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Original Article

Education Section

The Proposal of a BDS Syllabus Framework to Suit Choice Based Credit System (CBCS)

SHIVASAKTHY MANIVASAKAN[1], KR SETHURAMAN[2], KA NARAYAN[3]

ABSTRACT

Introduction: Higher education takes a new dimension universally in the form of choice based Credit System (CBCS). In India, the University Grants Commission (UGC) has made CBCS mandatory in all fields except for Health Profession. Not much attempts were made in designing a BDS syllabus to suit CBCS.

Aim: Aim of the study was to propose a model dental syllabus to fit into choice based credit system.

Materials and Methods: A model BDS syllabus Prototype for CBCS was designed based on the UGC guidelines for terms as well as calculations for CBCS. Engineering curriculum models from IIT and Anna University were also referred to.

Results: Semester based BDS syllabus was designed without changing the norms of Dental Council of India (DCI). All the must know areas of the subjects were considered as "core" areas and the desirable and nice to know areas are left for "electives" by the students. By this method, none of the subject was left out at the same time students are provided with electives to learn deeper on their topics of choice.

Conclusion: The existing BDS syllabus can be effectively modified by incorporating few changes based on the UGC regulations for Choice based credit system. The proposed framework gives an insight on the nature of modifications that are needed. By adopting this, BDS Course regulations can also follow CBCS without neglecting or reducing the weightage of any subject.

Keywords: BDS syllabus, Choice Based Credit System, Cumulative grade point average, Dental education, Dental research, Dental students, Electives, Graduate dental education

INTRODUCTION

Education is an open system where the feedbacks from the stake holders including society, students, teachers, organization bodies and government allow changes to happen as and when required. Educational reforms are required periodically to keep the system upgraded and to suit the need of the hour. The University Grants Commission (UGC) of India is a statutory organization set up by Union government, for the coordination, determination and maintenance of standards of university education. The UGC recommends timely academic reforms for the overall improvement of higher education. One of such reform is the implementation of Choice Based Credit System (CBCS). It has been made mandatory in the field of arts, science and engineering [1,2].

CBCS is a model of education, in which the subjects are divided into core courses and electives. The students can choose the elective courses from subjects of their own choice. This education model also allows the students to learn at their own pace where the assessment is grade based on a credit system.

The existing Bachelor of Dental Surgery (BDS) syllabus in India follows an annual exam pattern [3]. Few subjects like Prosthodontics and Conservative dentistry are taught for two years but assessed only after the subject is completed in final year. This causes lack of interest for students in non-exam going subjects and they find the summative exam at the end of final year to be difficult. This could be overcome by semester system and assessments at the end of each semester that provides good feedback to the students and make learning easier in chunks. Another drawback of the existing syllabus is, though the student is allowed to clear BDS within 8 years, the students don't have a choice of appearing for few subjects at a time and appearing for rest in future. The students who cannot clear the exams at one go, thus discontinued from the batch for 6 months, lose their confidence and their academic performance might decline further. This could be overcome by credit system where the students are allowed to take lesser subjects, clear them and then learn the rest, at the same time BDS should be completed within same 8 years limit. Possibility of learning at their own pace keeps the students in the center stage of learning and also makes them responsible for their progress. Elite students can be allowed to earn more credits by taking more electives within the same semester which will be reflected in their grade card at the end.

Apart from this, students graduating from different institutions face the problem of recognition when going abroad or to a different university within the same country. Many universities abroad, provide job and higher education opportunity only to students who graduate from few selective Indian Dental Institutions. Such inconsistencies could be overcome by the credit system where, if implemented by Dental Council of India (DCI), all the colleges will follow a common system and anywhere in the middle of BDS the students can transfer their credits to the new college where they will join and continue the rest of the course. Credit transferring is a biggest advantage from stake holder's point of view. Hence, if so many nice things are possible, why can't we check what needs to be done if BDS syllabus should be made to suit CBCS? The aim and objective of the study was to design a BDS syllabus that suits CBCS at the same time without compromising the existing one.

MATERIALS AND METHODS

Designing of the syllabus: The existing annual based BDS syllabus of DCI [3] was divided into semesters. UGC guidelines [4] were used for calculation of the educational hours & credits that match the number of teaching hours recommended by the DCI. The key subjects were divided into two papers, Paper – I & II and distributed in the semesters. This maintained the weightage of the subject and at the same time reduced the academic load on the students.

The key factor in health professions education is that none of the subject can be left in choice and all are mandatory to learn. But

there is a possibility of classifying the portions of each subject into must know, desirable to know and nice to know areas for an undergraduate student to learn. The classification can either be done by the dental academicians of respective specialties in the institutions or the governing body can form a committee constituting senior dental academicians. As an undergraduate student, they are expected to know only few topics in each subject mandatorily which can become the "core areas". Few topics in each subject are to be known at postgraduate level and the undergraduate cannot be forced to learn everything. Such nice to know areas can be taken as "electives" and only interested students will choose to learn them. By doing so, the basic qualification of BDS remains undisturbed.

