

Curriculum Integration for Dental Education; A Lesson Learned from Real Experiences of Development and Implementation

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ABSTRACT

This paper presents a dental school's experience of curriculum development and the process of implementation. It includes the things that can be expected to happen or that may go beyond expectations in the development of new curriculum for the College of Dentistry (School of Dentistry), Seoul National University

In 2002, the Ministry of Education and Human Resources Development of Korea announced introduction of new school system in which provides medical and dental education after bachelor's degree. This "Professional Graduate School" system is one of the greatest challenges for Korean dental education. Now Korean dental schools chose two different dental education systems from 2005, the six year dental college system and the four year professional dental graduate school system. College of Dentistry, Seoul National University chose the new system. The school also changed curriculum. The change of dental education system is one, but not all of the reason for the curricular reform. Through the sophisticated process of problem identification and needs assessments, we chose the integrated curriculum. A careful planning and organization process were applied. The whole process of curriculum development took ten month. The evaluation is still going on. Even the curriculum intended to apply the solid principles and aims towards sound objectives; the curriculum evaluation in the present is not very encouraging. It casts lots of pending questions. Promising part of the new curriculum has the flexibility and readiness to change of environment.

Keywords: integrated curriculum, dental education, educational reform, problem based learning

BACKGROUND

January 2002, the Ministry of Education and Human Resources Development announced introduction of new school system in which provides medical and dental education after bachelor's degree (undergraduate + 4 system). This "Professional Graduate School" system allows students from a variety of academic backgrounds access to dental education. It might reflect the growing needs of renewal in dental education and general tendency of change in dental education. This is one of the greatest challenges for Korean dental education community. In the roadmap of the Ministry of Education and Human

Resources, "Professional Dental Graduate Schools" will be starting from 2005. But the change is not a mandatory at the time. Dental schools can choose the new system until year 2009. 5 dental colleges (4 national schools and a private school) chose the professional school system. And the others decided to remain in the present system. Now, one private school and one national school reverse their initial decision, and total 7 out of 11 dental Schools are going to change into the professional graduate schools.

Now, Korean dental schools have two different dental education systems from 2005, the 6 year dental college system and the 4 year professional dental graduate school system, in which the only candidates with bachelor degree will be admitted. Before 2004 all Korean dental school has 2+4 system. In the 2-year pre-dental course, the curriculum includes several elementary courses for natural and social sciences and liberal arts. The 4-year undergraduate dental curriculum usually has the structure of basic dental sciences in the freshmen and sophomore and clinical courses in the junior and senior. Like many dental schools in the world, this system is adopted by most of the Korean schools with minor differences.

College of Dentistry Seoul National University chose the new system. During the change of school system, we also changed curriculum. But the graduate education isn't the only reason for the change in the curriculum of School of Dentistry, Seoul National University. For many years, the problems in our dental education have been pointed out repeatedly. The problems in the present curricula which warrant reform in the present include that;

1. The courses are heavily didactic (lectures and labs)
2. The courses focus mainly on transferring discipline-based (fragmented) knowledge, rather improving the problem-solving potential of students.
3. The lack of appropriate student evaluation process
4. The lack of linkage between the basic science courses and the clinical courses, as well as among different courses (disciplines).
5. Irrelevant arrangement of the courses in the context of whole curriculum.

All these problems have become more and more serious year by year. The rationale for the reform became prominent and was unavoidable. Its aim was to supply dentists who have basic research and clinical capacity, willingness to serve for the public interest, an ability to educate oneself, and a sense of duty.

Table 1. The changes in Korean dental education system.

Year	No. of Dental College	No. of Students	Academic Years
Before 1959	1	100	4 (dental college)
1959-2004	11	760	2 + 4 (Pre-dental 2 yr)
2005	6	420	2 + 4 (Pre-dental 2 yr)
	5	340	4 + 4 (Graduate school)
2006	5	340	2 + 4 (Pre-dental 2 yr)
	6	420	4 + 4 (Graduate school)
2009	4	240	2 + 4 (Pre-dental 2 yr)
	7	520	4 + 4 (Graduate school)

PRESENT STATUS

The reform of dental education means the re-setting the goal of dental education. It includes clarifying the basic educational goal for new dentists and detailed goal for the individual classes.

