

# BRINGING COMPETENCE, PROFICIENCY, OUTCOMES AND APPROPRIATENESS INTO THE PERIODONTAL CURRICULUM

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The fundamental aims of a curriculum in Periodontology at the UWI Dental School, Mt. Hope, Trinidad are described. Objectives of the course are determined and linked to levels of competence that must be achieved. However, there are also good reasons to demand optimal standards of proficiency especially in relation to cross infection hazards. Psychomotor, effective and cognitive skills are all required to practice periodontology and methods to stimulate learning in these domains are enumerated. Both self-directed learning and tutor-directed self-reflective forms of learning are advocated. An evaluation methodology in keeping with the underlying theoretical learning principles is then outlined. The final test of a curriculum must be the student outcomes, and in a clinical discipline such as periodontology, patient treatment outcomes. These demand the showing of appropriate alternatives in treatment planning, yet a need to follow approved treatment guidelines.

## **Introduction**

Curriculum has been defined as "all the learning which is planned and guided by the school, whether this is carried on in groups or individually, inside or outside the school." (Kerr, 1968). Periodontology, as a teaching discipline within clinical dentistry, has as its major objective to facilitate students' acquisition of knowledge of the subject of Periodontology, the ability to differentiate healthy and diseased conditions around the teeth clinically, and to know the limits of their abilities to treat or refer the patient. In more specific terms, this is to have a sound understanding of the biology and pathology of the periodontal tissues, and the ability to make accurate diagnoses and manage clinical problems. Also, the new graduate should be able to develop an ability to assess and contribute to satisfying community need (Sweet, 1995).

The periodontology curriculum at the University of the West Indies (UWI) Dental School in Trinidad, has been built around two demands: The first is that there should be emphasis upon research evidence and a scientific basis for treatment regimes carried out by students. They should also "critically appraise" both the periodontal literature and their clinical examination and treatment findings. Secondly, great consideration should be given to ethical, behavioural and education research which can lead to improvement in the management of patients and provide for optimal learning by the students. In response to these demands, a curriculum was developed along the lines illustrated in Diagram for Curriculum Development Theory (Appendix I). Society, in general, entrusts the autonomy of a teaching institution to the professionals responsible, who outline the objectives of the course, possibly in the context of linking these to levels of *competence*. However, as Knox (1986) has indicated, there may be some optimal standards of *proficiency* that are required for their professional role in society. The new dental surgeon should surely be proficient at doing no harm to his or her patient, which includes fastidious infection control procedures.

While the student must become more "knowledgeable" about the subject, clinical competence in the discipline of Periodontology demands approximately equal levels of competence in affective and psychomotor skills as well, to manage patients in the community as a dental professional (Sweet, 1995). In fact, Leat (1993) has proposed that it is synchrony between cognition, feelings and behaviour that defines competent performance. While most tasks involve more than one skill domain simultaneously, a range of tutor directives can be "carefully scaffolded" (Leat, 1993). A competence-based curriculum implies that cycles of learning are required, covering the same subject matter, but at increasing levels of complexity, until a satisfactory level is reached, much like the spiral curriculum advocated by Bruner (1977). While psychomotor and affective skills may be more important at an action phase, cognition and feelings may be more likely partners during a review or reflection stage. The danger is that a potential learning experience may become another repetitive experience which goes by unrecorded; lost. It is for this reason that the major methodology used in the periodontal curriculum here is to insist that the student use a structured workbook or journal where there is ample opportunity throughout the sections to record a response to the question "what have

I learnt?". This, in turn, provides a continuous self, peer or tutor assessment opportunity with built-in content validity which can be criterion referenced, as recommended by King (1979). Also, a direct record of patient outcomes provides operant (i.e., task), performance-based information.

### Stimulating Learning Based on Domain

The psychomotor skills can be sufficiently developed, in part, in the laboratory, to prevent harm to patients. One basic requirement is for the periodontal student to be able to measure how far a blunt probe will pass into a pocket space between the gingiva and teeth, under light pressure. The recommended force of 25g can be tested first on a balance. To help translate this to clinical practice, a useful adjunct is role-play where students can act as surgery assistants and patients to experience probing for themselves. This same teaching cycle can also be used for training in basic instrumentation techniques. The use of a mannequin also has a place in developing skills in surgical technique to simulate the actual patient condition. This can be carried out in a realistic environment such as a side clinic with the necessary sterile drapes and protective wear for aseptic technique.

