

PROBLEM-BASED LEARNING

## **First Graduates' Perceptions on a Problem-Based and Task-Based Learning Curriculum**

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**ABSTRACT** **Introduction:** *Determination of graduates' perceptions and suggestions is essential in the evaluation of educational programmes. Dokuz Eylul University School of Medicine (DEUSM), the country's first medical school implementing a Problem-Based Learning (PBL) and Task-Based Learning (TBL) programme, graduated the first students of its new educational programme starting from the 2002–2003 academic year. The aim of the present study is to determine first graduates' perceptions on their self-efficacy and school's educational programme's efficacy.*

**Methods:** *In June 2003, 51 graduating students were asked to use five-point scales to evaluate: the content of the educational programme, the educational methods, communication with educators, assessment methods and instruments, the efficacy of each year of their undergraduate programme and the overall program, their satisfaction levels about educational programme regarding the acquisition of knowledge and skills, their self-efficacy and contentment level of being a physician.*

**Results:** *In the content of educational programme, the highest score was attributed to "acquisition of behavioural objectives" and the lowest score to "acquisition of basic science knowledge". Regarding the efficacy of educational programme, the highest score was attributed to "communication with educators". The highest scores regarding the satisfaction levels on the acquisition of knowledge and skills provided by the School were attributed to "implementing basic professional procedures" and "history taking" and the lowest score to "selecting appropriate treatment".*

**Conclusion:** *The graduating students' mainly positive evaluations regarding the efficacy of DEUSM's new educational programme were considered as supportive reflections on the new educational programme. Further studies to monitor our graduates' future professional performances are being envisaged.*

**KEYWORDS** *Problem-based learning, students' perceptions, task-based learning.*

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## **Introduction**

The discussions intensifying in the second half of the 20th century made important contributions to the content and quality of medical education. The World Medical Association described the objective of medical education as “raising physicians who are skilled and competent in knowledge, skills, values and behaviours, leading to the provision of qualified preventive and curative services for the patient and community”.

The declaration of the World Federation for Medical Education in the 1988 Edinburgh Conference, stated its objective as “to produce doctors who will promote the health of all people” and presented the improvements essential to medical education. One important principle of the declaration is the enlargement of the range of settings to include all health resources. Also the curriculum content should reflect national health priorities, ensure the continuity of learning throughout life by shifting emphasis from traditional methods to more active learning, and the curriculum and examination systems should ensure the achievement of professional competence and social values (Edinburgh Declaration, 1988).

The Turkish Medical Association describes the objective of medical education in Turkey in the 21st century as “producing physicians who are competent at making right diagnosis, providing appropriate treatment, establishing communication, who are aware of the value of teamwork spirit in the provision of health services, who can prioritise preventive care and community health and play a pioneering role in the community and who are aware of the necessity for continuous self-improvement in the field of medical education”.

The redefinition of the objectives of medical education in accordance with these requirements led many medical schools to revise their curricula. In this context, Dokuz Eylul University School of Medicine (DEUSM) in Izmir described its objective as: to educate students with basic scientific knowledge, attitude and skills required for providing an efficient primary health care service:

- who can perceive an individual as a whole with his/her biological, psychological and social environment,
- who have knowledge about the priority health problems of the community and can find solutions,
- who can analyse health patterns and practice in a field,
- who learn to learn and understand the need for life long learning,
- who know the health organisations, the roles of health personnel and who can develop efficient relationships and learn the methods of community participation,
- who practice their careers and keep-up-to date with scientific advances and can participate to progress of science (DEUSM Information Guide, 2003; Alici & Gidener, 2001).

In the 1997–1998 academic year in line with these objectives, active learning was adopted, and the implementation of Problem-Based Learning (PBL) curriculum was started.”

PBL is a learning method based on the principle of using problems as starting points for the acquisition and integration of new knowledge. Several advantages have been associated with the method. Acquisition of retrievable and usable, robust knowledge, integration of basic and clinical science knowledge, self-directed learning skills, clinical reasoning skills, awareness of the limitations of one’s knowledge, communication skills and motivation are some outcomes that have been associated with PBL in the literature (Barrows, 1980; Schmidt, 1983; Barrows, 1984; Schmidt, 1990; Barrows & Kelson, 1993; Thomas, 1997; Davis & Harden, 1999).

