

The View of Dentistry Tutors and Students of Tabriz University of Medical Sciences about Assessment Methods of Theoretical and Practical Courses of Clinical Sciences

Maedeh Vakili Saatloo¹, Shirin Fattahi^{2*}, Solmaz Bigham³

¹Department of Oral and Maxillofacial Pathology, Faculty of Dentistry, Urmia University of Medical Science, Urmia, Iran

²Assistant Professor, Department of Oral and Maxillofacial Pathology, Faculty of Dentistry, Tabriz University of Medical Sciences, Tabriz, Iran

³Dentist, Faculty of Dentistry, Tabriz University of Medical Sciences, Tabriz, Iran

Abstract

Background: Assessment is one of the indispensable parts of educational plans and appropriate assessment results in higher educational efficiency. Efficient assessment provides valuable information about the educational plan and students' success. We aimed to study the view of dentistry tutors and students of Tabriz University of Medical Sciences about assessment methods of theoretical and practical courses of clinical sciences in 2015-2016 to find out the basic problems of assessment.

Methods: This cross-sectional study was conducted on tutors of all educational departments and 100 dentistry students who had entered university during 2009-2010. The data collection instrument of the study was questionnaire designed in two theoretical (14 items) and practical (9 items) sections, scored from 0 to 4. The assessment condition was divided and calculated in the faculty based on different courses and the collected data were analyzed using SPSS software, version 16.

Results: The students evaluated theoretical assessment as moderate, this is while practical assessment was mentioned as inappropriate. The masters evaluated both theoretical and practical assessments as appropriate.

Conclusion: According to the students' viewpoint who evaluated assessment as moderate and inappropriate, it can be concluded that assessment methods of theoretical and practical courses should be substituted with more efficient and acceptable ones.

Keywords: SATISFACTION, THEORETICAL AND PRACTICAL ASSESSMENT, DENTISTRY STUDENT, TUTOR

Journal of Medical Education Winter 2018; 17(1):50-60

Introduction

An accurate evaluation in dentistry is to make judgement of students' performance in clinical practices (1). Clinical assessment is critical for improvement of newly educated students skills. Clinical competency is the most expected skill for practioners. Practical

assessment of dentistry students is an important aspect of the educational curricula (2). Several assessment methods are used in Tabriz Dentistry School to evaluate student's competency. Dental students are commonly assessed by summative methods including Objective Structured Clinical Examination (OSCE) and written exam. OSCE exams seems to be more popular among tutors and more appropriate in practical course assessments (3). OSCE exams are expected to improve clinical training (4), facilitate the objective assessment and discover students weaknesses

*Corresponding author: Shirin Fattahi, Faculty of Dentistry, Tabriz University of Medical Sciences, Golgasht Ave, Tabriz, Iran
Phone: +98 (914) 3150165; Fax: +98 (41) 33346977
Email: shirin_fattahi@yahoo.com

(5). Students remember the assessment parts of their education period more than what the teachers focus on. On the other hand, exams guide the students to learn (5). Education can easily be attractive and efficient through meeting the tutors and students demands and discovering what is important to them. The best educational strategy is one which focus on the needs. Concentrating on students' needs not only makes the education course more satisfactory to them but also improve their performance in clinical practices (6). The assessment of satisfaction is not done simply. Satisfaction is defined as the favorability of student's assessments due to their experience from theoretical and practical courses (7). Curriculum and assessment methods are the most important factors influencing the students satisfaction (8). Overall, satisfaction is the sum of classroom environment, academic program, and teaching and evaluation methods (9, 10). Successful universities attract students by attending to their needs to make them more stronger in clinical performances (11). Although different standard evaluation methods are developed in medical education, more studies are needed to improve the clinical assessment of dentistry students to find the best one (12). Miller's competence pyramid has different stages from "knows how", the stage which we evaluate it in written exams, to "shows how", as is described in OSCE exam and final operation in clinical practice (13). Mavis revealed that OSCE exam which has different purposes needs different educational strategies (14). Written tests and OSCE are significantly correlated (15). The aim of this study was to investigate the satisfaction of students and tutors from the assessment process of dentistry students which include both theoretical and practical aspects.

