MEDICAL EDUCATION

NEW CURRICULUM DESIGN AT MARMARA UNIVERSITY SCHOOL OF MEDICINE

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Goal of education

World Health Assembly, the principal governing body of the World Health Organization, encourages all countries to undertake activities to reform medical education and to organize appropriate programs of basic and continuing education (1) in order to attain the goal known as 'health for all'. The aim of medical education is emphasized as "to educate and to train skilled and competent medical doctors". Optimal educational approaches should be used to train the future graduates as "care provider, decision maker, communicator, community leader and manager" physicians. Based mainly on a report prepared by the Turkish Medical Doctors' Association (2), the aim of undergraduate medical education at Marmara University School of Medicine was defined as "to educate qualified medical doctors equipped with the knowledge, skills and attitudes to provide a qualified health care for the individual and the community, in order to attain the goal of "health for all" in March 1999.

Current status developed according to the needs for change

Marmara University School of Medicine was founded in 1983, based on a standard integrated curriculum adopted originally from Case Western Reserve University, Ohio. In accordance with the increasing interest in reforming medical education worldwide, the first national Medical Education Symposium, which directed attention to the new concepts in medical teaching in Turkey, was organized by Marmara University School of Medicine in 1993 in Istanbul (3). In February 1995, two faculty members visited Liverpool University School of Medicine to gather information about their new curriculum based on problem-based learning and how they managed this radical change in their undergraduate medical curriculum. The first step was implemented at our Institution in the academic year of 1998-1999, when three new bodies were formed for the development of new strategies and methods to create a model for a change and its management: 1) The Institutional Undergraduate Medical Education Research, Planning and Coordination Committee (RPCC) was established in December 1998 (Table I). 2) A committee was selected in February 1999 to plan and organize postgraduate training activities. 3) The Department of Medical Education was established in November 1999, in an attempt to guide the educational reforms and to assess the impact of curricular changes.

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Therefore, due to the current algorithm of the management of education in Marmara University School of Medicine (Fig 1), the main functions carried out by the RPCC will be thereafter taken over by this department, under the consultancy of the RPCC.

Based on a survey on the ongoing educational system among the graduates of the year 2000, the needs for change were determined by the RPCC, and the following innovations were designed and implemented (4-7).

Footprints in change management

Historically, classes in medicine have been taught via lectures and visual aids. In recent

Table I: Committees for the design and implementation of the innovations in the education at Marmara University School of Medicine.

Institutional Undergraduate Medical Education Research, Planning and Coordination Committee (RPCC)	
Subcommittees / study groups	**Output of the activities**
Baseline evaluation of the old educational system	• A survey on the graduates' opinion about needs for change in the educational system • A report about the students' grades and overall success rates in all classes, the performance of our graduates in the postgraduate placement exams and the relationship among these parameters
Core curriculum coordination	• A search for different core curricula from other countries • A survey on the "knowledge, skill and attitude objectives" from the point of view of faculty members • Core disease/condition/symptom, core skills and core behavior/attitudes lists for institutional core curriculum based on the above mentioned survey and the report prepared by the Department of Public Health, which summarizes the priority health problems in Turkey • Staff meetings to discuss core lists
Phase 1 organization	• A guide-book on how to facilitate interactive study modules • Planning and application of interactive study modules • Implementation of "Introduction to Clinical Practice" course including communication skills and first aid • Implementation of vertical integration
Phase 2 organization	• Reorganization of the clerkship programs based on the core topics and skills survey • Clerkship guides including aims and objectives of the program • Implementation of the elective clerkship and clinical development module
Assessment and evaluation	• A software program for the item analysis of multiple choice questions (MCQ) • Regular MCQ analysis and feedback to the related departments • "Teacher training" courses on student assessment and evaluation techniques
Teacher training	• "Teacher training" courses on new learning and teaching methods
Phase 3 organization	• A survey to understand interns' problems and comments on their education • A survey for the skills objectives of internship programs
Development of clinical skills laboratory	• A clinical skills laboratory with manikins, models and other teaching materials essential for the Introduction to Clinical Practice course. • This working group forwarded its responsibility to the Head of the Clinical Skills Lab reporting to the Coordinator-in-chief.
Library	• Subscription to new journals • New books and internet access to biomedical sources • Guidance to students and academic staff for the interactive study modules
Teaching quality assessment and medical education unit	• Establishment of the Medical Education Department to undertake several functions of the subcommittees / working groups such as organization of "teacher training" courses, item analysis of MCQs, etc.
Project preparation	• A project supported by the Turkish Government Planning Commission
Postgraduate Medical Education Council	
• Evaluation of the current status of postgraduate education via meetings, questionnaires • Log-books for research assistants • Training of research assistants on basic principles and planning scientific research projects, presentation of data and essential ethical aspects of research and medical practice (178 research assistants attended these courses.) • Advanced courses for research assistants on use of experimental animals in research (handling, anesthesia, drug administration etc.) (75 research assistants attended these courses.) • Handbooks for the above courses • Guidelines on how to write a thesis	

