

## Evaluating the Quality of Educational and Psychological Sciences Curriculum Based on the Kano Model: A Case Study of University of Kirkuk, Iraq

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ARTICLE INFO	ABSTRACT
<p>Received: 16 September 2024            Revised: 16 December 2024            Accepted: 27 December 2024            Online: 08 December 2025</p>	<p>The research was conducted with the aim of evaluating the quality of educational and psychological sciences at the College of Human Sciences at the University of Kirkuk, Iraq. The statistical population of the research included all undergraduate male and female students of University of Kirkuk. The sampling method was a multi-stage clusterField data collection and researcher-made questionnaires were used to collect data. The questionnaire achieved a Cronbach's alpha reliability coefficient of 93%. To analyze the data, paired one-sample t test was used with the help of SPSS 27.0 software and Kano's matrix. The findings of the study showed that students' expectations in the elements of curriculum were more than their perceptions, and this difference was more in the elements of Objectives, Content, Teaching and learning strategies, Teaching activities and educational tools, Educational resources and materials, Communication between teachers and students, and Evaluation surpass their perceptions. Also, it was found that the most felt needs of the students in the classification of the Kano model were among the mandatory needs. Therefore, it can be concluded that the curriculum of educational and Psychological sciences in implementation (perception) stage does not accord with the expectations of the students. According to the findings, it seems that curriculum planners in politically transformed societies such as Iraq should revise the curriculum of their higher education system in light of the demands and needs of stakeholders.</p>
<p><b>KEYWORDS</b></p> <p>Curriculum            Evaluation            Expectations            Higher Education            Perceptions</p>	

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## 1. Introduction

Current era is witnessing a great civilizational shift and technical progress that encompasses all aspects of life. This progress is accompanied by significant developments in the fields of scientific and technological knowledge (Mahmoodi et al., 2021). As a result, all sectors worldwide are compelled to keep pace with this development and universities and higher education centers are not exempt from this. Higher education constitutes an essential element in the societal system and is one of the most important stages in human life. Its success depends to a large extent on the quality and accuracy of the evaluation processes it undergoes. Modern education places great emphasis on the evaluation process and considers it an integral part of the educational process (Jabara, 2015). This is because evaluation serves as a means to determine the extent to which educational goals and quality are achieved. Additionally, evaluation provides feedback to the educational process, contributing to its development by identifying strengths to be enhanced and weaknesses or deficiencies to be addressed. This approach aligns with the ongoing developments in the field of education throughout life (Al-Ghasawneh et al., 2011).

Therefore, achieving the quality of education requires directing all human resources, systems, processes, and infrastructure in order to create outputs conducive to innovation and creativity. This ensures that the educational product meets the requirements to prepare the student to reach the level we all seek to achieve (Adib et al., 2021). while maintaining the quality necessary to build the individual learner and society in accordance with the rapid scientific and technological developments and changes (Al-Zalimi et al., 2012).

Since quality implies conformity with needs and specifications, the curriculum, being crucial to the educational process, must exhibit high quality and adhere to its standards. Studies and research are conducted to identify potential problems that may arise during implementation, considering that the curriculum is not rigid but rather evolves in response to the latest developments (Al-Aboudi, 2015)

If universities want to perform their missions optimally, their beneficiaries must be assured that university efforts are of good quality and they use the necessary mechanisms to improve quality (Bazargan, 2008). Naturally, evaluating the internal quality of curriculum and educational programs presented in the universities is of great importance in this regard. The curriculum is considered one of the fundamental inputs in the educational process. It serves as the heart of academic centers and reflects the roles and goals of higher education that deserve attention (Hossein Nia, 2019 ). This encompasses changes in social structure, philosophical foundations of

society, challenges it faces, and aspirations for the future (Tedesco, Juan Carlos & Amadio, 2014). Due to the immense significance of the curriculum for individuals and society, it is crucial for the relevant authorities overseeing the curriculum process to diligently verify and monitor it. This ensures the quality of the curriculum and its sustained effectiveness (Dussel, 2020). Additionally, it helps identify any shortcomings or weaknesses in the curriculum and enables prompt actions to address them. By doing so, the necessary measures can be taken to overcome any deficiencies and ensure the curriculum meets the required standards. Consequently, university institutions have attached great importance to the development and construction of curricula (Al-Sarayrah & Al-Assaf, 2008). They have established contemporary standards for modern curricula to keep pace with the evolving needs of contemporary individuals (Patton, 2014). Ensuring the quality of education is a key objective of higher education, and achieving this goal relies heavily on the quality of curricula. One way to assess curriculum quality is through the application of the Kano model. It is essential to periodically evaluate curricula and implement reforms in order to enhance the quality of education and employ the best practices for policy setting, design, and implementation. This task falls under the responsibility of higher education institutions (Nasser, 2019).

The quality of humanities curricula is a measure of how well the curriculum meets the expectations of students in this field (Bazaregan, 2014). It can be claimed that if the quality of higher education in undergraduate and graduate courses is not favorable, the graduates with academic degrees in the field of humanities will not be able to carry out their specialized programs and duties. In this case, the scientific future of this field of study will not be reassuring. The decline in educational quality in undergraduate and postgraduate courses leads to a shortage of skilled and specialized human resources and the country's socio-economic growth and development programs face serious problems.

This is despite the fact that many education experts believe that the main goal of education in any field should be to educate thinking, expert and efficient people. The research results show that most of the graduates lack high-level thinking skills, expertise and practical skills; It means that the educational system has failed in achieving scientific, skill and technological goals; Especially in the education system of Iraq, which is based on the transmission of information, other basic problems are also seen. Today, most employers complain about the quality of the education system and state that young people who graduate from institutions and universities do not have the necessary skills to do their jobs (Aliq, 2019). In terms of socialization, they do not acquire the necessary social skills. Their talents are also not well identified, educated and nurtured. In terms of values, they don't learn the necessary values well, and... All this shows that all of educational systems are not working

successfully and graduates of humanities are no exception to this. Attitudes and judgments regarding humanities graduates are also such that the graduates of this field did not have a good curriculum during their studies (Tahmasebzadeh Sheikhlari, 2013).

The city of Kirkuk, located in northern Iraq, is considered one of the most significant provinces under the central Iraqi government due to its economic and geographical importance. The city boasts rich natural resources, most notably oil and natural gas, alongside fertile agricultural lands that support the farming sector. Its strategic geographic location also makes it a vital hub connecting southern Iraq to the Kurdistan Region in the north. Historically, Kirkuk is one of the oldest cities in the world, with a history spanning over 5,000 years. It was historically known as "Arrapha," a city whose significance is evidenced by its archaeological remains and cultural heritage. This rich history has contributed to its demographic diversity in terms of ethnicity and religion. The city is situated 240 km north of Baghdad and is bordered to the west by the Hamrin mountain range. According to official statistics, the population of Kirkuk province is approximately 1,585,468.

In terms of education, most schools in Kirkuk, as in the rest of Iraq, follow the public education system, with the recent emergence of some private schools. University of Kirkuk, established in 2003, is a public institution comprising 19 colleges and enrolling around 36,000 students, in addition to five private colleges. Despite educational advancements; University of Kirkuk faces significant challenges, including a lack of basic resources such as equipment and qualified personnel, as well as administrative issues. The curricula also suffer from weak logical cohesion and difficulty in comprehension, lacking reliance on clear concepts. These factors hinder the university's ability to meet the desired academic aspirations.

Study the curriculum of Iraqi universities and especially the University of Kirkuk is because the country of Iraq has witnessed many changes in political, economic, educational terms, etc. in recent decades, and relatively in these decades, peace has not reigned over the society. Therefore, its higher education and consequently the university curriculum have not undergone quantitative and qualitative changes in accordance with global standards and the rate and speed of the growth of science and technology, and have not benefited from the recent achievements of human knowledge and technology, and progress has been made based on trial and error. Now it is necessary to carry out quantitative and qualitative evaluations of higher education and its existing curriculum, in order to determine the degree of compliance of the curriculum with the expectations of the beneficiaries of the higher education system. Also a review of the history of the humanities curriculum in Iraq shows that the curriculum has been adjusted in such a way that knowledge is

due to its nature due to conflicts in war and the domination of other countries during the past centuries, as well as the reason that the traditional view of the knowledge process is dominant, has been of interest. In this point of view, the necessity of including concepts and topics in an educational program was only in the context of conveying the content to the students. Therefore, the higher education of the country thought of changing and improving the university curricula and the subject of the curriculum of the humanities field according to the change and Scientific and technological developments, needs, resources and limitations, etc. were reviewed; So that these changes were notified to the country's universities for implementation. A review of research results shows; No research has been conducted on the quality of curriculum in the field of curriculum development in Iraq.

In this study, in order to check the quality of the curriculum adopted for educational and Psychological sciences, the Kano model was used so that its results can be used for policy making, designing, and implementation of its processes. The Kano model is one of the methods that can be used to check the quality of the research subject from the customers' point of view and, if necessary, to make corrections in order to improve its quality. This model is presented to estimate the level of quality expectations. Kano makes it possible to define quality by putting the functional parameters of quality and satisfaction together in a two-dimensional diagram.

The process of evaluating the quality of the curriculum with the Kano model includes identifying the strengths and weaknesses of the program; a result of which is that it can be used to determine in which ways the curricula are effective and in which ways they need to be modified, changed, or completed. Checking the quality of the curriculum clarifies to what extent each of the elements of the program is appropriate and implementable based on the conditions of the learner, limitations, and other possibilities.

Therefore, the present research is important because it will lead to determining the perceptions (current situation) of students and professors of humanities as the main audience of this field, as well as determining their expectations (optimal situation) from this field and determining the difference between The cases in which there are differences lead to determining the issues that need to be corrected in order to reach the desired situation and provide practical solutions. Kano's model is presented to estimate the level of expectations from quality. By putting together the functional parameters of quality and satisfaction in a two-dimensional diagram, Kano made it possible to define quality.

