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Factors Affecting the Learning of Fixed Prosthodontics Course by Students at Kermanshah University of Medical Sciences

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Keywords: Education; Learning; Effective factor; Fixed prosthodontics course; Dentistry students

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Abstract

AIM: The objective of this study was to investigate the factors affecting the learning of fixed prosthodontics course from the viewpoint of students and faculty members of Kermanshah Dentistry School.

MATERIAL AND METHODS: This research was a descriptive-analytical study conducted using the convenient sampling method. A total of 72 students and 5 faculty members were included in the study. Data were collected using a researcher-made questionnaire containing two sections. The first section consists of demographic information, and the second section consists of 14 questions to evaluate the factors affecting the learning of the fixed prosthodontics course.

RESULTS: From the students' point of view, there was a significant relationship between the effect of using clinical points during a teaching on the learning efficacy of the fixed prosthodontics course and gender (P = 0.028). There was a statistically significant relationship between the level of professor's knowledge regarding the modern educational methods on the learning of fixed prosthodontics course (P = 0.034). The factor of displaying and implementing practical work on the real patient was considered important by students, and having knowledge about modern educational methods was considered important by faculty members.

CONCLUSIONS: It is recommended that appropriate educational planning be implemented to enhance students' practical work on the real patient and increase professors' knowledge about modern educational methods.

Introduction

Education means any pre-designed activity or strategy designed and implemented aiming to create learning in learners and make necessary changes in their behaviour. Each educational program pursues certain goals, based on which they should monitor the education process and evaluate the expected results at the end of the program [1], [2]. Education will be effective if it possesses the following features: being independent and having individual orientation, cooperation and interaction between students and professors; educational orientation should not be long-term and target all aspects of the life of the individual. Moreover, other studies suggest that to improve the level of education, both professors and students should be aware of the objectives of the components of the course and the whole program [3], [4], [5]. Understanding and using a systemic approach are helpful for health educators or other people, whose profession is associated with education in some ways [1], [6]. The goal of educating dentists is to provide preventive and therapeutic services for oral and dental diseases so that dentists can provide these services using theoretical knowledge and clinical skills acquired during their education. To achieve this goal, there is a need for educational planning based on clinical education principles, so that graduated students do not feel unable to perform these skills after graduation [7], [8].

Nowadays, education encounters problems in a theoretical and clinical education setting. Educational planners must attempt to provide the conditions for students so that they can acquire the required knowledge and skill by providing the conditions for optimal use of available resources [9]. In this regard, researchers consider the use of the

views of experienced people important in evaluating the curriculum. Many studies have been conducted on the quality of education and attitudes of dentistry graduates in various aspects of education around the world. They aim to find a solution to improve the quality of education and encourage students to enhance their level of knowledge and scientific performance [10], [11], [12].In this regard, it is necessary to evaluate the current status of education continuously and identify its strengths and weaknesses to achieve effective clinical education. One of the most important and good ways to identify the quality of clinical education is to examine educators' views. In the educational system of medical science universities, teaching is extremely important to the nature of the fields of studies in these universities, and the improvement of the quality of education of medical science students is not possible without changes in teaching methods and techniques.

Hence, the present study aimed to investigate the factors affecting the learning of the fixed prosthodontics course by dentistry students of Kermanshah University of Medical Sciences.

Material and Methods

The present study is a cross-sectional study conducted at the Dentistry School of Kermanshah University of Medical Sciences in Kermanshah province, the largest province in western of Iran with a population of approximately 2 million people [13] in the academic year of 2018-2019. In this research, 5 faculty members and 72 students were interviewed. Convenient sampling was used in this study. The research population included faculty members and students of Kermanshah Dentistry School. Information was collected from the students and faculty members who had completed the fixed prosthodontics courses at the dentistry school. The study inclusion criteria included passing and teaching a fixed prosthodontics course by the participants and having the individual's consent to participate in the study. Also, the exclusion criteria included temporary guest students, students who did not complete the course of fixed prosthodontics, and students who were not willing to participate in the study. In completing the questionnaire, further explanations were provided by the researchers to students and professors, if needed. In this research, a researcher-made questionnaire was used. This questionnaire has 14 questions in addition to the demographic section (gender, age, and university entrance year).

