressing the curricular and instructional implications.[21] The two methods of evaluation for CBE are authentic and portfolio.[11] Authentic evaluation refers to a judgment about an individual's ability to perform in realistic clinical settings. In the private clinical settings, students are supposed to practice independently without any assistance. CBE offers opportunities such as case presentations, community-based projects, and multidisciplinary courses. This kind of education has been adopted for the teaching and learning of conservative dentistry in several dental schools. However, the deficiencies still remain in the evaluation of clinical performance. Portfolio evaluation has been suggested to overcome the deficiencies related to authentic evaluations. A portfolio or logbook refers to a collection of evidence of completed cases, letters or forms signed by Heads of Departments, and research papers or abstracts.[11] Some researchers[22, 23] proposed to conduct structured clinical operative tests and objective structured clinical examinations in order to improve the evaluation of students' clinical performance. However, these alternative and innovative methods should not be added to the existing evaluation methods, rather than restructuring of the course.[21] Assessments of student performance can be formative or summative and are reported to be quite effective in competency-based education programs improving knowledge, professional attitude and performance skills of the dentists.[14] It has been advocated conducting laboratory and clinical learning tasks which contributes in continuous formative assessments.[22] A more realistic perspective develops with increased maturity in the self-assessment of a problem-based learning curriculum in dentistry.[24]

DENTAL CURRICULUM AND COMPETENCY CONTINUUM

The competency is a point on a continuum where responsibility for learning is transferred from teachers to learners. The dental graduate must take the continuum to higher levels of competency, which is only possible through continuing education and postgraduate dental programs.[25] The problems and problem-solving strategies during the dental practice may be solved in successive stages.[26] It has been suggested to formulate competency statements if necessary.[27] Some researchers[27, 28] proposed to adopt the evaluation of clinical competency in postgraduate general dentistry in current postgraduate teaching. Also, it has been suggested employing certain programs such as alumni to assess the self-perception of competencies at time of dental school graduation.[29] Certain educational establishments have been observed in colleges conducting the courses such as a one-year PG diploma course in general dentistry, diploma and membership examinations for general dental practitioners, and an open examination for a diploma certificate in general dentistry. Linking postdoctoral general dentistry programs with community-based clinical care settings has been advocated.[30]

CONCLUSIONS

The benefits to dental students and teachers of employing learning outcomes for assessing and developing curriculum in dental education are multiple. Traditional discipline-based education in dentistry offers limited opportunities to learners in regards with learning, judgments, skills, and clinical decisions. Contrary to this, competency-based education focuses on what learners must be able to do when they begin their independent clinical practice and forms the basis for a career in competency continuum. Along with this, it focuses the minds of educators and facilitates the integration of teaching, rather than promoting the discipline-based curricula in dentistry. CBE offers an innovative way of looking and thinking towards dental and allied-dental curricula.

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