EXPERT VIEW

Identifying Needs and Preparing for Curriculum Changes in Indian Dental Education

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Abstract

The aims of dental professional courses are to prepare dental healthcare providers to manage common dental diseases, perform surgeries, and offer prevention. They should also be equipped to understand the needs of the society they are serving and willing to amend their skills. As they are expected to be a part of a team providing health care, they should have the requisite leadership and managerial skills for leading the team to serve its objectives in the best possible way. Thus, with changing times, there is a need to bring reforms in dental curricula. Traditional classroom teaching is now shifting to a competency-based education system across the globe. The Dental Council of India (DCI), as a dental health regulator in the country, implements reforms periodically in an attempt to further strengthen the training process and bring quality improvement in dental education. A process of redesigning the curriculum started a couple of years ago. The technical team supporting this work brainstormed the need for such reforms and studied the existing pattern of undergraduate curricula in other developed countries. It was found that many countries are following outcome-based teaching-learning methods. There are several institutions and professional associations proposing recommendations on curricular reforms, and India also suggests following the same. The new education policy (NEP) of the Government of India (GoI) is also in sync with the changes proposed to the DCI. Though such changes are challenging and require time to strategize and implement, it is essential to have reforms in curriculum, especially related to methods of teaching-learning and assessment, and for this, the dental faculty needs to be trained.

Keywords: Curriculum, Dentistry, Developed countries, Faculty, Parents, Policy, Students, Workforce.

International Journal of Clinical Pediatric Dentistry (2024): 10.5005/jp-journals-10005-2846

Introduction

Past 2 decades have seen a paradigm shift in healthcare system and approach of public toward health. Dental healthcare is no exception to this and dental healthcare providers need to be prepared as per changing societal needs and archetype.[1] The existing curriculum for dental graduates in the country was made with an aim to make them good dental surgeons by providing greater emphasis on surgical skills and lesser emphasis to overall health and primary prevention.

Primary oral healthcare remains a priority area in the planning process for a country with large population,[2] and consequently, the role of dental education system is very important. There are several concerns with India's undergraduate dental education, such as curricular reforms and faculty development. Programs for faculty development tend to focus on enhancing participants' teaching skills; however, there are issues with the system of dental education adjustments to the curriculum.

As the dental profession evolves, it is necessary to examine current requirements and customize courses for the benefit of all stakeholders, including students and the community. Curriculum forms the basis of dental education, and there is a need for appreciating the necessity of transitioning from traditional to competency-based dental education (CBDE) system. The current article lays emphasis only on reforms related to curricular aspects, and not on other issues such as admission policies, caste-based admissions, religion, economic status, privatization in dental education, etc.

Need Assessment

In most developing countries, dental education and healthcare face significant obstacles in terms of both content and competence.[3]

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How to cite this article: Deshpande AN, Mathur VP, Lele GS, *et al.* Identifying Needs and Preparing for Curriculum Changes in Indian Dental Education. Int J Clin Pediatr Dent 2024;17(7):842–850.
Source of support: Nil

The burden of oral diseases is still significant in developing nations, that is attributed to poor infrastructure, lack of resources (shortage of dental surgeons, an unequal distribution of human resources, and access to high-quality oral healthcare), and the standard of dental education.[4]

The administrators and policymakers of the healthcare education need to aim at providing young professionals with a strengthened foundation to provide primary oral healthcare with competence, rather than merely conducting examinations, post their training period, to certify their status.[5] The current system requires skilled and competent dental surgeons. The Dental Council of India (DCI), the statutory professional regulatory body, oversees dental education in the country (Table 1).[6] Having identified that dental education has to alter, the DCI has initiated the process of transitioning to competency-based curriculum.

To combine the demand for opening new dental colleges while maintaining and raising quality standards has proven to be the DCI's biggest challenge. It is suggested that curricula be changed in order to systematically address these problems and create plans to enhance the system of dental education and oral healthcare so that Indian dental graduates meet or exceed international norms. The curricular reform's goals are to analyze and develop a roadmap for dental education that is appropriate for a nation in the changing contexts: to create strategies that make dental education innovative; capable of preparing undergraduates to perform in the changing dental science scenario; and to gradually implement immediate fixes and propose medium- and long-term strategies to modify or improve current dental education.[7,8] Additionally, other areas like attitude, empathy, compassion, professionalism, humanities, and communication skills need to be presented and taught in a more organized manner. Curriculum changes that the DCI intends to implement should be taken seriously, and every effort should be made to make them a reality.[9]

Policy Analysis (Based on Previous Gazette Documents and Amendments)

The primary reason for the need of curricular reforms is the continued use of an outdated curriculum designed more than a few decades ago that compartmentalizes medical and dental specialties rather than providing a comprehensive understanding of the topic.[10] Academicians and governing bodies at all academic institutions have long argued for the necessity to introduce extensive curricular changes in dental education by adapting it to the requirements and expectations of the modern world, but when it comes to taking action, policymakers are still moving slowly. The modifications made to the dental profession education curriculum through the analysis of gazette papers were tallied, which demonstrated the urgent need for reform (Table 2).

Conflict of interest: Dr Nikhil Marwah is associated as Editor-in-Chief of this journal and this manuscript was subjected to this journal's standard review procedures, with this peer review handled independently of the Editor-in-Chief and his research group.

