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Sara Mortaz Hejri, Azim Mirzazadeh, Mahboobeh Khabaz Mafinejad,
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A decade of reform in medical education: Experiences and challenges at Tehran University of Medical Sciences

Sara Mortaz Hejri^{a,b,c} , Azim Mirzazadeh^{a,c,d}, Mahboobeh Khabaz Mafinejad^{b,c,e}, Maryam Alizadeh^e, Narges Saleh^{a,e}, Roghayeh Gandomkar^{a,b,c}  and Mohammad Jalili^{a,c,f} 

^aDepartment of Medical Education, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran; ^bEducational Development Center, Tehran University of Medical Sciences, Tehran, Iran; ^cHealth Professions Education Research Center, Tehran University of Medical Sciences, Tehran, Iran; ^dDepartment of Internal Medicine, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran; ^eEducational Development Office, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran; ^fDepartment of Emergency Medicine, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

ABSTRACT

Purpose: In this paper, we present the major curricular reform in MD program of Tehran University of Medical Sciences, the oldest and the largest medical university in Iran, initiated about a decade ago.

Materials and methods: Following a comprehensive program evaluation, many of the basic challenges of the traditional curriculum were revealed, namely, lack of pre-defined competencies for graduates, over-reliance on teacher-centered teaching methods, over-emphasis on knowledge base in student assessments, and focusing solely on biomedical aspects of patient care. In 2010, a vision statement for reform was created and approved by the University Council. The new curriculum was launched in 2011.

Results: The changes included: revising the content of the courses, assimilating horizontal and vertical integration, emphasizing clinical skills, encouraging active involvement in patient management, providing more opportunity for supervised practice, integrating behavioral and psychosocial topics into the curriculum, incorporating interactive teaching methods, assessing students' higher levels of cognition, and strengthening workplace assessments. To evaluate the changes, data were continuously collected and analyzed from the beginning.

Conclusions: Changing the curriculum of an MD program is a laborious task which should be planned and undertaken carefully and cautiously. It is an endless, yet invaluable and satisfying endeavor toward better future.

Introduction

Tehran University of Medical Sciences (TUMS), established in its modern form in 1935 is the oldest and largest medical university in Iran. TUMS School of Medicine offers a seven-year medical curriculum, including 18 months of internship. While graduates are eligible for independent practice as general practitioner, they might pursue their education in medical specialties. TUMS has continuously been recognized as the first rank in the country, in terms of both research and education. TUMS enrolls over 250 medical students each year and entry to School of Medicine is through a very competitive national university entrance exam, and TUMS has constantly been the first choice of applicants taking this test. Despite all these achievements, throughout the years, many concerns have been voiced about our Doctor of Medicine (MD) program by different stakeholders including medical students, graduates, and faculty members. Worldwide advances in medical education, rapidly changing healthcare environment, and the pressing need to tailor the curriculum for the new millennial generation convinced the authorities of the Medical School that they need to embark on profound changes in the curriculum. While several small alterations in our MD program had been initiated in previous years, a wide-ranging comprehensive curricular reform, encompassing all aspects of the curriculum, deemed necessary. We, therefore, conducted a comprehensive program evaluation during

Practice points

- Curricular reform is not only possible, but also necessary in universities with a long history and deep-rooted traditions.
- Different aspects of a curriculum, including objectives, content, teaching process, and assessment methods should be systematically considered in a major revision.
- Renewal process should be undertaken carefully. Faculty development, adjusting organizational structure, and a working leadership plan are important considerations.
- Evaluating the program consistently help monitor the changes and provide a clear picture of achievements and failures.

