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Original Article

Evaluation of educational programs in endodontics, periodontics and oral & maxillofacial surgery departments of babol dental school from students' perspective based on CIPP model

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Abstract

Introduction: Evaluation is a tool that can be used to achieve the goals of higher education. The aim of this study was to evaluate the achievement level of educational objectives in Babol dental school using the CIPP (content, input, process, and product) model based on the point of view of students.

Materials&Methods: This cross-sectional study was performed using a researcher-made questionnaire based on CIPP model for educational groups of oral and maxillofacial surgery (OMFS), endodontics and periodontics among dental students admitted to Babol University of Medical Sciences in 2008 and 2009. Total scores were calculated for each field and categorized as undesirable, relatively desirable and desirable with scores less than 50, 51-70 and 71-100, respectively. Statistical analysis was performed using ANOVA, T-test and Tukey HSD tests and P <0.05 was considered significant.

Results: The mean scores of four areas were not significantly different between groups for two entries using ANOVA test. By comparing two groups, the mean scores of input area were significantly different in periodontics (p=0.007) and OMFS (p=0.002) departments.

Conclusion: Achieving to educational goals within the context area was desirable in all departments. But there are some problems in other studied areas which must be pay attention.

Keywords: Dental students, Education, Training programs, Educational models

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ارزشیابی برنامه های آموزشی بخش های اندودانتیکس، پریودانتیکس و جراحی دهان، فک و صورت دانشکده دندانپزشکی بابل از دیدگاه دانشجویان بر اساس الگوی CIPP

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چکیده

مقدمه: ارزشیابی ابزاری است که می توان از آن برای تحقق هدف های آموزش عالی استفاده کرد. این مطالعه جهت بررسی میزان دستیابی به اهداف آموزشی در دانشکده دندانپزشکی بابل با کمک *الگوی* [CIPP زمینه (محتوا)، درون داد، فرآیند، برون داد] از دیدگاه دانشجویان انجام شد.

مواد و روش ها: این مطالعه از نوع مقطعی با استفاده از پرسشنامه محقق ساخته بر اساس الگوی CIPP در سه گروه اندودانتیکس، پریودانتیکس و جراحی در میان دانشجویان ورودی ۸۷ و ۸۸ صورت گرفت. نمرات کل در هر حیطه محاسبه شده و نمرات کمتر از ۵۰ ، ۷۰-۵۱ و ۱۰۰-۷۱ به ترتیب نامطلوب، نسبتا مطلوب و مطلوب در نظر گرفته شد. آنالیز آماری با استفاده از آزمون های ANOVA، T-testو Tukey HSD انجام شد و $P<0.05$ معنی دار در نظر گرفته شد.

یافته ها: در آزمونANOVA میانگین نمرات چهار حیطه در بین بخش های هر دو ورودی معنی دار نبود. با مقایسه نظرات دانشجویان دو ورودی، میانگین نمرات حیطه درون داد در بخش پریودانتیکس($p=0.007$) و در بخش جراحی($p=0.002$) اختلاف معنی داری مشاهده شد.

نتیجه گیری: دستیابی به اهداف آموزشی در حیطه محتوا در بخش های مورد بررسی مطلوب میباشد. اما در سایرحیطه های مورد مطالعه مشکلاتی وجود دارد که باید به آنها توجه شود.

واژگان کلیدی: دانشجویان دندانپزشکی، آموزش، برنامه های آموزشی، مدلهای آموزشی

Introduction

Evaluation is a critical issue to achieve the goals of education. [1] In this study, the CIPP model was used to evaluate educational programs. This model was first published in 1966 by Stufflebeam et al. to help managers and decision makers to promote this belief that "the most important goal of evaluation is to improve, not to prove". [2] The CIPP title is composed of the abbreviation of the content, input, process and product. The purpose of content evaluation is to provide a rational context with the aim of determining educational objectives. In input evaluation, the information required for how to use resources is collected to achieve program goals. The process evaluation assesses how the program is implemented. The obtained results determined in the product evaluation are compared with the objectives of the program, and the relationship between expectations and actual results is determined. [3] Pakdaman et al. who evaluated the periodontics and oral health groups of the Tehran University using the CIPP model in 2011 showed that there were statistically significant differences in the content and process areas between