For example, basic endodontics is must know for an undergraduate but not post endodontic procedure. Hence, the former becomes core area and the later can be given as elective to learn in detail if interested. By doing so, none of the subject is left unlearnt as a health profession graduate and advanced study in each subject is done on their choice. The core electives are topics from dental subjects and more number of topics give more options for students.

The elective options suggested in Vision 2015 [5] for medical undergraduates and the elective system prevailing in Engineering [6] were taken into consideration while framing the courses and regulations for open and core electives.

According to the design, the students were given opportunity to choose their electives from the given list of courses and got it registered at the beginning of the semester. Minimum ten participants were needed in an elective course to function. The departments concerned with the electives were designed free to adopt any methodology and fix the schedule for conducting of the elective as well as the grades to be awarded. The students have to do a minimum of 4 core electives, 3 open electives and 1 non-credit course. The non-credit courses are like student involvement in National Service Scheme, Red Ribbon Club etc., that helps developing service mentality and community team work to become a responsible citizen. Students capable of taking more electives are allowed to earn more credits. This will be shown in the grade card as additional credits. The credit earned in each semester is calculated into semester grade point average and at the end of each semester; the previous semester marks will be calculated for Cumulative Grade Point Average.

The syllabus table as shown in [Table/Fig-1-4] clearly shows that the subjects are taught in the same systematic way from basics as that of existing one and the electives that are allowed in first two semesters are only open electives that are not dentistry-related subject. The core electives that are subject related are given time from third to sixth semester and the final two semesters are elective-free to make the students concentrate more for clinical exams. Breaking all years into semesters and the subjects into two papers, with credits for each part permits easy learning in chunks and the assessment at the end of each part facilitates the student learning and motivation.

Though the BDS curriculum is for 4 years plus one year of internship, slow learners can be allowed to take less credits in each semester but need to finish BDS in 8 years of time from the date of joining at their own pace. Minimum 15 credits should be earned by the student at the end of one semester. Internship training can be followed as per the norms of the University.

RESULTS

The syllabus Prototype

Principles Followed in Calculation

- 1 Lecture = 1 Educational hour

Subjects I Semester	Lecture hours	Practical hours	Clinical hours	Total hours	Credits
General anatomy - I	30	60		90	
Educational hour	30	30		60	4
Physiology - I	30	60		90	
Educational hour	30	30		60	4
Biochemistry	30	60		90	
Educational hour	30	30		60	4
Oral anatomy & Tooth morphology	20	50		70	
Educational hour	20	25		45	3
Orientation to dental clinics			60		
Educational hour			30	30	2
Open Elective - I					
Educational hour					3
Total					20
Subjects II Semester	**Lecture hours**	**Practical hours**	**Total hours**		**Credits**
General anatomy - II	30	60	90		
Educational hour	30	30	60		4
Physiology -II	30	60	90		
Educational hour	30	30	60		4
Oral histology	30	60	90		
Educational hour	30	30	60		4
Behavioral science & ethics	30				
Educational hour	30		30		2
Open Elective - II					
Educational hour					3
Open elective - III					
Educational hour					3
Total					20

[Table/Fig-1]: I & II Semester (First year).

- 2 Practical/clinical = 1 Educational hour
- 15 Educational hours = 1 Credit

(15 edu hours+25 Self-study hours {notional hours} = 40 hours/credit)

- 3 to 4 credits (can be more for key subjects)= 1 course
- 18 to 20 credits = 1 semester
- Max 40 credits per year for an average learner
- Grade point = Number grade secured X Credit hours of the course

The designed credit based semester details of BDS syllabus are given in [Table/Fig-1-4] as example. Non-credit course activities are not semester bound.

Core Course Details – An Example

Course: Dental Materials – I(III semester)

Course Co-Ordinator: Head of the Department, Department of prosthodontics.

Details of theory classes are Structure of matter and principles of adhesion. – 1hour; Physical properties applicable to dental materials - 2hours; Mechanical properties applicable to dental materials – 2hours; Biological considerations in use of dental materials – 1 hour; Gypsum & gypsum products – 5 hours; Impression materials used in dentistry – 5 hours; Synthetic resins used in dentistry – 5 hours; Acrylic resins – 4 hours. Total 25 hours. Practical classes for material manipulation and anatomical landmarks – 5 labs (2 hours each). Sub Total – 10 hours.

Total educational hours calculated – Theory + Practical = 25+5 = 30. No. of credits for the course = 2.