Rate of Changes and Modifications Done in Alignment with Societal Needs and Pace of Reforms in Other Areas of Higher Education

There has been a complete shift in other professional educations like medicine, engineering, and pharmacy over a period of time. The National Council for Professional Education in the country remodeled the curriculum as technology replaced manual work in engineering sciences. Similarly, there is a complete change in the way medical students are being trained—from standard traditional teaching to integrated classes, the use of technology, and imparting practical training in an objective and structured format. The dental profession has been impacted by rapid advances in science and technology, and in the future, there may be a transition from classroom teaching to self-directed learning for a few topics.

Literature Review/Research Analysis

A research was done to identify current gaps in the medical education system and to suggest changes from the viewpoint of medical undergraduates.[11] Under the guidance of a medical education specialist, medical undergrads took part in group discussions. Based on demand and the influence on medical education, challenges were identified in the scientific paper and ranked in order of importance (Table 3). After analyzing the relevant material rigorously, consensus was achieved on the best course of action by the authors.[11]

A major shift in how students and teachers are perceived in terms of teaching–learning principles is one of the suggested remedies for the current problems. In order to create a system of medical education that is more effective, it is necessary to emphasize these themes to decision-makers and implementers.[11] The perception of various teaching–learning principles are also applicable and relevant to dentistry education in the contemporary situation and, hence, should be planned for dental profession education.

Review of Global Scenario of Dental Education

While educational institutions and methods utilized at dentistry schools across the world differ, there are many commonalities in the

Table 1: Governance, functions, and responsibilities of DCI

Governance	*Functions*	*Responsibilities*
DCI	To maintain dental education at both the undergraduate and graduate levels of a uniform quality To plan for periodic inspections for reapprovals as well as inspections of dental colleges for authorization to open new dental colleges, add seats, or launch new postgraduate programs To establish requirements for and standard curricula for the training of dental technicians, dental hygienists, and dentists To establish the minimal criteria for exams and other conditions that must be met in order to be recognized as qualified under the act To monitor all dental institutions and make sure they uphold the necessary standards	Recognizing the dental degrees granted by various universities and upholding national standards for dental education No dental college is authorized to begin operating until the DCI is satisfied by inspections or other means that the teaching personnel, equipment, building, etc., given, are in compliance with the basic standards as laid out by the DCI and approved by the Central Government

perspectives of students, staff, and curriculum. One must comprehend the significance of promoting global convergence with long-term goals for the reciprocal acceptance of international degrees.[12] World over, key areas have been identified to establish competencies and criteria of excellence in dental education (Table 4). The exchange of professional viewpoints between nations and interprofessional communication will also benefit from global convergence.

According to the Institute of Medicine's (IOM)[19] study of dental education, the issue in reforming dental education is not so much a lack of agreement on the paths for change as it is a challenge to get over roadblocks.[20,21] There isn't a perfect curriculum that could be used at any dental school across the globe. As dental education standards converge, the curriculum could be competency-based, focused on the subjects listed by the European Union (EU)[22] in accordance with local and regional criteria, and employing the profile and competencies for the European dentist. Basic, clinical, and other biological topics can all be introduced as electives.

According to Hendricson et al.,[23] the foundation of clinical reasoning and judgment, which represents the expertise of a qualified dental professional, is the capacity for critical thought combined with problem-solving abilities. Additionally, learning techniques such as case-based learning and reviews, in-class

Table 2: Major developments in curriculum reforms of dental education in India

Year	*Development*
1948	On 12th April 1949, the DCI, a statutory body, was established by an Act of Parliament called the Dentists Act, 1948 (XVI of 1948)
1992	The modifications were implemented by an edict that the President of India issued on 27th August 1992. Through this ordinance, new sections 10A, 10B, and 10C of the Dentists Act, 1948 were added in order to primarily prevent the mushrooming of dental colleges, the addition of seats to any courses, and the launch of new, more advanced programs without the prior approval of the Central Government, Ministry of Health and Family Welfare. The modification took effect on 1st June 1992, as formally announced by the GoI in Extraordinary Gazette of India, Part-II, Section-I on 3rd April 1993
2007	In order to be admitted to the BDS program, a student had to be 17 years old on or before 31st December of the admission year. For admission to the BDS program, candidates must have passed the 10 + 2 (Higher Secondary Examination) The BDS program was a 5-year program with either a 6-month or a 1-year paid rotating internship. Admission to the program was based on merit (the sum of a student's marks in biology, chemistry, and physics). Any student who failed the first BDS University Examination in any topic within 3 years of their entrance date will be expelled from the program
2011	National Eligibility cum Entrance Test (NEET) for BDS program admission. An applicant must get at least 50th percentile in the "NEET" exam in order to be considered for admission to the BDS program The required minimum score for Scheduled Castes, Scheduled Tribes, and Other Backward Classes is the 40th percentile. Candidates with a minimum score of 45th percentile must have a locomotor impairment The 5th year students were taken out. With 240 teaching days each academic year and a 1-year paid rotating internship at a dental institution, the undergraduate dentistry curriculum leading to the BDS degree was to last 4 academic years The exam schedule was divided into four sections, with the last year being separated into two sections. The 5-year subjects listed above were removed. Any student who does not complete the BDS program in its entirety within 9 years, including the mandatory 1-year paid rotational internship, will be expelled from the program. Any applicant who failed one topic on an examination was allowed to enroll in the next higher class, take the failed subject again, and pass it before being allowed to take the next higher exam

