

Application of Kano Model in Higher Education Quality Improvement: Study Master's Degree Program of Educational Psychology in State Universities of Tehran

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Abstract: The purpose of this study is to identify the student requirements regarding the quality of Master's degree program of Educational Psychology in state universities of Tehran and to analyze the roles they play in student satisfaction. To achieve this goal, first the students' perceptions of and expectations from the quality of this program were analyzed and compared. Then, the indicators with significant negative gap were introduced into the two-dimensional Model Kano as the voice of customer. So, quality requirements are classified into four categories of attractive, one-dimensional, must-be and indifferent. Finally, better value and worse value were measured and so the role any one of these requirements play in increasing the customer satisfaction and decreasing their dissatisfaction was identified.

Key words: Quality in higher education • Customer satisfaction • Attractive requirements • One-dimensional requirements • Must-be requirements • Indifferent requirements.

INTRODUCTION

In this widely changeable world that is getting increasingly uncertain, all higher education institutes need to look for appropriate responses to social needs [1]. Confrontation with many rapid changes and challenges as well as the increasing competition among organizations has forced higher education institutes to be more dynamic in focusing on their customers in order to improve their creditability. So, higher education institutes are trying to specify the most important attributes for services that help satisfy the needs of customer and improve their popularity [2]. One complicated challenge before the universities on their path to the achievement of this goal is how to design studies on identifying and realizing the needs and expectations of today and tomorrow [3]. A review of the related literature proves that quality improvement in higher education has been addressed in different ways in the literature and different articles on this topic [4]. A significant part of these studies have been focusing on the analysis of student satisfaction at university level in several countries and many factors

have been identified that may potentially affect student satisfaction with the services provided by the universities [5]. For example, several studies have introduced factors such as the characteristics of professors [5-9], course material content [5, 9-12], course facilities [4, 5, 6, 9, 13], teaching methods [5, 14], assessment methods [15, 16] and some other factors affect the student satisfaction with higher education. However, although several studies have been carried out on the student satisfaction with higher education, only a few have dealt with the influence of different factors on increasing or decreasing student satisfaction. Indeed, although it is essential to identify the attributes affecting the student satisfaction with the quality of higher education services, the identification of the nature of these attributes and their influence is also a significant and undeniable matter. Hence, this study first compares the current situation and the ideal situation of the indicators for the quality of Educational Psychology as a field of study in state universities of Tehran, according to the opinions of the students; and then the nature and type of any one of these factors are identified by Kano Model. And finally, better value and worse value