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two educational groups and the sub-titles of these two areas should reviewed. [4] In another study, Samyari et al. assessed the restorative dentistry and periodontics training groups in Shahed and Tehran Universities using the CIPP model. Results indicated that the students did not achieve the desired goals in these two courses and it was necessary to review the system and educational programs, and to offer new strategies. [5]

The aim of this study was to assess the educational goals of the oral and maxillofacial surgery (OMFS), endodontics and periodontics departments of dental school of Babol University based on the CIPP evaluation model from the viewpoint of students.

Materials & Methods

This cross-sectional descriptive study was performed using a researcher-made questionnaire based on CIPP model among 61 dental students admitted to Babol University of Medical Sciences in 2008 and 2009. The sampling method was census. Among the 32 and 29 students in each entry year, 26 respondents (81.85% and 89.65%) were answered the questionnaire. 69.2% of them were female. Data collection tool was a questionnaire designed based on the educational objectives for endodontics, OMFS and periodontics departments in accordance with the educational curriculum. The validity of questionnaire was checked by three faculty members of Babol Dental School. The reliability of questionnaire was also calculated by test-retest method within 10 days (Cronbach's alpha=0.97) in the randomly selected departments.

The questionnaire is designed to evaluate the field, the educational policies and educational environment. Input evaluation of the study assessed the input elements for the training program included the following: planning, equipment, budget and human resources. In the process evaluation, problems related to student learning, continuous evaluation process of teaching and learning were examined. The product evaluation assessed the students' satisfaction for the outcome of the education and its applicability in endodontics, surgery and periodontics departments.

Oral explanations were given to the students about the study by the researcher and an anonymous questionnaire was sent to them by email at the end of the semester. The items like yes, somewhat and no answers were used to determine the content, input and process. For the statistical comparison, the yes option had 3 points, somewhat had 2 points and no received 1 point.

The product evaluation was ranged five options: very low, low, medium, high and very high, and for the statistical comparison, 1 to 5 points were assigned. Then, very low and low options were mixed in the low group and high and very high were mixed in the high group. Sum of scores was calculated for each area separately, and for having comparable scores in each area, the obtained scores from each area were reduced to 100. In analyzing the results, an average less than 50 was considered as undesirable, between 51-70 was relatively desirable and 71-100 was considered as desirable. Data were analyzed by SPSS 22 using analysis of variance (ANOVA), Tukey HSD test and T-test. $P < 0.05$ was considered statistically significant.

Results

The mean scores assigned to the areas of content, input, process and product among the studied departments were not significant based on ANOVA test. The mean scores of the input area had a significant difference in the periodontics (P=0.007) and surgery departments (P=0.002) based on Post Hoc test. The comparison between areas of content, input, process, and product is reported in Table 1 based on the entry year for all the students.

The content area was evaluated as desirable in three departments on the indicators of "the relevance of the content presented in their department with the content presented in other sections, providing materials tailored to the needs of students, the appropriateness of the duration of the unit", and only undesirable indicator was "the time allocated to the unit " in the endodontics department (Table2).

The process area was evaluated as desirable in three departments on the indicators of "no problem with teaching methods, sufficient amount of educational materials for training, providing materials at the right time for students"; and was relatively desirable in three departments on the indicator of "required consistency between theory and its application to clinical work" (Table 2). The input area is illustrated in Table 2 on the basis of different departments. Output area was evaluated as desirable in the endodontics department. Among 18 indicators, 8 indicators (44.5%) were relatively desirable and other indicators (55.5) were desirable (Table 3). The product area was evaluated as

relatively desirable in periodontics department. Among 18 indicators, only 38.8% were desirable in achieving educational goals, while other indicators (61.2%) were relatively desirable (Table 4).

The product area was evaluated as relatively desirable in surgical department. Among 17 indicators, only 8 (47.1%) were desirable and the other indicators were relatively desirable (Table 5).