2006–2009. It composed of four large-scale projects involving students, faculty members, and experts in medical education, as well as the administrators and authorities of the university. We communicated its results in several ways including seminars, meetings, face-to-face discussions, and newsletters to show the major stakeholders what really happens in our MD program. The insights obtained from this process shed light on many of the basic challenges of our traditional medical program, and raised the necessity of

change. Based on the recommendations of the evaluation reports, a vision statement was created via a participatory approach; and after taking many expert reviews, in 2010, it was ratified by the University Council. According to the plan, in order to establish an outcome-based curriculum, it was required to define the expectations and capabilities supposed to be gained by graduate students. Hence, the TUMS MD competency framework was developed and formally approved in 2010 including 8 domains, 40 sub-domains, and 130 specific competencies (Mortaz Hejri and Jalili 2013; Mirzazadeh et al. 2014). Subsequently, different components of the new curriculum were designed aligned with the required competencies. The revised curriculum, approved by the Curriculum Reform Committee (CRC) was launched in September 2011 and, now, the first cohort of the students has enrolled in the clinical phase as interns. The new curriculum boasts several features which are summarized in Table 1 and will be elaborated in the following sections.

Highlights of reform

Curriculum model

For many years, our curriculum was discipline-based, focusing mainly on information transfer, with notable dissociation between basic and clinical sciences (Jalili et al. 2008; Mirzazadeh et al. 2013). As shown in Figure 1, the revised TUMS MD curriculum consists of four phases: The first two phases, Basic Sciences and Foundation of Clinical Medicine (FCM), are considered pre-clinical phases. The third and fourth phases, which are clinical, consist of Clerkship and Internship in teaching hospitals and healthcare centers and form the second half of training. During the first phase, topics related to the normal structure and function of human body, including genetics, biochemistry, biophysics, histology, anatomy, embryology, and physiology are presented to the students in five semesters in the format of integrated organ-system blocks. In FCM phase, during two semesters, students take integrated organ-based courses related to abnormal structure and function of human body including pathology, pathophysiology of diseases, and pharmacology. During Clerkship, students rotate in clinical wards within different hospitals and outpatient clinics. The emphasis is on gaining clinical skills, in terms of taking history, performing physical examination, and interpreting diagnostic tests. Students are expected to get involved in real patient management as members of a care provider team. During Internship, students are provided with the opportunity for supervised practice, with the aim of consolidating their clinical knowledge and skills and gaining sufficient experience to work as independent general practitioners. They also have the opportunity to take a number of elective courses, which help them choose their career path in a wise manner.

New topics in the curriculum

In response to the call that behavioral, psychological, social and spiritual aspects of health care needed to be inserted in the curriculum, we focused on the inclusion of these topics in the curriculum. It was clear for us that these topics could not be learnt through stand-alone courses

with limited hours. As a matter of fact, competencies such as communication skills, professional behavior, and clinical reasoning require continuous teaching through deliberate practice and reflection. Therefore, seven topics were spread throughout the curriculum in the form of so-called vertically integrated themes (VITs); namely, Clinical Skills; Communication Skills; Personal Development; Professionalism, Ethics and Laws; Decision Making, Reasoning and Problem Solving (Soltani et al. 2017a, 2017b); Disease Prevention and Health Promotion; and Health System and Role of Physician. The CRC set a focal point responsible for designing and implementing a longitudinal program for each theme. For instance, the focal point for Personal Development theme and Professionalism theme were the TUMS Student Counselling Center, and the Medical Ethics Department, respectively. Each focal point established the list of learning outcomes in all four phases (Basic sciences, FCM, Clerkship, and Internship), prepared the content material, and suggested the teaching and assessment methods (Kadivar et al. [in Press]; Mafinejad et al. 2016). The proposed program for each VIT was discussed using inputs from faculty members of basic sciences disciplines and clinical departments, content experts in the related theme, and student representatives. Training of each of the topics was delegated to a specific department, which in some cases collaborated with other departments to accomplish the task. Respecting cadavers, for example, which is a part of the Professionalism, Medical Ethics and Law theme, has been taught collaboratively by Medical Ethics and Anatomy Departments. Likewise, students practice breaking bad news in a joint course presented by Communication Skills Department and Department of Internal Medicine. Moreover, an assessment system was designed for gathering information about the students' performance in each theme. Students are categorized as pass, fail, or marginal according to their performance. Failed and marginal students must take remedial courses. The details of the educational program of the clinical skills theme in each of the four phases are presented in Table 2, as an example.