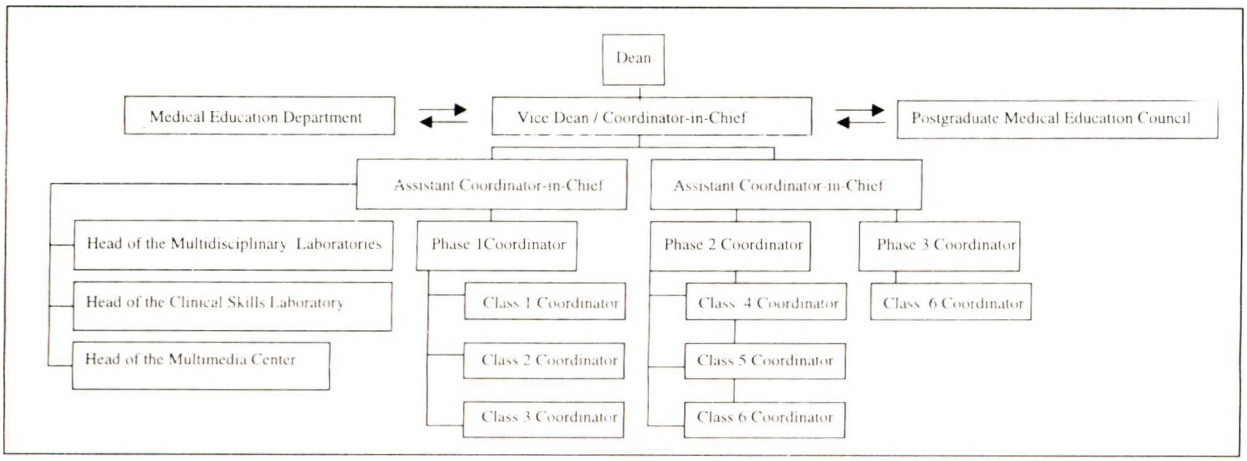

Fig.1 : The organizational scheme of the educational steering body (October 2002).

years, medical educators have been challenged to develop new, innovative and creative educational materials that enhance problem-solving skills, encourage group discussions, and engage students in interactive learning (8). Recently, there has been a trend at many institutions to reduce the number of lecture hours and provide more instruction through small-group problem-based learning sessions.

At Marmara University School of Medicine, in order to motivate the faculty to apply student-centered interactive teaching techniques and to encourage the use of small-group teaching methods, a "teacher training" program was developed in September 1999. Since then, a total of 133 faculty members (62 % of the academic staff) have attended a 5-day course to acquire mostly interactive educational skills organized by trained faculty members. Since changing the curriculum without modifying the examination system is not advocated (9), we aimed to improve our present examination system, while planning and applying more relevant methods of student assessment. The above-mentioned faculty members (62 % of the academic staff) were also trained on student assessment and evaluation techniques through a short course between 2000-2002 (10). Since there was no formal education to learn how to teach undergraduates, the Executive Committee decided to make these courses a prerequisite for assistant professorship candidates.