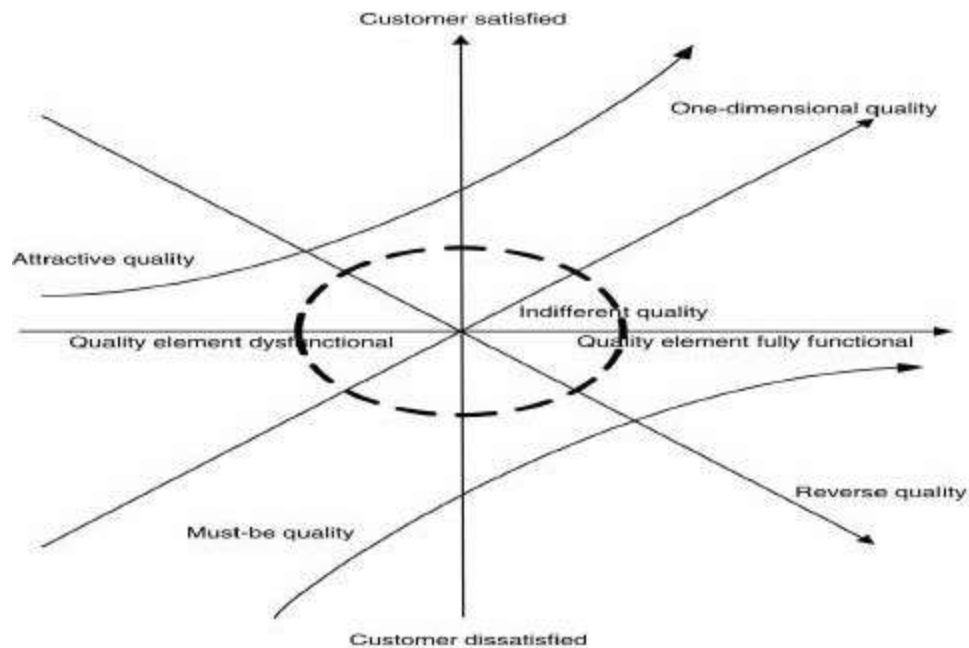


Diagram1: Kano's Two-Dimensional Model (Kano et al, 1984, cited in Chen and Kano, 2011: 102)

are estimated for any one of the quality indicators to identify the level to which any of these indicators are affecting the increase of customer satisfaction and decrease of customer dissatisfaction.

Kano Model: There are many instruments and methods designed to help organizations understand the customer requirements. Among these methods, Kano Model is an instrument that has been widely used to perceive the voice of customer in order to influence the customer satisfaction [17]. Kano et al developed a model to classify the attributes of services or products which studies the relationship between customer satisfaction and the function of product or services [18]. Kano model classifies the customer requirements into 6 categories, based on the extent to which they have been able to satisfy customers. The first class includes attractive quality elements and includes some attributes of services or products the presence of which leads to customer satisfaction; however the absence of them will not result in dissatisfaction. These are the attributes of products or services that will distinguish the organization from its rivals. The second class includes one-dimensional quality elements that have a positive and linear relationship with customer satisfaction. So, the more these attributes are realized, the more satisfied the customers will be and vice versa, the lesser these attributes are realized, the lesser satisfied the customer will be. The third category is the

must-be quality elements. These attributes are the basic criteria for a product or service the lack of which will make the customers quite dissatisfied. However, the fulfillment of these attributes will not increase the customer satisfaction. Another class belongs to the indifferent quality elements the presence or the absence of which will not influence the satisfaction or dissatisfaction of customers. The fifth class in Kano Model is the reverse quality elements the presence of which causes the dissatisfaction of customers and the absence of which causes their satisfaction. There is another class in Kano's classification, other than these elements, that is called questionable elements. This is when customer has not perceived the question or the information provided by the question is not sufficient, or in other words, the customer is doubtful about this criterion [11, 17, 18, 19, 20].

The classification of quality attributes in Kano Model will be possible by Kano's two-dimensional questionnaire. In this questionnaire, any one of these customer requirements is analyzed by a pair of functional (positive) question and dysfunctional (negative) question. There are 5 points or answers for every question: like, must-be, neutral, live with and dislike. Then, the answers of customer are combined into two categories of functional and dysfunctional questions and so the customer requirements are classified into 6 categories. In Kano Model, an indicator that is marked as mode or the most frequent, based on customer's answers,

Table 1: An Example of Kano's Questionnaire

		Like	Must-be	Neutral	Live with	Dislike
Functional	How you will feel if the course material is up-to-date?					
Dysfunctional	How you will feel if the course material is not is up-to-date?					

Table 2: Analysis of Kano's questionnaire (Berger et al cited in Wang & Jay, 2010)

		Dysfunctional				
		1. Like	2. Must-be	3. Neural	4. Live with	5. Dislike
Function	1. Like	Q	A	A	A	O
	2. Must-be	R	I	I	I	M
	3. Neural	R	I	I	I	M
	4. Live with	R	I	I	I	M
	5. Dislike	R	R	R	R	Q
A = Attractive		M = Must-be		R = Reverse		
O = One-dimension		I = Indifferent		Q = Questionable		

Table 3: Composition of the Sample Subjects based on Their Sex, University and Course Type

		University						Total
Program	Sex	Alzahra	Shahid Rajaei	Tarbiyat Moallem	Tehran	Shahid Beheshti	Allameh Tabatabaei	
Daily	Male	-	4	6	4	2	8	24
	Female	15	6	11	8	10	13	63
Nightly	Male	-	6	3	5	-	2	16
	Female	9	3	5	8	-	8	33
Total	24	19	25	25	12	31	136	

is used as the final classification of customer requirements [10, 17]. An example of Kano's questionnaire as well as its analysis is shown in the two following tables.