The importance of the affective domain for student learning has probably been underestimated. Boud, Keogh, & Walker (1985) outline the value of reflection in the learning process, and how it is important to attend to feelings and re-evaluate experience. A section in the workbook, period-log, is dedicated to students' own periodic record of their feelings about their knowledge base, technical and social skills, along the lines of Progoff (1992). This section can provide a resource for personal knowledge which can help give study direction and motivation within other cognitive sections in the workbook. Polanyi & Prosch (1975) strongly advocate the need to spend time to reflect on scientific knowledge and relate this to personal knowledge, to develop meaning. The affective domain is also important to consider in patient management. Various types of interaction between student and patient can be demonstrated and tested with simulated patients (Barrows, 1986). These are persons who are trained to act out a case scenario with a consistent format. This produces a more true-to-life situation and tends to draw out more issues than role-play alone, although the latter has a

place. Video has particular value as a medium to convey awareness and a feel for the subject, such as periodontal surgery. Unfortunately, the pre-recorded type appears to date very quickly, and often needs careful tutor annotation. Feedback in the affective domain may also be achieved with camcorder videos of performance, recording patient responses via a questionnaire and, finally, in a mock practical examination in which students, tutor-examiners and patients can review together the events of the day.

The student has to start with some knowledge of periodontology; the cognitive. I have argued (Sweet, 1995) that the problem-based learning methodology can provide a useful link between the pre-clinical and clinical courses. A series of related problems are given to the students at the beginning of their course, over a period of six weeks, covering a wide range of objectives, most of which are in the cognitive domain. Some are fairly straightforward such as "to describe the normal structure and function of the periodontium" and "to describe the features of gingivitis"; others a little more demanding such as "to explain what is meant by experimental gingivitis", to the more obscure "to evaluate the limits of self-assessment methods" which demands leaving the comfort zone of secondary textbook sources to reach deeper into primary sources of research information, which provide the guidelines for treatment practice. Barrows (1986) has provided the concept of closed loop problem-based learning, where maximal learning occurs when the problem is tackled for a second time at a later stage, and success of the learning process at the first attempt is assessed. From this, more articulate learning objectives are formulated, references are quoted and presentation materials recorded in the Journal workbook.

In the early stages of cognition in periodontology, the student can find the terminology and the requirement to take on board important new diagnostic skills, such as interpreting radiographs, a little intimidating. At the same time, they are intrigued by the new instruments used and processes advocated in the discipline. Object lesson (after Harden, 1986), may provide a useful adjunct to learning. Objects, such as photographs, radiographs or physical objects are placed at stations in a room, each labelled with a question. Small groups of students may then visit the stations in turn, and finally join in a discussion. Biran (1991) has described this format as a GOSCE, a group format of the original

Objective Structured Clinical Examination, and has used it following a problem-based course primarily as a method of self-assessment and learning rather than evaluation. The objectives of the course have been set out into four categories: professionalism, structure and disease, clinical examination and establishment, and maintenance of a healthy oral environment.

Whenever possible, the topics are covered within the structured clinic of three hours. A seminar is held for the first half hour, and for the last half hour a review period, which is used primarily to provide an opportunity for feedback and to discuss clinical cases. Greater focus on the case can be achieved and clinical mastery achieved if the student is asked to write a letter of referral or reply as consultant, and present this for group discussion. Most topics will be better discussed close to the clinical environment (Norman & Schmidt, 1992), however, some subjects may be best covered with lectures when material on the subject is not readily found or the time and effort required for self-directed learning is not justified. Further critical appraisal of the literature is demanded of the student in an information review. A documentary video is shown to the students on an important issue such as the possible transmission of the AIDS virus via dental instruments. They are then given a scientific paper and a letter in a professional newspaper on the same topic and asked to critically appraise the different sources of information. They have a few weeks to view the video again, search the literature and submit their report. A detailed list of points to look for in a good scientific paper (Borg & Gall, 1989) is given to the students to help in their research and also to be used in the evaluation of their reports. This exercise is designed to prepare the student for a course work essay requirement. This is taken as a method to demonstrate an ability to self-select a problem within periodontology, to search primary sources, and to critically evaluate them, as a model for life-long continuing education in the subject. The students are encouraged to choose a topic which can be argued from more than one angle or has two or more contrasting aspects, and to submit drafts for discussion prior to final submission.

### Evaluation Within the Curriculum

King (1979) indicates the importance of using an evaluation scheme which is appropriate to the format of the course, and she warns of the possibility of "atrophy", that is, the condition where demands to make measurement easy dictate a very meagre range of objectives for the course. In addition, Willis (1993) emphasises that the rhetoric of curriculum reform, with its reference to the development of understanding and life-long learning, is meaningless unless the accompanying assessment reflects the same theoretical principles. Continuous assessment marks are derived mainly from the Journal workbook which includes the information evaluation and essay, glossary of terms recorded and the period-log, the write-up of the object lessons, seminars, case studies and lectures. Students are also required to place a narrative on patients they treat with sequential chartings, with a statement on "what have I learnt?". This provides a direct outcomes record, which is operant, task-related, performance-based information. An occasional attendance quiz, which takes up the first five or ten minutes of seminar or lecture time, is also used to provide further evaluation data for the students. This can also act as a learning reminder, as the quiz is discussed, or be used as a starting point for a seminar.