Researches have been conducted on the quality of curricula of various disciplines, especially educational sciences and curriculum development, using various models and evaluation models, such as the SIP model, the Serqual model, and some of them are mentioned below:

Tahmasebzadeh et al (2024) in a research entitled "Evaluating the quality of medicine curriculum based on the Kano model" they found that students' expectations in the elements of Aker were more than their perceptions, and this difference was more in the elements of logic, content, teaching and learning strategies, teaching and learning activities, and time and place of learning. Also, after examining the Kano matrix, it was found that the most felt needs of the students in the classification of the Kano model were among the mandatory needs. Saud (2023) conducted a research entitled "Students' satisfaction with educational science curricula" and concluded that although most students (84 percent) were satisfied with educational science curricula and its time, more than 85 percent They believed that the method of education should be changed to case-based education. Hermans (2023), conducted a research titled "Evaluation of the internal quality of the educational planning curriculum" and came to the conclusion that the professors rated the quality of the content, goals and evaluation as favorable and the rest of the factors as average, but the students rated the quality of the content And the coordination of the curriculum with specialized scientific developments and the ability of the curriculum to create specialized ability have been evaluated as unfavorable and the rest of the factors as average. Tabatabai Mehrizi et al. (2022) in a research entitled "Measuring the quality of the undergraduate curriculum of textile engineering based on the Kano model (the case study of Yazd University)" showed that the quality of the textile engineering course in terms of content, structure and professors' characteristics is at a relatively high level. High and in terms of educational facilities, it is at a weak level. Also, the comparison of students' expectations and their perception of the current situation showed that there is a significant difference between their expectations and perceptions. In addition, the results of Kano's model analysis also determined that the most needs of students in the field of study are "one-dimensional needs" and then "mandatory needs". Based on the findings, it is suggested to pay attention to the improvement of the quality of the curriculum of textile engineering through the optimal development of facilities and also to fulfill the one-dimensional needs of the students.

Dianti Deylami et al. (2022) in a research entitled "Evaluation of the internal quality of the management accounting curriculum in Iran: from the perspective of professors and students of this field" showed that from the professors' point of view, in the curriculum of management accounting, target elements, learning activities and Unfavorable level grouping; Content elements, teaching strategies, time, evaluation, and educational materials and resources are at an average level, and

the location element is also at an optimal level. From the point of view of the students, the grouping elements, materials and educational resources are at the average level and the rest of the elements are at the desired level. Tahmasebzadeh Sheikhlari et al. (2019) in a research entitled "Evaluation of the quality of the curriculum of the master's course in curriculum development based on the Kano model" reached the conclusion that the students' expectations from logic, goals, content, teaching and learning strategies, teaching activities and learning, learning materials and resources, grouping of learners, time and place of learning, evaluation is more than their perceptions and according to the findings of the research, there is a difference between the expectations and perceptions of professors about logic, goals, content, teaching and learning activities, learning materials and resources, time and place of learning and evaluation.

The results of Maroufi et al.'s research (2018) entitled "Evaluation components of the continuous undergraduate curriculum of Farhangian University" led to the selection of 12 factors, 59 criteria and 193 indicators as the most important components of the evaluation of the quality of the continuous undergraduate curriculum of Farhangian University. The relative weight of the components was also determined using the rank-order analysis method. Amini, Rahimi and Khodabakhshi (2017) conducted a research entitled "Comparative evaluation of the quality of curriculum elements in the field of educational sciences". The findings showed that in the field of educational sciences, Isfahan University had a higher average than Isfahan Azad University in the dimensions of goals, content, learning experiences, teaching methods, evaluation methods, time and educational equipment. Piri, Asadian and Derakhshani (2017) conducted a research entitled "Evaluation of the quality of the curriculum of the physical education (sports physiology) master's course from the students' point of view". The results of the research showed that in relation to the purpose and content, the needs and expectations of the students were estimated at an average level; however, in relation to implementation strategies (teaching-learning strategies, management strategies) and curriculum evaluation strategies, it has not been able to meet their needs and expectations. Hadi et al. (2016) in a research entitled "Indices for measuring the quality of higher education based on the Kano model in Urmia University" showed that there is a significant difference between students' expectations of the content, structure and facilities of university courses and professors' characteristics, with their perception. In other words, the level of students' perceptions of four dimensions (course content, course structure, professors' characteristics, course facilities) in Urmia University is lower than their expectations.

Shobeiri, Shamsi Papkiadeh (2014), conducted a research titled "Evaluation of the internal quality of the Master's program in Educational Sciences from the point of view of professors,

students and educational experts of Payam Noor University" and they came to the conclusion that between the point of view of professors, students and educational experts There is a significant difference in the curriculum elements of the field of educational sciences, curriculum development, Master's course of Payam Noor University, except for the element of grouping. Barnes (2015) has conducted a research in the form of a qualitative study under the title "Changing the Curriculum of Educational Sciences" which was conducted on a small group of teachers in Queensland and during which 5 factors were identified, which are: weak The interest of students, external curriculum, management style, support from the school environment and the expression of personal opinions of the planners, these factors caused the curriculum of educational sciences to be changed and a new program be replaced.

There are different models to evaluate the quality of a plan or program. By studying these models and examining the curriculum status of the Iraqi University of Kirkuk, the researchers chose the model provided by Kano as the evaluation model for the subject of the current research; because the purpose of this model is to measure the level of perceptions and expectations of students (educational beneficiaries) regarding the quality of the curriculum. For this purpose, Noriaki Kano presented his two-dimensional model in 1984 to measure the estimation of customers' expectations of quality. By putting together the performance parameters of quality and consumer satisfaction in a two-dimensional diagram, Kano made it possible to define quality (Mehrgan and Ghasemi, 2019). In fact, Kano's model classified the needs and quality characteristics of each product (program) into three categories, each category representing a specific type of audience needs, which are: mandatory (basic) needs, one-dimensional needs (functional) and attractive (stimulating) needs (Arab et al., 2014). Therefore, the Kano model provides an opportunity to determine the perceptions and expectations of the beneficiaries of the curriculum of educational and Psychological sciences of University of Kirkuk, and to show the difference between the current situation and the desired situation, and in this way, the real needs, strengths and weaknesses of this curriculum are identified and compared. In order to solve those, the necessary suggestions should be made for those involved and based on that, detailed actions should be taken by them.

Therefore, the objective of the current research is to evaluate the quality of the curriculum of educational and Psychological sciences of University of Kirkuk using the Kano model. . This assessment aims to identify the difference between the perceptions of students. Additionally, it seeks to determine their expectations regarding the comprehensiveness and quality of university curriculum elements. Consequently, this research has emerged to address several questions that

could contribute to the development of university curricula in the Republic of Iraq. Despite Iraqi universities' role in developing curricula across various disciplines, there is significant criticism regarding the poor quality and relevance of these curricula to societal needs, labor market demands, societal philosophy, and aspirations (Al- Sayed, 2016). As a result, the research problem can be summarized in the following main question: "To what extent do the curricula of the College of Education for educational and Psychological sciences - at the University of Kirkuk adhere to quality standards and global trends, based on the perspective of curriculum beneficiaries?" Therefore the objects of research are: Identifying the difference between students' expectations in the elements of university curricula and their perceptions in the field of curriculum development. Determine the must-be attractive and one-dimensional needs of students, in accordance with quality standards and global trends in the elements of university curricula in the field of curriculum development.

## **2. Research Method**

The present study used cross-sectional and descriptive survey designs. The statistical population of the research includes all male and female undergraduate students of Kirkuk University, numbering 4207 people, who were studying in various faculties and educational departments. The research sampling method was a multi-stage cluster. In this way, using this method, the Faculty of Humanities was first selected among the faculties of this university. The Faculty of Humanities has 8 educational Departments (English language, educational and psychological sciences, Arabic language, Kurdish language, Turkish language, history, geography, Qur'anic sciences and Islamic education) and the number of undergraduate students is 854. Then, among the 8 educational departments of this faculty, undergraduate students of the Department of Educational and Psychological Sciences were purposefully selected. The purpose of choosing this faculty was that the researcher has studied in this field in bachelor and master degrees and has full knowledge of this field and is currently an educational instructor of this educational department. The number of undergraduate students in educational and Psychological sciences is more than 300. Questionnaires were randomly distributed among 300 people and 270 questionnaires were collected and analyzed.

The data collection tools were two researcher-made questionnaires, which were provided to the students both via an online link and in person. For in-person method, most often students who went to the university used to attend class's and to follow up on their educational affairs were asked if they were willing to participate in the study and were provided with the questionnaires if they agreed, and they completed and delivered them on the spot. Additionally, a link to the online

questionnaires was sent electronically to all students; a few of the participants completed and submitted them the first time it was sent, and most of the participants completed and sent them in the second and third follow-ups. After the number of questionnaires reached the quorum of 300 questionnaires, of which 30 questionnaires were considered outliers as they were distorted, they were no longer followed up and data analysis started.

To develop the first questionnaire that measures the expectations and perceptions of the students of educational and Psychological sciences, the theoretical foundations and literature of educational and Psychological sciences were studied with regard to the curriculum elements, and potential questions that might rise around each element were presented in a list. Considering the Kano model, the questions for each curriculum element were designed based on its nature in two dimensions, one of which measured expectations and the other measured perceptions. In both dimensions, a 5-point Likert scale was used for scoring (1 rated as very low, 2 as low, 3 as medium, 4 as high, and 5 as very high). The minimum score in each questionnaire was 41 and the maximum score was 205. The second questionnaire was to measure what students of educational and Psychological sciences need from the curriculum considering its curriculum elements. The questions were to measure perceptions and expectations as needs, and the students were asked to imagine the stated feeling and express their perception so that the type and level of their needs could be measured. This questionnaire also had 41 questions, the options of which were: mandatory needs, attractive needs, and one-dimensional needs for students. Each feature was represented by a pair of questionnaires (functional and dysfunctional). The functional questionnaire assessed the respondent's satisfaction level when a specific service was present, while the dysfunctional questionnaire assessed their satisfaction level if the service was not available.

