Research Article

Application of Personalized Demand Based on Kano Model in Private Colleges

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In recent years, with the continuous growth of college students’ personalities, the development of their personalized education needs has become more and more prominent, and how to meet those needs has become the focus of current research. From the perspective of Kano, this paper establishes a “student-centered” learning situation analysis system, based on the degree of support for graduation requirements and the training objectives for the individual needs of students. Furthermore, the paper builds a trinity of individual needs-oriented education evaluation mode, so as to realize the basic needs, expected needs, and attractive needs of students, and forms a teaching implementation plan for personalized needs from the perspective of Kano. Then, the established teaching implementation plan of individual needs from the perspective of Kano is applied to the "applied statistics" course of economic management students in a private college, and the experimental results of the undergraduate students and the students who are promoted to college are compared. The research shows the following: the application of the teaching implementation plan of personalized needs from the perspective of Kano can help improve the comprehensive performance of students; differentiated students can reduce differences through the teaching implementation plan of personalized needs from the perspective of Kano, so that personalized needs are more satisfied, so as to further improve the quality of teaching.

1. Background

More than 2,000 years ago in ancient China, the sage Confucius put forward the educational thought of "Teach students according to their aptitude, and there is no difference." This is the earliest concept and thought of individualized education in China. The idea of "teaching students according to their aptitude, there is no class" is the personalized education idea emphasized today. With the continuous changes of the times, the personalized needs of students are becoming more and more intense; in particular, the private education in China has the purpose of corporate profit. In essence, it is faced with more diverse students than public education, and the individual needs of students are stronger. However, the Kano model is a classic analysis model for analyzing consumers’ product demand classification and demand satisfaction survey. Therefore, we use Kano model characteristics, according to the individual needs of students in private colleges and universities to formulate a better teaching system plan, so as to realize the real personalized needs-oriented teaching system reform, achieve a win-win effect for teachers and students, and truly achieve higher teaching quality.

2. The Model Design Basis of Personalized Needs in Education from the Perspective of Kano

With the continuous development of the economy and society, the personality of this generation of college students has been continuously publicized, and the students’ ideas are no longer bound by traditional education methods. What students pursue is more of their own needs. Since there are no two identical people, students are more pursuing their own needs in education based on their native families. Especially in private education, students no longer simply pursue high scores and simply graduate like public
education students. With respect to research on education, Mei proposed in 2021 that the “five withdrawals and five standings” to promote the connotative development of local undergraduate education can promote the development of education [1]. Zhongbiao proposed in 2022 that ideological and political education should be added to education, adding objective factors [2]. Lu proposed that “self-directed learning” is an important educational basis for building lifelong learning for all people [3]. In 2021, Wu et al. constructed a teaching quality evaluation model in colleges and universities under the Kano model [4]. What students need more is the result of the experience process and learning process. At this time, education is actually a “regression.” How to find a better teaching plan in the more intense changes of students' individual needs, so as to take into account the needs of students and achieve better teaching effect, is the important content of this paper. In fact, personalized needs, that is, non-standard, special, alternative needs, are nonuniversal needs for most users, which belong to partial customization needs.

The process of satisfying individualized needs in teaching is the reform of educational system engineering, and the process of educational system reform also requires the systematic design of educational programs. Higher education needs to know whether the talents cultivated by traditional education are in line with the talents that are about to be in line with the society. In response to individual needs, Yang proposed a trusted model of cloud manufacturing under individual needs in 2022 [5]. In 2022, Yin proposed to establish personalized needs corresponding to readers in university libraries [6]. In 2022, Yu et al. proposed the personalized requirements for building fuzzy Kano models [7]. In 2022, Qu proposed to establish “accurate recommendation” in the tourism industry to meet the personalized needs of tourists [8]. Jiang et al. proposed one-stop information for users' personalized needs in 2022 to meet users' needs [9]. At the same time, for the reform of education evaluation, it is currently advocated that the “formative evaluation” should be focused on and the evaluation standards and content should be more diverse. With such an evaluation form, we must pay more attention to how to make the evaluation more scientific and reasonable. Therefore, how to continue to improve the quality of school education and meet the individual needs of students is also the content of this study.

