ORIGINAL ARTICLE

DEVELOPING THE OUTCOMES OF A BACCALAUREATE OF DENTAL SURGERY PROGRAMME

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Background: Curriculum broadly falls into two categories, prescriptive and outcome-based. In the prescriptive curricula emphasis is placed on teaching with generally little integration between subjects and across disciplines. Currently, universities in Pakistan are undergoing a cultural change in the curricular design in order to apply an outcome-based learning instead of prescriptive teaching. Regionally, the need for change was recognised on account of the vast body of evidence available internationally. In order to bring about a shift towards an outcome based curriculum in the 4-year BDS programme, we first need to specify the outcomes/traits that the dental health professionals should be able to demonstrate upon leaving the programme. This paper describes the process and outcome of arriving at the desired consensus through a series of workshops involving all stakeholders including students, community members, teaching faculty, programme directors and representatives of the dental health industry. **Methods:** A series of workshops were conducted between September 2009 to February 2010 in all of the 18 disciplines of basic and dental sciences individually and then collectively. A questionnaire sought responses from the participants regarding their perception about the status of the current BDS curriculum and their understanding of an outcome-based integrated curriculum, as well as whether such an integrated curriculum should be adopted or not? In the second half of the workshop through brainstorming and Delphi technique, the outcomes in terms of measurable traits that should be possessed by a graduate dental health professional entering community service were enlisted. The pre- and post-workshop questionnaire scores were entered into SPSS-16 and paired sample *t*-test as well as chi-square test were applied. Cron back alpha value of <0.05 was taken as statistically significant. Secondly, the outcomes developed in each workshop were entered into Ethnograph® and common outcomes of the 4-year BDS programme were extracted. **Results:** In total, 234 participants attended the workshop over a period of five months in 18 discipline-wise workshops and four integrated workshops involving faculty members of all disciplines. Results indicate clearly that the workshop resulted in an attitude shift of the participants and their perception of the current curriculum and the need and rationale for a move towards an outcome-based curriculum. The 30 outcomes identified were grouped under two categories namely 'clinical skills' and 'professional behaviours'. **Conclusion:** Defining the final programme outcomes is only the initial step in developing an outcome-based, objective, integrated curriculum which will require considerable work in the future.

Keywords: Baccalaureate of Dental Surgery, Punjab, outcome-based curriculum, learning objectives, competencies

INTRODUCTION

Zuga in 1989 cites researchers who have categorised curricular designs as follows[1]:

a) **Academic Curricular Design:** Focuses on a body of knowledge grouped into disciplines and subjects.
b) **Technical Curricular Design:** Is organised around analysis of performance of task and process sequencing rather than content.
c) **Intellectual Process Curricular Design:** Focuses on increasing learning efficiency and transfer of problem solving skills to other content areas and life experiences, thus developing cognitive processes.
d) **Social Curricular Design:** Focuses on application of knowledge in real world situations.
e) **Personal Curricular Design:** Is learner-centred with a focus on the individual student and his needs and interests.

Curriculum broadly falls into two categories, prescriptive and outcome-based. In the prescriptive curricula emphasis is placed on teaching with generally little integration between subjects and across disciplines. Education is therefore teacher-centred and mostly requires cramming huge volumes of factual knowledge and learning certain taught traits. On the other hand, in outcome-based curricula, the goal of the educational programme is clearly defined and so are the means by which goals are achieved. These types of curricula are mostly student-centred, allow for vertical and horizontal integration and challenge critical thinking by students.

We believe that no curriculum is either wholly prescriptive or entirely outcome-based.[2,3]

Rather any curriculum lies along a continuum from prescriptive to outcome-based. In a prescriptive curriculum, outcomes may also be defined and may be based on the level and extent of prescription and its assimilation. Whereas, in an outcome-based curriculum, some degree of prescription leads to outcomes.

John Franklin Bobbitt[4] published the first book on the subject of curriculum in 1918. According to Bobbitt, curriculum encompasses the entire scope of formative deeds and experiences occurring in and out of school, and not just in the school. He identified two notable features in curricular formulation[5]:

a) That specific expert could best be qualified to and justified in designing curricula based upon their expert knowledge of what qualities are desirable in a member of society, and which experiences would generate these qualities.
b) Curriculum is defined as the deeds-experiences the student ought to have to become what he/she ought to become.