In DEUSM’s curriculum, the PBL sessions are the core of educational activities. Educational activities, such as lectures, professional skills, communication skills, clinical entrance (propaedeutics), practicals, field studies, professional values and ethics, are structured to support PBL (Musal *et al.*, 2002b; Musal *et al.*, 2003b). In Turkey, medical education leading to a MD degree lasts six years. Beginning in the 2000–2001 academic year following the completion of the first three years PBL programme, Task-Based Learning (TBL) was implemented during the clinical medical education of the 4th and 5th years (Ozkan *et al.*, 2001). TBL is a learning model, which harmonizes with PBL. It is an integrated system with a multidisciplinary teaching and learning approach and offers the students rich learning opportunities in different disciplines (Harden *et al.*, 1996; Harden *et al.*, 2000). The objectives of the clerkship are to develop clinical experiences, skills, attributes and competences for the profession. In TBL, students see the patients in a real clinical setting, learn about the tasks, understand the concepts and mechanisms underlying those tasks, apply this knowledge and the skills in different contexts and acquire general competences (Ozkan *et al.*, 2004). During the sixth year of undergraduate education, students work as interns in the clinical wards. The internship includes hands-on-patient practice and an active role in patient management.

In parallel with the curricular reform, new formative and summative assessment methods and systematic studies on the reliability and validity of assessment instruments were introduced. It is emphasized that the role of students, the importance of student satisfaction, the fact that students are reliable and valid sources of information in the assessment of different parameters of the education process, and the feedback and proposals of students can be used in curriculum evaluation (Wilkes & Bligh, 1999; Wojtczak, 2002; Kember *et al.*, 2002; Morrison, 2003). There are studies on students’ perceptions of their educational programme and their gains during their medical education (Moore *et al.*, 1994; Caplow *et al.*, 1997). Curriculum evaluation in DEUSM does not rely solely on the successes of students but also on educators’ and students’ continuous oral and written feedback.

The present study aims to determine the perceptions of the first PBL and TBL graduates in Turkey, regarding the efficacy of their educational programme and their self-efficacy. The research questions for the present study are:

- How do the graduates evaluate the content and methods of educational programme, communication with educators and assessment methods and instruments?
- What are their academic year-based and overall perceptions about the educational programme?
- What are their educational programme satisfaction levels regarding the acquisition of essential knowledge and skills?
- What are their self-efficacy levels in acquiring the knowledge and skills comprised in the educational programme.
- How content are they about becoming physicians?

## **Materials and Methods**

In June 2003 during their last week in DEUSM, interns were asked to reply to four locally developed scales and one question on their level of contentment about being a physician (Appendix 1). The response rate was 51 out of 56 interns (91%).

The first scale evaluated the efficacy of the educational programme with respect to the curriculum content, educational methods, communication with educators and assessment methods and instruments. The second scale was designed to evaluate the efficacy of each year of their undergraduate education and the overall curriculum. The third scale was prepared to evaluate the satisfaction level of the educational programme's intended gains in essential knowledge and skills. The fourth scale consisted of a single parameter and aimed to evaluate the students' self-efficacy level regarding the knowledge and skills comprised in the educational programme.

The efficacy and satisfaction levels for the parameters of the scale were evaluated using a five-point scale (1=minimum, 5=maximum). The data was grouped as low (1–2 points), medium (3 points) and high (4–5 points).

The different clinical rotation intern groups were reached during the last week of their undergraduate education. The purpose of the study was briefly explained to the participants, and their oral consents were obtained. The data were evaluated using the SPSS 11 package programme. Paired Samples *t*-test was used to investigate the statistical significant difference between students' perceptions on the efficacy of the educational programme of each academic year.

## Findings

The gender distribution of the interns who participated in the study was 41.2% male ( $n=22$ ) and 56.9% female ( $n=29$ ). The results of the evaluations of the students for the first scale parameters are given in Table 1.