Knowing that consulting and publicizing the changes are essential steps in the management of curricular changes, in September 2001, two "Teaching Quality and Curricular Reconstruction" meetings were organized by the Dean's Office with attendance of 66 % of the faculty members. Small group discussions and plenary sessions were held during these two-day workshops, particularly on new trends in medical education, how to catch up with the world in this respect, and, on the implemented curriculum changes. Encouraging faculty members to propose their ideas and openness to communication helped to reduce resistance against changes and positively influenced efforts in this area.

Recently Implemented Curricular Changes in Marmara University School of Medicine

A) Horizontal and Vertical Integration of Basic and Clinical Sciences:

In the teaching system of Marmara University School of Medicine, preclinical years (Phase 1; years 1, 2 and 3) were organized as subject committees such as respiratory system, cardiovascular system, hematopoietic system, etc. during which the related topics were taught in an integrated manner. However, the integration was between basic medical disciplines in years 1 and 2, and between clinical sciences, pathology and pharmacology in year 3. The new organization of the subject committees involves a vertical integration of the basic and clinical sciences in addition to the above-mentioned horizontal integration (Table II and Fig. 2). During Phase I, "an interactive study module" is implemented in each subject

Table II: Subject Committees and Interactive Study Modules in Phase 1.

Subject Committees	Interactive Modules
Year 1:	
• Introduction to Cell and Cellular Replication	• Down Syndrome
• Cellular Metabolism and Transport	• Cystic Fibrosis
• Tissue and Immune Response	• In Vitro Fertilization
• Basics of Nervous and Endocrine Systems	• Pain
Year 2:	
• Cellular and Tissue Injury	• Neoplasia brdrs
• Musculoskeletal and Integumentary Systems	• Sports in Medicine
• Hematopoietic System	• Hematology Cases
• Respiratory System	• Cigarette smoking
Year 3:	
• Cardiovascular System	• Hypertension
• Gastrointestinal System and Metabolism	• Arteriosclerosis
• Endocrine Diseases and Neuropsychiatric Disorders	• Obesity
• Urinary and Reproductive Systems	• AIDS