Changes in pedagogy

While still maintained as the main teaching method in our new curriculum, time-honored interactive lectures have been improved using quizzes, presenting clinical relevance and applying questioning techniques in order to enhance students' learning. Besides, we had planned to incorporate e-learning, and Team Based Learning (TBL) in 15% of the classes during pre-clinical phase. While we successfully implemented TBL in a considerable number of classes in the integrated blocks (Hassanzadeh et al. 2013; Alizadeh et al. 2017a), we failed to achieve our goal regarding e-learning. However, we managed to go beyond the planned program and implemented several other teaching methods. For instance, the seven-step Problem-Based Learning tutoring model, adopted by Maastricht Medical School, has been adapted in some blocks. We also carried out a number of Case-Based Learning (CBL) sessions, in which students were given a clinical case in the form of a video clip, a written scenario, or a real patient, and then discussed their interpretations of the clinical findings first in small groups and then for the large class, applying basic sciences concepts

Table 1. Shortcomings of the traditional curriculum, reform priorities, and highlights of the revised curriculum.

	Shortcomings of the traditional curriculum ^a	Reform priorities ^b	Highlights of the revised curriculum
Admission	<ul style="list-style-type: none"> • Student selection based on a national cognitive exam rather than their personal competencies and non-cognitive attributes 	<ul style="list-style-type: none"> • Improvement of the admission mechanisms, so that students' personal characteristics would be considered in the admission process besides their scientific competencies 	<ul style="list-style-type: none"> • Due to the national regulations, no change has occurred in admission system. However, a parallel graduate-entry system has been adopted since 2008, in which a limited number of applicants are accepted annually through Multiple Mini Interview as well as a written test
Outcomes and competencies	<ul style="list-style-type: none"> • Unclear expectations of the society and the health system from a general practitioner • Inexplicit mission, outcomes, and main objectives of the MD program 	<ul style="list-style-type: none"> • Establishing the mission, main objectives, and outcomes of training GPs • Defining the competencies of the TUMS MD graduates based on the societal needs, and designing the new TUMS MD curriculum in accordance to the outcome-based approach 	<ul style="list-style-type: none"> • The competency framework for TUMS MD graduates was developed through a participatory approach
Educational content and strategies	<ul style="list-style-type: none"> • Delivering isolated basic and clinical sciences • Curriculum overload: enormous and highly specialized content • Overlaps among topics of different courses • Lack of clinical relevance in the majority of courses of the preclinical phase • Insufficient attention to the physical, psychological, social, and intellectual aspects of patient care • Failure to instill confidence in students, particularly in skills such as history taking, physical examination, and performing practical procedures • Training solely in the hospital field, little exposure to outpatient cases • Opportunistic training during the clinical phase • Absence of elective courses 	<ul style="list-style-type: none"> • Incorporating integration at temporal coordination level in pre-clinical phase in organ-system blocks • Modifying the content of the program, so the content would be proportionate to the needs of a GP, and, the coordination between different courses would be facilitated • Addressing bio-psycho-socio-spiritual competencies, especially professionalism and communication skills • Improving training of skills and competencies, such as history taking, physical examination and procedural skills, problem solving, self-directed learning, critical thinking, and evidence-based medicine • Considering early clinical exposure for emphasizing vertical integration. • Shifting from inpatient education (in hospitals) to outpatient and community setting • Introducing electives in both pre-clinical and clinical phases • Effective use of interactive lectures • Using more student-centered methods (small groups, Problem Based Learning, self-learning, simulators, and manikins) • Improving supervision and feedback in clinical rotations, as well as increasing bedside teaching and ambulatory teaching • Enhancing the assessment of higher levels of cognitive domain in written exams • Enhancing the assessment of professionalism and practical skills specially in workplace • Encouraging formative students' assessment • Improving the validity, reliability, and fairness of the exams, continuously 	<ul style="list-style-type: none"> • Ten organ-system integrated blocks have been designed and included in the pre-clinical • Seven vertically integrated themes included in the curriculum, namely; clinical skills; communication skills; personal development; professionalism; ethics and laws; decision making; reasoning and problem solving; disease prevention and health promotion; and health system • Early clinical exposure and shadowing programs have been designed and implemented in the pre-clinical phase • Elective courses have been conducted in clinical phase
Teaching and learning methods	<ul style="list-style-type: none"> • Teacher centered instructional methods • Lecture as the main teaching method • Few practical classes 	<ul style="list-style-type: none"> • Effective use of interactive lectures • Using more student-centered methods (small groups, Problem Based Learning, self-learning, simulators, and manikins) • Improving supervision and feedback in clinical rotations, as well as increasing bedside teaching and ambulatory teaching • Enhancing the assessment of higher levels of cognitive domain in written exams • Enhancing the assessment of professionalism and practical skills specially in workplace • Encouraging formative students' assessment • Improving the validity, reliability, and fairness of the exams, continuously 	<ul style="list-style-type: none"> • Lectures have been enhanced by using interactive techniques. • Student-centered methods, such as TBL, PBL, CBL, Peer teaching have been utilized in classes
Student assessment	<ul style="list-style-type: none"> • Assessments targeted at the lower levels of cognitive domain mainly by multiple choice questions • Ignoring assessment of higher order thinking, clinical performance, professionalism, and communications skills • Almost no formative assessments 	<ul style="list-style-type: none"> • Enhancing the assessment of higher levels of cognitive domain in written exams • Enhancing the assessment of professionalism and practical skills specially in workplace • Encouraging formative students' assessment • Improving the validity, reliability, and fairness of the exams, continuously 	<ul style="list-style-type: none"> • A student assessment system has been developed based on medical graduates' competency framework • Various types of written tests are used to support higher levels of thinking • Assessment of practical and clinical skills at the end of major clinical rotations has been enhanced • Use of workplace based assessments has been strengthened in major clinical rotations