The points attributed to the parameters regarding the efficacy of the educational programme varied between  $2.37 \pm 0.87$  and  $4.20 \pm 0.72$ . The lowest score was attributed to “acquisition of basic science knowledge”, highest score to “communication with educators”. Among the parameters under the heading “content of educational programme”, the lowest score was given to the “acquisition of basic science knowledge” and the highest score to “acquisition of behavioural perspective”.

The averages and percentage distributions of the scores reported by interns regarding their perceptions of the efficacy of each academic year’s educational programme and their overall perceptions in the light of first scale’s parameters are given in Table 2.

The average scores of interns on their evaluation of efficacy for each year of educational programme ranged between  $2.47 \pm 1.17$  and  $3.76 \pm 0.79$ . A gradual increase was observed from Year I to Year V, followed by a decrease in Year VI. The overall evaluation score for the curriculum was  $3.15 \pm 0.83$ .

When the scores of perceived efficacy of consecutive years were considered, statistically significant differences were observed between the scores of following years: Year II and III ( $p=0.020$ ), Year III and IV ( $p=0.000$ ) and Year V and VI ( $p=0.000$ ).

**Table 1.** The evaluation of educational programme’s efficacy

Parameters	Average of scores* $\pm$ SD	Percent distributions of scores		
		Low %	Medium %	High %
<i>Content of the educational programme</i>				
Acquisition of:				
Basic science knowledge	$2.37 \pm 0.87$	62.7	27.5	9.8
Clinical knowledge	$3.61 \pm 0.78$	5.9	33.3	60.8
Community health perspective	$3.92 \pm 0.87$	5.9	23.5	70.6
Behavioural perspective	$4.06 \pm 0.88$	5.9	17.6	76.5
<i>Educational methods</i>	$3.40 \pm 0.90$	12.0	40.0	48.0
<i>Communication with educators</i>	$4.20 \pm 0.72$	2.0	11.8	86.3
<i>Assessment methods and instruments</i>	$3.53 \pm 0.81$	7.8	43.1	49.0

\*Minimum = 1; maximum = 5 points.

**Table 2.** The overall and academic year-based evaluation of the efficacy of the educational programme

	Average of scores* $\pm$ SD	Percent distributions of scores		
		Low %	Medium %	High %
1st year	2.47 $\pm$ 1.17	58.8	19.6	21.6
2nd year	2.71 $\pm$ 0.90	41.2	41.2	17.6
3rd year	2.92 $\pm$ 0.94	33.3	43.1	23.5
4th year	3.67 $\pm$ 0.79	7.8	23.5	68.6
5th year	3.76 $\pm$ 0.79	5.9	21.6	72.5
6th year	2.53 $\pm$ 1.27	47.1	25.5	27.5
Overall evaluation	3.15 $\pm$ 0.83	20.8	43.8	35.4

\*Minimum = 1; maximum = 5 points.

With respect to the acquisition of knowledge and skills described in the third scale, the average and percentage distribution of the scores reported by the interns of the efficacy of educational programme are given in Table 3.

The average scores attributed to the educational programme with respect to essential knowledge and skills vary between  $3.24 \pm 0.97$  and  $4.57 \pm 0.64$ . The lowest score is attributed to “selecting appropriate treatment” and the highest score to the parameters of “basic professional procedures” and “history taking”.

The interns' perceived self-efficacy regarding the acquisition of essential knowledge and skills were evaluated as low 3.9%, medium 37.3% and high 58.8%.

The answers given to the question referring to interns' level of contentment of being a physician were 94.1% ( $n = 48$ ) glad or partially glad and 5.9% ( $n = 3$ ) not glad.