Problem Identification and Needs Assessment

For the development of new curriculum, the process should start from the review of available information from published literature, curriculum documents from other schools, and documents of the current curriculum. It also included collection of new information through the surveys of students, faculties and alumni, focus group (general practitioner, students, and faculties) meetings, visit of benchmarked schools, and consultation from experts.

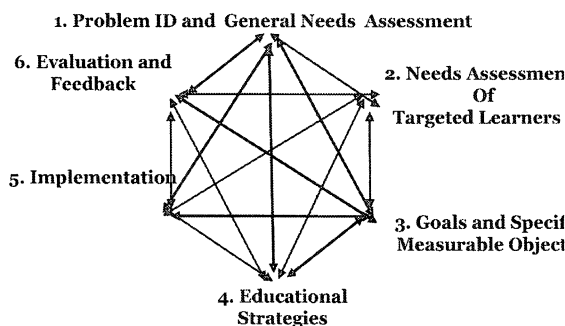


Figure 1. A process of curricular development

Through these processes, we identified problems in the curriculum and found most of them were already well-documented. These problems included;

- Basic science is weakly linked to Clinical science (Marilyn et al., 1995)
- Discipline-based or Department-based curriculum
- Too much redundancy among classes
- A few core clinical skills cannot be covered within current curriculum
- Too little time for students to consolidate concepts and develop critical thinking skills (Marilyn et al. 1995)
- Too little time to develop critical thinking skills

It became evident and agreed upon that the needs

for dental curriculum reform in Seoul National University were as follows;

- To Increase the efficiency of dental education in the new millennium
- To reduce the lack of connection between disciplines
- Early exposition of the student to the clinical situation
- Increasing demands for humanism education
- Increasing demands of relevant medical education

There were also heavy demands of reinforcing the clinical education. Concentrated or intensive programs in clinical curriculum are urgent in terms of efficiency of education. Early clinical exposures, community based oral health educations, and comprehensive primary care educations were the main parts of increasing educational demands. After series of task force team meeting and workshops, we decided the directions of changes to integrated curriculum, both vertical and horizontal.

Integrated curriculum

What is an integrated curriculum? Integration does not mean only tie distantly related lectures together, but means completely different way of designing educational processes to proper positioning of the goal of dental education. Job-readiness and school-to-work curriculum model is the one of the good example for professional education. It fulfills the demands of higher levels of communication, and analytical and problem-solving skills. The applied and integrated curriculum also helps more students master the skills in an information-based society.

Integrated education is very efficient in reinforcing the connection between the basic and clinical dentistry, reducing the redundancy or repetition, enhancing the small group based educational program like problem-based learning and promoting the student-centered education. Rationale for integration is already well proven from the evidence from cognitive psychology. Learning in context is the best way considering the students' interest, motivation, and integration of theory and practice.

Integrated Curriculum is intended to acquire knowledge, skills, and attitude as a whole. The courses should be integrated horizontally (integration among courses with same subjects) and vertically (integration between basic science and clinical courses).

Integrated curriculum and goal of dentistry

Final goal of dental education is to serve community (local, global) and care for individual in the context of community & family. Art of dentistry, leadership skill of research and scholarship, life-long learning and teaching, development of professionalism, and service to community should be put together into the educational course of a dentist. This goal can be achieved through weaving of concepts of basic and clinical sciences, culture and social system

Self-directed learning and life-long learning is another

er goal of curricular change. The rapid social and scientific development demands professionals with a capability to know when to change and to self-educate. The curriculum should be constructed to improve the capacity of dental students to search and analyze data by oneself and to make the right decision based on it. Professionalism is another issue to contend. The communication skills, decision-making skill, morality and sense of social duty are needed for dental health professionals.

Redefine the Mission and Goal of Education

Our mission of dental education was summarized like “the educational objectives of the undergraduate D.D.S. program are to develop individuals capable of undertaking comprehensive patient oral care, basic dental research, and social responsibilities.” Principles for new curriculum development included making a new goal of education, defining the precise contents of education, integrated curriculum with core courses and elective courses.