Material and Methods

A questionnaire (Table 1) was prepared and all tutors and 100 students of Tabriz Dentistry School were asked to fill the questionnaires

to find the main problems of competency assessment. This plan has been registered with the code of IR.TBZMED.REC.1395.209. The first question of questionnaire was about their consent to participate in this study. If they did not want they were excluded.

Satisfaction was evaluated by a questionnaire including 9 items for practical assessment and 14 items for theory courses instead of old methods of yes/no questions. Tutors of all departments were consulted to design the questions. The reliability was proved by Cronbach's alpha ($r=0.8$). the questions were scored from 0 (not satisfied at all) to 4 (fully satisfied).

Data Analysis

The questionnaires were assessed separately for theoretical courses and practical ones. Each question was scored as unfavorable ($0 < \text{Score} \leq 2$), moderate ($2 < \text{Score} \leq 3$) and favorable ($3 < \text{Score} \leq 4$). The collected data was analyzed using SPSS software, version 16.

Results

The questionnaire was filled by 49 students (Tables 1 and 2) and 38 tutors (Tables 3 and 4) completely. In order to evaluate student's attitude, written tests for theoretical exams were scored as "moderate" and teaching contents were moderately compatible with assessment exams. The correlation between teaching content and assessment in the Departments of Oral and Maxillofacial Pathology, Oral medicine, Orthodontics and Radiology was favorable and in other departments was scored as "moderate". Students stated that their behavior were not assessed in any departments except the Department of Oral Health. Students prefer multiple choice questions more than explanation ones because of the more reliable scores they receive. Students scored "moderate" for the use of multiple choice tests in final exams in the Department of Restorative and Esthetic dentistry and Oral and Maxillofacial department. It was favorable

Table 1: Mean±SD of questionnaires for theoretical assessments in each department (students' point of view)

Theoretical assessments	Pediatric	Oral and maxillofacial	Endodontics	Periodontology	Restorative and esthetic	Complete prosthodontics	Fixed prosthodontics	Partial prosthodontics	Orthodontics	Radiology	Oral and maxillofacial pathology	Oral medicine	Oral health
Compatibility of questions with the tutors lessons	3.00±0.74	2.29±1.07	2.73±1.93	2.17±1.07	2.36±0.85	2.44±1.03	2.19±1.06	2.50±1.03	2.83±1.14	2.83±0.91	2.91±0.95	2.90±0.91	2.58±1.01
Compatibility of questions with references	3.00±0.89	2.25±1.04	2.92±0.96	2.42±1.10	2.55±1.14	2.75±0.89	2.52±1.22	2.77±0.93	3.17±0.98	3.04±0.87	3.11±0.90	308±0.77	2.47±1.06
Use of Multiple choice questions	3.29±1.00	2.79±1.03	05/1±29/3	3.02±1.02	2.51±1.16	3.10±0.97	3.25±0.93	3.27±0.96	3.21±1.24	3.17±1.19	3.36±1.00	3.19±1.05	2.84±1.22
Watchfulness of exam supervisors	3.17±1.00	2.85±1.10	3.02±0.98	2.91±1.06	3.00±1.21	2.89±1.03	3.77±1.16	2.77±1.18	2.87±1.26	3.04±0.98	3.04±1.05	2.94±1.00	2.62±1.15
Use of “none of them” and “all of them” in multiple choice questions answers	1.96±1.00	2.85±1.10	1.77±1.01	1.92±1.06	1.85±1.10	1.90±0.93	1.98±1.10	1.92±1.13	1.88±1.18	1.85±1.17	1.85±1.12	1.83±1.04	1.80±1.14
Presence of tutors in exam environment	2.34±1.18	2.21±1.08	2.19±1.00	2.00±1.16	2.19±1.21	2.08±1.13	1.96±1.17	2.23±1.15	2.33±1.17	2.21±1.13	2.43±1.14	2.38±1.10	1.96±1.17
Use of Separate papers for each tutor's questions	2.34±1.52	2.96±1.14	2.15±1.36	2.21±1.30	2.59±1.31	2.40±1.33	2.21±1.38	2.40±1.35	2.19±1.47	2.40±1.35	2.24±1.35	2.62±1.15	1.91±1.29