The questionnaire consists of questions and statements each statement was rated on a five-point Likert scale, with high score 4 indicating strongly agree with that statement. The statements used in the questionnaire are: "I like this curriculum," "The curriculum should be designed in this way," "I don't have a particular opinion," "I can accept this curriculum," and "I don't like this curriculum." Each option was assigned a value of 4, 3, 2, 1, or 0, respectively. Both the functional and dysfunctional questionnaires were considered. For each question one determines into which category a given question feature falls by looking up the questionnaire answers to that feature's questions in the following Kano Evaluation Table as shown in Figure 1. The results of the Kano questionnaires were analyzed qualitatively and quantitatively.

		Dysfunctional				
		<i>Like it</i>	<i>should be</i>	<i>Neutral</i>	<i>Accept</i>	<i>Dislike</i>
		4	3	2	1	0
Functional	<i>Like it</i> 4	Questionable	Attractive	Attractive	Attractive	One-dimensional
	<i>should be</i> 3	Reverse	Questionable	Indifferent	Indifferent	Must-be
	<i>Neutral</i> 2	Reverse	Indifferent	Indifferent	Indifferent	Must-be
	<i>Accept</i> 1	Reverse	Indifferent	Indifferent	Questionable	Must-be
	<i>Dislike</i> 0	Reverse	Reverse	Reverse	Reverse	Questionable

Figure 1: Kano Evaluation

The results of the study can be analyzed qualitatively by using the Kano Evaluation Table to determine the must-be, attractive and one-dimensional needs of students.

*Relationships between Respondents Satisfaction and curriculum Quality Elements*

The quantitative analysis of the Kano model, as proposed, commences with the computation of two critical values: respondent satisfaction (RS) (Better) and respondent dissatisfaction (RD) (Worse) (Berger et al., 1993). Since different respondents usually have different requirements and expectations, calculating RS and RD values can reflect the average impact of a respondent's requirement on the satisfaction of all respondents, these two values can be calculated by using equations (1) and (2), respectively.

Respondents Satisfaction (RS)

$$RS(\text{Better}) = \frac{Q_0 + Q_A}{Q_M + Q_0 + Q_A + Q_I} \dots \dots \dots (1)$$

Respondents Dissatisfaction (RD)

$$RD(\text{Worse}) = -\frac{Q_M + Q_0}{Q_M + Q_0 + Q_A + Q_I} \dots \dots \dots (2)$$

A suitable mathematical function can be used to approximate the correlations between respondent satisfaction and curriculum quality element fulfillment. In general, the relationship function can be expressed as  $R = f(x, a, b)$ , where  $R$  represents the degree of respondent satisfaction,  $x$  represents the fulfillment level of curriculum quality elements ranging from 0 to 1, and  $a$  and  $b$  are adjustment parameters for various Kano categories of curriculum quality elements (X. Chen et al., 2015).

In regards to the one-dimensional elements, the relationship curve is described as a straight-line equation, since there is one functional point connected to one dysfunctional point according to the Kano evaluation table. The relationship function can be expressed as:

$$R_{oi} = a_1x + b_1$$

Where  $a_1$  is the slope of the straight line and  $b_1$  is the value of  $RD$  where the value of element is equal to 0. Substituting the  $RS$  and  $RD$  points, that is,  $(1, RS_i)$  and  $(0, RD_i)$ , into the straight line equation, it gives that:  $a_1 = RS_i - RD_i$  and  $b_1 = RD_i$ , therefore, the mathematical function for one-dimensional attributes is:

$$R_{oi} = (RS_i - RD_i)x_{oi} + RD_i \quad \dots \dots \dots (3)$$

For the attractive elements, the relationship curve is described by an exponential function since there is one functional point connected to three dysfunctional points according to the Kano evaluation table. The relationship function can be expressed as:

$$R_{ai} = a_2e^x + b_2$$

Substituting the  $RS$  and  $RD$  points, that is,  $(1, RS_i)$  and  $(0, RD_i)$ , into the equation, it gives that:  $a_2 = \frac{RS_i - RD_i}{e - 1}$  and  $b_2 = -\frac{RS_i - eRD_i}{e - 1}$ , therefore, the mathematical function for attractive attributes is:

$$R_{ai} = \frac{RS_i - RD_i}{e - 1} e^{x_{ai}} - \frac{RS_i - eRD_i}{e - 1} \quad \dots \dots \dots (4)$$

Where  $e$  is an exponential value which is approximately equal to 2.71828?

For the must-be elements, the relationship curve is described also by an exponential function since there is one dysfunctional point connected to three functional points according to the Kano evaluation table. The relationship function can be expressed as:

$$R_{mi} = -a_3 e^x + b_3$$

Substituting the  $RS$  and  $RD$  points, that is,  $(1, RS_i)$  and  $(0, RD_i)$ , into the equation, it gives that:  $a_3 = \frac{e(RS_i - RD_i)}{e - 1}$  and  $b_3 = \frac{eRS_i - eRD_i}{e - 1}$ , therefore, the mathematical function for attractive attributes is:

$$R_{mi} = \frac{e(RS_i - RD_i)}{e - 1} e^{-x_{mi}} + \frac{eRS_i - eRD_i}{e - 1} \dots \dots \dots (5)$$

#### *Calculating Average Functional and Average Dysfunctional Scores*

Calculating the average functional and average dysfunctional scores of the Kano questionnaire represents another method to quantify the Kano questionnaire results (Berger et al., 1993). The most frequent response method is used in the qualitative calculation of the Kano model to categorize the attributes, neglecting the other subsequent responses. Therefore, to take into account all participant responses and not neglect any responses, the average functional and dysfunctional scoring can be calculated using the equations below (Bauk et al., 2014; Kermanshachi et al., 2022):

$$\text{Average Functional Scores} = \frac{\sum \text{Functional Scores}}{\text{Number of Responses}} \dots \dots \dots (6)$$

$$\text{Average Dysfunctional Scores} = \frac{\sum \text{Dysfunctional Scores}}{\text{Number of Responses}} \dots \dots \dots (7)$$

The validity of the tool was calculated by a peer-reviewed A peer-reviewed committee with experience and expertise from academic professors in the University and experts in educational and psychological sciences, curricula, and teaching methods calculated the validity of the tool. The tool obtained an agreement rate of (90%) from the opinions of experts. The researcher verified the stability of the tool using Cronbach's alpha. The tool's coefficients were characterized by stability. The value of Cronbach's alpha was (0.938), which is an excellent value and indicates the stability of

the tool. The apparent validity of the tool was also calculated.

Data analysis is one of the main and most important parts of research. Descriptive and inferential statistics were used to analyze the obtained data. In the descriptive statistics section the mean and standard deviation were used, and in the inferential statistics paired one-sample t test was used with a confidence level of 0.95 and using SPSS 27.0 software. Also, as the study variables were two-dimensional and to determine the mandatory, attractive, one-dimensional, and indifference needs of the students in seven elements, Kano's matrix was used. Kolmogorov-Smirnov test was used to check the normality of the distribution of scores related to students' expectations and performance.

### 3. Findings

The questionnaire data for 270 students were analyzed and according to question number 1 in the research problem "Is there a large difference between the expectations of Kirkuk University students regarding curriculum development and their perception in accordance with quality standards and global trends in the elements of university curricula?". A paired samples T-test was conducted to compare the means of the seven elements and the results were tabulated in Table 1. Regarding the objective expectation items and objective perception items, the results revealed a significant difference ( $T = 56.19$ ,  $df = 269$ ,  $p < 0.0001$ ), with a mean difference of 1.50 (95% CI [1.45, 1.55]). Students' objective expectations had a mean of 4.56 ( $\pm 0.17$ ), while their objective perception was at 3.06 ( $\pm 0.39$ ) as shown in Figure 2(a). The content expectation items and content perception items results revealed a significant difference ( $T = 64.69$ ,  $df = 269$ ,  $p < 0.0001$ ), with a mean difference of 1.52 (95% CI [1.47, 1.57]). Students' content expectations had a mean of 4.56 ( $\pm 0.19$ ), while their content perception was at 3.04 ( $\pm 0.34$ ) as shown in Figure 2(b). The teaching and learning strategies expectation items and teaching and learning strategies perception items results revealed a significant difference ( $T = 56.58$ ,  $df = 269$ ,  $p < 0.0001$ ), with a mean difference of 1.61 (95% CI [1.56, 1.67]). Students' teaching and learning strategies expectations had a mean of 4.66 ( $\pm 0.20$ ), while their teaching and learning strategies perception was at 3.04 ( $\pm 0.43$ ) as shown in Figure 2(c).