Currently, universities in Pakistan are undergoing a cultural change in the curricular design in order to apply an outcome-based learning instead of prescriptive teaching. Regionally, the need for change was recognised on account of the vast body of evidence available internationally[6]. This evidence showed that a shift from prescriptive to outcome-based curriculum with both vertical and horizontal integration and competency in demonstrable minimal skills as a pre-requisite to be declared a safe product of the educational programme in lines with the needs of the community and the industry nationally and internationally is fuelling rapid social and economic growth globally.[7] In Pakistan, like elsewhere in the world, the need for the shift is being felt, especially in medical education. Pakistan Medical & Dental Council (PMDC)[8] like the General Medical Council, UK safeguards the health related interests of the public by ensuring that the product of medical education in Pakistan meets at least the bare minimum requirements to be classified a safe health professional practicing in the community. To ensure that the product does so, PMDC provides general guidelines on the medical curricula to be followed by the medical universities in the country. The universities however, are free to make adjustments in the curriculum as long as they conform to the broader principles of the document prescribed by PMDC.

The curricula in undergraduate and postgraduate, medical and dental sciences made available by PMDC and largely followed by all medical universities in Pakistan are broadly prescriptive in nature.[9] To take an example, Baccalaureate of Dental Sciences (BDS) curriculum is divided into four years of academic studies.[10] Each year of academic study is further divided into prescription in 3–4 individual disciplines without any horizontal or vertical integration. The document which is claimed to be a curriculum lists the subjects to be taught in each year and in each subject, a list of topics that need to be taught is provided much like the table of contents or an index of a textbook. This document fails to provide any advice on the teaching methodologies or the resources that can be exploited.

Medical education in Punjab has its own champion steering the way towards an outcome-based medical education and that is the University of Health Sciences (UHS), Lahore.[11] UHS has 80 Medical, Dental, Allied Health Sciences and Postgraduate institutes affiliated with itself. Understanding that regional improvement and sustainability in healthcare services was the need of the hour, the university recognised that the important shift from prescriptive to outcome-based curricula in medical education was imminent. The university realised that medical colleges have outcomes whether by design or otherwise. This means that they produce doctors but the nature of the product may be unspecified. The difference between outcome-based and simply producing outcomes is significant. An outcome-based college produces results relating primarily to predetermined curriculum and instruction[12]. The focus is on the achievement of results. Currently, in medical education in Punjab, the focus is on inappropriate and insufficiently rigorous outcomes.

In order to bring about a shift towards an outcome based curriculum in the 4-year BDS programme, we first need to specify the outcomes/traits that the dental health professionals should be able to demonstrate upon leaving the programme. To that end, UHS embarked on a series of workshops to develop these outcomes. The process was divided into two stages. In the first stage, a regional consensus within Punjab on the core values of a dental health professional based on the knowledge, skills and professional attributes required of a junior dental doctor about to start work in the regional community was to be achieved.

This paper describes the process and outcome of arriving at the desired consensus through a series of workshops involving all stakeholders including students, community members, teaching faculty, programme directors and representatives of the dental health industry.

METHODOLOGY

A series of workshops were conducted between September 2009 to February 2010 in all of the 18 disciplines of basic and dental sciences individually and then collectively involving dental students,

community members, dental health professionals, programme directors and representatives of the dental health industry.

The aim of the workshops was to enlighten the participants regarding the purpose and development of an outcome-based curriculum. A questionnaire (Annexure-A) sought responses from the participants regarding their perception about the status of the current BDS curriculum and their understanding of an outcome-based integrated curriculum, as well as whether such an integrated curriculum should be adopted or not? This followed an interactive presentation on the current curricula and the rationale of developing outcome-based curricula. Particular attention was given to discussing the development of outcomes of the 4-year BDS programme in Punjab, Pakistan. In the second half of the workshop through brainstorming and Delphi technique, the outcomes in terms of measurable traits that should be possessed by a graduate dental health professional entering community service were enlisted. At the end of the workshop, the questionnaire was administered again followed by a short Structured Answer Questions test on the topic of outcome-based curriculum.

The pre- and post-workshop questionnaire scores were entered into SPSS v.16 and paired sample *t*-test as well as chi-square test were applied. Cron back alpha value of <0.05 was taken statistically significant. Secondly, the outcomes developed in each workshop were entered into Ethnograph® and common outcomes of the 4-year BDS programme were extracted.

RESULTS

In total, 234 participants attended the workshop over a period of five months in 18 discipline-wise workshops and four integrated workshops involving faculty members of all disciplines. Thus a total of 468 questionnaires were filled in. The outcomes extracted in the initial 18 discipline-based workshops and the first two integrated workshops were further refined in the last two workshops.

The scores of the pre and post-workshop questionnaire were entered into SPSS-16 and Chi-square test and paired sample *t*-tests were applied. Results are shown in Figure-1 and Table-1 and indicate clearly that the workshop resulted in an attitude shift of the participants and their perception of the current curriculum and the need and rationale for a move towards an outcome-based curriculum.