(continued)

Table 1. Continued

	Shortcomings of the traditional curriculum ^a	Reform priorities ^b	Highlights of the revised curriculum
Program evaluation	<ul style="list-style-type: none"> No systematic and fully organized evaluations Focusing on limited aspects of the program and not on higher levels outcomes or overall quality of the curriculum Not linked to program improvement 	<ul style="list-style-type: none"> Performing regular internal evaluation of the program and its components by using various methods and resources Full establishment of a graduation survey system Using the evaluation results for continuous improvement of the program 	<ul style="list-style-type: none"> A systematic program evaluation with elements of internal and external evaluation is being used Courses and rotations have been evaluated using various tools to provide suitable feedbacks The graduation survey has fully established The School of Medicine is committed to use the evaluation results for continuous improvement of the program
Managerial structure	<ul style="list-style-type: none"> No connection between educational departments No oversight over the performance of departments 	<ul style="list-style-type: none"> Establishing committees for every phase under the supervision of the Deputy Dean of Education 	<ul style="list-style-type: none"> A new managerial structure has been instituted, which includes a curriculum committee and all its subordinate committees (such as phase committees, and the corresponding offices). The curriculum committee is contributing to departments' representatives and faculty administration and is supervised by the Dean of education

^aBased on TUMS comprehensive evaluation report (2006–2009).

^bBased on TUMS reform vision statement (2010).

(Peiman et al. 2017). In peer teaching, trained senior students collaborate as facilitators to ensure active learning sessions. Performing physical examination on peers has also been applied in which students act as models for their classmates in practicing simple physical examination and learn surface anatomy by painting on the surface of each other bodies. Using study guides and electronic content, we also took advantage of flipped classrooms, in which students discuss further about clinical cases. Reflective practice using guides and questioning techniques on team work process, leadership, communication skills, ethical and professional aspects of cases is encouraged in CBL and TBL sessions (Alizadeh et al. 2017b).