Table 3: Identified lacunae with proposed solution based on problem domains

Classification of problem domain	*Identified lacuna(e)*	*Proposed solution(s)*
Knowledge	Student training should be taken into account second to providing healthcare services	Students' education and training should come first
	Using less effective teaching methods	Optimizing the student to teacher ratio Encouragement of self-directed learning following basic instruction in a subject and expert responses to questions The implementation of flipped classrooms and case-based group discussions
	A lack of application in instruction method	Education based on outcomes
	An ineffective system of internal evaluation	Regular formative evaluations using clinical vignettes
	Inefficient use of students' and teachers' time as a result of bad scheduling	Improving departmental and interdepartmental cooperation and scheduling
Skill	Insufficient instruction in clinical techniques and ward protocols	Starting early instruction in ward procedures and involving students in bedside decision-making discussion.
	Insufficient emergency training	Mandatory emergency duties
	Insufficient development of soft skills	Promotion of the development of soft skills
Research	Undergraduates' disinterest in and ignorance about research	Fostering healthy mindsets and educating pupils about research

Table 4: Global recommendations and accreditations pertaining to dental education

Country	*Body/commission*	*Recommendations/areas of concern*
United Kingdom	Dearing report	Higher education institutions instantly start to create or look for access to programs for their staff's teacher training
United States	National Academy of Sciences	There is simply a tenuous link between clinical training and experience and basic science concepts The curriculum is not up to date enough with regard to dental science and practice There are numerous issues with using comprehensive patient care as a model for clinical education There are few links between dentistry and medicine Lack of space in the dentistry curriculum prevents the development of critical thinking abilities
United States	American Dental Education Association[13]	The Commission on Change and Innovation in Dental Education advocated various significant ideas, such as critical thinking, lifelong learning, and integrating knowledge from research into curriculum, with the aim of bringing about new changes in the education of general dentists[13,14]
United States	Commission on Dental Accreditation (CODA)[15]	Cited seven factors, including the rise in societal mobility around the world, changes in population and profession-level demographics, increased concern over patient access and the dental workforce, adjustments to the requirements for licensure, problems with dental education, the development of dental specialists, and illegal dental practice, as causes of the current upsurge in interest in international accreditation[15]
Europe	DentEd III and Association of Dental Education in Europe (ADEE)	DentEd III is working to align dental education with EU guidelines[16] ADEE outlined the rationale behind the international dentist profile's convergence. The reasoning for this suggestion was that the EU is made up of 29 separate states, each with its own unique culture, language, religion, ethnic group, and educational system[17]
EU	Guidelines for profile and competency of a dentist (PCD)	PCD is an acknowledged, international document that offers recommendations for curriculum changes in dental schools to converge standards toward a European Dental Curriculum while respecting local, national, and regional socioeconomic and cultural diversity. It is not a rigid template. When considering all areas of change in regard to the undergraduate dental education program in their country, "it is intended to provide guidance and reflection to those who deliver dental education"[18]

quizzes with quick feedback, self-assessment, and more have been recommended to help students develop their critical thinking skills.[24] To accommodate the current generation of tech-savvy dental students, the tactics and methods used to deliver dental education must be appropriately changed. A wide range of tools in information and communication technology (ICT) are available for use in dental education, including social media communication tools like weblogs, compact disks (CDs), and digital versatile disks (DVDs), video conferencing, webcasting, podcasts, and virtual learning environments.[25] The future of teaching and learning activities will involve the use of three-dimensional (3D) technology in simulation-based virtual environments, the use of avatars and role-plays for diagnosis and treatment planning, and access for participants from any campus or computer.

In contrast to the current approach we use, which is teacher-centered and content-based, tests conducted in the west have shown that the student-centered, outcome-based manner of dental education is more effective. Competency-based medical education (CBME) refers to a technique of teaching medicine that treats the student as the basic unit and their learning objectives or competencies as the endpoints.[26,27] A paradigm change in CBME involves basing the curriculum on societal/community requirements. These requirements inform the learning objectives or competences. By removing the barriers across specializations, the teaching–learning techniques and assessment get integrated.[28]

In order to draw international students to study in India and to retain Indian graduates after their training, dental schools in India may want to consider upgrading their undergraduate programs to meet international standards. A paradigm shift in dental education is required so that an Indian dental graduate is on par with an international dental graduate.

Role of Stakeholders in Reforms

It takes the engagement and participation of all stakeholders to acknowledge the need to transition from the traditional, teacher-centered, content-oriented style of education to the student-centered and outcome-oriented dental education system.

Around the world, there have been significant changes in dental education. All parties involved must support change, which necessitates coordinated and well-planned initiatives. The dental education system must undergo significant cultural transformation if it is to meet the demands of its professional bodies, regulators, students, and patients.

Students and Parents

On completion of the educational experience, the learner should be capable of performing any clinical activity autonomously at a specific point of healthcare with adequate precision, competence, and effectiveness.