Better Value and Worse Value: It seems that using the mode indicator in the analysis of Kano Model cannot be reliable [10]. Therefore, to come to a more comprehensive view about the results reached by Kano Model, the role of each element in increasing the satisfaction or decreasing the dissatisfaction of the customers can be identified by measuring better value and worse value for every quality indicator. Better value will be achieved by adding up the attractive and one-dimensional quality responses and then dividing the sum by the total number of attractive, one-dimensional, must-be and indifferent responses. Worse value will be achieved by adding up the must-be and one-dimensional quality responses and then dividing the sum by the total number of attractive, one-dimensional, must-be and indifferent responses and putting a minus before the answer. These formulas are presented below:

$$Better = \frac{A + O}{A + O + M + I} \quad Worse = -\frac{O + M}{A + O + M + I}$$

Considering the formula, better value shows to what extent customer satisfaction can be increased by improving quality elements. While, worse value shows to what extent non-fulfillment of quality elements can reduce satisfaction. Better value and worse value are between *zero* and *one*. If the value of an element approaches *zero*, that element has a low level of influence. The closer better value is to *one* the indication is that that element has positively influenced user's satisfaction. While, the closer the worse value of an element is to *one*, the indication is that that element decreases customer dissatisfaction. Therefore, we can understand how an element can influence user's satisfaction and to what extent, focusing on every element can increase the satisfaction and prevent the decrease of user's dissatisfaction [9, 10, 11].

Research Questions:

- What are the current situation and ideal situation for quality indicators of Educational Psychology, as a field of study, according to the university students?
- Based on Kano model, to what category of quality attribute do the indicators with meaningful negative gap belong?

- To what extent is any one of these indicators influential in increasing the customer satisfaction or decreasing his/her dissatisfaction?

Research Method: With regard to its purpose, this is an applied study and considering the level of controlling variables, it is a descriptive study and considering the method of data collection it is a survey. The statistical population of this study includes the students of master's degree program in the field of Educational Psychology from state universities of Tehran who had studied at least for one semester in master's degree program. This group included 240 subjects. To determine the sample size, Morgan Table was used which yielded a sample of 148 subjects. At first stage, 150 questionnaires were distributed to analyze the perceptions and expectations about the Master's Degree program of Educational Psychology. 136 questionnaires were properly filled in and returned (response rate=90%). The sampling method at this level was a stratified random sampling, considering the number of students with regard to sex, university and program type. The composition of the sample subjects are presented based on these three variables in the following table.

The primary questionnaire, that was designed and edited in order to analyze the current situation and the ideal situation for the quality of the field of study, included demographic questions and 41 indicators within 7 dimensions for the objectives of the program, course material, teaching-learning methods, attributes of the professors, course structures, course facilities, assessment methods for educational progress that, on one hand, measures the perceptions of the students and their expectations about course quality, on the other hand. For the answers of the questionnaire, a 5-point Likert Scale (1=Very little to 5=Very Much) was used. The validity of the questionnaire was approved by 9 professors and experts and its reliability was analyzed and proved by Chronbach's α coefficient that was 87%. When the current situation and ideal situation were identified for quality indicators, 27 indicators which had a negative gap at a significant level of 1% were introduced to Kano's Two-Dimensional questionnaire. In this step also, 150 questionnaires were randomly distributed and finally 112 questionnaire were appropriately filled and returned (response rate = 74%). The face validity of Kano's Questionnaire was also approved by 5 experts. Finally, correlated t-test, Kano's Questionnaire Analysis

Table and Better Value and Worse Value Formulas were used to analyze the data obtained in this study.