The teaching activities and educational tools expectation items and teaching activities and educational tools perception items results revealed a significant difference ( $T = 66.25$ ,  $df = 269$ ,  $p < 0.0001$ ), with a mean difference of 1.55 (95% CI [1.51, 1.60]). Students' teaching activities and educational tools expectations had a mean of 4.62 ( $\pm 0.18$ ), while their teaching activities and educational tools perception was at 3.07 ( $\pm 0.34$ ) as shown in Figure 2(d). The educational

resources and materials expectation items and educational resources and materials perception items results revealed a significant difference ( $T = 51.92$ ,  $df = 269$ ,  $p < 0.0001$ ), with a mean difference of 1.59 (95% CI [1.53, 1.65]). Students' educational resources and materials expectations had a mean of 4.64 ( $\pm 0.19$ ), while their educational resources and materials perception was at 3.05 ( $\pm 0.47$ ) as shown in Figure 2(e). The communication between professors and students expectation items and communication between professors and students perception items results revealed a significant difference ( $T = 50.9$ ,  $df = 269$ ,  $p < 0.0001$ ), with a mean difference of 1.58 (95% CI [1.51, 1.64]). Students' communication between professors and students expectations had a mean of 4.62 ( $\pm 0.31$ ), while their communication between professors and students perception was at 3.05 ( $\pm 0.42$ ) as shown in Figure 2(f). The evaluation expectation items and evaluation perception items results revealed a significant difference ( $T = 55.15$ ,  $df = 269$ ,  $p < 0.0001$ ), with a mean difference of 1.60 (95% CI [1.54, 1.65]). Students' evaluation expectations had a mean of 4.62 ( $\pm 0.21$ ), while their evaluation perception was at 3.03 ( $\pm 0.42$ ) as shown in Figure 2(g). These findings highlight areas where improvements can be made to align expectations with actual standards.

Table 1: A Paired Samples T-Test of Mean Expectation and Mean Perception for Students

	Elements	Mean Expectation	Expectation Standard Deviation	Mean Perception	Perception Standard Deviation	Mean Difference	T-Test	df	Sig.
1	Objective	4.56	0.17	3.06	0.39	1.50	56.19	269	0.0001
2	Content	4.56	0.19	3.04	0.34	1.52	64.69	269	0.0001
3	Teaching and learning strategies	4.66	0.20	3.05	0.43	1.61	56.58	269	0.0001
4	Teaching activities and educational tools	4.62	0.18	3.07	0.34	1.55	66.25	269	0.0001
5	Educational resources and materials	4.64	0.19	3.05	0.47	1.59	51.92	269	0.0001
6	Communication between professors and students	4.62	0.31	3.05	0.42	1.58	50.9	269	0.0001
7	Evaluation	4.62	0.21	3.03	0.42	1.60	55.15	269	0.0001

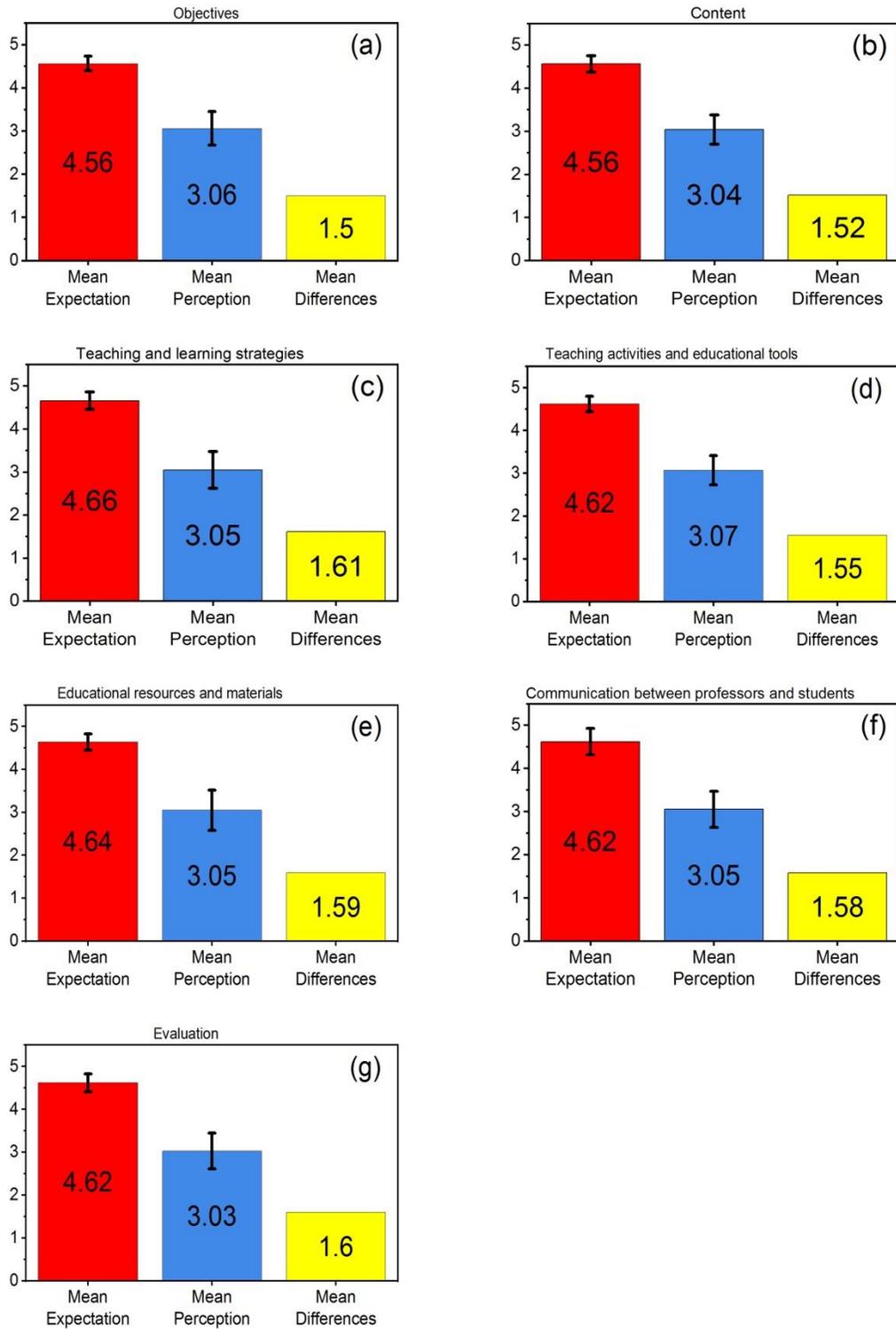


Figure 2: The mean value of Expectations, Perceptions, and the Differences between them for students: (a) objectives, (b) content, (c) teaching and learning strategies, (d) teaching activities and educational tools, (e) educational resources and materials, (f) communication between teachers and students, and (g) evaluation

The questionnaire data for students were analyzed and according to question number 2 in the research problem "What are the must-be, attractive and one-dimensional needs that Kirkuk University students expect in terms of the availability of quality standards and global trends in the elements of university curricula?", the following results were obtained:

A total of 270 responses have been received, which represent undergraduate students from different departments. The questionnaires that have been collected were processed by the traditional analysis in Kano's model to determine the Kano category. Table 2 summarizes the number of students' responses in each Kano category for each student's items, and Table 3 provides the percentage breakdown. The most frequent response method determines the final Kano classification for each student's items, with the highest tally indicating the dominant student's view of that requirement. According to classification results, eighteen attributes are classified as must-be attributes, eighteen attributes are classified as one-dimensional attributes, sixteen attributes are classified as attractive attributes, and four attributes are classified as indifferent attributes. The research results show that students have separate attractive, one-dimensional, must-be, and indifferent needs for each requirement of the curriculum. Since must-be needs are considered basic needs, special attention must be paid to these needs.

Table 2: Results of the Qualitative Kano Model of Student

Elements	Items	Must-be	One-dimensional	Attractive	Indifferent	Reverse	Questionable	Summation	Kano Category
Objectives	Q1	72	76	80	42	0	0	270	Attractive
	Q2	74	110	44	42	0	0	270	One-dimensional
	Q3	73	25	85	87	0	0	270	Indifferent
	Q4	80	100	43	47	0	0	270	One-dimensional
	Q5	62	68	78	62	0	0	270	Attractive
	Q6	115	105	31	19	0	0	270	Must-be
	Q7	88	86	55	41	0	0	270	Must-be
	Q8	67	63	80	60	0	0	270	Attractive
Content	Q9	97	89	49	35	0	0	270	Must-be
	Q10	78	108	39	45	0	0	270	One-dimensional

	Q11	41	76	66	87	0	0	270	Indifferent
	Q12	44	37	104	85	0	0	270	Attractive
	Q13	100	90	24	56	0	0	270	Must-be
	Q14	78	111	44	36	1	0	270	One-dimensional
	Q15	83	105	48	34	0	0	270	One-dimensional
	Q16	83	77	51	59	0	0	270	Must-be
	Q17	87	102	38	43	0	0	270	One-dimensional
	Q18	61	65	79	60	0	5	270	Attractive
	Q19	96	107	38	29	0	0	270	One-dimensional
	Q20	99	90	43	38	0	0	270	Must-be
Teaching and learning strategies	Q21	90	105	35	40	0	0	270	One-dimensional
	Q22	69	57	90	54	0	0	270	Attractive
	Q23	98	87	48	37	0	0	270	Must-be
	Q24	91	81	66	32	0	0	270	Must-be
	Q25	96	92	49	33	0	0	270	Must-be
	Q26	90	117	32	31	0	0	270	One-dimensional
	Q27	64	69	92	45	0	0	270	Attractive
Teaching activities and educational tools	Q28	92	107	41	30	0	0	270	One-dimensional
	Q29	42	74	66	88	0	0	270	Indifferent
	Q30	93	54	97	26	0	0	270	Attractive
	Q31	70	72	99	29	0	0	270	Attractive
	Q32	87	78	73	32	0	0	270	Must-be
	Q33	85	83	73	29	0	0	270	Must-be
	Q34	98	85	54	33	0	0	270	Must-be
	Q35	54	117	65	34	0	0	270	One-dimensional
	Q36	74	64	89	43	0	0	270	Attractive
	Q37	90	107	38	35	0	0	270	One-dimensional
Educational resources and materials	Q38	47	87	92	44	0	0	270	Attractive
	Q39	54	100	81	35	0	0	270	One-dimensional
	Q40	85	77	62	46	0	0	270	Must-be
	Q41	82	60	87	41	0	0	270	Attractive
Communication between professors and students	Q42	89	73	83	25	0	0	270	Must-be
	Q43	83	94	64	29	0	0	270	One-dimensional
	Q44	84	79	77	30	0	0	270	Must-be
	Q45	79	89	55	47	0	0	270	One-dimensional
	Q46	74	98	74	24	0	0	270	One-dimensional
	Q47	50	89	98	33	0	0	270	Attractive
	Q48	56	108	71	35	0	0	270	One-dimensional
Evaluation	Q49	38	89	92	51	0	0	270	Attractive
	Q50	81	80	67	42	0	0	270	Must-be
	Q51	75	84	77	34	0	0	270	One-dimensional
	Q52	43	99	105	23	0	0	270	Attractive
	Q53	41	100	106	23	0	0	270	Attractive