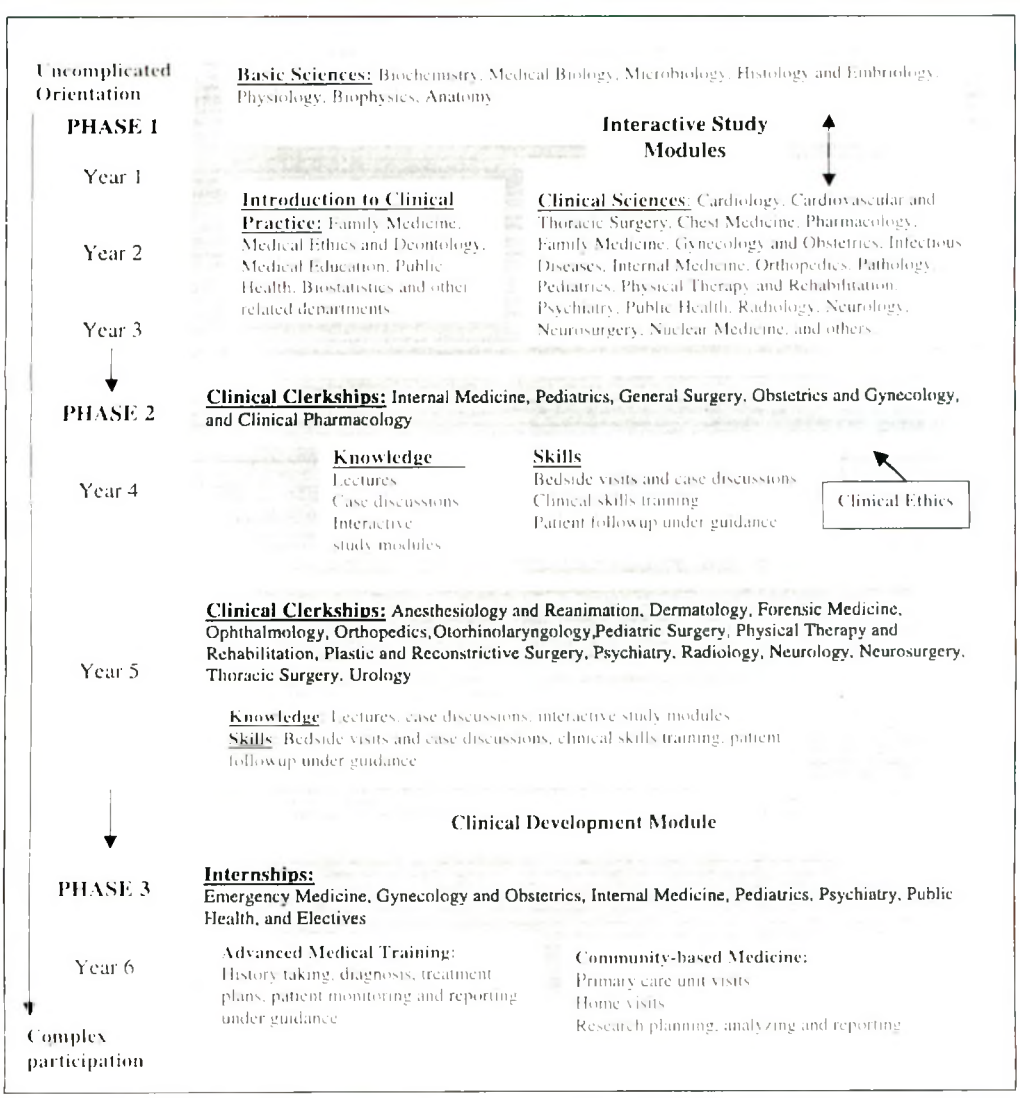

Fig.2 : Vertically and Horizontally Integrated Education System at the Marmara University School of Medicine

committee on a topic closely related to the main theme of the program.

B) Introduction to Clinical Practice (ICP)

In the old curriculum, students were first being introduced to patients in their 4th year and they were required to acquire clinical skills by practicing on real patients without any previous training. The modern trends in medical education are to gain clinical skills as early as possible and to practice on manikins and volunteers before approaching real patients. Therefore, a three-year, longitudinal and interdisciplinary course (ICP) with a primary emphasis on preparing students to care for patients and families in a humanistic, competent and professional manner designed by the Department of Family Medicine and implemented in the academic year 1999-2001 in cooperation with the Departments of Medical Education, Public Health, Psychiatry, Internal Medicine, General Surgery, Pediatric Surgery, Pharmacology, Medical Ethics and Deontology, mainly. The course goals are to provide a clinical context to the basic science curriculum, to acquire and demonstrate attitudes necessary for the achievement of high standards of medical practice in the service of individuals and the community, to acquire the skills of independent, self-directed learning and life-learning and to acquire basic procedural skills with humanistic principles. General learning topics of the program include, proficiency in medical decision making and in obtaining data, most common signs and symptoms in general medical practice, evidence-based medical practice, health maintenance protocols, health promotion and disease prevention, ethical and legal issues in general medical practice (Table III). Short lectures on the core content, case-based sessions, panel sessions, small group discussions with facilitators, role play, simulated/standardized patient exercises, video-taping, practicing on manikins and models are being used as learning tools when appropriate.

Table III: Curriculum Content of Introduction to Clinical Practice Course

Topics	Content
Communication skills	Communication in medical education-medical settings, basic interpersonal communication skills, public speaking skills, intercultural communication, introduction to the medical interview, physician-patient relationship, patient education
First aid	Survey of the accident area and the victim, transportation of the victim, resuscitation, soft tissue injuries, seizures, poisonings, shock, frostbite, bleeding, burns
History taking and physical examination	Medical interview, history taking, general and focused physical examination, difficult topics/sensitive issues, difficult patients
Outpatient clinics experience	Second and third year students visit determined outpatient clinics of Marmara University Hospital throughout the year to observe physician-patient relationships, history taking and/or physical examination using checklist and/or algorithms.
Basic clinical skills	Practice to acquire basic clinical skills such as injections, suturing, nasogastric tube insertion, etc.
Human in medicine	Courses/workshops/studies in medical humanities subjects. Ethics, social concepts in health, arts and humanities are some of the major course titles.
Evidence-based medicine	An evidence-based learning program is given by Departments of Public Health and Biostatistics for subjects as basic medical statistics, introduction to epidemiology, literature reading, etc.
Community continuity experience	This program may provide the students with an opportunity to observe patient care setting outside the hospital and to obtain experience in physician-patient relationships by following up on an assigned patient and/or family.
Student projects and Marmara Student Congress (MaSCo)	Within the program, students are required to plan and perform research projects (mainly epidemiological studies) and encouraged to present their results at MaSCo.