RESULTS

In the first phase of the study, the students' perception of and expectation from the field of Educational Psychology were compared. 41 items were analyzed as program quality indicators, using correlated t-test, in order to identify customer requirements. The results revealed that 27 items out of 41 had negative gap at a significance level of 0.01 and so they were recognized as the voice of customers ($p<0.01$). These 27 indicators are presented in table 2, in an order of the gap level. As observed in this table, the indicator of existence of more scientific courses during the program showed the biggest gap between the current situation and the ideal situation and other indicators such as the presence of incentives and facilities, up-to-date materials, appropriate environment for psychology lab were at the next places. It was also revealed that the indicator of specification of a major portion of the final score to the final exam was the only indicator which had no negative gap between the perceptions and the expectations. After this indicator came the indicators such as vertical coordination of the content, discipline of the professor in entering and leaving the classroom and encouraging the students to think had the lowest negative gap, respectively. So, the situation of all program quality indicators is shown from the highest gap to the lowest gap.

When it was revealed that 27 items had negative gap at a confidence level of 99%, these elements were introduced to Kano's Two-Dimensional Model in order to show to which class of customer requirements each of these attributes belong, based on Kano model. The results revealed that out of a total number of 27 indicators, five belonged to the attractive elements of quality, 7 belonged to the one-dimensional elements, 9 to the must-be elements and six to the indifferent elements of quality. Finally, to more properly investigate and determine the role of each quality element in increasing customer satisfaction and decreasing customer dissatisfaction, better value and worse value were measured for each attribute. The results showed that with regard to objectives, creating an ability in the students to understand how to learn instead of what to learn had the most effect on increasing customer satisfaction and the indicator of the ability of student to carry out research

Table 4: The Comparison of Students' Perceptions and Expectations about the Quality of Educational Psychology, as a Field of Study, from the Highest Gap to the Lowest Gap, Respectively