Today's tech-savvy "Y generation" (Gen Y) and "Generation Z" (Gen Z) have changing educational needs and require more varied and dynamic learning techniques that also incorporate information technology applications. In order to effectively cater to the educational requirements of the students and to motivate and rekindle their interest in learning, it is crucial to understand the point

of view of students and their preferences towards dental education in terms of the learning environment, educational methodologies, and course content. Appreciating the requirements of dental students will enable us to better prioritize aspects of the dental industry. This is likely to help in understanding the motivations and justifications behind their decision to pursue a career in dentistry. The motivations of dental students appear to be influenced by factors such as desirable working conditions, where they may set their own hours as opposed to medical professionals, monetary potential, and the ability to balance work and family obligations.[29]

Students from dental schools in North America and Canada participated in a strengths, weaknesses, opportunities, and threats (SWOT) analysis, and they claimed that the teaching techniques were boring and relied solely on memory recall rather than being problem-based or requiring critical thinking skills. The students of today belong to the so-called Gen Y or internet generation, and they have high expectations for training that is clearly explained and enables the use of readily available resources. They also prefer digital learning modalities, such as 3D software and websites that teach dental anatomy and provide videos and demonstrations to understand their preclinical procedures.[30,31] The students' view of the dental school environment has not been very favorable due to reasons such as limited interaction between professors and students, academic overload, tests, and grades, among others. Self-assessment opportunities, collaborative learning, and international student exchange programs are suggested ways to resolve these issues.[32] In a study done at the Harvard School of Dentistry, elements of team-based and self-directed learning were combined with peer-to-peer teaching, reducing the need for rigorous faculty supervision and creating an innovative educational program for Gen Y students. Study results revealed that purportedly slow learners improved noticeably near the end of the program, highlighting that completely unique educational approaches can effectively motivate students to learn.[33]

Parental acceptance and expectations should be considered, and assessment survey forms for parents should be created with a few open-ended questions. This will facilitate the completion of the cycle of curricular reforms.

Faculty

The quality and quantity of dental faculty have a significant influence on the dental education system, as the success of instruction is heavily reliant on the educators.

To address the issue of the declining number of professors, professional organizations and the dental education system must work together.[34] Apart from other aspects like research funding, possibilities for private practice, and room for professional development, the dental faculty believes that the work environment is the primary factor influencing professional satisfaction. Recognizing faculty members' opinions about their profession can help in implementing pertinent initiatives to enhance faculty recruitment and retention.[35]

In CBDE, the teacher's job is primarily to support students' learning by acting as a mentor.[36] Instead of didactic lectures and note-taking, more emphasis is placed on small group teaching techniques, self-directed learning, cooperative learning techniques, and communities of practice. It is the responsibility of the teachers to design their lessons to be more interactive and to encourage students to clarify their understanding as needed. A key component of CBDE is providing students with feedback on their learning. In order to effectively give students timely, formative, constructive, balanced, precise, and goal-oriented feedback, facilitators need to develop the necessary knowledge and abilities.[37]

Another area of concern is the immediate need for more dental faculty, worsened by the preference of graduating dentists who typically choose clinical practice over academia because it seems to be a more profitable career. The Academic Dental Careers Fellowship Program survey on faculty interviews by students found that factors like the intellectual and scientific challenge and a basic interest in teaching were the most important influences on their decision to pursue an academic career. In contrast, the disadvantages of choosing an academic career were student loan debt and lower income compared to private practice.[38,39] Refining the dental education program will inspire the dental graduate to pursue a career in academia.

Management

Management should work with a change management committee or specialists during the process of implementing change to ensure success. Any organization with a hierarchical structure and numerous employees is a company. Hence, dental college professors must also be cognizant of transformation planning because they are part of such a hierarchy. There are several tried-and-true change models, and the majority of them share common themes. A model for effective change management that is exhaustively defined, the Kotter's model of change management[40] has been thoroughly studied in many commercial organizations.

Any curriculum redesign requires a significant investment of time and money in faculty development, educational tools, and ICT. Faculty training is the most crucial component in helping them understand the importance of curricular adaptation and change.

Management's involvement is imperative for the long-term success of curricular change. It is important to motivate and inspire both teaching and nonteaching faculty, as well as students, to accept their responsibility for the change's success. These initiatives by faculty and administrators should be supported both cognitively and monetarily, along with their needs for resources and funds to implement reforms.

Regulatory Bodies and Current Policies

National priorities and policies: To ensure a successful transformation, the continual and dynamic process of curriculum evaluation should be maintained. All stakeholders, including students, teachers, support staff, and alumni, should be asked for their opinions on the curriculum. In many nations, renowned dental educators visit dental schools seeking accreditation as part of expert committees from various educational groups. Prior to the expert team's inspection visit, the dental school is required to submit a comprehensive study of their strengths, weaknesses, opportunities, and challenges. This process mirrors India, where the National Assessment and Accreditation Council (NAAC) evaluates institutes. The institution receives a report from its peer team detailing strengths, weaknesses, points of strength, points of weakness, and suggestions for improvement. Various operational policies exist in most countries to ensure curricular changes based on societal needs. In our country, higher education is overseen by the Ministry of Education, Family, and Healthcare, the University Grants Commission, along with professional regulatory bodies such as the DCI for dental programs. Forming a task force to implement changes, assess obstacles, and devise solutions can be an effective strategy.

The opportunity to participate in the Global Dental Congress's effort to achieve convergent standards, originally intended for the EU, was provided by the DCI's decision to extend the undergraduate dental program to 5 years. However, this decision was implemented but later reversed by the DCI.