	Q54	105	97	37	31	0	0	270	Must-be
	Q55	30	80	78	82	0	0	270	Indifferent
	Q56	88	82	59	41	0	0	270	Must-be

Table 3: Results of the Percentage Qualitative Kano Model of Student

Elements	Items	Must-be	One-dimensional	Attractive	Indifferent	Reverse	Questionable	Summation	Kano Category
Objectives	Q1	27%	28%	30%	16%	0%	0%	100%	Attractive
	Q2	27%	41%	16%	16%	0%	0%	100%	One-dimensional
	Q3	27%	9%	31%	32%	0%	0%	100%	Indifferent
	Q4	30%	37%	16%	17%	0%	0%	100%	One-dimensional
	Q5	23%	25%	29%	23%	0%	0%	100%	Attractive
	Q6	43%	39%	11%	7%	0%	0%	100%	Must-be
	Q7	33%	32%	20%	15%	0%	0%	100%	Must-be
	Q8	25%	23%	30%	22%	0%	0%	100%	Attractive
Content	Q9	36%	33%	18%	13%	0%	0%	100%	Must-be
	Q10	29%	40%	14%	17%	0%	0%	100%	One-dimensional
	Q11	15%	28%	24%	32%	0%	0%	100%	Indifferent
	Q12	16%	14%	39%	31%	0%	0%	100%	Attractive
	Q13	37%	33%	9%	21%	0%	0%	100%	Must-be
	Q14	29%	41%	16%	13%	0%	0%	100%	One-dimensional
	Q15	31%	39%	18%	13%	0%	0%	100%	One-dimensional
	Q16	31%	29%	19%	22%	0%	0%	100%	Must-be
	Q17	32%	38%	14%	16%	0%	0%	100%	One-dimensional
	Q18	23%	24%	29%	22%	0%	2%	100%	Attractive
	Q19	36%	40%	14%	11%	0%	0%	100%	One-dimensional
Q20	37%	33%	16%	14%	0%	0%	100%	Must-be	
Teaching and learning strategies	Q21	33%	39%	13%	15%	0%	0%	100%	One-dimensional
	Q22	26%	21%	33%	20%	0%	0%	100%	Attractive
	Q23	36%	32%	18%	14%	0%	0%	100%	Must-be
	Q24	34%	30%	24%	12%	0%	0%	100%	Must-be
	Q25	36%	34%	18%	12%	0%	0%	100%	Must-be
	Q26	33%	43%	12%	11%	0%	0%	100%	One-dimensional
	Q27	24%	26%	34%	17%	0%	0%	100%	Attractive
Teaching activities and educational tools	Q28	34%	40%	15%	11%	0%	0%	100%	One-dimensional
	Q29	15%	28%	25%	32%	0%	0%	100%	Indifferent
	Q30	34%	20%	36%	10%	0%	0%	100%	Attractive
	Q31	26%	27%	37%	11%	0%	0%	100%	Attractive
	Q32	32%	29%	27%	12%	0%	0%	100%	Must-be
	Q33	31%	31%	27%	11%	0%	0%	100%	Must-be

	Q34	36%	31%	20%	12%	0%	0%	100%	Must-be
	Q35	20%	43%	24%	13%	0%	0%	100%	One-dimensional
	Q36	27%	24%	33%	16%	0%	0%	100%	Attractive
	Q37	33%	40%	14%	13%	0%	0%	100%	One-dimensional
Educational resources and materials	Q38	17%	32%	34%	16%	0%	0%	100%	Attractive
	Q39	20%	37%	30%	13%	0%	0%	100%	One-dimensional
	Q40	31%	29%	23%	17%	0%	0%	100%	Must-be
	Q41	30%	22%	32%	15%	0%	0%	100%	Attractive
Communication between professors and students	Q42	33%	27%	31%	9%	0%	0%	100%	Must-be
	Q43	31%	35%	24%	11%	0%	0%	100%	One-dimensional
	Q44	31%	29%	29%	11%	0%	0%	100%	Must-be
	Q45	29%	33%	20%	17%	0%	0%	100%	One-dimensional
	Q46	27%	36%	27%	9%	0%	0%	100%	One-dimensional
	Q47	19%	33%	36%	12%	0%	0%	100%	Attractive
	Q48	21%	40%	26%	13%	0%	0%	100%	One-dimensional
Evaluation	Q49	14%	33%	34%	19%	0%	0%	100%	Attractive
	Q50	30%	30%	25%	16%	0%	0%	100%	Must-be
	Q51	28%	31%	29%	13%	0%	0%	100%	One-dimensional
	Q52	16%	37%	39%	9%	0%	0%	100%	Attractive
	Q53	15%	37%	39%	8%	0%	0%	100%	Attractive
	Q54	39%	36%	14%	11%	0%	0%	100%	Must-be
	Q55	11%	30%	29%	30%	0%	0%	100%	Indifferent
	Q56	33%	30%	22%	15%	0%	0%	100%	Must-be

Figure 3 represents the percentage for each Kano category according to students' responses to the questionnaire. It can be seen that 32% are must-be and one-dimensional requirements, while 29% are attractive requirements, and only 7% are indifferent requirements. Additionally, none of the students' responses were classified as reverse or questionable requirements.

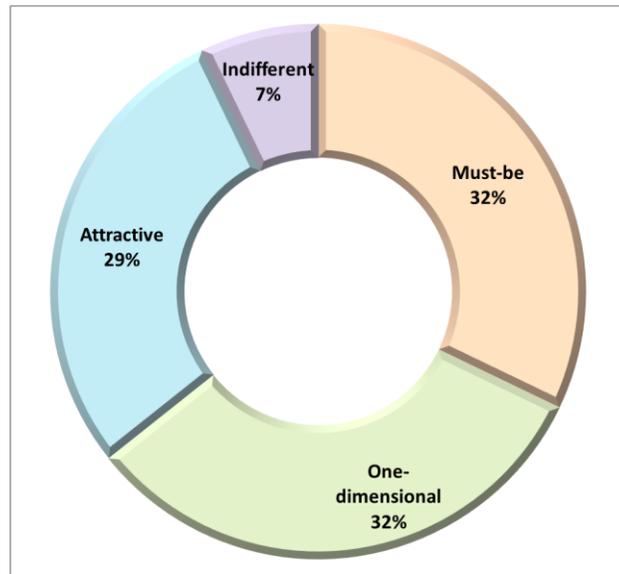


Figure 3: The Percentage of Categories for the Qualitative Kano Model of Student

*Relationships between Students Satisfaction and Curriculum Quality Elements*

Based on the results of the questionnaire analysis for students, the Kano quantitative analysis was applied to derive quantitative information about curriculum quality parameters from the student's point of view in the following steps.

Student Satisfaction (SRS) and Student Dissatisfaction (SRD) values calculation: Based on equations (1) and (2) Students Satisfaction (SRS) and Students Dissatisfaction (SRD) values have been calculated and tabulated in

Table 4: Calculation of Students Satisfaction (SRS) and Students Dissatisfaction (SRD) values for Students

Elements	Items	Must-be	One-dimensional	Attractive	Indifferent	Reverse	Questionable	Summation	SRS	SRD
Objectives	Q1	72	76	80	42	0	0	270	0.58	-0.55
	Q2	74	110	44	42	0	0	270	0.57	-0.68
	Q3	73	25	85	87	0	0	270	0.41	-0.36
	Q4	80	100	43	47	0	0	270	0.53	-0.67
	Q5	62	68	78	62	0	0	270	0.54	-0.48
	Q6	115	105	31	19	0	0	270	0.50	-0.81
	Q7	88	86	55	41	0	0	270	0.52	-0.64
	Q8	67	63	80	60	0	0	270	0.53	-0.48
Content	Q9	97	89	49	35	0	0	270	0.51	-0.69
	Q10	78	108	39	45	0	0	270	0.54	-0.69
	Q11	41	76	66	87	0	0	270	0.53	-0.43
	Q12	44	37	104	85	0	0	270	0.52	-0.30
	Q13	100	90	24	56	0	0	270	0.42	-0.70
	Q14	78	111	44	36	1	0	270	0.58	-0.70
	Q15	83	105	48	34	0	0	270	0.57	-0.70
	Q16	83	77	51	59	0	0	270	0.47	-0.59
	Q17	87	102	38	43	0	0	270	0.52	-0.70
	Q18	61	65	79	60	0	5	270	0.54	-0.48
	Q19	96	107	38	29	0	0	270	0.54	-0.75
	Q20	99	90	43	38	0	0	270	0.49	-0.70
Teaching and learning strategies	Q21	90	105	35	40	0	0	270	0.52	-0.72
	Q22	69	57	90	54	0	0	270	0.54	-0.47
	Q23	98	87	48	37	0	0	270	0.50	-0.69
	Q24	91	81	66	32	0	0	270	0.54	-0.64
	Q25	96	92	49	33	0	0	270	0.52	-0.70
	Q26	90	117	32	31	0	0	270	0.55	-0.77
	Q27	64	69	92	45	0	0	270	0.60	-0.49
Teaching activities and educational tools	Q28	92	107	41	30	0	0	270	0.55	-0.74
	Q29	42	74	66	88	0	0	270	0.52	-0.43
	Q30	93	54	97	26	0	0	270	0.56	-0.54
	Q31	70	72	99	29	0	0	270	0.63	-0.53
	Q32	87	78	73	32	0	0	270	0.56	-0.61
	Q33	85	83	73	29	0	0	270	0.58	-0.62
	Q34	98	85	54	33	0	0	270	0.51	-0.68
	Q35	54	117	65	34	0	0	270	0.67	-0.63