Use of descriptive questions	1.56±1.27	2.38±1.21	1.25±1.36	1.83±1.24	2.57±1.23	1.65±1.26	1.27±1.03	1.48±1.24	1.56±1.40	1.60±1.22	1.11±1.08	1.45±1.23	2.16±1.38
Use of extensive answers	2.13±1.00	2.22±1.04	1.82±1.02	1.93±1.08	1.91±1.12	1.89±1.12	2.20±1.20	2.11±1.18	2.35±1.23	1.98±1.16	1.67±1.06	1.93±1.07	1.88±1.07
Compatibility of exam duration time with the number of questions	2.15±1.19	2.47±1.11	2.43±1.14	2.13±1.16	1.89±1.32	2.28±1.33	2.07±1.29	2.20±1.24	1.74±1.34	2.07±1.29	2.20±1.20	2.31±1.20	2.16±1.29
Taking quizzes in semester period	0.40±0.68	0.47±0.72	0.54±0.91	0.61±0.97	1.40±1.21	0.84±1.17	0.47±0.84	0.76±1.06	1.00±1.37	1.13±1.24	0.49±0.89	0.67±0.88	2.32±0.52
Taking midterm exams	0.43±0.77	0.30±0.66	0.46±0.88	0.67±1.23	1.07±1.18	0.78±1.21	0.57±0.94	0.60±0.96	0.98±1.24	1.28±1.22	0.42±0.84	0.36±0.78	0.34±0.57
Compatibility of questions with each tutors teaching content	2.41±1.18	2.11±1.15	2.59±1.06	2.07±1.18	2.02±1.25	2.22±1.30	1.96±1.26	2.33±1.19	2.46±1.22	2.50±1.26	2.63±1.19	2.63±1.21	2.44±1.07
The effect of students presence on exam scores	2.43±1.51	1.41±1.30	1.50±1.34	1.67±1.30	2.60±1.32	2.24±1.42	2.02±1.39	2.09±1.43	1.72±1.39	1.76±1.35	1.57±1.25	1.42±1.32	1.53±1.30

Table 2: Mean±SD of questionnaires for practical assessments in each department (students' point of view)

Practical assessments	Pediatric	Oral and maxillofacial	Endodontics	Periodontology	Restorative and esthetic	Complete prosthodontics	Fixed prosthodontics	Partial prosthodontics	Orthodontics	Radiology	Oral and maxillofacial pathology	Oral medicine	Oral health
Expressing the exam criteria at the beginning of semester	2.30±1.44	1.67±1.30	1.91±1.22	1.91±1.22	2.11±1.25	2.11±1.26	1.83±1.36	1.74±1.32	2.30±1.49	2.02±1.18	2.24±1.48	1.64±1.32	1.57±1.26
The effect of tutors opinion on the scores	2.17±1.34	2.91±1.01	2.62±1.13	2.04±1.36	2.47±1.28	2.41±1.34	2.66±1.20	2.47±1.32	2.47±1.33	2.15±1.20	1.89±1.26	2.48±1.22	2.39±1.33
Use of stress reduction protocols in exam environment	1.06±1.46	0.96±1.08	1.26±1.25	2.79±1.16	1.36±1.28	1.40±1.25	1.19±1.12	1.34±1.29	1.55±1.36	1.51±1.38	1.31±1.26	1.40±1.32	1.04±1.09
Use of entrance exams	3.36±1.27	1.00±1.26	2.74±1.49	1.17±1.34	2.85±1.53	1.28±1.30	1.32±1.42	0.87±1.15	0.98±1.22	1.02±1.39	0.77±1.29	0.75±1.08	1.39±1.44
Use of exit exams	1.00±1.52	3.13±1.32	2.35±1.53	2.81±1.51	3.04±1.35	1.64±1.39	1.45±1.32	1.72±1.38	3.07±1.44	2.70±1.40	2.64±1.73	2.59±1.57	2.42±1.45
Effect of students' behavior on the scores	1.98±1.32	1.66±1.46	1.80±1.31	1.80±1.31	1.66±1.31	1.91±1.36	1.91±1.41	1.93±1.31	1.78±1.33	1.72±1.22	1.69±1.31	1.93±1.39	2.00±1.33
Exams stability (presence of equal pattern)	1.96±1.46	1.52±1.24	1.79±1.25	1.83±1.35	2.28±1.35	1.93±1.41	1.61±1.34	1.89±1.30	2.07±1.42	2.17±1.46	1.93±1.45	2.27±1.47	1.87±1.36
Compatibility of scores with the students' work	1.98±1.29	1.11±1.06	1.66±1.23	1.98±1.40	1.70±1.18	2.17±1.31	1.68±1.18	1.96±1.30	2.17±1.31	2.30±1.20	2.41±1.23	2.17±1.34	2.04±1.23
Compatibility of final scores with the gained competency	1.83±1.11	1.30±1.04	1.60±1.19	1.48±1.18	1.83±1.17	1.91±1.30	1.74±1.29	2.09±1.23	1.96±1.28	1.85±1.25	1.78±1.26	1.80±1.33	1.82±1.21