It is important to place a strong focus on teaching dentistry students about attitudes, ethics, and communication. Another significant change that the DCI will implement is the addition of advanced courses in health professions education for faculty, as well as basic workshops on educational technology for all instructors in dental institutions. These courses will provide dental educators with the necessary information and skills to develop lesson plans and implement cutting-edge teaching-learning, assessment, and evaluation strategies.

National Education Policy 2020: The Ministry of Education has updated the National Policy on Education (NPE), which was created in 1986 and was in force for 34 years, with the NEP 2020. The goal is to produce graduates who can understand the requirements and cultural background of the local community and are capable of handling patients at Public Health Centre (PHC) levels. The current NEP draft recommends alterations to the length and organization of medical courses, as well as emphasizes integrative healthcare and preventative medicine.[41] The areas of focus are: (1) integrating the departments of health services and medical education; (2) managing all health systems under one academic umbrella; (3) Multidisciplinary Education and Research Universities (MERUs) that are model public universities for holistic and multidisciplinary education, at par with Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs), etc.; (4) flexibility in medical education by allowing the individual to branch off and pursue other streams both inside and outside of medicine. Academic staff colleges should be developed with diverse cells, including those for curriculum design and development, teaching content development, and feedback evaluation assessment. Furthermore, there is an emphasis on integrating digital technology in teaching, learning, and assessment.

While the Indian Medical Association (IMA) expressed concerns about the National Education Policy 2020, particularly regarding medical education, the policy also hints at exploring possibilities of integrating conventional medical curriculum with Ayurveda, Naturopathy, Unani, Homeopathy, and Siddha in the future. To enhance the core curriculum and accommodate anticipated additions, autonomy must be granted to examining universities and apex national bodies. The National Medical Commission (NMC) and DCI must be empowered to establish the curriculum and pedagogy to ensure effective implementation.

Society to Whom Services are Provided

The economic development of the Indian subcontinent has resulted in an increase in both the quantity and quality of oral healthcare needs. The curriculum should be designed to meet the oral healthcare demands of the entire society, similar to how the socioeconomic conditions of a nation determine the treatment needs of its population.[42]

Additionally, in order to address this issue, there is a need for more numbers of competent graduates and specialists in India to meet the needs of the society for oral healthcare.

Need for Outcome-based Educational System vs Time Bound

The goal of outcome-based education (OBE) is to optimize student learning outcomes by enhancing their knowledge and abilities. OBE is a student-centric educational approach that maps and evaluates students' performance at every stage.

Outcome-based education is a pedagogical approach that necessitates changes in curriculum, pedagogy, and assessment procedures to focus on higher-order learning rather than simply accumulating course credits. This shift, which prioritizes what is learned over what is taught, is pivotal compared to traditional education. OBE is learner-centered and integrates real-world situations, emphasizing the knowledge, skills, and attributes students acquire upon completing a course or program. In traditional education systems, there is a strong emphasis on standardized procedures, with students gathering in one location at specific times for teacher-led instruction. Following lectures, students typically engage in peer interactions or seek clarification from faculty members. The success of this system heavily depends on the effectiveness of the instructor and the students' assimilation of knowledge. In contrast, OBE focuses on predetermined learning outcomes, highlighting the skill sets students should develop during their education. Activities both inside and outside the classroom are designed to support students in achieving these goals.

The clarity that OBE promotes is among its most significant advantages. Students and their parents can choose a school, a program, and a course based on explicitly stated learning objectives. What students are expected to accomplish following their course or program is determined by the course outcome (CO), program outcome (PO), program specific outcome (PSO), and program educational objective (PEO), respectively. The quality of instruction and delivery across divisions and departments, where teachers may better focus their attention, is further reflected in this clarity. The next benefit is flexibility, which is possibly the most evident one. OBE gives students the freedom to select their own courses and methods of learning. In addition to accommodating a learner's strengths and shortcomings, it also gives them enough time to become proficient and fluent in the subject. Additionally, the model enables students to switch to another university that is accredited with the OBE syllabus and transfer their credits. Based on this accreditation, institutions are recognized, measured against industry standards, and are easily comparable. Therefore, every stakeholder gains from the OBE framework.

Need for Transition from Traditional to Competency-based Dental Education

In a vast and diversified system, it is challenging to gauge compliance with DCI standards, and the majority of dental schools that deliver subpar education lack adequate standardization and quality assurance procedures.[43] Since the undergraduate dental curriculum is not competency-based, dentists trained in India who migrate to other developed nations need additional training.

Under "aims and objectives," in the DCI curriculum document "Bachelor of Dental Surgery (BDS) Course Regulation 2007," goals are listed under each of the three categories of knowledge, skills, and attitude. However, there is currently no way to qualitatively and quantitatively evaluate whether these goals have been achieved. Knowledge is delivered in a discipline-based manner using traditional teaching techniques. The fundamental ideas that improve learning[44,45]—learning through self-study, pertinent prior information, learning in context, purposeful practice, and favorable conditions—have not been promoted.