The questions were developed and indexed according to theoretical studies in the field of effective factors in learning, including educational facilities, teaching method, and individual communication. Finally, questions were designed for the questionnaire by considering the indices related to the learning factors appropriate to each of them. The researchers ensured the participants that the questionnaire information was used only for statistical analysis, and it would remain confidential. The study data were analysed in two sections of descriptive statistics and inferential statistics. In the descriptive statistics section, the criteria for central tendency and dispersion were reported along with the table. Non-parametric tests were used in the inferential statistics section owing to the rank nature of the variables. The Mann-Whitney test was used to compare the influential factors between men and women and between faculty members and students. Friedman Test and post hoc test were also used to compare the effective factors in learning the fixed prosthodontics course. SPSS Version 18.0 software (Inc., Chicago, IL, USA) was used to analyse the data. The significance level in this study was considered 0.05.

Results

In the present study, 77 examinees participated, of which 72 (93.5%) were students and 5 (6.5%) were faculty members. Out of the total examinees, 34 (47.2%) students and 4 (80%) faculty members were female, and 38 (52.8%) students and 1 (20%) faculty member were males. The mean age of faculty members was 39.80 ± 8.01, and the mean age of the students was 24.66 ± 1.94. Cronbach's alpha coefficient was used to calculate reliability. The value of this index was obtained at 0.786. There was a statistically significant difference between the female and male students in the level of effect of clinical points during the teaching fixed prosthodontics course (P=0.028) so that the mean of this variable was higher in female students (50%) than in male students (39.5%) (Table 1).

Table 1: Comparison of male and female students in terms of the factors affecting students' learning in fixed prosthodontics

			Mean	SD	Median	Min	Max	P-value*
Q1	Sex	Female	6.03	0.81	6.00	4	7	0.243
		Male	5.80	0.60	6.00	5	7	
Q2	Sex	Female	6.39	0.73	6.50	4	7	0.397
		Male	6.12	1.10	6.00	1	7	
Q3	Sex	Female	6.19	0.89	6.00	4	7	0.028
		Male	5.73	0.84	6.00	4	7	
Q4	Sex	Female	5.75	1.00	6.00	4	7	0.446
		Male	5.54	0.90	6.00	4	7	
Q5	Sex	Female	5.92	0.91	6.00	4	7	0.120
		Male	5.59	0.71	6.00	4	7	
Q6	Sex	Female	5.56	1.08	5.00	3	7	0.460
		Male	5.34	0.82	5.00	4	7	
Q7	Sex	Female	5.42	0.87	5.00	4	7	0.223
		Male	5.15	1.15	5.00	1	7	
Q8	Sex	Female	5.06	1.37	5.00	1	7	0.406
		Male	4.90	0.97	5.00	2	7	
Q9	Sex	Female	5.47	1.08	6.00	3	7	0.073
		Male	5.02	1.17	5.00	1	7	
Q10	Sex	Female	6.22	0.83	6.00	4	7	0.507
		Male	5.98	1.11	6.00	2	7	
Q11	Sex	Female	6.28	0.88	6.50	4	7	0.010
		Male	5.76	0.86	6.00	4	7	
Q12	Sex	Female	6.19	0.89	6.00	4	7	0.995
		Male	6.20	0.95	6.00	3	7	
Q13	Sex	Female	6.39	0.80	7.00	5	7	0.510
		Male	6.32	0.76	6.00	5	7	
Q14	Sex	Female	6.25	1.00	7.00	4	7	0.345
		Male	6.12	0.90	6.00	4	7	

SD: Standard Deviation; Min: Minimum; Max: Maximum; *Mann Whitney Test.

There was a statistically significant difference between faculty members and students in the level of effect of active participation of students (question and answer) on learning the fixed prosthodontics course (P = 0.039) so that the mean of this variable was higher in faculty members than in students. There was a statistically significant difference between faculty members and students in the level of effectiveness of the exams classified during the semester in learning the prosthodontics course (P = 0.002) so that the mean of this variable was higher in the faculty members than in the students. There was a statistically significant difference between the faculty members and students in terms of the effect of having a preliminary study on the learning of fixed prosthodontics course (P = 0.026) so that the mean of this variable was higher in the faculty members than in the students (Table 2).