Table 3: Mean±SD of questionnaires for theoretical assessments in each department (tutors' point of view)

Theoretical assessments	Pediatric	Oral and maxillofacial	Endodontics	Periodontology	Restorative and esthetic	Complete prosthodontics	Fixed prosthodontics	Partial prosthodontics	Orthodontics	Radiology	Oral and maxillofacial pathology	Oral medicine	Oral health
Compatibility of questions with the tutors lessons	3.25±0.02	2.67±0.58	3.00±0.00	3.00±0.00	4.00±0.00	3.43±1.13	3.17±1.17	3.00±1.41	3.00±1.73	4.00±0.00	3.80±0.45	3.67±0.57	4.00±0.00

Compatibility of questions with references	4.00±0.00	2.67±0.58	4.00±0.00	4.00±0.00	3.67±0.58	4.00±0.00	3.58±0.79	3.33±1.21	3.25±0.96	4.00±0.00	4.00±0.00	3.20±0.84	4.00±0.00	3.67±0.58
Use of Multiple choice questions	3.50±0.58	3.33±0.58	4.00±0.00	3.00±0.00	3.00±0.00	3.00±0.00	3.14±0.69	3.17±1.17	3.25±0.96	3.67±0.58	3.50±0.71	3.80±0.45	3.67±0.58	3.33±1.15
Watchfulness of exam supervisors	3.25±0.50	3.67±0.58	4.00±0.00	3.67±0.58	4.00±0.00	4.00±0.00	3.00±1.15	3.00±1.09	2.25±1.26	2.33±1.15	3.00±0.00	3.60±0.55	3.33±1.15	3.67±0.58
Use of “none of them” and “all of them” in multiple choice questions answers	0.50±0.58	1.33±1.53	0.00±0.00	1.33±0.58	0.40±0.89	1.14±1.46	1.00±0.63	1.25±0.50	1.00±1.00	1.00±0.00	1.60±1.34	0.00±0.00	0.33±0.58	0.00±0.00
Presence of tutors in exam environment	3.50±0.58	1.33±1.15	3.00±0.00	3.33±0.58	3.00±0.00	1.86±1.35	1.83±1.17	1.25±1.26	1.00±1.73	3.00±0.00	3.40±0.55	3.00±0.00	3.67±0.58	3.00±0.00
Use of Separate papers for each tutor’s questions	0.75±0.96	2.00±2.00	0.00±0.00	3.00±1.73	4.00±0.00	2.86±1.22	3.33±1.21	3.00±1.41	1.33±2.31	2.00±2.83	2.40±1.52	3.33±0.58	2.00±1.00	3.33±0.58
Use of extensive answers	0.25±0.50	2.33±1.53	0.00±0.00	1.00±0.00	2.40±0.89	2.43±0.98	1.83±1.33	1.25±0.50	0.67±0.58	1.50±0.71	1.00±1.73	0.33±0.58	3.00±1.00	0.33±0.58
Compatibility of exam duration time with the number of questions	1.33±0.58	1.33±0.58	0.00±0.00	1.00±0.00	2.00±2.00	1.50±0.55	3.00±1.15	2.33±1.53	2.00±1.00	1.00±0.00	2.00±0.82	1.67±0.58	2.00±0.00	1.67±0.58
Taking quizzes in semester period	3.67±0.58	3.00±1.73	4.00±0.00	3.00±0.00	4.00±0.00	3.67±0.82	2.50±1.29	3.67±0.58	3.33±0.58	3.00±0.00	3.25±0.96	3.67±0.58	4.00±0.00	3.67±0.58
Taking midterm exams	1.00±0.00	2.00±1.00	0.00±0.00	2.00±0.00	1.67±0.58	1.83±1.33	1.50±1.00	2.00±1.00	2.67±0.58	1.00±0.00	0.75±0.96	1.33±0.58	3.50±0.71	1.33±0.58
Compatibility of questions with each tutors teaching content	0.33±0.58	1.00±1.00	0.00±0.00	2.00±0.00	1.33±0.58	1.67±1.37	1.50±1.73	1.33±0.58	1.00±1.00	0.00±0.00	0.25±0.50	1.00±1.73	3.50±0.71	1.00±1.73
The effect of students presence on exam scores	4.00±0.00	3.00±1.73	4.00±0.00	4.00±0.00	4.00±0.00	2.67±1.51	2.75±1.50	2.00±2.00	2.67±0.58	4.00±0.00	3.25±0.50	3.67±0.58	3.50±0.71	3.67±0.58
Compatibility of questions with the tutors lessons	2.33±1.53	2.00±1.00	0.00±0.00	4.00±0.00	2.67±2.31	2.33±1.37	0.50±0.58	2.33±1.53	1.67±1.53	0.00±0.00	1.75±1.50	2.00±1.00	4.00±0.00	2.00±1.00