Table1. Mean and standard deviation, the percentage of desirability of the content, Input and process s divided of by their acceptance year within endodontic, periodontics and surgery groups

Acceptance year	s/Indicators	Content		Input		Process	
		Mean±SD	Desirability	Mean±SD	Desirability	Mean±SD	Desirability
2008	Endodontics	1.958±9.65	66.9	4.302±20.23	67.2	2.619±10.31	63.4
	Periodontics	1.925±9.88	74.3	4.230±21.85	73	2.657±11.5	74.3
	Surgery	2.002±10.38	80.4	4.461±22.31	76.8	2.353±11.54	77.0
	P-value	0.777		0.347		0.267	
2009	Endodontics	1.826±10.15	74.6	3.635±18.42	69.9	2.578±10.62	62.4
	Periodontics	1.855±10	75.6	4.765±18.31	74	2.486±11.5	65.3
	Surgery	1.509±9.96	79.4	3.881±18.54	76.3	2.438±12.12	76.5
	P-value	0.896		0.002		0.333	
Total	Endodontics	9.9±1.892	70.7	19/33±4/047	68.6	10.46±2.578	63.9
	Periodontics	9.94±1.873	74.9	20.42±4.556	73.6	11.83±2.391	69.7
	Surgery	10.17±1.768	79.9	20.08±4/808	76.5	11.5±2.548	77
	P-value	0.376		0.465		0.502	

Table 2. Desirability level on content, input and process areas in three educational groups (%)

Content	Endodontics	Periodontics	Surgery
Are the materials presented in the relevant group related to the material presented in other groups?	84.6	83.9	83.3
Are the materials presented in the relevant group adjusted to your needs as a dentist?	71.7	58.9	77.5
Is the time (term) of presenting theoretical unit appropriate?	77.5	78.8	87.8
Is enough time allocated to the respective unit ?	49.3	78.2	71.1
Input area			
Is course content adjusted to the needs of students?	76.9	59.6	78.8
Are sufficient resources (materials) and equipments provided to students in practical educational ?	66	67.3	78.2
Is sufficient educational resources for the study of the relevant group (theoretical and practical) provided to students?	80.1	77.5	80.7
Is the number of patients sufficient for practical educational ?	25.6	62.8	57
Is the number of teachers consistent and adequate for students?	74.3	76.9	75
Is the professors' supervision sufficient during students' performance?	55.7	67.9	76.9
Do the teachers have enough educational skills?	85.2	92.3	81.4
Do the nursing staff have enough cooperation with students?	85.2	85.2	85.2
Process area			
Is there any problem with teaching?	39.1	42.3	28.8
Is there necessary correspondence between education theory and its application in practical work?	56.4	52.2	60.2
Is the amount of materials adjusted to the educational needs?	64.1	83.9	85.2
Is the educational material presented in the proper time?	74.3	85.2	91.6

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Table 3. Distribution of answers to questions on the product area in the endodontics group