Table 2: Comparison of faculty members and students in terms of the factors affecting students' learning in fixed prosthodontics

			Mean	SD	Median	Min	Max	P-value
Q1	Academic Degree	Academic staff	6.40	0.55	6.00	6	7	0.149
		Student	5.88	0.71	6.00	4	7	
Q2	Academic Degree	Academic staff	6.60	0.55	7.00	6	7	0.438
		Student	6.22	0.97	6.00	1	7	
Q3	Academic Degree	Academic staff	6.40	0.55	6.00	6	7	0.297
		Student	5.92	0.90	6.00	4	7	
Q4	Academic Degree	Academic staff	6.20	0.84	6.00	5	7	0.203
		Student	5.60	0.94	6.00	4	7	
Q5	Academic Degree	Academic staff	6.40	0.55	6.00	6	7	0.073
		Student	5.69	0.82	6.00	4	7	
Q6	Academic Degree	Academic staff	5.40	0.89	5.00	5	7	0.818
		Student	5.44	0.96	5.00	3	7	
Q7	Academic Degree	Academic staff	6.20	0.84	6.00	5	7	0.039
		Student	5.21	1.02	5.00	1	7	
Q8	Academic Degree	Academic staff	6.40	0.55	6.00	6	7	0.002
		Student	4.87	1.14	5.00	1	7	
Q9	Academic Degree	Academic staff	6.20	0.45	6.00	6	7	0.026
		Student	5.17	1.15	5.00	1	7	
Q10	Academic Degree	Academic staff	6.60	0.55	7.00	6	7	0.269
		Student	6.06	1.01	6.00	2	7	
Q11	Academic Degree	Academic staff	6.20	0.45	6.00	6	7	0.741
		Student	5.99	0.93	6.00	4	7	
Q12	Academic Degree	Academic staff	6.20	0.45	6.00	6	7	0.756
		Student	6.19	0.94	6.50	3	7	
Q13	Academic Degree	Academic staff	6.60	0.55	7.00	6	7	0.594
		Student	6.33	0.79	7.00	5	7	
Q14	Academic Degree	Academic staff	6.20	0.45	6.00	6	7	0.741
		Student	6.18	0.97	7.00	4	7	

SD: Standard Deviation; Min: Minimum; Max: Maximum; *Mann Whitney Test.

Table 3 presents a comparison of effective factors in learning the prosthodontics course in female students. There was a statistically significant difference among the female students in terms of various factors affecting the learning of the prosthodontics course (P < 0.001, Friedman test). From the viewpoint of female students, the factor of displaying and implementation of practical work on the real patient was the most effective in learning the prosthodontics course. There was a significant difference among the male students in terms of various factors affecting the learning of the prosthodontics course (P < 0.001, Friedman test).

Table 3: Comparison of female students in terms of the effective factors in learning of prosthodontics course

	Median	Range
Q1	6.00^{abcde}	3.00
Q2	6.00^{de}	3.00
Q3	6.00^{bcde}	3.00
Q4	6.00^{abcde}	3.00
Q5	6.00^{abcde}	3.00
Q6	5.00^{abcd}	4.00
Q7	5.00^{ab}	3.00
Q8	5.00^{a}	6.00
Q9	5.50^{abc}	4.00
Q10	6.00^{bcde}	3.00
Q11	6.50^{cde}	3.00
Q12	6.50^{cde}	3.00
Q13	7.00^{e}	2.00
Q14	7.00^{cde}	3.00
P-value*	0.001	

*Non-parametric Friedman Test, followed by Post Hoc test; Medians followed by different letters, express a statistically significant difference (*P-value* < 0.05).

From the viewpoint of the male students, the factors of appropriate presentation of the professor, the way the professor interact with the students and the displaying and implementation of practical work on the real patient were the most effective factors in learning the fixed prosthodontics course (Table 4).