Changes in student assessment

In our old curriculum, assessments focused largely on the students' knowledge base and multiple choice question (MCQ) exam was the dominant form. Students took a teacher-constructed exam at the end of each course or clinical rotation and also sat for two national exams; one at the end of the basic sciences phase and the other at the end of the clerkship. The revised curriculum tried to answer the long standing call to enhance the assessment program. In the pre-clinical phase, test formats have been diversified using items such as short answer and extended matching questions along with MCQs in higher taxonomy levels. Besides, a number of interdisciplinary questions have been included at the end of each integrated organ system block exam. In order to enhance the quality of the test items, peer review sessions were held in which the block director along with faculty members and a medical education expert participated. Transforming exams from a discipline-based format to one pertaining to the organ system block could potentially lead to systematic deletion of the content of minor disciplines with little share in the overall score. In order to overcome this problem, we employed an innovative approach. Apart from the overall score calculated at the end of each block, a cumulative disciplinary score is reported at the end of the academic year by adding up the scores of the share of each discipline in each block exam (Mortaz Hejri et al. 2014). Although less widespread, assessment in the clinical phase has also undergone some changes and improvements. There is a reduction in knowledge-based assessments and an increased emphasis on workplace-based assessments. The use of end-of-rotation structured global rating forms to evaluate the clinical performance of clerks, and using Objective Structured Clinical Exams (OSCEs) at the end of most major rotations are examples of fundamental changes in this phase. Some departments, such as internal medicine, have started using key features test format to assess clerks' clinical reasoning skills. A comprehensive OSCE is conducted at the end of the third phase just before the beginning of internship to ensure that students have acquired sufficient skill to enter clinical practice. More recently, students are required to demonstrate their clinical competency in a nationally regulated OSCE before graduation.

Program evaluation

Before launching the new program, an evaluation committee and an evaluation unit were established.

Pre-Clinical Phase		Vertically Integrated Themes									
Basic Sciences	Year 1	Transition to University	Molecule to Cell Block	Tissue to Organ Block	RES T	Cardiovascular System Block	Respiratory System Block	Gastrointestinal System Block	Vertically Integrated Themes		
	Year 2	Endocrinology System Block	Reproductive System Block	Urinary System Block	RES T	Neural System Block	Special Sensory System Block	Immunology Pathology Microbiology	Comprehensive Written Exam		
Foundation of Clinical Medicine	Year 3	Introduction to FCM	Cardiovascular Course	Endocrinology Course	Nephrology Course	Gastrointestinal Course	Respiratory Course	Hematology Course	Rheumatology Course	Comprehensive OSCE	
	Vertically Integrated Themes										
Clerkship	Year 4	Transition to Clinical Practice	Internal Medicine rotation		General Surgery		Orthopedic Surgery	Urology	Dermatology	Community Care	Otolaryngology
	Year 5	Emergency Medicine	Ophthalmology	Radiology	Pediatrics		Obstetrics	Psychiatry	Neurology	Infectious disease	RES T
		Year 6	Internal Medicine		General Surgery		Psychiatry	RES T	Eight 2-week elective rotations (Ophthalmology, Neurology, Dermatology, Neurosurgery, ...)		
Internship	Year 7	Emergency Medicine	Pediatrics		Obstetrics	Community Care					

Figure 1. TUMS MD curriculum map (some details have not been illustrated).

Table 2. Educational program of the “Clinical Skills Theme” in TUMS revised MD curriculum.

Phase	Content	Teaching methods	Assessment methods
Basic sciences	Surface anatomy First Aids CPR Injection	Peer examination in practical anatomy Demonstration	Checklist assessment End of phase OSPE
Foundation of clinical medicine	Comprehensive medical history taking Physical examination and normal findings Simple procedures	Demonstration Mentoring	End of phase OSCE Mentor's assessment
Clerkship	Focused medical history taking Physical examination technique and abnormal findings Medical records note keeping Intermediate-level procedures	Demonstration Bedside teaching Mentoring	Pre internship OSCE End of rotations OSCEs End of rotations GRF Mentor's assessment
Internship	All of the outcomes in the clinical skills section of TUMS MD competency document	Bedside teaching	End of rotations GRF End of rotations OSCEs Graduating OSCE

TUMS: Tehran University of Medical Sciences; CPR: Cardiopulmonary Resuscitation; OSPE: Objective Structured Practical Examination; OSCE: Objective Structured Clinical Examination; GRF: Global Rating Form; MD: Doctor of Medicine.