The transition to outcomes components requires the most attention if the suggested CBDE strategy is to be successfully

implemented. It is important to use a pragmatic strategy that combines didactic lectures, case-based learning, small group discussions, and self-directed learning. The key elements of CBDE include early clinical exposure (ECE), vertical and horizontal integration, and a combination of timely formative and summative evaluation based on competency statements, using a range of assessment instruments. The best teaching and assessment practices, backed by theory, must be taught to faculty members through faculty development programs.[46]

The fact that the present syllabus is packed with a lot of knowledge components in the cognitive domain with reserved emphasis on the psychomotor domain (clinical skills), and almost no emphasis on the affective domain (attitude), is one of the key concerns.[47] The most crucial components of the affective domain, including empathy, professionalism, compassion, communication abilities, ethics, and humanities knowledge, are neither taught nor assessed at most dental schools.[48]

The use of unreliable and highly subjective assessment methods is another area of grave concern. The marks given by the examiner are frequently determined by how they subjectively interpret the responses.[49] Systems like 360° evaluation should be taken into consideration because a student who performs exceptionally well in a controlled examination setting may not perform the same way in a real-world scenario, and vice versa. Therefore, we must conduct assessments on the job and verify the student's competency based on how they perform in actual clinical contexts; this is known as workplace-based evaluation.[50] Therefore, we must ensure that graduates possess fundamental skills to exercise their clinical abilities competently and independently in specific settings; these are known as entrustable professional activities (EPA).[51]

Role of the Dental Council of India in Perceiving Need for (Rationale) and Proposing Development of Competency-based Dental Education in All Specialties of Dentistry

The DCI has made remarkable strides by updating the undergraduate dental education curriculum while keeping in mind the need for change. The planned CBDE modification includes a fundamental shift in how students and teachers view teaching-learning principles. It is essential to use effective teaching and evaluation strategies that center on competency-based education. The quality of dental education can be dramatically improved with a strengthened feedback mechanism.

To complete Kern's reform-related measures, implementation and program evaluation are necessary.[52] The outcomes of the evaluation process can also be used for analysis, program modification, and program strengthening.

Training academic staff in the teaching of the health professions will be a crucial component of this transition.[53] In order to facilitate other faculty, some of these skilled professors will need to form a core group. DCI has already established core groups for each specialization to create courses in those fields. This will make it possible for the essentially outcome-based teaching and assessment methodologies to be uniform.

These actions—proposed, endorsed, and carried out by the DCI—will go a long way toward guaranteeing that the nation has competent dental graduates, well-equipped and qualified to manage the oral healthcare requirements of the society.

Preparedness to Introduce Competency-based Dental Education for Undergraduate Curriculum

The guardians of the dental profession are working hard to establish a value-based curriculum by introducing novel concepts and ideas to make dental education realistic, useful, and student-friendly, aiming to produce better dental graduates as oral healthcare providers.[54]

It has been established beyond a doubt that curriculum changes have improved students' understanding and benefited teachers as well.[55] Medical school curriculum reforms have been tried in a variety of settings, with varying degrees of success,[56] but it has also been noted that without sufficient planning, it is challenging to sustain any curricular reform.[57]

Goals and objectives must be set once the targeted learners have been identified in order to create the program's blueprint. Although setting learning objectives is a skillful task, getting it wrong can have severe effects. Learning objectives serve as a roadmap for learning outcomes and guide the selection of teaching and learning strategies necessary to achieve desired results. After defining the objectives, educational strategies are decided upon, including assessment methods and training approaches (both theoretical and practical/clinical). The resources needed must be considered, including infrastructure, teaching and learning resources, tutoring materials, lesson plans, student guides, and schedule planning. Once refined, the strategy can be put into action.[53]

For teachers and facilitators to be successful, they must have access to continuing dental education programs and mentorship opportunities.[58,59] Faculty mentoring produces inspired, effective, and successful teachers who, in turn, inspire students and leave a lasting legacy. Additionally, it helps increase faculty satisfaction and retention by fostering a friendly and encouraging academic environment.[60] This is in accordance with Kern's seven-tier hierarchy of faculty development tactics, which emphasizes self-evaluation, participation in courses on improving one's teaching, and mentorship of incoming teachers, among others.[61]

Conclusion

Change should be viewed as an opportunity to avoid redundancy. Although it may be daunting to step outside one's usual environment, it should be seen as a chance for growth. For the benefit of students, faculty, society, and the greater good, it is time to embrace change and redesign how we approach dentistry. To ensure robust infrastructure and cutting-edge education, the DCI and the Union Government should rigorously enforce laws and regulations. Educational programs between nations should strive for greater uniformity, and a credit transfer system could be developed to achieve mutual recognition. Otherwise, we risk losing our standing among the world's leading nations. Preparation for collaboration with EU nations should follow the institutionalization of curriculum adjustments to international norms. Establishing a network among Asian countries could begin within the current South Asian Association for Regional Cooperation (SAARC) platform for mutual recognition of qualifications. In conclusion, curriculum reform is an ongoing process that must address the increasing complexity of the dental sector and the evolving needs of the public.

Declaration

Dr Latha was among the group who conceptualized and gave a shape to this paper however, we lost her before the final version was prepared for the same. All Authors are of unanimous opinion to keep her name as author for this manuscript.