C) Clinical Training Period (Clerkships)

The clinical years of undergraduate medical education (Phase 2; years 4 and 5) are designed as clerkships in clinical disciplines. Year 4 clerkships are in Pediatrics, Internal Medicine, Clinical Pharmacology, Gynecology and Obstetrics, and General Surgery, whereas at the end of year 5, the students are expected to successfully complete clerkships in Anesthesiology and Reanimation, Forensic Medicine, Pediatric Surgery, Dermatology, Physical Therapy and Rehabilitation, Thoracic Surgery, Ophthalmology, Otorhinolaryngology, Neurology, Neurosurgery, Orthopedics, Plastic and Reconstructive Surgery, Psychiatry, Radiology and Urology. A 3 week-elective clerkship period is also implemented in the program.

The goals of Phase 2 are to acquire medical history taking, inspection and examination skills, to comprehend the principles of basic therapy and rehabilitation, to understand the social and environmental components of different diseases and to consider the balance between individual and community health care, preventive and therapeutic care; to learn to promote healthy lifestyles with ethical and social responsibility, and to handle the teamwork with individuals and organizations. Therefore, the clinical training period is considered as an integrated educational period during which students acquire basic knowledge and skills in order to be able to give humanistic and effective health care. The goals of the teachers are to facilitate learning, to encourage independent ideas, to improve positive attitude to the patients, and to teach the habit of lifetime learning. There is a tendency to increase elective program elements when Institutional Core Curriculum studies come to an end in order, to allocate time for the students' in depth learning in areas of interest.

The last year is the internship (Phase 3; year 6) at the Departments of Public Health, Internal Medicine, Pediatrics, Gynecology and Obstetrics, Psychiatry and Emergency Medicine (Fig. 2). The students are expected to act like physicians under the guidance of their professors.

D) Clinical Development Module:

In the academic year 1999-2000 the subcommittee of the RPCC on Phase 2 programs raised attention to the necessity to create time for elective clerkships in accordance with the new trends. Additionally, as a first step of "institutional core curriculum + electives" study, it was agreed by the Departments of Nuclear Medicine and Radiation Oncology that the core content of the two disciplines might be better included by a multidisciplinary interactive study module instead of a two-week clerkship, in year 5. The module was named as "Clinical Development Module" and the goals and objectives were set as to develop clinical reasoning in order to improve clinical comprehension, which is essential in medical practice on the selected topic of "cancer".

The Clinical Development Module is organized and implemented by the Departments of Nuclear Medicine and Radiation Oncology in cooperation with several faculty members from Physiology, General Surgery, Pediatric Surgery, Pathology, Dermatology, Medical Oncology, Medical Education, Orthopedics, Medical Biology, etc. In the year 5, students attend short lectures on the core content, case-based sessions, a panel discussion and small group discussions (role playing and simulated/standardized patient exercises) once a week for one semester (twelve weeks).

Conclusion and future plans

Efforts to reform the curriculum and increase teaching quality at Marmara University School of Medicine highly motivated a large group of the academic staff. Most of the academic staff is now struggling eagerly to change into a "facilitator" rather being a "teacher" in the students' learning process. Teacher training courses for faculty members are being organized several times a year. Increasing the number of people involved in the management of change in education provides more creative ideas and encourages the teachers to think about new proposals to enhance the quality of teaching. Moreover, as more people are involved in the "backstage" of the modifications, there will be less friction or resistance to the implementation of proposed changes.

In addition to managing the problems we will face in the application of the above-mentioned

curricular changes, future plans are to finalize the "institutional core curriculum and electives" study, to start developing a multiple choice question bank to enhance the quality of such exams and to measure the impact of curricular changes on the quality of teaching and the satisfaction of the students.

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