One final method of assessment, which many students also found a valuable learning experience, is a sequential management problem (Barrows, 1986). This is useful as an exercise, both when the student has just a little periodontal competence or when he or she is more self-assured. The student is first presented with a brief patient scenario and asked to write down a list of further information to elicit or investigations that might be necessary. Fifteen minutes later, the student is asked to prioritise this list and write down, in lay terms, what one could say to the patient based on the information on hand. Fifteen minutes later, all papers are collected and a full dossier on the patient is presented to the student, who now has two open hours to consult any texts and write a report, comparing his original ideas with those now detailed before him. This format appears to elicit great interest, permit focus on important areas of competency in critical reasoning, and encourage clearly defined literature searches, within an open learning atmosphere. The final examination is composed of an essay question paper, a practical examination and treatment planning case.

## Curriculum Development

How much of the curriculum is in place? The answer is "everything" except for several affective aspects. The first Mock Practical examination is booked, the camcorder order is approved but not ordered, and the patient questionnaire is still in the planning stage. However, Coles (1977) has produced a useful diagram which illustrates that the course set on paper, is different from that in action (Appendix III). However, to return to the definition of the curriculum (Kerr, 1968), it is the course the students "learn" which is most critical to attempt to evaluate, to permit feedback for future improvements.

Development of the dental curriculum is currently undergoing much discussion, especially in the United States, where specific recommendations are:

- 1) design an integrated basic and clinical science curriculum that provides clinically relevant education in the basic sciences and scientifically based education in clinical care;
- 2) incorporate in all educational activities a focus on outcomes and an emphasis on the relevance of scientific knowledge and thinking to clinical choices;
- 3) shift more curriculum hours from lectures to guided seminars and other active learning strategies that develop critical thinking and problem-solving skills;
- 4) identify and decrease the hours spent in low priority pre-clinical technique, laboratory work, and lectures, and
- 5) complement clinic hours with scheduled time for discussion of specific diagnosis, planning, and treatment-completion issues that arise in clinic sessions (Dental education, 1995).

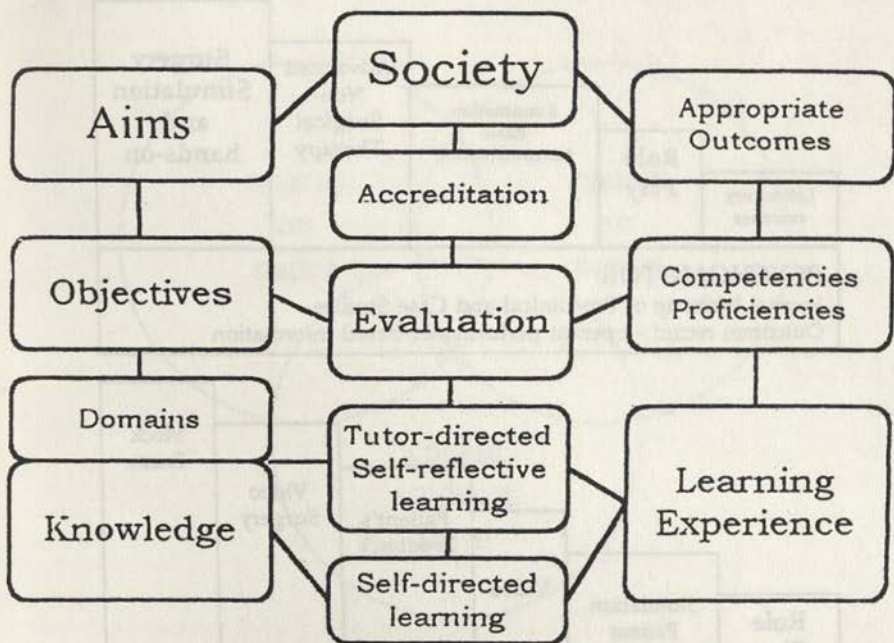
The periodontal curriculum developed over the last two years in Trinidad and described above appears to closely follow these recommendations. Treatment outcomes demand the showing of appropriate alternatives in

treatment planning while, at the same time, following recognised treatment guidelines. The mechanical checking off of effective completion of objectives may no longer be good enough. An accreditation panel may now be looking for aims, objectives, opportunities for student learning, teaching methodology and methods of evaluation. But it is the demonstration of completed competence and appropriate outcomes that will bring accreditation to the course and first dental school in the Caribbean at Mount Hope, Trinidad and Tobago.