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References

1. Kay E. Dental education—shaping the future. Br Dent J 2014;216(8):447–448. DOI: 10.1038/sj.bdj.2014.298
2. Kumar R. Healthcare and medical education reforms in India: what lies ahead? J Family Med Prim Care 2013;2(2):123–127. DOI: 10.4103/2249-4863.117394
3. World Health Organization. World health assembly official records—WHA 48.8 Reorientation of medical education and medical practice for health for all.
4. Shrivastava SR, Shrivastava PS, Ramasamy J. Curricular reforms in undergraduate medical education: an indispensable need. Int J Prev Med 2013;4(8):980–981.
5. Solanki A, Kashyap S. Medical education in India: current challenges and the way forward. Med Teach 2014;36:1027–1031. DOI: 10.3109/0142159X.2014.927574
6. Dental council of India, objectives.
7. Van Lerberghe W. The world health report 2008: primary health care: now more than ever. World Health Organization; 2008.
8. Ghose S. Medical Council of India—Regulations on Graduate Medical Education 2012. Ann SBV 2020;2(1):1–22. DOI: 10.5005/jp-journals-10085-2103
9. Kulkarni P, Pushpalatha K, Bhat D. Medical education in India: past, present, and future. APIK J Int Med 2019;7(3):69–73. DOI: 10.4103/AJIM.AJIM_13_19
10. Kumar R. Medical education in India: an introspection. IJPA 2014;60(1):146–154. DOI: 10.1177/0019556120140111
11. Kapoor D, Tiwari K, Faruqi A, et al. Proposed reforms in medical education in India: perspective of undergraduate students. Clin Epidemiol Glob Health 2020;8(1):305–307. DOI: 10.1016/j.cegh.2019.03.012
12. Kadagad P, Tekian A, Pinto PX, et al. Restructuring an undergraduate dental curriculum to global standards—a case study in an Indian dental school. Eur J Dent Educ 2012;16(2):97–101. DOI: 10.1111/j.1600-0579.2011.00726.x
13. Haden NK, Andrieu SC, Chadwick DG, et al. The dental education environment. J Dent Educ 2006;70(12):1265–1270.
14. Kalkwarf KL, Haden NK, Valachovic RW. ADEA commission on change and innovation in dental education. J Dent Educ 2005;69(10):1085.
15. Crawford JM, Adami G, Johnson BR, et al. Curriculum restructuring at a North American dental school: rationale for change. J Dent Educ 2007;71(4):524–531.
16. Shanley DB, Dowling PA, Claffey N, et al. European convergence towards higher standards in dental education: the DentEd Thematic Network Project. Med Educ 2002;36(2):186–192. DOI: 10.1046/j.1365-2923.2002.01125.x
17. Cowpe J, Plasschaert A, Harzer W, et al. Profile and competences for the graduating European dentist—update 2009. Eur J Dent Educ 2010;14(4):193–202. DOI: 10.1111/j.1600-0579.2009.00609.x
18. Plasschaert AJ, Holbrook WP, Delap E, et al. Profile and competences for the European dentist. Eur J Dent Educ 2005;9(3):98–107. DOI: 10.1111/j.1600-0579.2005.00369.x
19. In: Field MJ (Ed). Dental Education at the Crossroads: Challenges and Change. Washington: National Academy Press; 1995.
20. Bland CJ, Starnaman S, Wersal L, et al. Curricular change in medical schools: how to succeed. Acad Med 2000;75(6):575–594. DOI: 10.1097/00001888-200006000-00006
21. Hendricson WD, Cohen PA. Oral health care in the 21st century: implications for dental and medical education. Acad Med 2001;76(12):1181–1206. DOI: 10.1097/00001888-200112000-00009
22. Directive 2005/36/EC of the European parliament and of the council of 7 September 2005 on the recognition of professional qualifications. Official J Eur Union.
23. Hendricson W, Eisenberg E, Guest G, et al. What do dental students think about mandatory laptop programs? J Dent Educ 2006;70(5):480–499.
24. Hendricson WD, Andrieu SC, Chadwick DG, et al. Educational strategies associated with development of problem-solving, critical thinking, and self-directed learning. J Dent Educ 2006;70(9):925–936.
25. Feeney L, Reynolds PA, Eaton KA, et al. A description of the new technologies used in transforming dental education. Br Dent J 2008;204(1):19–28. DOI: 10.1038/bdj.2007.1185
26. Frank JR, Mungroo R, Ahmad Y, et al. Toward a definition of competency-based education in medicine: a systematic review of published definitions. Med Teach 2010;32(8):631–637. DOI: 10.3109/0142159X.2010.500898
27. van Mook WN, Bion J, van der Vleuten CP, et al. Integrating education, training and assessment: competency-based intensive care medicine training. Neth J Crit Care 2011;15:192–198.
28. Shah N, Desai C, Jorwekar G, et al. Competency-based medical education: an overview and application in pharmacology. Indian J Pharmacol 2016;48(Suppl 1):S5. DOI: 10.4103/0253-7613.193312
29. Kristensen BT, Netterstrom I, Kayser L. Dental students' motivation and the context of learning. Eur J Dent Educ 2009;13(1):10–14. DOI: 10.1111/j.1600-0579.2007.00485.x
30. Henzi D, Davis E, Jasinevicius R, et al. In the students' own words: what are the strengths and weaknesses of the dental school curriculum? J Dent Educ 2007;71(5):632–645.
31. Mattheos N, Stefanovic N, Apse P, et al. Potential of information technology in dental education. Eur J Dent Educ 2008;12:85–92. DOI: 10.1111/j.1600-0579.2007.00483.x
32. Divaris K, Barlow PJ, Chendea SA, et al. The academic environment: the students' perspective. Eur J Dent Educ 2008;12:120–130. DOI: 10.1111/j.1600-0579.2007.00494.x
33. Nalliah RP, Allareddy V. Weakest students benefit most from a customized educational experience for generation Y students. PeerJ 2014;2:e682. DOI: 10.7717/peerj.682
34. Livingston HM, Dellinger TM, Hyde JC, et al. The aging and diminishing dental faculty. J Dent Educ 2004;68(3):345–354.
35. Shepherd KR, Nihill P, Botto RW, et al. Factors influencing pursuit and satisfaction of academic dentistry careers: perceptions of new dental educators. J Dent Educ 2001;65(9):841–848.
36. Harris P, Snell L, Talbot M, et al. Competency-based medical education: implications for undergraduate programs. Med Teach 2010;32(8):646–650. DOI: 10.3109/0142159X.2010.500703
37. Holmboe ES, Sherbino J, Long DM, et al. The role of assessment in competency-based medical education. Med Teach 2010;32(8):676–682. DOI: 10.3109/0142159X.2010.500704
38. Schenkein HA, Best AM. Factors considered by new faculty in their decision to choose careers in academic dentistry. J Dent Educ 2001;65(9):832–840.
39. Emrick JJ, Gullard A. Integrating research into dental student training: a global necessity. J Dent Res 2013;92(12):1053–1055. DOI: 10.1177/0022034513508557
40. Kotter JP. 8 Step Process to Accelerate Change. Leading Change. Boston: Harvard Business School Press; 1996. pp. 1–186.
41. Ministry of Human Resource Development, G. O. I. (2020). National Education Policy 2020. In Working Papers (id:13106; Working Papers). eSocialSciences. FOUNDATIONAL STUDY ON THE IMPLEMENTATION OF NATIONAL EDUCATIONAL TECHNOLOGY FORUM. (n.d.). Retrieved January 15, 2021.