The ten item Structured-Answer-Question post-conference test of half an hour duration indicated good cognitive grasp on the subject of outcome-based curriculum in that the mean score of the 234 participants was 35±2.35 (maximum score attainable=50).

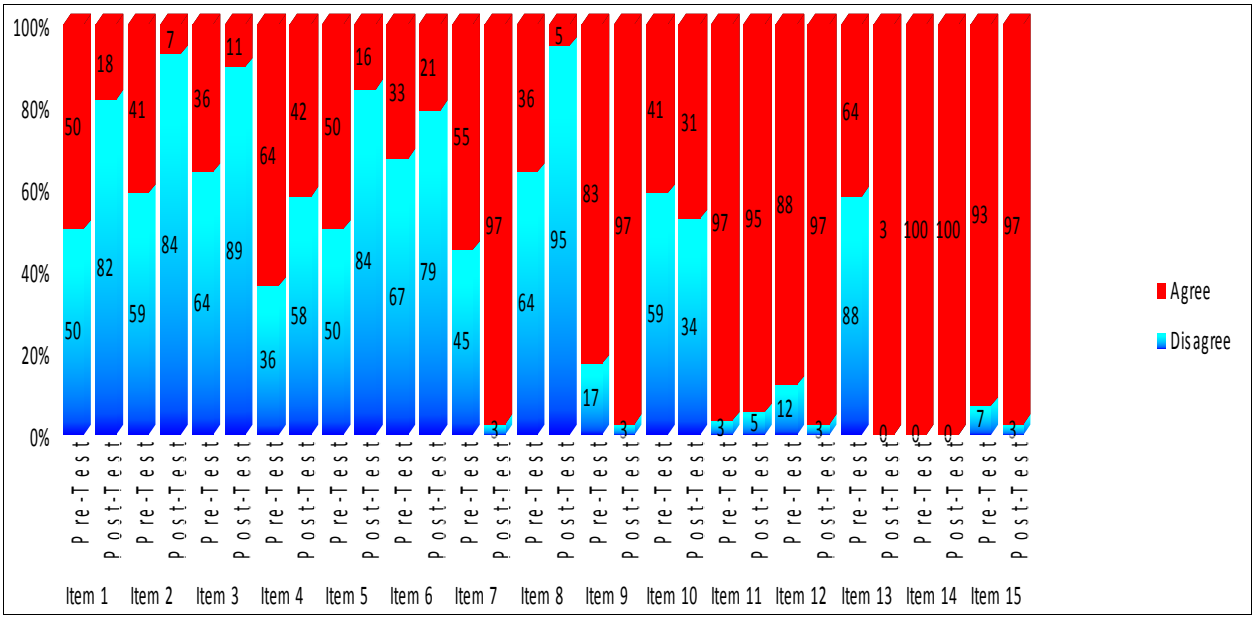

Figure-1: Item-wise responses in the Pre- and Post-test

Table-1: Results of Paired Sample *t*-test (n=234)

	Mean	SD	t	*p*
Pre-Test	41.26	4.63	5.79	0.000
Post-Test	39.14	2.97		

Responses were scored as: Strongly Agree 1, Agree 2, Disagree 3, Strongly Disagree 4, while items 8,9,14 & 15 were scored in reverse

The outcomes grouped into two categories namely 'clinical skills' and 'professional behaviours' are presented in Table-2.

Table-2: The University of Health Sciences' graduate outcomes of BDS programme

No.	Professional Behaviours	Clinical Skills
1	Imbued with the spirit of "**SERVICE TO HUMANITY**" and enhancing the good image of the healing profession.	Possesses sound basic knowledge of dental diseases and associated medical problems.
2	Understands the responsibility of Healthcare Professional towards Community and Profession.	Is able to record comprehensive medical and dental history.
3	Appropriate communication skills towards patients, healthcare professionals including breaking bad news to the patients etc.	Is able to perform general medical and dental examination.
4	Understands medical ethics and medical/dental jurisprudence.	Is able to examine common dental diseases, including caries, periodontal disease, ulcers and malocclusion etc.
5	Understands national demands and responsibilities to cope with dental diseases, communicable diseases and national disasters.	Is able to recognize and diagnose common dental diseases.
6	Demonstrates the ability to use different diagnostic tools (Radiographs and Laboratory investigations).	Is able to diagnose dental problems and refer for specialist care.
7	Understands the importance of cross infection control, informed consent, record keeping/ documentation and patient confidentially.	Is able to recognize common medical problems in dental office.
8	Life-Long Learning, Personal and Professional Growth and Development.	Is able to deal with medical emergencies and if required, refer for General Medical Care.
9	Should be able to manage patients of special needs group.	Is able to manage dental emergencies.
10	Should be research oriented.	Is able to understand and execute Basic Life Support.
11	Should possess good Information Technology skills.	Should be able to draft a comprehensive treatment plan including prognosis, complications and outcomes of the treatment.
12	Should be able to train and handle dental auxiliaries.	Depending on the treatment plan, should be able to perform common dental procedures.
13	Should have high emotional quotient.	Understands the importance of post-treatment follow-up.
14	Should be realistic and aware of his limitations.	Is able to correlate and transfer the theoretical knowledge to clinical procedure.
15	Should have multidisciplinary approach (Able to discuss and report the clinical conditions of the patient to the specialist).	Be aware of situations/conditions needing referral to appropriate consultant/specialist centres.