	Q36	74	64	89	43	0	0	270	0.57	-0.51
	Q37	90	107	38	35	0	0	270	0.54	-0.73
Education al resources and materials	Q38	47	87	92	44	0	0	270	0.66	-0.50
	Q39	54	100	81	35	0	0	270	0.67	-0.57
	Q40	85	77	62	46	0	0	270	0.51	-0.60
	Q41	82	60	87	41	0	0	270	0.54	-0.53
Communication between professors and students	Q42	89	73	83	25	0	0	270	0.58	-0.60
	Q43	83	94	64	29	0	0	270	0.59	-0.66
	Q44	84	79	77	30	0	0	270	0.58	-0.60
	Q45	79	89	55	47	0	0	270	0.53	-0.62
	Q46	74	98	74	24	0	0	270	0.64	-0.64
	Q47	50	89	98	33	0	0	270	0.69	-0.51
	Q48	56	108	71	35	0	0	270	0.66	-0.61
Evaluation	Q49	38	89	92	51	0	0	270	0.67	-0.47
	Q50	81	80	67	42	0	0	270	0.54	-0.60
	Q51	75	84	77	34	0	0	270	0.60	-0.59
	Q52	43	99	105	23	0	0	270	0.76	-0.53
	Q53	41	100	106	23	0	0	270	0.76	-0.52
	Q54	105	97	37	31	0	0	270	0.50	-0.75
	Q55	30	80	78	82	0	0	270	0.59	-0.41
	Q56	88	82	59	41	0	0	270	0.52	-0.63

Note that full satisfaction does not equate to 100%. This is because full satisfaction is defined as the RS value from Kano's model equation (1) and it is normally not equal to 1 for an ordinary question. To make RS values equal 1, all students should vote for "attractive" or "one-dimensional" attributes, and no students should vote for "must-be" or "indifferent" requirements. Therefore, the "must-be" and "indifferent" values are equal to 0. However, this is not common in practice. Moreover, an ordinary question must have certain "must-be" requirements, that is, some fundamental student needs that should be fulfilled. There is no chance for the SRS value of a "must-be" requirement to be 0, since the "must-be" value in equation (1) is not equal to 0 as shown in

Table 4. The fulfillment of "must-be" requirements causes student dissatisfaction. Due to the above reasons, full satisfaction for any question cannot reach 100%, which will in turn make the full satisfaction rate below 100%.

The scatter diagram in Figure 4 illustrates the analysis of the student's answers based on seven classification elements: objectives, content, teaching and learning strategies, teaching

activities and educational tools, educational resources and materials, communication between teachers and students, and evaluation. Each element comprises several questions that describe the quality standards of university curricula. The results for each of these elements can be described as follows:

The answers to questions Q1, Q2, Q4, and Q7 in the objectives element are one-dimensional attributes, while question number Q6's answers fall into both an attractive and one-dimensional category. Questions Q5 and Q8 are must-be attributes, while question number Q3 can be classified as an indifferent requirement, as shown in Figure 4(a).

The answers to questions Q9, Q10, Q14, Q15, Q17, and Q19 in the content element are one-dimensional attributes, while the answers to question number Q20 fall into both an attractive and one-dimensional category. Questions Q13 and Q16 are attractive attributes, while questions Q11, Q12, and Q18 can be classified as must-be requirements, as shown in Figure 4(b).

The answers to questions Q21, Q24, Q25, and Q26 in the teaching and learning strategies element are one-dimensional attributes, while question number Q23's responses fall into both an attractive and one-dimensional category. Question Q22 can be classified as a must-be attribute, while question number Q27 falls into both one-dimensional and must-be requirements, as shown in Figure 4(c).

The answers to questions Q28, Q30, Q31, Q32, Q33, Q34, Q35, and Q37 in the teaching activities and educational tools element are one-dimensional attributes. Question Q29 can be classified as a must-be attribute, while question number Q36 falls into both one-dimensional and must-be requirements, as shown in Figure 4(d).

The answers to questions Q39, Q40, and Q41 in the educational resources and materials element are one-dimensional attributes, while question number Q38 falls into both one-dimensional and must-be requirements, as shown in Figure 4(e).

The answers to questions Q42, Q43, Q44, Q45, Q46, Q47, and Q48 in the communication between teachers and students element are one-dimensional attributes, as shown in Figure 4(f).

The answers to questions Q50, Q51, Q52, Q53, and Q56 in the evaluation element are one-dimensional attributes, while question number Q54's responses fall into both an attractive and one-dimensional category. Questions Q49 and Q55 can be classified as must-be attributes, as shown in Figure 4(g). The detailed results discussed above are comprehensively presented in Table 5.

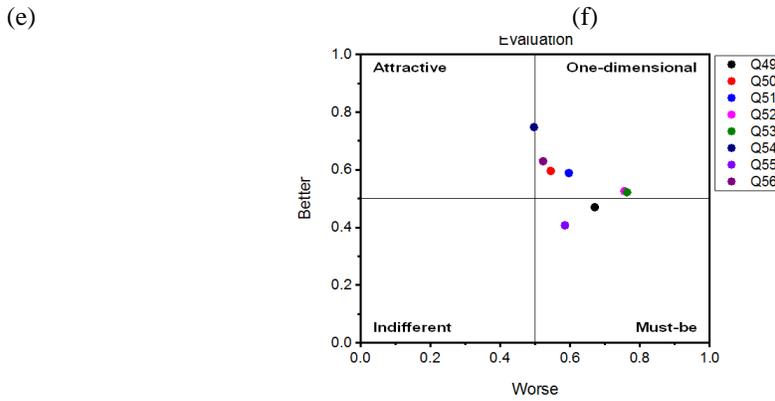
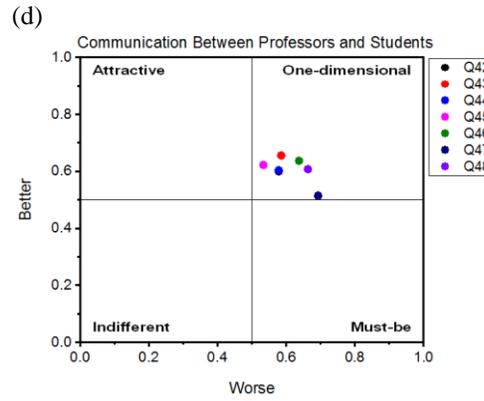
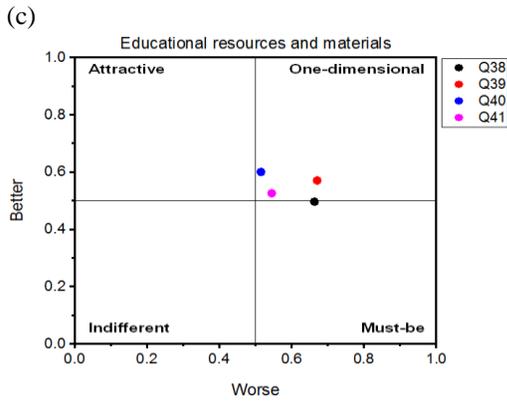
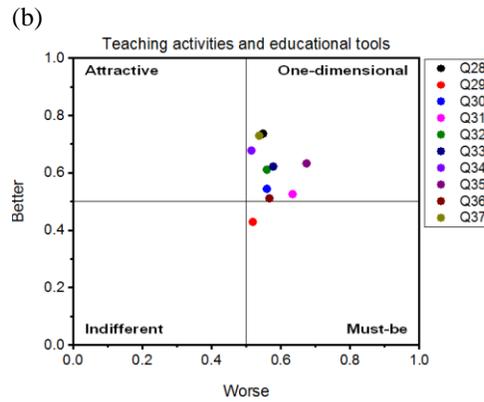
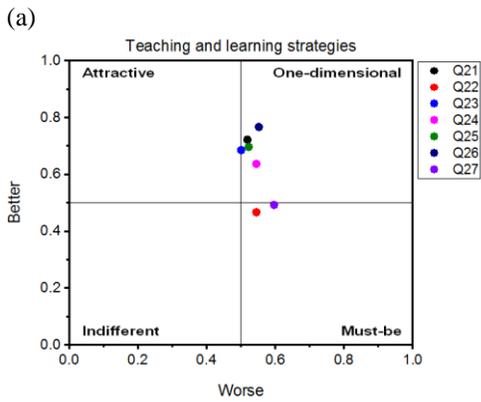
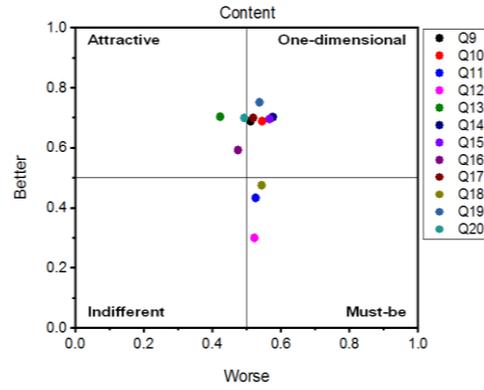
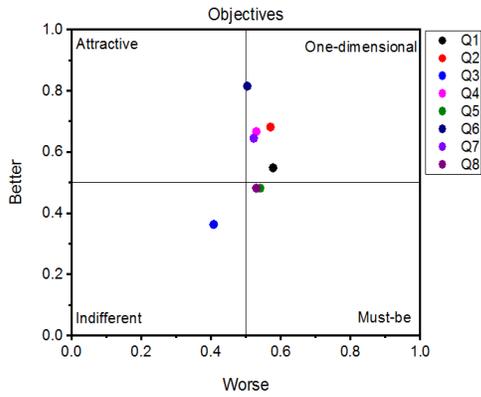