Row	Requirements	Mean of Perceptions	Mean of Expectations	Mean Gap	t	Sig.
1	Existence of more scientific courses during the program	1.8676	4.3015	-2.43382	-19.187	.000
2	Presence of incentives and facilities to improve educational and research activities of students (e.g. providing coupons for book, credits for duplication, etc)	2.0074	4.3897	-2.38235	-21.008	.000
3	Up-to-date material and their conformity to modern scientific findings	2.6397	4.7647	-2.12500	-5.597	.000
4	Appropriate environment for Psychology Lab (light, ventilation, chairs, voices, etc)	2.1765	4.1838	-2.00735	-15.730	.000
5	Appropriate environment for the site (light, ventilation, chairs, voices, etc)	2.2868	4.2279	-1.94118	-17.212	.000
6	Acquisition of IT skills by the students	2.0000	3.8971	-1.89706	-17.972	.000
7	Appropriate environment for the library (light, ventilation, chairs, voices, etc)	2.4926	4.3529	-1.86029	-15.995	.000
8	Existence of more elective courses during the program	2.1397	3.9926	-1.85294	-4.724	.000
9	Appropriate material for preparing the students to cope with their problems in life and to make proper decisions	2.2500	4.0662	-1.81618	-16.966	.000
10	Accepting criticisms (for professors)	2.4926	4.2426	-1.75000	-15.721	.000
11	The ability of professors in motivating the students about subject matters	2.6176	4.3015	-1.68382	-14.685	.000
12	Appropriate physical environment for the classroom (light, ventilation, chairs, voices, etc)	2.6471	4.2941	-1.64706	-15.510	.000
13	Friendly communication of professors with students	2.8015	4.4338	-1.63235	-15.277	.000
14	The ability of professor in conveying the materials	2.8824	4.4559	-1.57353	-17.222	.000
15	Enabling the students understand how to learn not what to learn	2.6103	4.1618	-1.55147	-18.463	.000
16	Transparency of assessment standards at the very beginning of the semester	2.5735	4.0882	-1.51471	-12.266	.000
17	Encouraging the students to be involved in the teaching-learning process	2.8824	4.3750	-1.49265	-15.246	.000
18	Specifying sufficient time to perceive a subject matter	2.8750	4.3456	-1.47059	-7.699	.000
19	Allocating a major portion of the final score to student activities during the semester (process-oriented assessment)	2.6544	4.1029	-1.44853	-12.043	.000
20	The professor's interest in answering the student's questions	2.9706	4.3824	-1.41176	-12.698	.000
21	Enabling the students to carry out research studies about the topics of Educational Psychology	2.8897	4.2868	-1.39706	-16.567	.000
22	Transparency of assessment standards at the very beginning of the semester	2.7868	4.1176	-1.33088	-11.837	.000
23	Enabling students to teach the courses of Educational Psychology	2.7574	4.0882	-1.33088	-15.235	.000
24	Horizontal order and coordination of courses (course materials) during the program	2.7941	4.0441	-1.25000	-12.114	.000
25	Coordination between the content of exam questions and the emphasis of teacher on the taught subjects	3.0147	4.0809	-1.06618	-9.517	.000
26	Allocation of a portion of exam score to practical activities such as research studies, etc	3.4265	4.2426	-8.1618	-8.472	.000
27	Considering an average level of difficulty for course materials (neither so simple nor so difficult)	3.0147	3.8015	-7.8676	-8.739	.000
28	Developmental evaluation (mid-term exams)	3.2868	3.6103	-3.3253	-2.305	.023
29	Dynamic role of professor in conveying the subject matters	3.3529	3.6618	-3.0882	-2.293	.023
30	Appropriate area of classroom for the number of students (physical per capita)	3.3309	3.6397	-3.0882	-2.487	.014
31	Having a certain curriculum (for professors)	3.4265	3.7059	-2.7941	-2.427	.017
32	Suitable and up-to-date mental measurement tools in the Psychology lab	3.3088	3.5662	-2.5735	-2.223	.028
33	Observing consistency for the content of the courses	3.3015	3.5441	-2.4265	-2.154	.033
34	Familiarizing the students with the ways for improving learning processes	3.2721	3.5147	-2.4265	-1.927	.056
35	Enabling students to properly use mental-educational measurement tools	3.4044	3.6397	-2.3529	-2.230	.027
36	Acquisition of required knowledge and skills about the principles and fundamentals of Educational Psychology as a science	2.9485	3.1397	-1.19118	-1.683	.095
37	Providing feedback for the evaluation of educational progress of the students	3.1103	3.2426	-1.13235	-1.210	.228
38	Encouraging the students to think	3.5441	3.6691	-1.12500	-1.018	.311
39	Observing the order and discipline in entering and leaving the classroom (by the professor)	3.4412	3.5294	-0.8824	-7.18	.474
40	Vertical order and coordination of courses (materials) during the program	3.6176	3.6838	-0.6618	-6.71	.503
41	Allocation of a major portion of the final score to the final exam	3.4632	3.3162	.14706	1.029	.305

Table 5: The Results of Kano's Questionnaire Analysis

Dimension	Customer Requirements	A	M	O	R	Q	I	Total	Grade	Better	Worse
Objectives	1. Enabling students to teach the courses of Educational Psychology	22	48	29	-	-	13	112	M	0.45	-0.68
	2. Enabling the students to carry out research studies about the topics of Educational Psychology	12	55	33	1	3	8	112	M	0.41	-0.81
	3. Enabling the students understand how to learn not what to learn	15	8	51	2	-	36	112	O	0.60	-0.54
Material	4. Up-to-date material and their conformity to modern scientific findings	29	29	38	3	1	12	112	O	0.62	-0.62
	5. Considering an average level of difficulty for course materials (neither so simple nor so difficult)	16	27	21	2	3	43	112	I	0.34	-0.44
	6. Acquisition of IT skills by the students	37	26	27	2	-	20	112	A	0.58	-0.48
	7. Appropriate material for preparing the students to cope with their problems in life and to make proper decisions	17	33	40	-	-	22	112	O	0.50	-0.68
Teaching	8. Encouraging the students to be involved in the teaching-learning process	6	17	60	5	1	23	112	O	0.62	-0.72
Method	9. Specifying sufficient time to perceive a subject matter	14	29	27	3	-	39	112	I	0.37	-0.51
Attribute of Professors	10. The ability of professor in conveying the materials	10	44	33	-	-	25	112	M	0.38	-0.68
	11. The ability of professors in motivating the students about subject matters	27	31	29	-	-	25	112	M	0.50	-0.53
	12. Friendly communication of professors with students	33	21	30	-	-	28	112	A	0.56	-0.45
	13. Accepting criticisms (for professors)	29	17	44	1	1	20	112	O	0.66	-0.55
	14. The professor's interest in answering the student's questions	17	27	43	2	-	22	112	O	0.54	-0.63