Table 4: Table 4: Comparison of male students in terms of the effective factors in learning of prosthodontics course

	Median	Range
Q1	6.00^{bcd}	2.00
Q2	6.00^{d}	6.00
Q3	6.00^{bcd}	3.00
Q4	5.50^{abcd}	3.00
Q5	6.00^{abcd}	3.00
Q6	5.00^{abc}	3.00
Q7	5.00^{ab}	6.00
Q8	5.00^{a}	5.00
Q9	5.00^{ab}	6.00
Q10	6.00^{cd}	5.00
Q11	6.00^{bcd}	3.00
Q12	6.50^{d}	4.00
Q13	6.00^{d}	2.00
Q14	6.00^{cd}	3.00
P-value*	0.001	

*Non-parametric Friedman Test, followed by Post Hoc test; Medians followed by different letters, express a statistically significant difference (*P-value* < 0.05).

There was no significant difference among the faculty members in terms of various factors affecting learning the prosthodontics course (P = 0.181, Friedman test) (Table 5).

Table 5: Comparison of faculty members in terms of the factors affecting the learning of prosthodontics course

	Median	Range
Q1	6.00	1.00
Q2	7.00	1.00
Q3	6.00	1.00
Q4	6.00	2.00
Q5	6.00	1.00
Q6	5.00	2.00
Q7	6.00	2.00
Q8	6.00	1.00
Q9	6.00	1.00
Q10	7.00	1.00
Q11	6.00	1.00
Q12	6.00	1.00
Q13	7.00	1.00
Q14	6.00	1.00
P-value*	0.181	

*Non-parametric Friedman.

Discussion

The results of this study showed that the female students considered the displaying and implementation of practical work on the real patient as the most important factor affecting the learning of fixed prosthodontics course, which could be justified given the clinical nature of this course. From the viewpoint of the male students, the displaying and implementation of practical work on the real patient as well as the professors' presentation skills and the interaction with the students were one of the most important factors influencing the learning of the prosthodontics course. Furthermore, the views of the professors participating in the present study demonstrated that all the evaluated factors had equal importance, and there was no significant difference between these factors. Midgley (2006) and Karimi *et al*., (2010) in separate studies indicated that the most important determinant ineffective education was the performance and knowledge of professors, since professors can transfer their knowledge and experience better to the student by having characteristics such as self-confidence, high skill and effective communication skills [14], [15]. These results were consistent with the results of the present study from the viewpoint of the male students (a good presentation by the professor and his or her interaction with the student).

In line with the present study, the study conducted by Mehralizadeh *et al*., (2013) showed that the students' opinion of lecturers' good presentation skills is the most influential in learning [11]. The results of other study indicated that from the viewpoint of the students, good behaviour of the officials, the professor and the student play an effective role in enhancing the level of learning [16]. It was consistent with the result of the present study. Elkan and Robinson (2000) have stated that the university should provide opportunities for students to be prepared for providing services in the future. In this regard, teaching consistent with the clinical needs and the use of a safe clinical, educational setting by the experienced and skilled professors are extremely important [9]. Maginnis *et al*. (2010) also stated in their study that students were not able to transfer what they were learning in an academic setting to the clinical setting. There is a cognitive dissonance here. This cognitive dissonance makes students unable to integrate the ideals of the academic setting with the realities of the clinical setting [17]. It is more highlighted in medical science courses, particularly specialised courses of dentistry. Achievement of effective learning requires using the existing clinical facilities as much as possible and enhancing the student's access to more practical settings. Thus, the educational setting reform should be considered by educational officials to standardise it in supplying educational facilities and equipment. The results of this research revealed that all students, including male and female students, considered displaying and implementation of practical work on the real patient as the most important factors influencing the learning of the fixed prosthodontics course.