42. Bertolami CN. Rationalizing the dental curriculum in light of current disease prevalence and patient demand for treatment: form vs. content. J Dent Educ 2001;65(8):725–735.
43. Mahal AS, Shah N. Implications of the growth of dental education in India. J Dent Educ 2006;70(8):884–891.
44. Ryder MI, Sargent P, Perry D. Evolution and revolution: the curriculum reform process at UCSF. J Dent Educ 2008;72(12):1516–1530.
45. Kersten HW. The enhancement of learning by teaching. Eur J Dent Educ 1997;1(4):149–152.
46. Licari FW. Faculty development to support curriculum change and ensure the future vitality of dental education. J Dent Educ 2007;71(12):1509–1512.
47. Modi JN, Gupta P, Singh T. Competency-based medical education, entrustment and assessment. Indian Pediatr 2015;52:413–420. DOI: 10.1007/s13312-015-0647-5
48. Sood R, Adkoli BV. Medical education in India—problems and prospects. J Indian Acad Clin Med 2000;1:2010–2012.
49. Deswal BS, Singhal VK. Problems of medical education in India. Int J Community Med Public Health 2016;3(7):1904. DOI: 10.18203/2394-6040.ijcmph20162063
50. Singh T, Sood R. Workplace-based assessment: measuring and shaping clinical learning. Natl Med J India 2013;26(1):42–46.
51. Dhaliwal U, Gupta P, Singh T. Entrustable professional activities: teaching and assessing clinical competence. Indian Pediatr 2015;52:591–597. DOI: 10.1007/s13312-015-0681-3
52. Kern DE, Thomas PA, Hughes MT (Eds). Curriculum Development for Medical Education: A Six-Step Approach, 2nd edition. Baltimore: Johns Hopkins University Press; 2009.
53. Lagali-Jirge V. Change has become a necessity: curricular reforms and change management is what we need. J Indian Acad Oral Med Radiol 2019;31(1):2–3.
54. Mazumdar D. Guest editorial: current scenario of dental education in India. Contemp Clin Dent 2011;2(4):272–273. DOI: 10.4103/0976-237X.91786
55. Michaud PA. Reforms of the pre-graduate curriculum for medical students: the Bologna process and beyond. Swiss Med Wkly 2012;142(5152):w13738. DOI: 10.4414/smw.2012.13738
56. Moshki M, Atarodi BA, Moslem A, et al. Applying an educational-participatory program based on the PRECEDE model for promoting self-esteem and mental health of students in Iran. Int J Prev Med 2012;3(4):241.
57. Robins LS, White CB, Fantone JC. The difficulty of sustaining curricular reforms: a study of "drift" at one school. Acad Med 2000;75(8):801–805. DOI: 10.1097/00001888-200008000-00010
58. Schrubbe KF. Mentorship: a critical component for professional growth and academic success. J Dent Educ 2004;68(3):324–328.
59. Walsh A, Koppula S, Antao V, et al. Preparing teachers for competency-based medical education: fundamental teaching activities. Med Teach 2018;40(1):80–85. DOI: 10.1080/0142159X.2017.1394998
60. Ullian JA, Stritter FT. Types of faculty development programs. Fam Med 1997;29(4):237–241.
61. Hendricson WD, Anderson E, Andrieu SC, et al. Does faculty development enhance teaching effectiveness? J Dent Educ 2007;71(12):1513–1533.