Subjects III Semester	Lecture hours	Practical hours	Total hours	Credits
Medical microbiology - I	35	20	55	
Educational hour	35	10	45	3
General pathology - I	30	30	60	
Educational hour	30	15	45	3
General pharmacology	35	20	55	
Educational hour	35	10	45	3
Dental materials - I	25	10	45	
Educational hour	25	5	30	2
Preclinical prosthodontics - I	20	50	70	
Educational hour	20	25	45	3
Preclinical conservative - I	20	50	70	
Educational hour	20	25	45	3
Core Elective - I				
Educational hour				3
Total				20
Subjects IV Semester	**Lecture hours**	**Practical hours**	**Total hours**	**Credits**
Medical microbiology - II	35	20	55	
Educational hour	35	10	45	3
General pathology - II	30	30	60	
Educational hour	30	15	45	3
Dental materials - II	35	20	60	
Educational hour	35	10	45	3
Preclinical prosthodontics – II	15	90	105	
Educational hour	15	45	60	4
Preclinical conservative - II	15	90	105	
Educational hour	15	45	60	4
Core Elective – II				
Educational hour				3
Total				20

[Table/Fig-2]: III & IV Semester (Second year).

Subjects V Semester	Lecture hours	Practical hours	Clinical hours	Total hours	Credits
General medicine - I	30		30	60	
Educational hour	30		15	45	3
General surgery - I	30		30	60	
Educational hour	30		15	45	3
Oral pathology	45	30		75	
Educational hour	45	15		60	4
Removable partial prosthodontics	30		60	90	
Educational hour	30		30	60	4
Growth & development and Preclinical orthodontics	30	30		60	
Educational hour	30	15		45	3
Core Elective – III					
Educational hour					3
Total					20
Subjects VI Semester	**Lecture hours**	**Clinical hours**	**Total hours**		**Credits**
General medicine - II	30	30	60		
Educational hour	30	15	45		3
General surgery - II	30	30	60		
Educational hour	30	15	45		3
Oral medicine	30	60	90		
Eductional hour	30	30	60		4
Child psychology & Preclinical pedodontics	30	60	90		
Educational hour	30	30	60		4
Local anesthesia & exodontia	30	30	60		
Educational hour	30	15	45		3
Core elective - IV					
Educational hour					3
Total					20

[Table/Fig-3]: V & VI Semester (Third year).

Course: Dental Materials – II(IV semester)

Details of theory classes are Restorative resins – 5 hours; Metal and alloys – 5 hours; Dental waxes – 5hours; dental casting investments – 5 hours; Soldering, brazing and welding – 1 hour; Wrought base metal alloys – 1 hour; Dental cements -5 hours; Dental ceramics – 5 hours. Total theory - 35 hours. Practical classes for material manipulation and anatomical landmarks – 10 labs (2hours each). Sub Total – 20 hours.

Total educational hours calculated – Theory + Practical = 35+10 = 45. No. of credits for the course = 3.

Recommended Books

1. Phillips Science of Dental Materials – Kenneth J. Anusavice.
2. Restorative Dental Materials - Robert G.Craig.

List of Elective Courses: [3 credits each]

Core Electives (Any four)

1. Acrylic lab course
2. Wax pattern & metal casting lab course
3. Basic Ceramic lab course
4. Molar root canal treatment
5. Fixed partial bridges course
6. Cast partial denture course
7. Medical emergencies in dental office
8. Forensic odontology
9. Dental equipment engineering
10. Community projects
11. Clinical orthodontics
12. Management of traumatic injuries in children
13. Implant therapy for general dentist
14. Dental insurance policies
15. Transalveolar extraction
16. Minor OT procedures in dentistry
17. Basic periodontal surgeries
18. Therapeutics in oral medicine
19. Basic histopathology procedures
20. Esthetic dentistry
21. Post endodontic restorations
22. Ergonomics in dentistry
23. Medical records maintenance
24. Dental oncology
25. Dental practice management.

Open Electives (Any three)

1. Research Methodology
2. Dental education (Pedagogy)
3. Computer and Computer Applications
4. Leadership management and personality development
5. Mentored research
6. Biostatistics

Subjects VII Semester	Lecture hours	Clinical hours	Total hours	Credits
Oral radiology	30	30	60	
Educational hour	30	15	45	3
Conservative dentistry	30	60	90	
Educational hour	30	30	60	4
Basic periodontology & immunology	30	30	60	
Educational hour	30	15	45	3
Removable complete prosthodontics	30	60	90	
Educational hour	30	30	60	4
Clinical pedodontics	30	30	60	
Educational hour	30	15	45	3
Epidemiology, indices & community health programs	30	30	60	
Educational hour	30	15	45	3
Total				20
Subjects VIII Semester	**Lecture hours**	**Clinical hours**	**Total hours**	**Credits**
Endodontics	30	60	90	
Educational hour	30	30	60	4
Fixed partial prosthodontics & implants	30	60	90	
Educational hour	30	30	60	4
Clinical Periodontics	30	30	60	
Educational hour	30	15	45	3
Comprehensive dental community practice	30	30	60	
Educational hour	30	15	45	3
Dental trauma & oncology	30	30	60	
Educational hour	30	15	45	3
Clinical Orthodontics	30	30	60	
Educational hour	30	15	45	3
Total				20

[Table/Fig-4]: VII & VIII Semester (Fourth year).