Table 4: Mean±SD of questionnaires for practical assessments in each department (tutors' point of view)

Practical assessments	Pediatric	Oral and maxillo-facial	Endodontics	Periodontology	Restorative and esthetic	Complete prosthodontics	Fixed prosthodontics	Partial prosthodontics	Orthodontics	Radiology	Oral and maxillofacial pathology	Oral medicine	Oral health
Expressing the exam criteria at the beginning of semester	3.25±0.50	2.00±1.00	4.00±0.00	2.67±0.58	4.00±0.00	2.71±1.50	2.83±0.98	2.25±1.26	1.00±1.00	3.50±0.71	3.20±0.84	3.00±0.00	3.33±0.58
The effect of tutors opinion on the scores	1.00±1.41	2.00±0.00	0.00±0.00	1.33±1.53	0.50±0.58	1.86±0.70	1.50±0.84	2.25±0.50	1.00±1.73	2.50±0.71	1.60±1.52	1.67±1.53	0.67±0.58
Use of stress reduction protocols in exam environment	2.75±0.96	2.33±1.15	3.00±0.00	3.00±0.00	3.00±0.82	2.33±1.21	2.33±1.21	1.50±1.00	1.67±1.53	2.00±1.41	3.00±1.00	3.00±0.00	3.33±1.15
Use of entrance exams	4.00±0.00	1.67±1.53	4.00±0.00	1.33±1.53	4.00±0.00	1.43±1.27	2.50±1.38	2.00±0.81	1.00±1.00	0.50±0.71	0.80±1.79	0.67±1.15	4.00±0.00
Use of exit exams	0.25±0.50	3.67±0.58	4.00±0.00	4.00±0.00	3.40±1.34	1.57±1.13	1.50±0.55	1.50±1.00	2.00±1.73	4.00±0.00	3.80±0.45	4.00±0.00	2.33±1.53
Effect of students' behavior on the scores	3.25±0.57	3.33±0.58	3.00±0.00	3.00±1.00	3.80±0.45	3.29±0.76	3.17±0.98	2.25±1.26	2.67±0.58	2.50±1.12	2.60±1.14	2.33±1.15	4.00±0.00
Exams stability (presence of equal pattern)	3.50±0.58	2.67±0.58	4.00±0.00	3.33±0.58	4.00±0.00	3.14±1.21	3.00±0.89	2.75±0.50	3.00±1.00	4.00±0.00	3.60±0.55	2.67±1.53	4.00±0.00
Compatibility of scores with the students' work	3.25±0.50	2.33±0.58	4.00±0.00	3.33±0.58	3.80±0.45	3.29±0.76	3.17±1.17	3.25±0.96	3.00±1.00	3.50±0.71	3.60±0.55	2.67±1.53	3.67±0.58
Compatibility of final scores with the gained competency	3.00±0.00	3.00±1.00	4.00±0.00	3.67±0.58	3.80±0.45	2.86±1.07	2.50±1.05	2.50±1.29	2.00±1.00	2.50±2.12	3.00±0.71	2.33±1.15	3.33±0.58