The Kano model is a useful tool for classifying and prioritizing consumer needs, invented by professor Noriaki Kano, Tokyo Institute of Technology. The result indicates that there is no linear relationship between the performance of products and the satisfaction of users. The Kano model considers the needs of consumers more. As private institutions, private colleges and universities have more characteristics of enterprises. Therefore, applying the Kano model to study the individual needs of students in private colleges and universities can better meet the fundamental demands of students in colleges and universities, which is more conducive to the improvement of teaching quality [10, 11].

According to statistics, in 2020, the number of private schools in China will reach 186,700, accounting for more than 1/3 of the total number of schools in the country, with 55.6445 million students, accounting for nearly 1/5 of the total number of students. Therefore, private education has become an important part of education. In 2022, as a result of the epidemic, the enrollment of private schools was greatly impacted, and the survival crisis of private schools was even more severe. Then, in order to develop their own characteristics, private schools paid more attention to the individualized development of different students. Thus, how to meet the individual needs of middle school students in private colleges and universities and promote the development of private colleges and universities has become a problem that needs to be solved, and it is also a matter that China's educational undertakings should pay attention to. Therefore, this paper studies the personalization model of students in private colleges and universities from the perspective of Kano model, and it is of great significance to apply this model in experiments.

3. The Design of the Teaching Mode

3.1. Basic Framework of Personalized Demand Model System from the Perspective of Kano

As an important part of private colleges and universities in China, the individual needs of students can be divided into basic needs quality, expected demand quality, and attractive demand quality. Therefore, the establishment of the personalized demand model system of private college students from the perspective of Kano is based on the basic needs of students, the quality of expected needs, and the quality of attractive needs. The multidimensional assessment of the realization of students’ needs through the learning situation analysis system has formed an all-round and multi-angle basic model framework. Therefore, this article establishes a “student-centered” learning situation analysis system, based on the individual needs of students, the degree of support for graduation requirements, and the three dimensions of training goals, forming a personalized view from the perspective of Kano, so as to
achieve the purpose of improving the quality of teaching, as shown in Figure 1.

From Figure 1, it can be seen that the personalized needs of students in the personalized demand model system from the perspective of Kano are realized through basic demand quality, expected demand quality, and attractive demand quality. Analysis system, degree of support for graduation requirements, and training objectives are achieved. The teaching implementation plan is constantly updated with the teaching process and the results of the staged assessment.

3.2. Design of the Indicator System of the Personalized Demand Model from the Perspective of Kano. The traditional student teaching is based on teachers' teaching and final examinations to form the entire curriculum system. This method cannot fully reflect the individual needs of students, and the assessment method is also relatively one-sided. Therefore, the setting of the curriculum system should be based on the individual needs of students. The quality of students' basic needs is reflected in the “student-centered” learning situation analysis system, the quality of expected needs starts from the degree of support required for graduation, and the quality of attractive needs starts from the training goals, which changes the traditional course teaching method and forms a new model. From the perspective of Kano, this paper constructs a three-in-one personalized demand-oriented educational evaluation model from the perspectives of the “student-centered” learning situation analysis system, the degree of support for graduation requirements, and the training objectives, so as to achieve students' satisfaction. The dimensions of the three perspectives are as follows.

3.2.1. Dimension 1: Constructing a “Student-Centered” Learning Situation Analysis System. We build a “student-centered” learning situation analysis system, as shown in Figure 2.

The proposed learning situation analysis system can specifically include the following points:

1. Analysis of existing knowledge. This includes the study of the prerequisite courses, which has laid a solid theoretical and practical foundation of the discipline, laid the foundation for the teaching of the subsequent courses, and promoted the teaching and application of the courses. Analyze the basic knowledge that students have learned, and conduct face-to-face analysis for some special students, such as those who have poor foundation and who have not studied corresponding basic courses (such as probability theory and advanced mathematics). The survey questionnaire is in the form of questionnaire analysis, such as the survey questionnaire made by students for the establishment of “applied statistics.”