Goals of education temporarily defined as “The goal of dental education is to supply dentists who have basic research and clinical capacity, willingness to serve for the public interest, capacity to self-educate, and a sense of duty.” The goals for the whole curricula, as well as specific goals of each course, were addressed, which needed to be managed systemically. The contents of education described in the form of knowledge / skills / attitudes with promotion of self-directed learning, problem solving and decision making

Designing Issues

In the designing of the integrated curriculum, integration does not mean physical aggregation of teaching in the classroom. Careful arrangement and sequencing of specific subject to coincide with one another is essential. Inter-faculty cooperation and pedagogical ground work is necessary. In the designing an integrated curriculum, systemic connectivity based on descending organization is important.

Integration of the basic science courses and the clinical courses were the most important part to allow the conceptualization of the knowledge. Problem-based learning opportunities to the students through clinical case studies were considered to promote the capability (knowledge, skills, and attitude) as a general dentist. It was well-proven method for making self-directed and active learners, who would continuously absorb cutting-edge knowledge and solve the problems that he/she would meet as a dentist. To increase the lateral connectivity among the integrated courses, the related topic in different courses placed to teach in close temporal proximity. We defined the general principles of curriculum development which can be grouped as integration (horizontal and vertical), self-directed learning, life-long learning, professionalism and community-based education with continuous quality improvement

In the clinical education, problem-sensing and solving skill in small group or solo-practice situation was the

goal for the curriculum. Early clinical exposure starting from the first semester of dental school was regarded important to develop communication skill and professional ethics.

Elective courses were included for the expanded knowledge. Externship and research projects were the choice. Elective courses included were researches, social sciences, and externships programs in a domestic and foreign dental schools and institutions. Student researchers were prepared with early designation of research advisors.

For the general organization of integrated curriculum, consistent and coherent guiding principle were necessary and multi-departmental consensus group were developed for setting the contents of integrated curriculum and final goal of dental education (not from disciplinary or departmental concern)

Organization for the Curriculum management

For the successful implementation of a new curriculum, the need of administrative organization for planning, monitoring, and coordination the integrated curriculum was great. The “education committee” makes plans, controls and monitors the whole curriculum, evaluate the educational plan of each integrated course, and control the relationship among different integrated courses. The “management committees” in each integrated course take charge of setting goals, deciding the contents, operational methods and evaluation time/methods for each course. The “office of education” develops teaching methods, materials, and evaluation methods. We put these three kind of different organizations into the curriculum development and maintenance.

Evaluation of curriculum

Evaluation and quality management of curriculum are indispensable. To improve the education system, repetitive evaluation and reform processes were critical. The new education system evaluation should start upon initiation with continuous amendments.

Evaluations of education consisted of curricular evaluation and student assessment. Both were integral part of curricular development and implementation. Curricular evaluation should be practical to achieve the educational goals. Scope of evaluation of curriculum included objectives, repetitions, and omissions during the integration. It also included the effectiveness of teaching methods, appropriateness of assessment, student's achievement of affective domain (attitude) and the educational effort of faculty and staff. The integrated courses progressed as planned by comparing the education plan (teaching goal, learning goal, evaluation, and weekly progress plan) and the data collected (student's achievements, student' appraisal, and lecturer's appraisal).

For student assessment we should consider that the goal of evaluation is not grading students nor making dropouts. It is to monitor the educational progress from the point of lectures' as well as students' view, to