Figure 4: Pairs of Better and Worse points for each questions based on Students Satisfaction (SRS) and Students Dissatisfaction (SRD) values for (a) objectives, (b) content, (c) teaching and learning strategies, (d) teaching activities and educational tools, (e) educational resources and materials, (f) communication between teachers and students, and (g) evaluation

Table 5: Description of Better and Worse points of Students

Elements	Items	X, Y pair	Location of the Points on the Better and Worse Graph
Objectives	Q1	0.58 , 0.55	One-dimensional
	Q2	0.57 , 0.68	One-dimensional
	Q3	0.41 , 0.36	Indifferent
	Q4	0.53 , 0.67	One-dimensional
	Q5	0.54 , 0.48	Must-be
	Q6	0.50 , 0.81	Attractive - One-dimensional
	Q7	0.52 , 0.64	One-dimensional
	Q8	0.53 , 0.48	Must-be
Content	Q9	0.51 , 0.69	One-dimensional
	Q10	0.54 , 0.69	One-dimensional
	Q11	0.53 , 0.43	Must-be
	Q12	0.52 , 0.30	Must-be
	Q13	0.42 , 0.70	Attractive
	Q14	0.58 , 0.70	One-dimensional
	Q15	0.57 , 0.70	One-dimensional
	Q16	0.47 , 0.59	Attractive
	Q17	0.52 , 0.70	One-dimensional
	Q18	0.54 , 0.48	Must-be
	Q19	0.54 , 0.75	One-dimensional
	Q20	0.49 , 0.70	Attractive - One-dimensional
Teaching and learning strategies	Q21	0.52 , 0.72	One-dimensional
	Q22	0.54 , 0.47	Must-be
	Q23	0.50 , 0.69	Attractive - One-dimensional
	Q24	0.54 , 0.64	One-dimensional
	Q25	0.52 , 0.70	One-dimensional
	Q26	0.55 , 0.77	One-dimensional
	Q27	0.60 , 0.49	One-dimensional - Must-be
Teaching activities and educational tools	Q28	0.55 , 0.74	One-dimensional
	Q29	0.52 , 0.43	Must-be
	Q30	0.56 , 0.54	One-dimensional
	Q31	0.63 , 0.53	One-dimensional
	Q32	0.56 , 0.61	One-dimensional
	Q33	0.58 , 0.62	One-dimensional
	Q34	0.51 , 0.68	One-dimensional
	Q35	0.67 , 0.63	One-dimensional

Educational resources and materials	Q36	0.57 , 0.51	One-dimensional - Must-be
	Q37	0.54 , 0.73	One-dimensional
	Q38	0.66 , 0.50	One-dimensional - Must-be
	Q39	0.67 , 0.57	One-dimensional
	Q40	0.51 , 0.60	One-dimensional
Communication between professors and students	Q41	0.54 , 0.53	One-dimensional
	Q42	0.58 , 0.60	One-dimensional
	Q43	0.59 , 0.66	One-dimensional
	Q44	0.58 , 0.60	One-dimensional
	Q45	0.53 , 0.62	One-dimensional
	Q46	0.64 , 0.64	One-dimensional
	Q47	0.69 , 0.51	One-dimensional
Evaluation	Q48	0.66 , 0.61	One-dimensional
	Q49	0.67 , 0.47	Must-be
	Q50	0.54 , 0.60	One-dimensional
	Q51	0.60 , 0.59	One-dimensional
	Q52	0.76 , 0.53	One-dimensional
	Q53	0.76 , 0.52	One-dimensional
	Q54	0.50 , 0.75	Attractive - One-dimensional
	Q55	0.59 , 0.41	Must-be
Q56	0.52 , 0.63	One-dimensional	

This step includes the correlation functions between satisfaction and student requirements for one-dimensional, attractive, and must-be, attributes. Indifferent characteristics have low values for both SRS and SRD, indicating their minimal influence on student satisfaction. Table 2 identifies four attributes, including Q3, Q11, Q29, and Q55, as indifferent. Thus, this stage of quantitative analysis excludes them due to their minor impact on the satisfaction of students. Figure 5 shows the correlation between the degree of satisfaction and the student requirements fulfillment level for one-dimensional attributes, calculated using Equation (3-3). Students' satisfaction and requirement fulfillment level for Q2, Q4, Q10, Q14, Q15, Q17, Q19, Q21, Q26, Q28, Q35, Q37, Q39, Q43, Q45, Q46, Q48, and Q51 attributes exhibit a linear relationship. It means that if the students' requirements fulfillment level increases, then their satisfaction will increase.

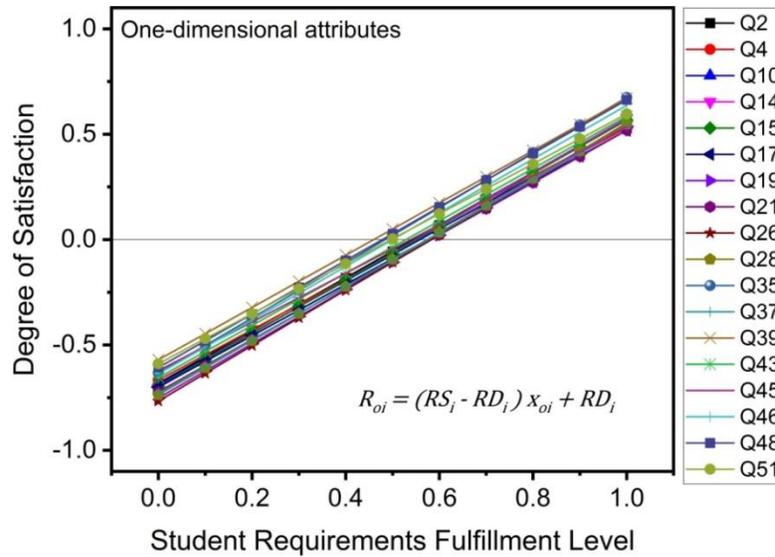


Figure 5: Relationship curves for one-dimensional attributes

Figure 6 shows the correlation between the degree of satisfaction and the student requirements fulfillment level for attractive attributes, calculated using Equation (3-4). Students' satisfaction and requirement fulfillment level for Q1, Q5, Q8, Q12, Q18, Q22, Q27, Q30, Q31, Q36, Q38, Q41, Q47, Q49, Q52, and Q53 attributes exhibit a positive exponential relationship. It means that if the students' requirements fulfillment level increases, then their satisfaction will increase more drastically.

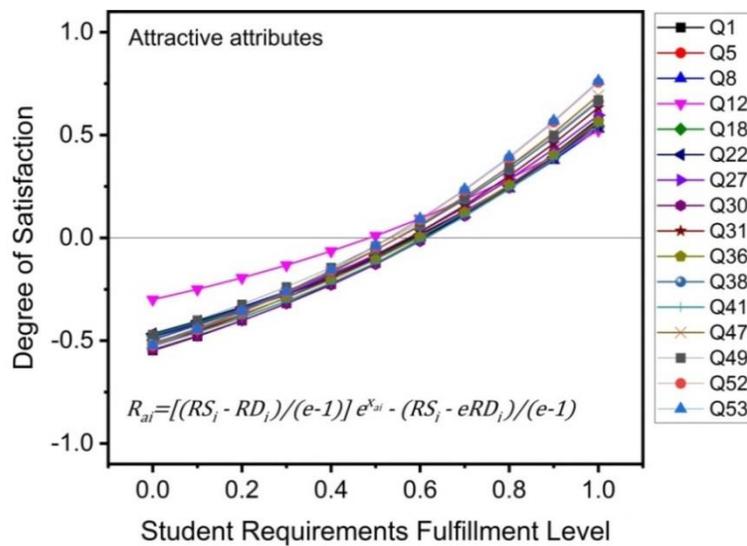


Figure 6: Relationship curves for attractive attributes

Figure 7 shows the correlation between the degree of satisfaction and the student requirements fulfillment level for must-be attributes, calculated using Equation (3-5). Students' satisfaction and requirement fulfillment level for Q6, Q7, Q9, Q13, Q16, Q20, Q23, Q24, Q25, Q32, Q33, Q34, Q40, Q42, Q44, Q50, Q54, and Q56 attributes exhibit an exponential relationship. It means that it requires higher increases in students' requirements fulfillment level, to increase their satisfaction.