## Discussion

In comparison with the acquisition of basic and clinical knowledge parameters, interns attributed higher scores to attainment of community health and behavioural objectives within the context of efficacy of curriculum content. Starting from the first year in DEUSM's curriculum, the PBL scenarios are designed to include social and behavioural aspects, and they are supported by field studies and small group activities. From the perspective of curriculum content, interns gave the lowest score to acquisition of basic science knowledge (Table 1). There are studies in the literature demonstrating that in comparison with the students of traditional education, PBL students get lower scores in basic science knowledge on NBME I (National Board of Medical Examiners)

(Mennin *et al.*, 1993; Vernon & Blake, 1993). In a 2001 DEUSM study on effectiveness of PBL, the students and PBL tutors in the first three years gave the lowest ratings in PBL programme to acquisition of basic science knowledge. It is noteworthy that the ratings of the tutors from departments of basic sciences were statistically higher than those of clinical sciences (Musal *et al.*, 2003b). This point needs further investigation to clarify the underlying facts. There are also studies stating that PBL students tended to rate themselves lower in terms of their basic science preparation (Woodward & Ferrier, 1983).

In the evaluations of interns regarding the efficacy of the education provided by DEUSM, the highest score was attributed to the item on “communication with educators”, and it was found to be highly efficacious at a level of 86.3% (Table 1). In a survey-type study in the 2000–2001 academic year, Musal *et al.* found that from the perspective of the support and facilities provided by the School, the highest score was similarly attributed to “communication with educators” (Musal *et al.*, 2001). In the success of educational programmes, the importance of positive communication of tutors with students and positive learning environment are emphasised (Barrows, 1984). It is thought that the faculty development programmes (Musal *et al.*, 2002a) in DEUSM, which aimed to improve educators’ adaptation to the system, had a positive impact on the high evaluation of these items by the interns.

The scores attributed by interns to the efficacy of each year’s undergraduate educational programme were evaluated from the perspectives of content of educational programme, educational methods and communication with educators. A continuous increase from Year I to Year V was observed (Table 2). An important characteristic of the interns who participated in the study is that they are the first students of the PBL programme who started their education in the year DEUSM started its PBL programme. The fact that the average of scores attributed to the first year were lower than those of following years seems understandable, considering that this was a newly structured and implemented programme, and the students from a traditional high school education system may have needed an adaptation period. When the changes in the average scores of different years were investigated, statistical significant differences were observed between: Year II and III; Year III and IV; Year V and VI. The statistically significant prominence of the scores attributed to Year III compared to Year II ( $p=0.020$ ) may arise because the objectives determined for Year III were more closely related to the practice of medicine. Similarly, statistically significant higher scores attributed to Year IV compared to Year III ( $p=0.000$ ) may be explained with the facts that Year IV was the year when the students started their Task-based Learning with intensive clinical education and were more actively involved in medical practice. A significant decrease was observed in the scores given to Year VI with respect to Year V ( $p=0.000$ ). Only small numbers of the interns were involved in the study, because they were the first group of students who were required to take a foreign language proficiency test. The students who failed this test had to attend

**Table 3.** Satisfaction levels of the educational programme regarding the acquisition of essential knowledge and skills

Knowledge and skills	Average scores* $\pm$ SD	Rank	Percent distributions of scores		
			Low %	Medium %	High %
Acquisition of clinical reasoning skills	3.88 $\pm$ 0.86	14	5.9	25.5	68.6
Determination of knowledge limits and learning needs	3.54 $\pm$ 1.03	19	14.0	32.0	54.0
Reaching and using different learning resources	4.08 $\pm$ 0.85	11	3.9	19.6	76.5
Problem solving skills	3.96 $\pm$ 0.85	13	5.9	19.6	74.5
Planning, implementing and presenting a scientific research	4.00 $\pm$ 0.85	12	5.9	17.6	76.5
History taking	4.57 $\pm$ 0.64	1	–	7.8	92.2
Physical examination	4.31 $\pm$ 0.71	2	–	13.7	86.3
Developing a diagnostic algorithm and making differential diagnosis	3.80 $\pm$ 0.81	17	5.9	23.5	70.6
Selecting appropriate diagnostic test (lab, X ray etc.)	3.86 $\pm$ 0.78	15	5.9	19.6	74.5
Selecting appropriate treatment	3.24 $\pm$ 0.97	20	19.6	43.1	37.3
Implementing basic professional procedures (CPR, IV, catheter implementation etc)	4.57 $\pm$ 0.64	1	–	7.8	92.2
Emergency intervention	4.14 $\pm$ 0.80	10	3.9	13.7	82.4
Gaining knowledge on priority health problems of Turkey	4.22 $\pm$ 0.73	6	–	17.6	82.4
Gaining knowledge and skill on preventive medicine	4.26 $\pm$ 0.77	4	2.0	13.7	84.3
Gaining knowledge on health organization of Turkey	4.22 $\pm$ 0.80	6	2.0	16.3	81.6
Gaining knowledge on sociocultural and environmental factors influencing health	4.16 $\pm$ 0.76	9	–	21.6	78.4
Gaining a holistic approach to patient regarding biological, social, cultural and behavioural aspects	4.18 $\pm$ 0.84	8	2.0	21.6	76.5
Knowing legal responsibilities of a physician	3.76 $\pm$ 0.91	18	7.8	31.4	60.8
Knowing the managerial responsibilities of a physician	3.76 $\pm$ 0.89	18	7.8	29.4	62.7