2. Learning ability analysis. Through course study and chapter tests, we can grasp the class learning status, knowledge mastery, and students' learning ability in real time; dynamically adjust the course teaching method and teaching rhythm; and design the depth, difficulty, and breadth of the course.

3. Diagnosis of the overall learning status of the teaching class. Build a four-dimensional integrated communication platform of “counselor-academic tutor-teacher-student” before class to fully understand the overall learning situation of the class. According to the results of the analysis of the learning situation, teach students according to their aptitude, stimulate the learning interest of students with poor foundations, and improve students with outstanding innovation skills to expand these skills.
(4) Analysis of existing innovation ability. For example, most of the students in the two undergraduate classes of the 2019 e-commerce major in the first semester of 2021–2022 have participated in the national market research and forecasting competition, and some students have already won provincial and above competition awards. It can be seen that the 2019-level e-commerce students have a certain foundation of innovative thinking and practical ability, but the statistical professional knowledge and application ability need to be further improved. However, in the first semester of 2021–2022, the two undergraduate classes of the 2019-level logistics management majors have almost no foundation, and they have not even studied probability theory and advanced mathematics related to the “applied statistics” course.

3.2.2. Dimension 2: Degree of Support for Graduation Requirements. The degree of support of the course for graduation requirements can be divided into 4 points: First, this course mainly aims to train students to master the basic theoretical knowledge of the course while mastering the professional knowledge. Second, this course trains students to have corresponding ability goals while possessing professional basic knowledge. Third, this course trains students to form the analytical ability of their own professional characteristics based on the knowledge of applied statistics. Fourth, this course cultivates students with the knowledge and ability goals required for graduation, as well as the corresponding qualities. Ideological and political teaching points and a large number of employment guidance elements that are consistent with the teaching content are set up for each credit hour in the course design, which promotes the effective integration of the course content and the ideological and political education work for students and cultivates students’ scientific, truth-seeking spirit. It effectively embodies the fundamentals of teachers’ moral cultivation and helps to cultivate applied talents with innovative spirit.

3.2.3. Dimension 3: Training Goals. The construction of the curriculum system in this paper aims to enable students to understand the principles of the curriculum, master the basic methods and skills of the curriculum, and explore the regularity of the curriculum learning through the study of the curriculum, so as to achieve a scientific understanding of objective things. The curriculum system can cultivate students’ literacy and skills in theoretical knowledge analysis. Let students have the spirit and ability of science and proof. The specific training objectives are divided into four levels:

(1) Knowledge goals. Through heuristic, practice, and discussion teaching methods and mutual promotion of knowledge, students can master the basic principles and methods of the course. Help students with course-related theoretical foundations.

(2) Ability target. Students can master the basic principles related to the course, understand the basic concepts related to the course, and use the theoretical knowledge of the course to complete the corresponding exercises.

(3) Process and method objectives. Through the connotative teaching of “theory + practical operation” and the “online + offline” mode in the learning process, students can learn courses based on their inner interests. According to the characteristics of teaching content and learning situation, the course teaching uses project-based teaching, flipped classroom, online and offline mixed teaching and other teaching modes, so that students have the independent learning, cooperative learning, and exploratory learning abilities.

(4) Emotional attitude and value goals. In addition to the corresponding content of the course, excavate high ideological and political elements; help students
establish a sense of science and justice; cultivate students’ spirit of hard work and perseverance; cultivate students’ spirit of seeking truth; and strive to cultivate students to be dedicated to their jobs, be excellent statisticians who are willing to give, and be applied undergraduate talents with ideals, ethics, knowledge, and high degree.

3.3. Constructing a Curriculum Reform System Oriented by Individual Needs from the Perspective of Kano. According to the indicator system of the personalized demand model from the perspective of Kano, curriculum teaching is guided by the personalized demand, and a teaching mode suitable for students is designed. With the characteristics of this course, teachers hope to have certain practical guiding significance in the implementation of the course teaching mode reform. The Kano result-oriented connotative teaching design aims mainly to improve the quality of the course and student satisfaction. The specific Kano result-oriented connotative teaching model is shown in Figure 3.