Questions	Low	Average	High	Desirability (%)
1.Knowing the pulmonary and periapical diseases and ability to diagnose them	2(3.8)	22(42.3)	28(53.9)	83.3
2.Knowing the endodontic examination and completing their file	3(5.8)	11(21.2)	38(73.1)	89.1
3.Ability to radiographic Interpretation and diagnosis of pulpal diseases and Periapical tissue in radiographic stereotypes	2(3.8)	21(40.4)	29(55.7)	84
4.Knowing the endodontic devices and how to use them	7(13.5)	20(38.5)	25(48.1)	78.2
5.Knowing the clinical symptoms of reversible pulpitis and ability to cure	2(3.8)	22(42.3)	28(53.8)	83.3
6.Knowing the clinical symptoms of irreversible pulpitis and ability to cure	1(1.9)	22(42.3)	29(55.7)	84.6
7.Knowing the clinical symptoms of palpic necrosis and its treatment design	2(3.8)	18(34.6)	32(61.6)	85.9
8.Knowing the clinical symptoms of palpic calcification and ability to cure	16(30.7)	21(40.4)	15(28.9)	66
9.Knowing the clinical symptoms of acute and chronic apical periodontitis and ability to cure	14(26.9)	25(48.1)	13(25.0)	66
10.Knowing the clinical symptoms of acute and chronic apical ablation and ability to cure	12(23.1)	26(50.0)	16(30.8)	71.8
11.Knowing the clinical symptoms of osteoid condensant and related treatments	19(36.5)	22(42.3)	11(21.2)	61.5
12.Knowing the treatments of pulpal and periapical diseases and ability to perform	9(17.3)	23(44.2)	20(38.5)	73.7
13.Knowing the incidents during treatment and ability to manage them	21(40.4)	19(36.5)	12(23.0)	60.9
14.Knowing the prevention principles of endodontic and protecting the pulp	7(13.4)	23(44.2)	22(42.3)	76.2
15.Knowing the endodontic emergencies and ability to cure	13(25.0)	24(46.2)	15(28.9)	68
16.Knowing the basics of root rehabilitation and the ability to perform	33(63.4)	11(21.2)	8(15.3)	50.6
17.Knowing the endodontic treatment of traumatic teeth and ability to perform	28(53.9)	13(25.0)	11(21.2)	55.7

Table 4. Distribution of answers to questions on the product area in the periodontics group

Questions	Low	Average	High	Desirability (%)
1.Knowing how to teach dental hygiene to patients	1(1.9)	11(21.2)	40(77.0)	91.6
2.Ability to diagnose the etiological local and systemic factors of the periodontal diseases	3(5.8)	25(48.1)	24(46.1)	80.1
3.Knowing the diagnosis, prognosis, and treatment plan for periodontal disease	7(13.5)	25(48.1)	20(38.4)	75
4.Ability to radiographic interpretation and diagnosis of periodontal diseases in radiographic stereotypes	9(17.3)	18(34.6)	25(48.1)	76.9
5.Knowing the clinical symptoms of acute gingivitis and its treatment	8(15.4)	21(40/4)	23(44.3)	76.2
6.Knowing the diagnosis and treatment of periodontal abscess	10(19.2)	31(59.6)	11(21.2)	67.3
7.Knowing the mucogingival problems and principles of its treatment	16(59.5)	22(42.3)	14(26.9)	65.3
8.Knowing the pericoronitis and its treatment	8(15.3)	22(42.3)	22(42.3)	75.6
9.Knowing the methods of brushing and ability to perform	4(7.7)	11(21.2)	37(71.2)	87.8
10.Knowing how to curettage and ability to perform	22(42.3)	19(36.5)	11(21.2)	59.6
11.Knowing the technique of gingivoctomia and gingiviplasty and the ability to perform	34(65.4)	10(19.2)	8(15.4)	50
12.Knowing the basics of osteotomy and ostectomy and the ability to perform them	33(63.4)	10(19.2)	9(17.3)	51.2
13.Knowing how to stitch	19(36.6)	17(32.7)	16(30.8)	64.7
14.Knowing the periodontal reconstruction methods	28(53.8)	16(30.8)	8(15.4)	53.8
15.Knowing the temporary and permanent splint and ability to perform	30(57.7)	9(17.3)	7(13.5)	44.2
16.Knowing the vertical root fracture and how to detect it	27(51.9)	14(26.9)	11(21.1)	56.4
17.Knowing maintenance treatments and ability to perform	26(50.0)	13(25.0)	13(25.0)	58.3

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Table 5. Distribution of answers to questions on the product area in the surgery group