*(continued overleaf)*

**Table 3.** (continued)

Knowledge and skills	Average scores* $\pm$ SD	Rank	Percent distributions of scores		
			Low %	Medium %	High %
Knowing the basic concepts and procedures of forensic medicine	3.84 $\pm$ 0.88	16	5.9	29.4	64.7
Knowing the basic concepts and procedures of occupational medicine	3.86 $\pm$ 0.83	15	2.0	35.3	62.7
Knowing the responsibilities of a primary health care physician	4.26 $\pm$ 0.74	4	-	17.6	82.4
Gaining interpersonal communication skills	4.18 $\pm$ 0.80	8	-	24.0	76.0
Knowing basic concepts of ethics and professionalism	4.24 $\pm$ 0.68	5	-	13.7	86.3
Knowing the concept of teamwork and its importance	4.29 $\pm$ 0.67	3	-	11.8	88.2
Gaining knowledge on multidisciplinary approach	4.20 $\pm$ 0.75	7	-	19.6	80.4
Knowing the basic principles of health education and counselling and taking responsibility for them	4.24 $\pm$ 0.84	5	2.0	13.7	84.3

\*Minimum = 1; maximum = 5 points.

a one-year foreign language preparatory class. Their small numbers meant they had a heavier burden contributing to the daily routine of the clinics besides carrying the responsibilities of internship.

In a previous study in DEUSM, tutors and students had positive opinions on PBL's effectiveness (Musal *et al.*, 2003b). In this study the majority of students evaluated the overall efficacy of educational programmes as medium or high (Table 2). The fact that one out of five students rated the educational programme as low needs further investigation.

From the perspective of acquisition of essential knowledge and skills, interns attributed the highest scores to the parameters of "history taking" and "implementing basic professional procedures" (Table 3). Starting from the second half of the first academic year, "history taking" is taught within the context of the clinical entrance course. According to the results of a survey type study about students' opinions on educational activities, support/possibilities and tutors in DEUSM, "professional skills lab activities" was the most highly rated parameter (Musal *et al.*, 2001). In the present study, "physical examination" training, the parameter with the following highest score, was also given during the clinical entrance course.

In the acquisition of essential knowledge and skills, the parameter with the lowest rating was "selecting appropriate treatment" (Table 3). This evaluation may be due to interns' anxiety about taking personal responsibility at the beginning of their professional life. The second lowest rating was "determination of the limits of knowledge and learning needs". The students with a high school education background, in which information is presented within a predetermined framework, discovered the infinity of knowledge in PBL curriculum. As frequently expressed in their oral and written feedbacks, students have difficulty in determining the breadth and depth of knowledge during their self-study process.

The fact that the averages of scores attributed to most of the public health, ethics and communication related parameters were rated above 4.00 is noteworthy (Table 3). These parameters are among the curricular objectives of DEUSM. They have a crucial importance in community-based medical education, public health and ethics (Edinburgh Declaration, 1988; Tomorrow's Doctors, 2002; Doctors for Health, 1996; Sayek & Kilic, 2002; Musal *et al.*, 2003a).