The committee formulated a program evaluation guideline which described the infrastructures needed for evaluations, provided details on how to design and implement the evaluations, and made particular suggestions on reporting and utilization of the results (Gandomkar et al. 2015a). As the next step, the committee developed specific evaluation plans based on the guideline, for each of the four phases of the curriculum, as well as a separate plan for VITs (Gandomkar et al. 2015b). Questionnaires as the most commonly used evaluation tools are administered after each course or rotation. Focus group discussions with students are conducted after each course, annually for the first cohort of students and biannually for other cohorts, to elicit the students' viewpoints. Focus groups with teachers and individual interviews with administrators are regularly held. The Dundee Ready Education Environment Measure questionnaire is delivered at the end of each curriculum phase to assess the educational environment. Analyzing students' performance in achievement tests and national exams are other sources of evaluation data (Mirzazadeh et al. 2016). The graduation survey, which started eight years ago and has been continuously administered to graduates of our traditional curriculum, is going to be used for the first cohort of the new curriculum graduates in September 2018. The evaluation results have been analyzed and reported in different formats, mainly written. However, in order to speed up the feedback cycle, we held several meetings to share the findings with planners and decision makers. Moreover, educational seminars and public announcements on websites were used to provide information to teachers and students. We made continuous revisions in our program based on the evaluation results. A longitudinal study on the primary data obtained from these evaluations was published elsewhere (Mortaz Hejri et al. 2015). Beyond the internal evaluation, we were also interested in receiving external feedbacks from national and international consultants. Hence, the new program was visited and evaluated by delegates of Ministry of Health and Medical Education and World Federation of Medical Education (WFME) in the second and fifth years of its implementation, respectively. The WFME visit was after a comprehensive self-study of our MD program based on WFME Global Standards for BME program and resulted in

a detailed picture of new program, five years after its implementation.

Curriculum management and governance structure

The CRC is responsible for approval of the new courses designed by phase committees and VIT Committees, ensuring a logical sequence in various segments of the curriculum, and reviewing the results of evaluations attained by the Evaluation Committee. The School of Medicine Dean serves as the chair of the CRC. Members of the CRC were selected by Dean with input from the Assistant Dean for Undergraduate Education, and departmental chairs. In addition to the faculty members, students and representatives from Educational Development Office attend the meetings. Members of the Supreme Council, chaired by the University Chancellor, gather annually to oversight the changes and set the overall policies and standards. Further details of management and governance structure are illustrated in Figure 2.

Process of leading change

As in any other complex organization, the decision of the school administrators to implement transformational change was not sufficient to succeed. The prevailing traditional perspective of the faculty members, reservations of the administrators of the university, the potential risk of jeopardizing the existing credibility of the university, as well as other elements of resistance to change, necessitated a collaborative and carefully-planned approach for implementing the changes. Hence, John Kotter's eight-step model for change leadership was adapted as a guide. Although the process of change is too complicated to be simplified in a step by step implementation of a change model, careful adoption of such a model was very useful for us, and provided a framework for facilitating the process.

We first needed to establish a sense of urgency. Obtaining solid evidence about the deficiencies of our MD curriculum by conducting a comprehensive evaluation and communicating its results helped us induce a sense of