Questions	Low	Average	High	Desirability (%)
1.Knowing how to examine and complete the patient file	0	7(13.5)	45(86.6)	95.5
2.Knowing the principles and techniques of numbness in the upper and lower jaw and ability to perform	1(1.9)	16(30.8)	35(67.3)	88.4
3.Knowing the teeth extraction procedure and ability to perform	1(1.9)	19(36.5)	32(61.5)	86.5
4.Knowing the registration of vital signs and the ability to control the patient's vital signs in the clinic	4(7.7)	23(44.2)	25(48.1)	80.1
5.Knowing the medical emergencies in dentistry and the ability to manage emergency cases in the clinic	11(21.1)	24(46.2)	17(32.7)	70.5
6.Knowing the principles of tooth extraction and how to perform	3(5.7)	12(23.1)	37(71.1)	88.4
7.Knowing the principles of removing half-grown teeth and how to perform	18(34.6)	17(32.7)	17(32.7)	66
8.Knowing the principles of removing impacted teeth and how to perform	31(59.6)	9(17.3)	12(23.1)	54.4
9.Knowing the necessary considerations and care after removing the tooth	1(1.9)	15(28.8)	36(69.3)	89.1
10.Knowing the principles of prevention and treatment of odontogenic infections	10(19.2)	25(48.1)	17(32.7)	71.1
11.Knowing the principles of endodontic surgery and how to perform	34(65.4)	8(15.4)	10(19.2)	51.2
12.Knowing how to diagnose and treat the Dry Cavity	10(19.2)	19(36.5)	23(44.2)	75
13.Knowing the treatment of sinusitis and maxillary sinus surgery	33(63.5)	11(21.2)	8(15.4)	50.6
13.Ability to diagnose and treat diseases and disorders of the salivary glands	33(63.5)	10(19.2)	9(17.3)	51.2
15.Knowing the surgical principles of Pathological lesions of the oral cavity and how to perform	36(69.2)	7(13.5)	9(17.3)	49.3
16.Knowing the dentoalveolar lesions and soft tissue damage, therapeutic methods and ability to perform	30(57.7)	10(19.2)	12(23.0)	55.1
17.Knowing how to diagnose and treat pain in the oral and maxillofacial area	23(44.2)	23(44.2)	6(11.5)	55.7

Discussion

Following the CIPP model, the current research evaluated four areas including input, content, process, and product in endodontics, periodontics and OMFS departments of Dental School of Babol University from the viewpoint of the students with the entry year of 2008 and 2009. According to the results, the content was desirable in the periodontics and surgery departments, while being reported relatively desirable in the endodontics department. The study of Pakdaman et al. in the periodontics group indicated that the students were more satisfied with the content than other three ones. These results are consistent with ours since the students of periodontics department have also described this indicator as relatively desirable. [4]

Our results in the input area showed that the indicator of "the relevance of the presented content with the needs of the students" was rather desirable in the periodontics department. Unlike our research, in the study of Pakdaman et al. the students were mostly satisfied with the content of the curriculum. [4] The "equipment and resources (materials) for the students" was one of indicators in the input area, which was rather desirable in both departments. It is recommended to improve the facilities and equipment of endodontics and periodontics departments at the discretion of the authorities. Pakdaman et al. stated that the students believed that resources and equipment of the periodontics department were insufficient for educational purposes, which is consistent with our research. [4]

In the study of Borhan-Mojabi, most of the students mentioned the equipment and tools required in the endodontics department were not sufficient, and 45% of the students declared the physical equipment of the periodontics department were not sufficient, which is similar to our study. [6] The least satisfaction with the equipment and facilities was reported in the endodontics department by Eslamipour et al.. which resembles our study. [7] Another indicator in the input area was the "sufficient number of patients for practical training", which was undesirable in the endodontics department

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and relatively desirable in two other ones. There are many reasons for this lack of educational facilities, including easy access to the college for community members, proper and regular responses of college admissions to clients and etc.

On the other hand, the experiences of the patients with endodontic treatments and long-term treatment protocols in the endodontics, sometimes taking several sessions discourage some of them from referring to the college clinics for treatment and they occasionally give up to continue treatment sessions.