In the primary health care settings of Turkey, some of the basic forensic medicine services are delivered by general practitioners. Because of this, it is essential for the new graduates to acquire forensic medicine related basic knowledge and skills. A considerable percentage of interns positively evaluated these parameters (Table 3).

Emergency interventions are generally considered anxiety arousing issues for medical students. The fact that this parameter is highly rated by interns may reflect their confidence in coping with emergency situations (Table 3).

An important percentage of interns evaluated their self-efficacy regarding the acquisition of the above-mentioned essential knowledge and skills as

medium (37.3%) and high (58.8%). A very high percentage of interns were either glad or partially glad they were physicians. These findings were considered as positive signs reflecting their overall approval of the new programme of DEUSM.

## Conclusion

The evaluations of students and graduates of curriculum and of their self-efficacy are valuable data for curriculum evaluation studies. In line with this understanding, this study aimed to investigate the perceptions of the first graduates of DEUSM's PBL programme. The study group's positive evaluations regarding their medical education and self-efficacy are considered as supportive reflections about the new programme. Continuation of connections with the graduates is considered to obtain their perceptions on professional performances. The major limitation of the present study was the lack of a control group. There are self-reported studies in the literature comparing the professional performances of physicians who graduated from a conventional curriculum with those graduating from a PBL curriculum (Schmidt & van der Molen, 2001). Similar studies are being planned to compare the performances of DEUSM's graduates with those of other medical faculties.

## References

- ALICI, E. & GIDENER, S. (2001). Tip egitiminde degisim-yonetim ve orgutlenme (Change, management and organization in medical education). *DEU Tip Fakultesi Dergisi (Journal of Dokuz Eylul Medical Faculty), Ozel Sayi; Aktif Egitim*, 1–5.
- BARROWS, H.S. (1980). *Problem-based learning: An approach to medical education*. New York: Springer Series on Medical Education.
- BARROWS, H.S. (1984). A specific, problem-based, self-directed learning method designed to teach medical problem-solving skills, and enhance knowledge retention and recall. In: H.G. SCHMIDT & M.L. DE VOLKER (Eds), *Tutorials in Problem-Based Learning*. Maastricht, The Netherlands: Van Gorcum, 16–32.
- BARROWS, H.S. & KELSON, A.M. (1993). *Problem-based learning: A total approach to education. Monograph*. Springfield, Illinois: Southern Illinois University School of Medicine.
- CAPLOW, J.A., DONALDSON, J.F., KARDASH, C. & HOSOKAWA, M. (1997). Learning in problem based medical curriculum: Student's conceptions. *Medical Education*, 66, 440–447.
- DAVIS, M.H. & HARDEN, R.M. (1999). AMEE Medical Education Guide No.15: Problem-based Learning: A practical guide. *Medical Teacher*, 21, 130–154
- DEUSM (2003). *Information Guide*. Izmir: Dokuz Eylul University Press.
- DOCTORS FOR HEALTH (1996). *A WHO global strategy for changing medical education and medical practice for health for all*. Geneva: World Health Organization.