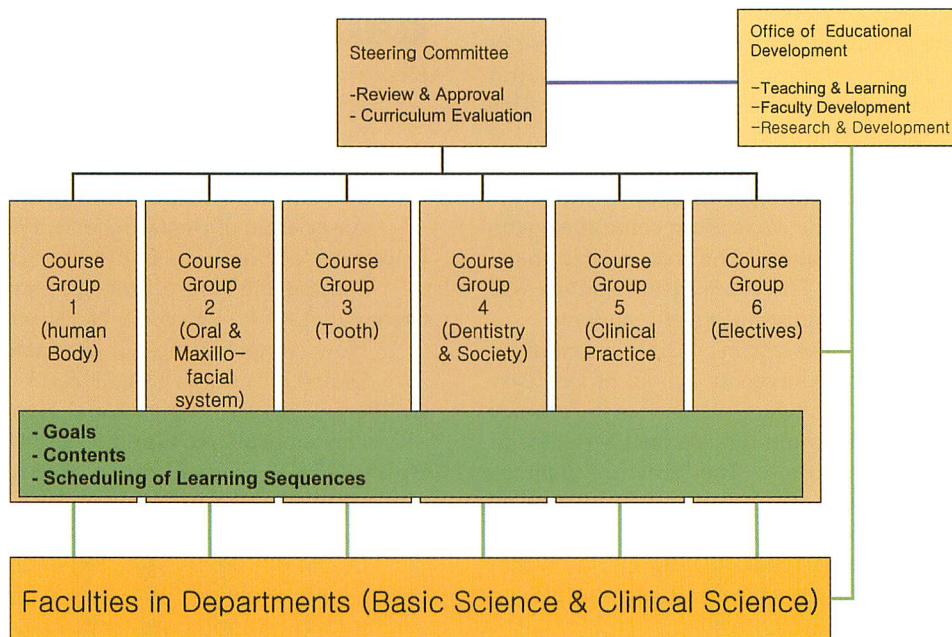


Figure 2. Organizational structure of dental education

improve the quality of education, and to assess the students' application capability of the knowledge that he/she had obtained during the course. We designed tests which will evaluate students' capacity and progress as a whole. The assessment methods included formative assessment, portfolio assessment, structured interview and OSCE.

Development process for 2004-2005 dental curriculums

The process started at 2002 April after acceptance of the new school system. Government provided research funds for study of the new education system. Careful research works started in co-operation of five dental schools who decided to change. The report was published in the early 2003. It contained lists of suggestion for admission and education in professional dental graduate schools. In April of 2003, sub-committee for development of new dental curriculum organized and had its first meeting on the direction of the curriculum change. More than 12 meetings and 3 workshops including a general faculty development workshop were held until September. The first formal report for the plan of new curriculum came out in July and three formal revisions were reported. At September 2003, the organizing and steering committee for new curriculum started and detailed curriculum writing process began. 14 scheduled meeting and several informal meeting of the committee were held until November. Final curriculum draft came out in November. Several meetings of department chairmen and education committee were necessary before the final approval in the general faculty meeting.

DISCUSSION

Findings and remaining tasks includes faculties' indiffer-

Phase 1	Phase 2	Phase 3
Task Force Team	Steering Committee	Course Group
<ul style="list-style-type: none"> ◆ Problem ID ◆ Needs assessment ◆ Design Curriculum Structure <ul style="list-style-type: none"> - Goal - Objectives - Main courses 	<ul style="list-style-type: none"> ◆ Representatives of Each Depts. ◆ Define detail of each integrated courses <ul style="list-style-type: none"> - Goal - Objectives - Contents and Sequence 	<ul style="list-style-type: none"> ◆ Selection of Coordinators ◆ Course Book for students <ul style="list-style-type: none"> - Goal & Objectives - Expected Outcomes - Weekly schedule - Strategies - Assessment

Figure 3. Schematic representation of the development process

ence toward educational mission, change of professor teacher-centered curriculum into the student-centered one, and faculty development. Basic structure of integrated curriculum progresses from the study of the basic foundations of dentistry to applications in supervised patient management and solo performance of practice.

Leadership groups should be organized to support professional development and leadership skills through collaborative group learning activities that relate personal experience to organized studies. Students should be regarded as highly motivated for their choice of studies and responsible for their own learning. The learning process should encourage student motivation. Learning in dental school is a social process between students/teachers. It is also an individual process. A student has real co-responsibility for their own progress, and faculty should provide facilities suitable for group and individual learning.

There are varieties of methods of teaching. It includes lectures, Seminars, small group practices, lab courses (dissection, microscopy, and statistics lab) and conference. Problem based learning (PBL) is not just

method of teaching, but principle of teaching. It can be designed for the groups of 7-8 students with purpose of enhancing student activation, cooperative skills, and individual reasoning through collective reflections. This may provides theoretical learning objectives by means of "real" patient. We hope it can provide firm basis for life long learning. Planning and organizing of the new curriculum was centered to the curriculum committee, who deals with all kind of questions. The tasks related to the planning and organizing. The committee members will be pedagogic advisor, administrative staff, Students.

In conclusion, the basic aim of 2004 curriculum reform in Seoul National University School of Dentistry is an integrated curriculum which maximizes the efficacy of education through the multi-dimensional synthesis of knowledge, skill, and attitude. The structure includes horizontal integration (interdisciplinary) and vertical integration (basic-clinical science). The self-directed learning heads toward the "skill of learning" for rapidly evolving "new dentistry" through the motivation and responsibility of students.

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