Moreover, insufficient number of patients in OMFS can be due to the nature of surgery treatments as well as the patients' stress and anxiety about surgical procedures. According to Seijo et al. the endodontic treatment is considered as secondary therapy, and many patients return after a long time when their teeth require gingival surgery and sometimes extraction, so they are no longer suitable for endodontic treatment. [8]

In our study, the process area was desirable in the surgical department and it was relatively desirable in the endodontics and periodontics ones. The students rated the indicator of "having problem with teaching methods" relatively desirable in endodontics and periodontics departments. It seems that there must be some improvements made in endodontics and periodontics departments. In the study by Pakdaman et al. 67% of the students were completely or partially unsatisfied with the teaching method in the periodontics group, which is somewhat the same as our study. [4]

Our research findings in the process area demonstrated that the indicator of "consistency between theory and its application to clinical work" was relatively desirable in three departments, which may be due to the high volume of content in the theory courses based on the educational curriculum or due to the inconsistencies among professors' teaching methods, confusing the students.

In the product area, the students explained the lowest capabilities in the indicators of "understanding the principles of root retreatment", "familiarity with therapeutic stages of endodontic traumatic teeth", "familiarity with problems during treatment", and "familiarity with Perio-Endo lesions" in endodontics group, because above items are only theoretically offered in the general practitioners' curriculum.

Hence, it is recommended that the post-graduate students teach such issues in the form of training seminars or case reports to the under-graduate students to help them improve their theoretical knowledge. Tanalp's study also indicated that the students remarked their low self-confidence in root canal therapy in teeth with absorbed, apexification treatment and root retreatment. Such therapeutic cases are referred to post-graduate clinics and the students do not encounter with it. On the other hand, according to the Dental Education Association in Europe, the required capabilities of the general practitioner dentists include single-root and multi-root canal therapy, as well as the knowledge of surgical and non-surgical complicated root treatments; being consistent with the results of the present study.[9] Students of surgical group in the product area expressed their lowest capabilities in the indicators of "knowing the principles of surgical pathologic lesions of the oral cavity", "knowing the treatment of sinusitis and maxillary sinus surgery", "knowing the principles of endodontic surgery"," the treatment of diseases and disorders of salivary glands", "knowing the principles of extracting the impacted teeth", "knowing the dent alveolar lesions" and, "soft tissue damages ".

According to these results, the indicators with rather favorable condition are considered as theoretical knowledge of the students. As a result, providing training seminars and case reports in the practical sections are recommended.

Wanigasooriya represented that the students had the lowest level of self-confidence in the skills of managing the medical emergency situations and the occurrence of oral systemic diseases as well as the highest level of self-confidence in the skills of treatment of periodontal diseases and cavities, which is compatible with our study. [10]

The product area in the periodontics group was relatively desirable. Students had the lowest level of capability in the indicators of "knowing the temporary and permanent splint"," knowing the technique of gingivectomy and gingivoplasty", as well as "knowing the principles of osteotomy and osteoctomy". In the study of Pakdaman et al. the students in the periodontics group stated their good theoretical and practical abilities in terms of examination, treatment design and diagnosis. However, their theoretical and practical ability in the areas of splint, acute gingivitis and electrosurgery was weak. With regards to the fact that most of these cases are referred to the post-graduates students, insufficient skills of the students would be somewhat expected. Nevertheless, it should be noticed that post-graduate students must know these issues at an average level,

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which is congruent with our study.[4] Samyari et al. evaluated the achievement level of the educational objectives in the periodontics training groups in Shahed and Tehran Universities. The results showed that the students did not achieve the desirable educational goals, as a result of which they ultimately found it essential to reform the educational system and provide the new strategies.[5] These results have relative similarity with our results.

Conclusion

From the viewpoint of the students of the Dental School of Babol University of Medical Sciences with the entry year of 2008-2009, there are some problems including insufficient facilities and equipment in endodontics and periodontics departments, insufficient number of patients for three departments, inconsistency between theory and its application to clinical work in three departments.

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Authors' Contributions

The study was designed by Mitra Tabari and Iman Jahanian .The study data were collected by Ziba Nourali. Analysis and interpretation of data, drafting of the manuscript, and critical revision of the manuscript for important intellectual content were pre-formed by Soraya Khafri .Study supervision was performed by Mitra Tabari and Iman Jahanian.

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