In the present study, the effects of factors such as patience and calmness of the professor in the classroom, the exams classified during the semester, active participation of students (question and answer), having a preliminary study, reviewing theoretical topics in the practical class, using dental moulage, using educational illustrations, including video and animation, and holding educational seminars on learning the fixed prosthodontics course were studied. The results did not reveal a significant difference in the groups studied. The only significant difference based on the students' gender was related to the use of clinical points during the teaching on learning the fixed prosthodontics course. Ramazani *et al*. (2013) investigated the practical education and the factors affecting it. The results of their study revealed a significant difference in the mean score of students' viewpoints in terms of age ($P = 0.048$) and gender ($P = 0.040$) so that the score of viewpoints was higher for students older than thirty-five years. Involvedness in things such as out-of-school treatment work, life pursuits, has drawn such a conclusion. Also, compared to male and female students, male students' viewpoints indicate a more favourable situation in practical education. This may be owing to emotions and self-esteem in boys [18]. In the research conducted by Kelsey *et al*., (2009), there was no difference between the genders in evaluating the academic setting of the dentistry school [19]. Regardless of using clinical point during the teaching, it was consistent with the result of the present study.

Moreover, in the present study, the viewpoints of professors and students differed only in the level of the effect of professor's knowledge about modern educational methods on learning the fixed prosthodontics course. Karimi *et al*., (2011) also showed that applying new teaching methods, enhancing the academic and practical levels of professors, using active educational methods, and establishing consistency between theoretical education and professional needs could be effective in improving the quality of education [15]. Akbari *et al*., (2014) stated that the views of professors and students matched each other, except for four cases (the importance of timely presence of the professor in the classroom, the importance of paying attention to the secondary cases, such as communication with the patient, the importance of presenting pamphlets in the classroom and the importance of giving high scores to the students) [20]. In the present study, this difference was observed only regarding the effect of the professor's knowledge about modern educational methods. Rieger *et al*., (2009) reported that applying new educational methods could be effective in improving the educational process and showed that the new and blended educational method compared

to traditional education would increase the success rate of students by 10% [21]. Previous studies showed that the use of new and innovative educational methods was effective in teaching the fixed prosthodontics course [22], [23]. Kavadella *et al*. (2012) reported the effect of the blended method on teaching oral and dental radiology to dentistry students [24].

According to the present study results, it can be stated that the factor of displaying and implementing the practical work on the real patient was considered important by the students and having knowledge on the modern educational methods was considered important by the faculty members. Thus, it is recommended that appropriate educational planning be implemented in this regard to enhance and improve these two factors. Healthcare services aiming at improving the health of individuals and the community depend on the extent to which the goals of the educational programs are realised. If the educational programs are not designed and implemented well, it can cause irreparable damage and social, economic and cultural harms to the learners and the people in the community. Thus, it is necessary to consider specialised courses like the fixed prosthodontics course, which has a more practical nature and requires providing an appropriate clinical setting for education.

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Appendix

Questionnaire Form

This questionnaire was designed to investigate the factors affecting learning of fixed prosthesis from the viewpoints of students and faculty members of Kermanshah Dental School. Dear students and faculty members, please complete the questionnaire and help us in this regard.

Academic degree : □ Faculty members □ Student
Gender : □ Female □ Man

Age: …… Year of entry: ……

1) How is the impact of using dental molasses on learning a fixed prosthesis lesson?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
2) How is the effect of using a good teacher's expression on learning a fixed denture lesson?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
3) How effective are the clinical points during the teaching of fixed prosthesis?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
4) How effective is the review of theoretical issues in the practical classroom of fixed prosthesis lessons?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
5) How effective are educational images like animation videos in learning a fixed denture lesson?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
6) How effective is the conduct of educational seminars on learning a fixed denture lesson?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
7) How effective is the active presence (question and answer) of students in learning a fixed denture lesson?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
8) How effective are the exams classified during the semester of taking a fixed prosthesis course?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
9) How effective is having a pre-study course on fixed denture learning?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
10) How effective is the teacher's patience and calmness in the classroom on learning a fixed denture lesson?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
11) How effective is the use of clinical tips when teaching a fixed prosthesis lesson?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
12) How effective is the way a teacher deals with students in learning a fixed denture lesson?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
13) How effective is the demonstration and execution of practical work on a real patient in learning a fixed prosthesis lesson?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad
14) How is the effect of a teacher's familiarity with new teaching methods on learning a fixed prosthesis lesson?
   a) excellent b) very good c) good d) average e) relatively bad f) not bad g) very bad