- EDINBURGH DECLARATION (1988). World Conference on Medical Education Edinburgh, 12 August.
- HARDEN, R.M., CROSBY, J., DAVIS, M.H., HOWIE, P.W. & STRUTHERS, A.D. (2000). Task-based learning: The answer to integration and problem-based learning in clinical years. *Medical Education*, 34, 391–397.
- HARDEN, R.M., LAIDLAW, J.M., KER, J.S. & MITCHELL, H.E. (1996). *AMEE Education Guide No. 7: Task-based Learning: an Educational Strategy for Undergraduate, Postgraduate and Continuing Medical Education*, Dundee: Association for Medical Education in Europe.
- KEMBER, D., LEUNG, D.Y.P. & KWAN, K.P. (2002). Does the use of student feedback questionnaires improve the overall quality of teaching? *Assessment & Evaluation in Higher Education*, 27, 411–425.
- MENNIN, S.P., FRIEDMAN, M., SKIPPER, B., KALISHMAN, S. & SNYDER, J. (1993). Performances on the NBME I, II, and III by medical students in the problem-based learning and conventional tracks at the University of New Mexico. *Academic Medicine*, 68, 616–624.
- MOORE, G.T., BLOCK, S.D., STYLE, C.B. & MITCHELL, R. (1994). The influence the new pathway curriculum on Harvard medical students. *Academic Medicine*, 69, 983–989.
- MORRISON, J. (2003). ABC of learning and teaching in medicine. Evaluation. *British Medical Journal*, , 385–387
- MUSAL, B., ABACIOGLU, H., DICLE, O., AKALIN, E., SARIOGLU, S. & ESEN, A. (2002a). Faculty development programs in Dokuz Eylul School of Medicine: In the process of curriculum change from traditional to PBL. *Medical Education Online* [serial online], 7(2). Retrieved 12 April 2005 from <http://www.med-ed-online.org/res00030.htm>.
- MUSAL, B., AKALIN, E., KILIÇ, O., ESEN, A. & ALICI, E. (2002b). Dokuz Eylul Universitesi Tip Fakultesi Probleme Dayali Ogrenim Programi, Surecleri ve Egitim Yonlendiricilerinin Rolu. [Educational program and processes of Dokuz Eylul University School of Medicine, and roles of tutors], *Tip Egitimi Dunyasi*, 9, 39–49.
- MUSAL, B., AKSAKOGLU, G. & UCKU, R. (2003a). Community-based Education Programme of Dokuz Eylul School of Medicine. *Education for Health*, 16, 218–221.
- MUSAL, B., TASKIRAN, C., DICLE, O. & OZKAN, S. (2001). Dokuz Eylul Universitesi Tip Fakultesinde ogrencilerin egitim etkinlikleri, fakultenin sagladigi destek/ olanaklar ve egitim yonlendiricilerine iliskin gorusleri. [Students' opinions about educational activities, support/possibilities and tutors in Dokuz Eylul University School of Medicine]. *Dokuz Eylul Universitesi Tip Fakultesi Dergisi (Journal of Dokuz Eylul Medical Faculty)*, 15, 371–375.
- MUSAL, B., TASKIRAN, C. & KELSON, A. (2003b). Opinion of tutors and students about effectiveness of PBL in Dokuz Eylul University School of Medicine. *Medical Education Online* (serial online), 8(16). Retrieved 12 April 2005 from <http://www.med-ed-online.org/f0000073.htm>.
- OZKAN, H., DEGIRMENCI, B., MUSAL, B., ITIL, O., AKPINAR, H., AKALIN, E., OZKAN, S. & ALICI, E. (2001) Mezuniyet Oncesi Klinik Tip Egitiminde Taska Dayali Ogrenim ve DEUTF Ornegi [Task-based Learning in Undergraduate Medical Education and DEUSM Example]. *DEU Tip Fakultesi Dergisi (Journal of Dokuz Eylul Medical Faculty)*. Ozel Sayi; Aktif Egitim, 11–23.

- OZKAN, H., DEGIRMENCI, B., MUSAL, B., ITIL, O., AKPINAR, H., AKALIN, E., OZKAN, S. & ALICI, E. (2004). Task-based learning (TBL) in Dokuz Eylul University Medical School, Turkey [Letter to editor]. *Medical Teacher*, 26, 279–280.
- SAYEK, I. & KILIÇ, B. (2002). *Turkiye’de Tıp Eğitimi: 2002*. TTB Mezuniyet Öncesi Tıp Eğitimi Raporu [*Medical Education in Turkey: 2002*]. Turkish Medical Association Undergraduate Medical Education Report), 7–33.
- SCHMIDT, H.G. (1983) Problem-based Learning: Rationale and description. *Medical Education*, 17, 11–16.
- SCHMIDT, H.G. (1990). Onderwijskundige spectra van probleemgestuurd onderwijs (Educational Aspects of Problem-Based Learning). In: W.M.G. JOCHEMS (Ed), *Activerend onderwijs*. Delft: The Netherlands, 1–16.
- SCHMIDT, H.G., VAN DER MOLEN, H. (2001). Self-reported competency ratings of graduates of a problem-based medical curriculum, *Academic Medicine*, 76, 466–468.
- THOMAS, R.E. (1997). Problem-based learning: measurable outcomes. *Medical Education*, 31, 320–329.
- TOMORROW’S DOCTORS (2002): *Recommendations on undergraduate medical education*. Accessed on 12 April 2005 from <http://www.ascofame.org.co/t doctors.php# Introduction>.
- VERNON, D.T. & BLAKE, R.L. (1993). Does problem-based learning work? A meta-analysis of evaluative research. *Academic Medicine*, 68, 550–563.
- WILKES, M. & BLIGH, J. (1999). Evaluating educational interventions. *British Medical Journal*, 318, 1269–1272.
- WOJTCZAK, A. (2002). Glossary of medical education terms: Part 2. Evaluation. *Medical Teacher*, 24, 338–340.
- WOODWARD, C.A. & FERRIER, R.M. (1983). The content of the medical curriculum at McMaster University: Graduate’s evaluation of their preparations for post-graduate training. In: P.L. NANDI, J.N. F. CHAN, C.P.K. CHAN, P. CHAN & L.P.K. CHAN (2000). Undergraduate medical education: comparison of problem-based learning and conventional teaching, *Hong Kong Medical Journal*, 6, 301–306