Table 5: Continue

Dimension	Customer Requirements	A	M	O	R	Q	I	Total	Grade	Better	Worse
Structure	15. Existence of more scientific courses during the program	28	18	25	-	-	41	112	I	0.47	-0.38
	16. Existence of more elective courses during the program	36	11	26	-	-	39	112	I	0.55	-0.33
	17. Transparency of educational regulations related to the Department of Psychology	10	39	27	3	-	33	112	M	0.33	-0.60
	18. Horizontal order and coordination of courses (course materials) during the program	23	36	26	-	-	27	112	M	0.43	-0.55
Facilities	19. Appropriate environment for Psychology Lab	43	18	22	-	-	29	112	A	0.58	-0.35
	20. Appropriate environment for the site	39	21	23	2	1	26	112	A	0.56	-0.40
	21. Appropriate environment for the library	32	23	17	-	-	40	112	I	0.43	-0.35
	22. Appropriate physical environment for the classroom	13	49	19	-	-	31	112	M	0.28	-0.60
	23. Presence of incentives and facilities to improve educational and research activities of students (e.g. providing coupons for book, credits for duplication, etc)	61	6	22	-	-	23	112	A	0.74	-0.25
	24. Transparency of assessment standards at the very beginning of the semester	19	40	30	-	1	22	112	M	0.44	-0.63
Progress	25. Coordination between the content of exam questions and the emphasis of teacher on the taught subjects	7	17	52	-	-	36	112	O	0.52	-0.61
Assessment	26. Allocation of a portion of exam score to practical activities such as research studies, etc	31	11	31	4	-	35	112	I	0.57	-0.38
	27. Allocating a major portion of the final score to student activities during the semester (process-oriented assessment)	21	32	28	3	-	28	112	M	0.44	-0.55

studies was the most influential in decreasing the dissatisfaction of students. With regard to the material, the indicator of up-to-date materials was the most influential in increasing customer satisfaction and the indicator of appropriate materials for preparing the students to cope with their problems in his/her life, had the highest influence on decreasing the students dissatisfaction. Other results are illustrated in table 5. Generally, it was revealed that two indicators of the existence of incentives and facilities for improving educational and research activities of the student and acceptance of criticisms for the professors had the highest influence on increasing student satisfaction, respectively. Moreover, the ability of students to carry out research studies and being involved in teaching-learning processes had the highest influence in decreasing student dissatisfaction, respectively.

CONCLUSION

The purpose of this study is to identify the student requirements as the first-rank customers of higher education and to determine the role of each one of these requirements in their satisfaction. For this purpose, first the gap between the conceptions and expectations of the students were analyzed in order to identify the most significant attributes of quality as the voice of customer. The results of this phase of study showed that in most cases, there was a significant difference between what students expected and what they perceived in practice. So, the need for reconsidering the quality of educational activities and considering the student requirements is felt for the program under investigation. Then, the student requirements were entered into Kano model and so these

requirements were classified under four categories of attractive, one-dimensional, must-be and indifferent elements. In this phase, 9 attributes were identified as the must-be elements of quality. These are basic attributes that need to be taken into further consideration in order to avoid at least the dissatisfaction of students. Other than fulfillment of these requirements, we can hope that through considering other student requirements, we may step toward the promotion of quality and increasing the satisfaction of students. Finally, this study can help the related authorities prioritize their strategies and decisions in order to guarantee the program's quality. Totally, we can hope that this study may improve the quality of this program in the future through identification of the current situation and the ideal situation for the Educational Psychology program and through presenting a perspective of customers' requirements.

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