DISCUSSION

At present in Pakistan, medical, dental and allied health sciences curricula are prescriptive, outdated and vague. This has led the country for decades into teacher-centred didactic medical education with emphasis on rote-learning. This in turn has led to the production of health professionals based only on cognitive competencies mainly in the lower grades (Bloom's taxonomy).[13] Lifelong-learning and acquisition of principal practical and behavioural skills as measurable traits has never been given their due importance. Under the circumstances, it is not surprising that these days much too frequently we hear of appalling incidences of negligence and incomepetencies in the delivery of health care services regionally. Many incidences especially in remote rural areas go unreported. Internationally, a move towards an outcome-based curriculum instruction model happened decades ago leading to measurable improvements in the delivery of healthcare services.[14–18]

It was against this backdrop that UHS recognised the need for change. The comments received in the post-workshop questionnaire by various participants testify to the importance they attribute to this shift. One of the participants who was a student remarked:

> "*For too long have we been grappling in the dark trying to seek our identity as a Health Professional. In an outcome-based curriculum, we know what we need to do and how, in order to become what we ought to be*".

Similarly, a faculty member wrote down:

> "*The outcomes in an outcome-based curriculum add purpose and direction to everything that is involved in teaching and learning in an educational programme*".

A member of the public remarked:

> "*The outcomes define the product and the public puts its faith in the standardisation of achieving these outcomes in the 4-year BDS programme by all dental colleges to ensure that the product is safe to practice in the community*".

Presently, there existed no national agreement on the outcomes of the 4-year BDS programme but there was a general consensus amongst all stakeholders that the end-of-programme outcomes are based on the cognitive, psychomotor and affective attributes required of a junior doctor working in the public health service. In the latest edition of General Medical Council, UK, '*Tomorrow's Doctor*', the point that an effective educational programme can not be delivered without making its learning outcomes explicit has been emphasised.[14] Internationally, considerable work has already been done in identifying these learning outcomes and stating them as measurable traits.[19] In the United Kingdom, based on the model developed at the University of Dundee, five Scottish medical schools have enlisted common learning outcomes in their Baccalaureate of Medicine & Baccalaureate of Surgery (MBBS) programme.[20]

Based on learning outcomes, framework for curriculum development has also been published. Of particular note are the works at the Brown University, USA, University of Dundee and Sheffield University, UK.[20,21] In the Brown model, the outcomes are arranged

in nine abilities and a multidimensional matrix is imposed upon them. In the Dundee approach, a three-circle model incorporates twelve outcomes. The Sheffield model is simpler and is based on the two themes of their core curriculum that is, 'clinical competencies' and 'underpinning medical sciences'. Outcome objectives for these two themes were developed separately.

University of Health Sciences' main quest is to bring medical education regionally, inline with Best-Evidence-Medical-Education practices worldwide. However, UHS prefers to ensure that all the changes are rooted within our cultural, societal and demographic context. Therefore, instead of applying a western model to regional dental colleges, UHS embarked on developing its own outcomes for the 4-year BDS programme (Table-2). The outcomes have been identified under the two themes of 'clinical skills' and 'professional behaviours'. Under these themes, 15 graduate outcomes each in 'professional behaviour' and 'clinical skills' have been described as measurable traits necessarily possessed by all graduates of the 4-year BDS programme. When comparing it with similar work internationally, the outcomes developed at UHS have many common traits, but important regional elaborations based on the strength and weaknesses of our health services and existing lacunae in health professional personnel competencies.

This is but the first step in developing an outcome-based curriculum following a top-down approach. In the next stage of curriculum development, the core syllabus of each subject will have to be revised based on the final programme outcomes, and integrated vertically and horizontally.

CONCLUSIONS

We believe that the introduction of outcome-based BDS curriculum will improve the quality of the graduate dental doctor and eventually the dental health care services regionally. By conforming to the generic outcomes, we will be able to produce a product that can easily be assimilated in the international health delivery market. Defining the final programme outcomes is only the initial step in developing an outcome-based, objective, integrated curriculum which will require considerable work in the future.

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