The teaching characteristics are mainly reflected in the transformation from the traditional "teacher-centered" to the new "student-centered" classroom teaching mode, the integration of ideological and political elements in curriculum design, a complete learning situation analysis system, and Kano results-oriented typical reform courses of connotative teaching, as well as the rich network teaching resources that have been established and used as the basis of Rain Classroom. Turn students from the audience of learning into the main body of teaching; based on scientific ideas, professional ability, and tasks driven as a supplement, the theoretical teaching content is based on the principle of sufficient use, and online and offline mixed teaching is carried out to improve the teaching effect. Formulate student online learning control measures, effectively monitor students’ online learning, optimize course teaching resources, and improve teaching methods in a timely manner.

4. The Application of Teaching Reform of Individualized Needs in the Experiment from the Perspective of Kano

This paper takes the course of "applied statistics" in a private college as an example, through the teaching reform of personalized needs from the perspective of Kano, that is, based on the personalized needs of students proposed in Section 3, the training objectives, the degree of support for graduation requirements, and the three dimensions of the "student-centered" learning situation analysis system; the experimental results are obtained by comparing the final grades achieved by students. In order to ensure the fairness and impartiality of the experimental results and to build the same experimental environment as possible, the subjects of this experiment are the same class of students in a private college. There are a total of 124 students in 4 classes. The students in the 4 classes are all undergraduate students, but two of them are 31 and 36 undergraduates, and students who passed the college entrance examination in normal class 1 and 2, respectively. The other two classes have 27 and 29 undergraduate students who passed the college entrance examination in advanced classes. The number of samples is 124. Due to the epidemic, 1 person did not take the test and had no final comprehensive score. It is invalid to exclude 1 sample, so there are 123 valid data samples, and the effective rate is 99.19%, which meets the requirements of the number of samples.

4.1. The Experimental Basis of the Teaching Reform of Individual Needs from the Perspective of Kano

4.1.1. The Teaching Process of Personalized Needs from the Perspective of Kano: Taking the Course “Applied Statistics” as an Example

(1) Accurately grasp the course positioning and teaching objectives according to the degree of support required for graduation, and accordingly revise and improve the course syllabus, teaching plan, lesson plan, courseware, exercise set (library), test set (library), and other text-based teaching resources to. The online course platform, containing all of the above teaching resources, is efficiently connected with offline classroom teaching.

(2) The teaching of practical courses adopts the connotative task teaching method. The purpose is to let students understand the true connotation of applied statistics by completing the tasks of each link, and to independently complete the basic statistical methods in a relatively close manner to the real application situation. Comprehensive ability.

(3) Evaluate the teaching effect of the course and the learning effect of the students in practice stages, summarize and reflect in a timely manner, and guide the improvement and perfection of the course construction.

(4) Strengthen the teaching of practical links. By combining the corresponding knowledge points of “applied statistics” and the study of computer software SPSS, the students’ practical operation ability will be enhanced, and the corresponding knowledge points will be used to solve operational problems in life.

(5) Strengthen the integration of ideological and political elements in the course of applied statistics. According to the changes of national policies and social environment, for each of the 48 hours of teaching of the “applied statistics” course, case teaching of ideology and politics that is in line with the teaching content is set up, which promotes students’ understanding of the course content. Effective integration with ideological and political education work cultivates students’ spirit of science, truth-seeking, and verification and truly cultivates morality.

(6) Continue to improve and apply the “student-centered” complete learning situation analysis system.
The teaching content is divided logically from shallow to deep: the entire teaching content is divided into logical and step-by-step modules, and the teaching arrangement and design are carried out in a step-by-step, planned, and connected manner.

Simulation of teaching organization form: teaching combines theory and practice, and integrates individuals and groups to improve students’ ability to cooperate, enhance course interest, and improve students’ enthusiasm for learning.