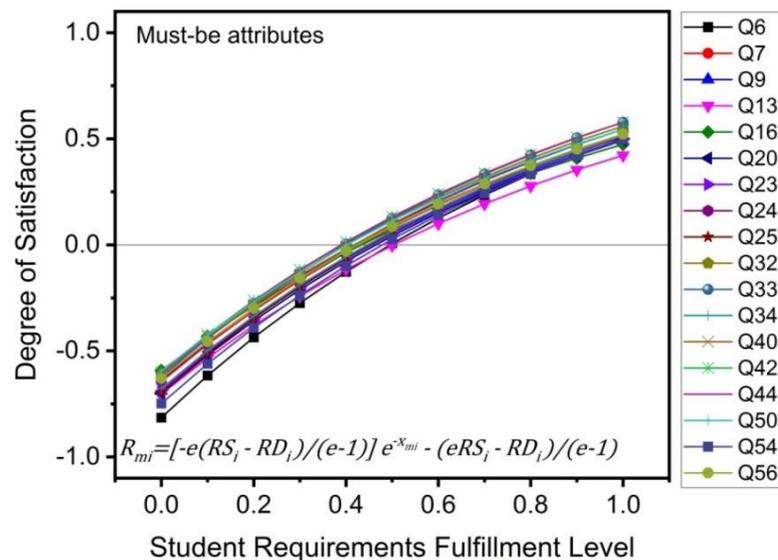


Figure 7: Relationship curves for must-be attributes

Based on equations (6) and (7) Average Functional and Dysfunctional Score values have been calculated for students and tabulated in Table 6. The objectives element shows a relatively balanced distribution between the average functional and dysfunctional scores. Items Q1, Q2, Q3, Q4, Q5, and Q7 reflect moderate functional scores (ranging from 2.77 to 3.10), suggesting that the objectives are somewhat clear but not optimal. Notably, Q6 has a higher dysfunctional score (3.61) compared to

its functional score (2.72), indicating a potential issue with the clarity or relevance of that specific objective. Overall, while the objectives are generally functional, there are areas that may require attention to reduce dysfunctionality. The content element presents a mixed picture. Items such as Q12 (3.00 functional, 2.56 dysfunctional) and Q14 (2.90 functional, 3.18 dysfunctional) indicate a moderate balance between functionality and dysfunctionality. However, items like Q13 (2.49 functional, 3.31 dysfunctional) and Q20 (2.61 functional, 3.27 dysfunctional) show significant dysfunctional scores, suggesting areas where content might be confusing or not well-aligned with learning objectives. Overall, while some content elements are performing adequately, others need considerable improvement to enhance overall educational quality.

In the teaching and learning strategies element, there is a general trend towards higher functional scores. Items Q21 (2.80 functional, 3.30 dysfunctional) and Q26 (2.84 functional, 3.47 dysfunctional) show some balance, but the dysfunctional scores indicate room for improvement. Conversely, items such as Q22 (3.09 functional, 2.80 dysfunctional) and Q24 (3.09 functional, 3.24 dysfunctional) suggest that while strategies are generally effective, there are instances of high dysfunctionality that need addressing to optimize the learning experience.

The teaching activities and educational tools element shows relatively high functional scores across most items, with Q31 (3.27 functional, 3.05 dysfunctional) and Q35 (3.25 functional, 3.21 dysfunctional) standing out positively. However, items like Q28 (2.79 functional, 3.42 dysfunctional) and Q37 (3.07 functional, 3.38 dysfunctional) indicate some challenges, especially in ensuring that educational tools are consistently effective and not causing confusion or issues for students. The educational resources and materials element exhibits strong functional scores, particularly in Q38 (3.33 functional, 2.99 dysfunctional) and Q39 (3.34 functional, 3.14 dysfunctional), indicating that resources are generally well-regarded. However, the relatively high dysfunctional scores in some items suggest that while resources are effective, there may be issues with accessibility or relevance that need to be addressed to ensure consistent quality and utility.

The communication between professors and students element reflects a generally positive interaction, with items like Q47 (3.39 functional, 3.01 dysfunctional) and Q46 (3.27 functional, 3.19 dysfunctional) showing high functional scores. However, the presence of notable dysfunctional scores across items (e.g., Q45: 3.07 functional, 3.21 dysfunctional) indicates that while communication is generally good, there are areas where it could be improved to ensure clarity and effectiveness. The evaluation element shows strong functional scores, especially in items like Q52 (3.51 functional, 3.02 dysfunctional) and Q53 (3.53 functional, 3.02 dysfunctional). These high scores suggest that the evaluation processes are largely effective. However, some items such as Q54

(2.71 functional, 3.39 dysfunctional) highlight areas where the evaluation methods may be causing issues, indicating a need for refinement to reduce dysfunctionality and enhance the overall assessment experience. These results suggest a mixed performance across different elements, with certain areas needing more attention to reduce dysfunctionality and improve the overall effectiveness of the educational experience.

Table 6: Average Functional and Dysfunctional of Qualitative Kano Model of Student

Elements	Items	Average Functional Score	Average Dysfunctional Score	Elements	Student Items	Average Functional Score	Average Dysfunctional Score
Objectives	Q1	3.10	3.04	Teaching activities and educational tools	Q28	2.79	3.42
	Q2	2.90	3.22		Q29	3.07	2.85
	Q3	2.81	2.64		Q30	3.12	3.09
	Q4	2.80	3.13		Q31	3.27	3.05
	Q5	2.99	2.93		Q32	2.87	3.16
	Q6	2.72	3.61		Q33	3.16	3.24
	Q7	2.77	3.05		Q34	3.03	3.32
	Q8	2.91	2.78		Q35	3.25	3.21
Content	Q9	2.76	3.27	Educational resources and materials	Q36	3.13	3.01
	Q10	2.83	3.21		Q37	3.07	3.38
	Q11	2.88	2.82		Q38	3.33	2.99
	Q12	3.00	2.56	Communication between professors and students	Q39	3.34	3.14
	Q13	2.49	3.31		Q40	3.03	3.19
	Q14	2.90	3.18		Q41	3.09	2.95
	Q15	2.84	3.20		Q42	3.16	3.15
	Q16	2.66	3.02		Q43	3.17	3.25
	Q17	2.66	3.15		Q44	3.16	3.15
	Q18	2.72	2.27		Q45	3.07	3.21
Q19	2.79	3.39	Q46	3.27	3.19		
Q20	2.61	3.27	Q47	3.39	3.01		
Teaching and learning strategies	Q21	2.80	3.30	Evaluation	Q48	3.33	3.18
	Q22	3.09	2.80		Q49	3.34	2.87
	Q23	2.70	3.31		Q50	3.09	3.13
	Q24	3.09	3.24		Q51	3.19	3.13

	Q25	3.04	3.33		Q52	3.51	3.02
	Q26	2.84	3.47		Q53	3.53	3.02
	Q27	3.19	2.91		Q54	2.71	3.39
			Q55		3.17	2.69	
			Q56		3.04	3.20	

#### 4. Conclusion

The research results were presented, interpreted, and discussed in light of achieving the research objectives to reach statistical hypothesis tests. Through their analysis, we attempt to answer the questions posed in the research questions section. The current study relied on evaluating the quality indicators of university curricula based on the Kano model at the University of Kirkuk, identifying the must-be, attractive, and one-dimensional needs of students in the seven elements of curriculum quality. The research results showed a difference between students' expectations and perceptions across all seven curriculum elements. These results indicated those students' expectations regarding Objectives, Content, and Teaching and learning strategies, Teaching activities and educational tools, Educational resources and materials, Communication between teachers and students, and Evaluation were higher than their perceptions. From the students' perspective, there are unmet standards in each curriculum element. This result is consistent with the results reached by Hossein Nia (2019), Tofighi et al (2011) , Shabiri & Popkiade ( 2015) and Mardbari ( 2023) . All of this research emphasized the importance of verifying the quality of the curriculum as an effective factor in developing students' scientific and research capabilities. The results related to the curriculum's content showed that it has logical coherence. However, the course content is significantly outdated and requires revision and updating. Therefore, curriculum information must be compatible with students' inclinations and motivations, as well as appropriate to their level of maturity and experience.. This result is also consistent with the findings of Al-Aboudi ( 2015), Al-Zalimi (2012) and Tahmasebzadeh et al (2024). Additionally, the preparation programs fall short of keeping pace with global developments. Therefore, curriculum information should be linked to students' interests and motivations, and be appropriate for their level of maturity and experience. Moreover, the quality standard in the elements of teaching activities, educational tools, communication between professors and students, and evaluation has not been met from the students' perspective. This indicates a real problem related to the lack of practical training laboratories, despite the critical importance of this aspect within the

quality standards framework. There is also a lack of focus on active learning, collaborative learning, exploration, research, the development of higher-order thinking skills, various learning activities, and providing students with opportunities for self-expression and creative interaction with professors and peers in specialized subjects. It is essential to provide these important elements in university curricula, which should be linked to students' needs on one hand and society's needs on the other, and be adaptable to keep up with global tendencies and developments. Furthermore, theoretical and practical integration must be achieved to elevate the level of university curricula. Therefore, the following conclusions can be drawn from the above findings:

- Quality standards are relatively met in each curriculum element.
- Stakeholders do not sufficiently emphasize practical training regarding educational tools and laboratories.
- There is a clear difference between the curricula and the needs of society and the labor market on one hand, and contemporary developments on the other.

The results of this study serve as a guide and document to assist curriculum experts at the University of Kirkuk in formulating policies and strategies to improve the quality of educational services, particularly in the area of curriculum development and teaching methods at the university. Based on the results obtained from this study, it is suggested: in regard to the element of object, the curriculum of educational and Psychological sciences field should pay special attention to the methods of learning recent global issues and different social, cultural, economic, political, etc. fields and should pay attention to the skills needed by students and also consider the needs of the society. In regard to the element of content, the curriculum of educational and Psychological sciences needs to pay attention to the coherence and logical connection of the content and seek to strengthen creative and critical thinking in students. In regard to the element of teaching-learning strategies, attention should be paid to active or learner-centered methods in the curriculum of educational and Psychological sciences. In regard to the element of learning materials and resources, attention should be paid to new resources in accordance with modern technology and new educational facilities in the curriculum of educational and Psychological sciences. In regard to the time and place of learning, special attention should be paid to the appropriate time and place of education, especially mentally and emotionally, in the curriculum of educational and Psychological sciences. In regard to curriculum evaluation, attention should be paid to the method of evaluation

and its patterns, specifically in adopting process evaluations in the curriculum of educational and Psychological sciences.

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