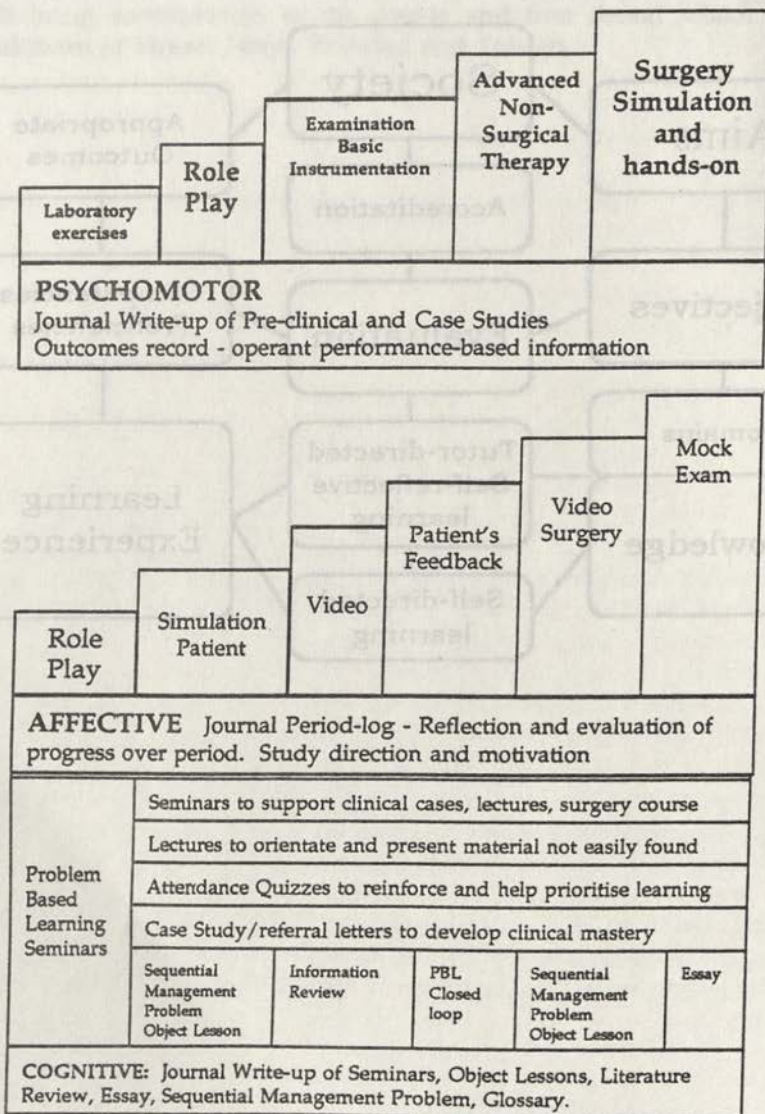
## Appendix I

## DIAGRAM FOR CURRICULUM DEVELOPMENT THEORY



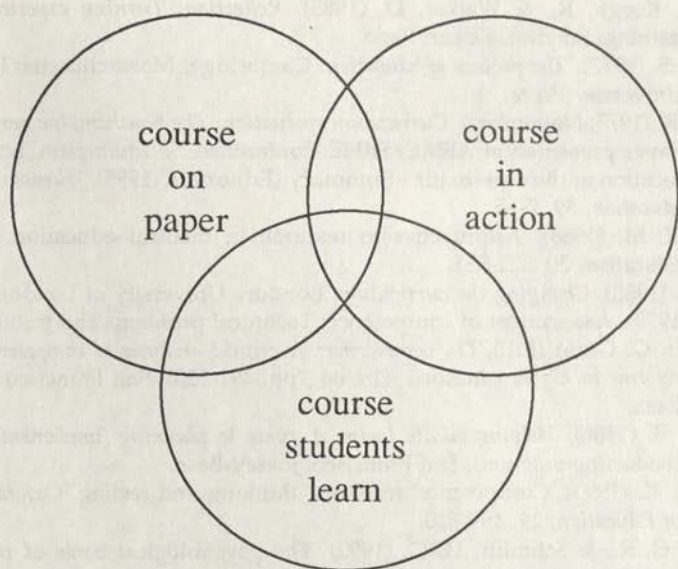
## Appendix II

## Methods to Stimulate Learning Based on Domain



## Appendix III

## Curriculum Model



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