in other departments as they stated. Students revealed that some questions of all departments were unfavorable in all semesters. Duration of examination was inappropriate and not long enough to answer all questions. The questions were not compatible with the references in the Fix Prosthodontics Department and the compatibility was assessed as “moderate” in other departments. Practical examination was unfavorable in all departments due to ambiguous questions and lack of definite references. Students stated that practical exams were directly influenced by tutors’ ideas in all departments except the Department of Oral and Maxillofacial Pathology. In the Department of Periodontology, tutors facilitated the exam environment to reduce the stress but in other departments students declared that no stress reduction was done. Tutors took entrance exams in Pediatric and Restorative and Esthetic departments but it rarely occurs in other departments. Exit examination was done in all departments except departments of Pediatric and Prosthodontics.

Discussion

Satisfaction evaluation is a cognitive procedure in which students compare their received education with the expected one. When the received services are relatively equal to the expected ones then satisfaction is achieved. On the other hand, satisfaction is the result of met expectations (16). Medical university tutors should take continuous theoretical and practical exams to educate expert students (17). Examination is one of the most important educational steps in medical faculties (18). In Iran, first continuous examination was scheduled in 1994 but it is not yet well-structured (19). Students evaluation is done as long as teaching exists but the new prospective is to know how to evaluate, how to make questions more reasonable, how to make teachers and students more satisfied with evaluation methods (20). It is important to have a structured evaluation method to increase

the knowledge and competency of students. One of the most valuable aspect is to know if the exams can educate practioners to do the best with no tutor (21). Imanipour and Jalili stated that tutors and students were not positive about the existing evaluation method and the difference between their opinions were not statistically significant. They believed that the existing assessment method could not evaluate the students’ competency and it should be improved to enhance the acceptability of the exams (22). Many studies have assessed the acceptability and validity of exams in Medical universities in Iran. Inappropriate questions and lack of enough time in exam were two of the main problems (23, 24). In 2011, a study in Kordestan University of Medical Sciences showed that multiple choice questions were more popular among students (25). Ghadimi revealed that tutors of faculties of psychology have more knowledge in designing exam questions than tutors of basic science faculties (26). In 2006, Arab demonstrated that multiple choice questions have structural defieny in Hamedan Medical University (27). Shakurnia and colleagues found the same results in JondiShapoor University (28). Tarrant and colleagues expressed that half of the multiple choice questions of Hong Kong Medical University have structural weakness and they just assess low-level knowledge of students (29). Some studies demonstrated that tutors are not well-educated in designing practical questions (24). In Babol Medical University practical exams were inappropriate as in our study. The stability of examination methods was assessed as inappropriate in Tabriz Faculty of Dentistry but it was unfavorable just in some departments of Babol University (30). In Kermanshah University practical assessment was inappropriate too. In Kermanshah Medical University students revealed that the exam environment was really stressful as Tabriz students stated. In order to find the best assessment method, especially in practical dentistry, students and masters satisfactory is important. Questionnaires with no name

make both feel calm in order to fill it honestly. In Kermanshah Medical University as in Tabriz, students revealed that exams were not competency based (31). Shokouh and colleagues also stated that practical exam does not really assess the practical skills (32). In Mashhad Medical University, students declared that their requirements completion during the semester period do not affect the practical exam scores at all as Imanpoor and Jalili stated (33).

In this research, students were not satisfied with the compatibility of practical exams scores with their works during the semester period. In a qualitative research by Calman and colleagues, practical skills were not assessed properly in Medical Universities (34).

Dentistry is a multidimensional skill and universities should have standard methods to assess the competency and maybe these methods be a combination of some useful methods (34). Many researchers have done similar studies in nursing faculties (25, 35) but the lack of enough information in dentistry assessment methods made us to do this research in Tabriz Dentistry School.