(7) Strengthen the teaching reform of “applied statistics” course and update it continuously. Establish a curriculum reform of connotative teaching from the Kano perspective and the result-oriented perspective, and design a connotative teaching mode suitable for students. Based on the online resources, a variety of teaching methods and means are adopted, such as explanation type, practice + operation type, case type, discussion type, and flipped classroom. Carry out online and offline mixed teaching to improve teaching effect. Through the form of “competition to educate people,” strengthen the students’ learning of the knowledge points of “applied statistics.”

4.1.2. Analysis of the Teaching Process of the Individual Needs of the “Applied Statistics” Course from the Perspective of Kano. From the perspective of Kano, the teaching process of the individual needs of the “applied statistics” course as an example combines online and offline learning. The experiment is conducted on the basis of the “student-centered” learning situation analysis system based on the individual needs of students, that is, on the basis of research and analysis of learning situation for each student participating in the experiment.

The teaching of this course is mainly based on offline teaching and supplemented by online teaching. The offline teaching is the main teaching, and the network is the form of tutoring teaching. Among them, offline teaching starts from the individual needs of students, and on the basis of investigating each student’s academic situation through the Internet and grasping the real needs of students, teachers make corresponding offline and online course design and teaching plan design. Based on the principle of morality and the supremacy of law, teachers teach courses on the basis of students’ needs and update their offline teaching at any time according to changes in staged teaching objectives, different degrees of support for graduation requirements, and changes in students’ needs design. During the online teaching process, the network resources are adjusted and updated at any time according to the students’ offline reactions and online learning, as well as the completion of homework. The construction of teaching video resources, including teaching videos, audios, micro-lectures (videos), high-quality classroom recordings, and other resources based on the difficult course chapters, is uploaded to the online course platform of Xijing College to further improve the construction quality of video teaching resources and make them a powerful auxiliary material for students to study after class. The following is the use of online teaching resources for students.

Note that 52 of the 176 people in Figure 4 belong to the data of restudy students and are not included in this experiment.

In this paper, the experimental process of the “applied statistics” course from the perspective of Kano is carried out in the way of online and offline integration, and the online mode is mainly applied through the Rain Classroom network terminal shown in Figure 4. At the beginning of the experiment, students are required to watch the relevant videos of this course in the Rain Classroom, and then conduct offline learning under the guidance of teachers. Some course knowledge points will also be added in the offline teaching process, and finally let the students complete the offline teaching through the Rain Classroom. In the after-school knowledge point exercises in the learning part,
The teacher will re-explain the content that the students do not know according to the effect of the students doing the questions in the Rain Classroom, thus forming a closed-loop model of teaching and learning.

The teaching syllabus and teaching plan used in the experimental teaching process of individual needs in the "applied statistics" course from the perspective of Kano are formulated on the basis of the degree of support for graduation requirements. The teaching objectives of the course are presented in detail in the syllabus, and the realization of each teaching objective is explained in detail in the lesson plan.

4.2. Comparison of the Results of the Teaching Reform of Personalized Needs from the Perspective of Kano after the Experiment. This experiment is actually carried out under the same environment, after analyzing the academic conditions of all students for two types of undergraduate students who are promoted to undergraduate and unified enrollment. Through the experimental research on the connotative teaching reform of the "applied statistics" course from the perspective of Kano, under the same assessment method, 4 classes (124 students in total) were designed for the implementation plan of the connotative teaching mode without using the Kano model, of which two classes are a...
The research results are shown in the next section.

4.3. The Teaching Reform of Personalized Needs from the Perspective of Kano Is Found in the Experiment. Through the teaching reform experiment of the "applied statistics" course based on individual needs from the perspective of Kano, after using the teaching plan in Section 3, we observed 4 teaching classes (124 students in total), of which 2 were normal and 2 were advanced classes. The research results are as follows:

(1) The evaluation score for teachers provided by students in 4 classes is above 90, which is excellent. It can be seen that the satisfaction of students is still very high, so from the perspective of Kano, the personalized needs framework of students in private colleges and universities can meet the needs of students.