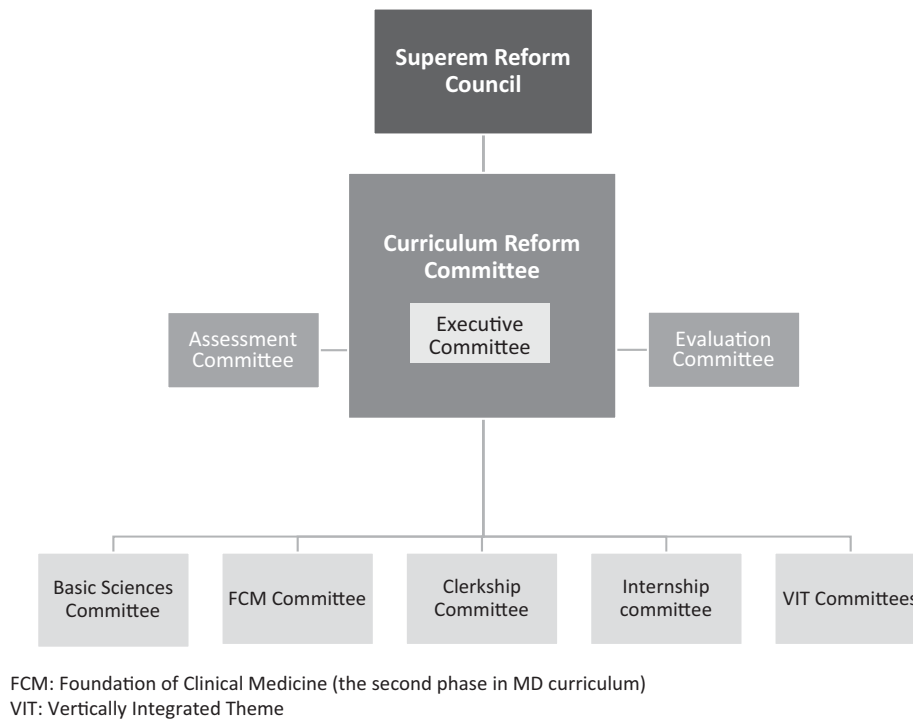


Figure 2. Curriculum management and governance structure in TUMS. FCM: Foundation of Clinical Medicine (the second phase in MD curriculum); VIT: Vertically Integrated Theme.

urgency for change among main stakeholders, which then provided the required momentum for change.

Before articulating the details of the change, we created a strong guiding coalition for promoting the change consisting of the Dean, Associate Deans, and some faculty members, which greatly eased the huge task of design, development, implementation and evaluation of the new curriculum, and also provided a platform for better contribution of different disciplines, departments and hospitals in the process of change.

Writing a clear reform vision statement for the new curriculum in a participatory manner assisted us to clearly depict the proposed future of the curriculum and overcome the concerns of faculty members, students and administrators about the hidden agenda of change leaders.

Using a variety of methods, and making the most of every opportunity for communication of the change plan including seminars, formal and informal meetings, discussions in different committees, newsletter and websites, and perhaps most importantly face-to-face encounters, we communicated the desirable changes with different stakeholders and managed to raise a common sense of awareness and collaboration, and also to improve the sense of ownership among the stakeholders.

Besides revising the program, paying attention to staff development was an obligation that could not be overemphasized. Promoting change needs not only a robust leadership plan, but also a comprehensive plan for staff development in all phases of the curriculum planning and implementation. We tried to improve faculty members teaching performance by running workshops on TBL, effective lecturing, active learning, and flipped classroom. In addition, various activities such as providing consultations, holding conferences, and inviting international experts were considered.

Defining milestones in the path toward the new curriculum and celebrating short-term wins (such as approval of the vision statement by the University Council, and launching the new curriculum for the first cohort of students) helped us keep people motivated, and combat the negative sense of tiredness. We also tried to consolidate the changes to inhibit the regression to the past situation after the initial enthusiasm has abated.

Last, but not the least, anchoring new approaches in the institution by different methods helped us with the correct implementation of the planned curriculum, and also showed us new horizons for further change, which seemed impossible during the early steps. We let the practical modifications in structures, processes and behavior lead to a culture amendment. Hence, our initiatives were not specifically focused on changing the beliefs. Instead, we considered anchoring the new approaches into the culture.

Lessons learned

Changing the curriculum of an MD program is a laborious task which should be planned and undertaken carefully and cautiously. For many people, getting involved in the process of change of an MD curriculum is an once-in-a-lifetime experience. This, in turn, leads to the fact that those in charge of the curricular reform need not only to walk through the process of change, but also to concurrently develop their own capabilities for designing, developing, implementing and evaluating a curriculum, as well as capacity building and leadership skills.