7. Photography
8. Web designing
9. Online courses approved by the university
10. External hospitals and courses from other colleges as approved by the university.

Non-credit Courses (Any one)

NSS, RRC, Sports, Yoga, Music.

Elective Course Details

In an average 2hours/ session – 45 sessions – 1.5 months duration; can be completed in single stretch/spread out in the semester; Credits will be given at the end after assessment. The hours required for theory & practical are decided by the concerned department. If only practical, the number of instructional hours should be increased to get the credit value. No. of credits for the course = 3.

Assessment

All courses carrying credits should follow some method of assessment to grade the students. Non-credit courses should certify the student performance as satisfactory/ non- satisfactory. The assessment of the subjects in paper I can be purely internal and the end semester exam paper II/ when completing the subject will be assessed by an external expert. Not all exams require external experts. Based on CBCS curriculum, the assessment will be 50% internal and 50% external. Grades will be assigned to the students based on their performance. The UGC recommends grade system for final assessment and calculation of cumulative grade point average. The grades and grade points follow the UGC norms as given in the table.

Grades and Grade Points

O (Outstanding) – 10(90-100); A+(Excellent) – 9(80-89); A(Very Good) – 8(70-79); B+(Good) – 7(60-69); B(Average) – 6(50-59); F(Fail) – 5(less than 50); Ab (Absent) – 0. A student obtaining Grade F shall be considered failed and will be required to reappear in the examination [4].

The calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) are as followed as per UGC recommendation to compute. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts. For non-credit courses 'Satisfactory' or "Unsatisfactory' shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

At the end of semester, the part I exam can be conducted internally in the form of written test or viva or practical. The grade card issued at the end of each semester will contain all the details of the course. It will also have the letter grade, the attendance code obtained in each course, the total number of credits earned by the student up to the end of that semester in each of the course categories and the CGPA of all the courses taken from the first semester.

A student can be considered to have completed a subject successfully and earned the credits if he/she secures a letter grade other than F in that subject. A letter grade F in any subject implies a failure in that subject. Supplementary Examination may be availed by a student when the University calls for next examination.

Thus by applying the principles from the UGC guidelines, Vision 2015 MCI document and the engineering systems, the above modifications could be done in BDS syllabus to make it suitable for CBCS [4-6].

DISCUSSION

Mandeep S Virdi (2011) proposed a new semester and credit system for the dental undergraduates in India [7]. However, the method of calculation of the educational hours and credit points were not addressed by the author. In his syllabus all the subjects were given an equal credit of one. The syllabus was divided into ten semesters based on the five year BDS curriculum without internship. The syllabus framed in the current study suits the currently prevailing four year BDS curriculum with one year of internship. There is not much studies available stating similar need for revision in BDS curriculum. The syllabus prototype framed in this study gives a detailed explanation of the principles used in the calculation of the score and the credits are differed based on the weightage of the subjects. An example of the template for subject in the core curriculum and that of the elective is also provided for clarity. Assessment details including the grading system and the method of calculation of CGPA has also been explained. All other sectors of higher education have successfully implemented CBCS. The acceptability and feasibility of CBCS in BDS syllabus with opinion from dental academicians and students will be put forward in a subsequent paper.

CONCLUSION

Think globally and act locally" is the mantra for globalization in all fields. For an Indian dental graduate to fit easily into the global arena of education systems, adoption of Choice Based Credit System in the Indian syllabus would be a worthy and robust start without violating much of the Dental Council of India norms. It provides course equivalency, self-paced and learner centred

cafeteria approach to match the current demands of the society and generation. Adoption of CBCS in BDS syllabus would be the right change in the right direction at the right time.

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PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Prosthodontics, Indira Gandhi Institute of Dental Sciences, Sri Balaji Vidyapeeth, Puducherry, India.
2. Vice Chancellor, Sri Balaji Vidyapeeth, Puducherry, India.
3. Professor, Department of Community Medicine, Mahatma Gandhi Medical College, Sri Balaji Vidyapeeth, Puducherry, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Shivasakthy Manivasakan,
F3, Vaishali Enclave, Third Cross, Kamban Nagar, Reddiyarpalayam, Puducherry – 10, India.
E-mail: shivasakthym@igids.ac.in

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