Conclusion

Due to the ranking of the theoretical exams as “moderately favorable” and practical exams as “poorly favorable”, serious changes should be done in assessment methods.

Acknowledgment

Authors wish to thank masters of all departments of Tabriz Faculty of Dentistry.

Conflict of Interest

The author declares no conflict of interest.

References

1. Finch PM. A system of performance intervention zones for use during student evaluation in the clinical environment. *J Bodyw Mov Ther.* 2008; 12(4): 295-8. doi:10.1016/j.jbmt.2007.08.001.
2. Rolland S, Hobson R, Hanwell S. Clinical competency exercises: some student perceptions. *Eur J Dent Educ.* 2007; 11(3): 184-91. doi:10.1111/j.1600-0579.2007.00453.x.
3. Schoonheim-Klein ME, Habets LL, Aartman IH, van der Vleuten CP, Hoogstraten J, van der Velden U. Implementing an objective structured clinical examination (OSCE) in dental education: effects on students' learning strategies. *Eur J Dent Educ.* 2006; 10(4): 226-35. doi:10.1111/j.1600-0579.2006.00421.x.
4. Brown G, Manogue M, Martin M. The validity and reliability of an OSCE in dentistry. *Eur J Dent Educ.* 1999; 3(3): 117-25.
5. Brown GA, Bull J, Pendlebury M. Assessing student learning in higher education. New York: Routledge; 2013.
6. Cheong Cheng Y, Ming Tam W. Multi-models of quality in education. *Quality assurance in Education.* 1997; 5(1): 22-31. doi:10.1108/09684889710156558.
7. Oliver RL, DeSARBO WS. Processing of the satisfaction response in consumption: a suggested framework and research propositions. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior.* 1989; 2(1): 1-16.
8. Browne BA, Dennis OK, William GB, Daniel JB. Student as customer: Factors affecting satisfaction and assessments of institutional quality. *Journal of Marketing for Higher Education.* 1998; 8(3): 1-14. doi: 10.1300/J050v08n03_01.
9. Sevier RA. Those Important Things: What Every College President Needs to Know About Marketing and Student Recruitment. *College and University.* 1996; 71(4): 9-16.
10. Gabel D, Bunce D. Research on problem solving: Chemistry in D. L. Gabel (Ed.) *Handbook of Research on Science Teaching and Learning* (pp. 301-326).