Despite all achievements there are always failures and shortcomings. Comparing the second and third columns of Table 1, one can notice that in some cases a change had been considered as a priority in the reform vision statement, but it has not been achieved despite all efforts. For instance, efforts had been made to evaluate and improve

the validity and reliability of the exams, or to establish formative assessment as an integral part of the assessment system, but we failed to institutionalize these changes. Similarly, with regard to the program evaluation, we had some shortcomings in timely analysis and reporting of the results.

These failures may, at least partially, be accounted for by several reasons, such as diversity and complexity of the change initiative, fading of the initial motivation for change, lack of enough expertise in the required fields, instability in leaderships, and insufficient resources. As an example, our limited success in the implementation of interactive teaching methods may be rooted in faculty members' time constraints and the fact that content coverage often takes precedence over the students' engagement in the class.

In our experience, these obstacles could easily lead to a non-homogenous and mosaic implementation of the new curriculum. When this occurs, it should be recognized, analyzed, and fixed by appropriate remediation. Evaluation has a crucial role in this situation and should be planned and conducted carefully to provide an honest and clear picture of achievements and failures.

We now hope to keep the project moving forward to the next level, by careful preparation and proper planning. We are considering several ideas: To seek a higher level of integration across the curriculum, we would like to run a "back to basic sciences" course during the clinical phases. We assume that clerks and interns will retain a more in-depth understanding of basic sciences, and will be able to apply their knowledge, when managing their own patients. At the same time, we intend to start a constructive dialog with our basic scientist on how students benefit more from learning well a reasonable quantity of general, yet practical, principles rather than filling their minds with plenty of detailed factual knowledge. We hope to be able to convince them to cut out some unnecessary factual content that burden students with excessive demands. We are also still looking for a sound method to ensure that our curriculum leads to the desired outcomes and also that the designated outcomes match the expectations of the healthcare system and the society.

Overall, the process of curriculum change seems like an endless, yet invaluable and satisfying endeavor toward better future.

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Notes on contributors

Dr. Sara Mortaz Hejri, MD, PhD, AFAMEE, is an Assistant Professor at Department of Medical Education and Education Development Center (EDC), Tehran University of Medical Sciences (TUMS). She has been involved in designing and implementing the MD curricular reform project since 2008. She was Deputy Director of Educational Development Office (EDO) at TUMS School of Medicine while she was a PhD candidate.

Dr. Azim Mirzazadeh, MD, is an Associate Professor at Departments of Medical Education and Internal Medicine, TUMS. He has been involved in TUMS MD curricular reform since its beginning. He was the director of EDO at School of Medicine for 10 years. Now, he serves as the EDC director at the Ministry of Health and Medical Education, Iran.

Dr. Mahboobeh Khabaz Mafinejad, MSc, PhD, is an Assistant Professor at EDC, TUMS. At the same time, she is the coordinator of vertically-integrated themes of the new curriculum at EDO.

Dr. Maryam Alizadeh, MSc, PhD, is a graduate of medical education, works as the coordinator of teaching and learning methods of the revised curriculum at EDO, TUMS.

Dr. Narges Saleh, MD, MSc, is a PhD student of medical education at TUMS. At the same time, she serves as the Deputy Director of EDO, TUMS. She has been involved in designing and implementing the TUMS MD curricular reform (2008 till now).


Dr. Roghayeh Gandomkar, MD, PhD, AFAMEE, is an Assistant Professor at Department of Medical Education. She is the director of Evaluation Unit at EDC, TUMS.

Dr. Mohammad Jalili, MD, is a Professor at Departments of Medical Education and Emergency Medicine at TUMS. He served as the TUMS Vice Chancellor for Education from 2011 till 2017.

ORCID

Sara Mortaz Hejri  <http://orcid.org/0000-0002-9979-0529>

Roghayeh Gandomkar  <http://orcid.org/0000-0002-7262-6243>

Mohammad Jalili  <http://orcid.org/0000-0002-0689-5437>

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