## Appendix 1

*Evaluation of the PBL and TBL Curriculum by Dokuz Eylul University School of Medicine's First Graduates*

**Age:** .....

**Gender:** (1) Male (2) Female

### Opinions about medical education given by DEUSM:

#### Scale 1

Please give one point to each item between 1 and 5 point regarding the effectiveness of medical education (1: minimum, 5: maximum)

Items	1	2	3	4	5
<i>Content of the educational program</i>					
Acquisition of:					
*Basic science knowledge					
*Clinical knowledge and skill					
*Community health perspective					
*Behavioural perspective					
<i>Using educational methods</i>					
<i>Communication with educators</i>					
<i>Assessment methods and instruments</i>					

#### Scale 2

Regarding the above items please give one point to each year's programme and to the overall educational programme between 1 and 5 point (1: minimum, 5: maximum)

Years	1	2	3	4	5
1st year					
2nd year					
3rd year					
4th year					
5th year					
6th year					
Overall evaluation					

**Scale 3**

Please give one point to each parameter between 1 and 5 points to your satisfaction levels on educational programme regarding the acquisition of essential knowledge and skills (1:minimum, 5:maximum)

Parameters	1	2	3	4	5
Acquisition of clinical reasoning skills					
Determination of knowledge limits and learning needs					
Reaching and using different learning resources					
Problem solving skills					
Planning, implementing and presenting a scientific research					
History taking					
Physical examination					
Developing a diagnostic algorithm and making differential diagnosis					
Selecting appropriate diagnostic test (lab, X ray etc.)					
Selecting appropriate treatment					
Implementing basic professional procedures (CPR, IV , catheter implementation etc)					
Emergency intervention					
Gaining knowledge on priority health problems of Turkey					
Gaining knowledge and skill on preventive medicine					
Gaining knowledge on health organization of Turkey					
Gaining knowledge on sociocultural and environmental factors influencing health					
Gaining a holistic approach to patient regarding biological, social, cultural and behavioural aspects					
Knowing legal responsibilities of a physician					
Knowing the managerial responsibilities of a physician					
Knowing the basic concepts and procedures of forensic medicine					
Knowing the basic concepts and procedures of occupational medicine					
Knowing the responsibilities of a primary health care physician					
Gaining interpersonal communication skills					
Knowing basic concepts of ethics and professionalism					
Knowing the concept of teamwork and its importance					

(continued overleaf)

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Parameters	1	2	3	4	5
Gaining knowledge on multidisciplinary approach					
Knowing the basic principles of health education and counselling and taking responsibility for them					

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#### Scale 4

Considering the above-mentioned parameters and your readiness to future professional life, evaluate your competency level between 1 and 5 point (1: minimum, 5: maximum)

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	1	2	3	4	5
Your competency level					

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Are you glad for being a physician?

- (1) I'm glad
- (2) I'm partially glad
- (3) I'm not glad