- 1994, New York: Macmillan.
11. Patterson PG, Johnson LW, Spreng RA. Modeling the determinants of customer satisfaction for business-to-business professional services. *J Acad Mark Sci.* 1996; 25(1): 4-17.
 12. Schuwirth L, Van Der Vleuten C. Merging views on assessment. *Med Educ.* 2004; 38(12): 1208-10. doi: 10.1111/j.1365-2929.2004.02055.x.
 13. Miller GE. The assessment of clinical skills/competence/performance. *Acad Med.* 1990; 65(9): S63-7.
 14. Mavis BE. Does studying for an objective structured clinical examination make a difference? *Med Educ.* 2000; 34(10): 808-812.
 15. Gerrow JD, Murphy HJ, Boyd MA, Scott DA.. Concurrent validity of written and OSCE components of the Canadian dental certification examinations. *J Dent Educ.* 2003; 67(8): 896-901.
 16. Zeithaml VA, Berry LL, Parasuraman A. The nature and determinants of customer expectations of service. *J Acad Mark Sci.* 1993; 21(1): 1-12. doi:10.1177/0092070393211001.
 17. Yazdankhah Fard M, Pouladi S, Kamali F, Zahmatkeshan N, Mirzaei K, Akaberian S, et al. The Stressing Factors in Clinical Education: The Viewpoints of Students. *Iranian Journal of Medical Education.* 2009; 8(2): 341-350.
 18. Narenji F, Rozbahani N, Amiri L. The effective education and evaluation program on clinical learning of nursing and midwifery instructors and students opinion in Arak University of Medical Sciences, 2008. 2010; 12(4): 103-10.
 19. Bazargan A. From internal evaluation in medical education to national agency for quality assurance in Iran higher education: Challenges and perspectives. *Strides Dev Med Educ.* 2009; 6(1): 81-88.
 20. Sanatkhan M, Molla Z, Akbari M. Evaluation of the students' perception about clinical education and examination in Mashhad School of Dentistry (Iran) in 2009. *Journal of Mashhad Dental School.* 2012; 36(3): 211-22.
 21. Henzi D, Davis E, Jasinevicius R, Hendricson W, Cintron L, Isaacs M. Appraisal of the dental school learning environment: the students' view. *J Dent Educ.* 2005; 69(10): 1137-47.
 22. Imanipour M, Jalili M. Nursing students' clinical evaluation in students and teachers views. *IJNR.* 2012; 7(25): 17-26.
 23. Abbasi S, Einollahi N, Gharib M, Nabatchian F, Dashti N, Zarebavani M. Evaluation methods of theoretical and practical courses of paramedical faculty laboratory sciences undergraduate students at Tehran University of Medical Sciences in the academic year 2009-2010. *Journal of Payavard Salamat.* 2013; 6(5): 342-53.
 24. Sepasi H. A study of cognitive domain and analysis of psychometric characteristics of test items in final examinations of arabic, calculus and biology courses of the third grade high school girls in different socio-economic status in khuzestan, IRAN. *Journal of education and psychology.* 2007; Volume 13(4): 57-78.
 25. Delaram M, Forouzandeh N. Students' evaluation methods by academic staff in Shahrekord University of Medical Sciences. *Strides Dev Med Educ.* 2010; 7(1): 51-6.
 26. Ghadimi Moghaddam M. Survey on special knowledge faculties of Tehran Azad University [Thesis in Persian]. Tehran: Islamic Azad University. 2004.
 27. Arab M. Survey on defect of multiple choice question in medical school of Hamadan Medial University in 2000. in Tehran: Tehran University of Medical Sciences: 4th National Congress of Medical Education. 2000.
 28. Shakurnia A, Khosravi Brojeni A, Mozafari A, Elhampour H. Survey on multiple choice questions of academic members in Ahvaz Jundishapur University

- of Medical Sciences in 2005. *Strides Dev Med Educ*. 2009; 6(2): 129-38.
29. Tarrant M, Knierim A, Hayes SK, Ware J. The frequency of item writing flaws in multiple-choice questions used in high stakes nursing assessments. *Nurse Educ Today*. 2006; 26(8): 662-71. 26(8):662-71. doi:10.1016/j.nedt.2006.07.006.
30. Joodi Chalan R, Seyedmajidi M, Khafri S, Joodi Chalan S. Evaluation of students' satisfaction from clinical departments of Babol Dental School (2012-13). *Future of medical education journal*. 2014; 4(4): 36-41. doi:10.22038/FMEJ.2014.3742.
31. Siabani S, Moradi MR, Siabani H, Rezaei M, Siabani S, Amolaei KH, et al. Students' view points on the educational problems in medical school of Kermanshah University of Medical Sciences (2007). *J Kermanshah Univ Med Sci*. 2009; 13(2): 162-71.
32. Shokouh F, Mahboubi AA, Safa Isini AH, Asghari N, Zare SH. Medical student's views about assessment of methods used in clinical clerkship in medical school of hormozgan medical university in 2003. *Medical journal of hormozgan university*. 2006; 10(2): 185-90.
33. Bahreini Toosi M H, Modabber Azizi M J, Kaveh Tabatbaie M S, Ebrahimzadeh S, Bahreini Toosi V, Bahreini Toosi K. Medical Students' Viewpoints about the Evaluation Methods at Internship Stage (Mashad University 2001). *Iranian Journal of Medical Education*. 2002) 2 (:19-19 <http://ijme.mui.ac.ir/article-1-476-fa.html>
34. Calman L, Watson R, Norman I, Redfern S, Murrells T. Assessing practice of student nurses: methods, preparation of assessors and student views. *J Adv Nurs*. 2002; 38(5): 516-23.
35. Alavi M, Irajpour A. Optimum Characteristics of Nursing Students' Clinical Evaluation: Clinical Nursing Teachers' Viewpoints in Isfahan University of Medical Sciences. *Iranian Journal of Medical Education*. 2014; 13(10): 796-808.