(2) Figure 5 shows the comprehensive scores obtained by students in two normal classes after using the scheme in Section 3.

(3) Figure 6 shows the comprehensive scores obtained by the students of the two advanced classes after using the plan in Section 3.

From the above two normal classes and two advanced classes, the results obtained after the teaching reform of the "applied statistics" course using the personalized needs from the perspective of Kano are presented: First, the high-level scores of the students who have advanced to the university are no better than the unified admissions. Undergraduate students have poor grades.

### Table 1: Grade details of students in two regular classes.

<table>
<thead>
<tr>
<th>Class 1</th>
<th>Class 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of candidates</td>
<td>31</td>
</tr>
<tr>
<td>Number of absentees</td>
<td>0</td>
</tr>
<tr>
<td>100–90 points</td>
<td>0</td>
</tr>
<tr>
<td>89–80 points</td>
<td>10</td>
</tr>
<tr>
<td>79–70 points</td>
<td>14</td>
</tr>
<tr>
<td>69–60 points</td>
<td>6</td>
</tr>
<tr>
<td>59 points and below</td>
<td>1</td>
</tr>
<tr>
<td>Average</td>
<td>75.26</td>
</tr>
</tbody>
</table>
Even in the first unified enrollment class in Figure 6, there is no score between 90 and 100. Therefore, regardless of whether the student’s starting point is high or low, using the personalized needs from the Kano perspective can help students improve their scores. Second, the impact of the personalized demand plan from the perspective of Kano on the students in the normal class is not as great as that of the students in the special class. The grades of the two normal classes tend to be more normally distributed, but the grades of the two advanced classes both show a skewed distribution.

(4) Table 1 provides the details of the grades obtained by the students in the two normal classes after using the scheme in Section 3.

(5) Table 2 presents the details of the grades obtained by the students in the two advanced classes after using the scheme in Section 3.

From the analysis of the students’ detailed scores in Table 1 and Table 2, it can be concluded that after using the personalized demand plan from the perspective of Kano, the number of students with middle and high scores (i.e., 80–100 points) in the two specialization classes is more than that in the normal classes. After using the personalized demand plan from the perspective of Kano, the average score of the four classes can be more than 70, compared with the longitudinal average score of more than 60 [14], which is a relatively high level.

5. Conclusion and Outlook

5.1. Research Conclusions. The conclusion is obtained by establishing a personalized demand system scheme from the perspective of Kano and applying the scheme to four experimental classes. Based on the perspective of Kano, the individual needs of students, the student-centered academic situation analysis system, the degree of support for graduation requirements, and the training goals, we build a trinity of personalized needs-oriented education evaluation model, so as to realize the basic needs, expectations, and attractive needs of students, and we establish a teaching implementation plan for personalized needs from the perspective of Kano. Then, the established teaching implementation plan of individual needs from the perspective of Kano is applied to the “applied statistics” course of economic management students in a private college, and the experimental results of the undergraduate students and the students who are promoted to college are compared. The research shows the following: the application of the teaching implementation plan of personalized needs from the perspective of Kano can meet the personalized needs of students; it is helpful to improve the comprehensive performance of students; differentiated students can reduce differences through the teaching implementation plan of personalized needs from the perspective of Kano, so that individual needs are more satisfied, thereby further improving the quality of teaching. Therefore, it can be inferred that the promotion of the teaching implementation plan of personalized needs from the perspective of Kano has practical significance.

5.2. Research Outlook. The results obtained by comparing the experimental results of undergraduate students and students who have advanced to college can be applied to other disciplines and majors, and then an excellent student-centered curriculum system can be formed to meet the needs of more college students for personalized courses. And then it can be built into a standard “one teacher, one excellent course.” Secondly, on the basis of the “one teacher, one excellent course” technology, it will continue improvement and reform and can be built into a high-level, high-quality college-level key course. On the basis of the key course, it will be built into a school-level key course. On the basis of the school-level key course, it will be built into a provincial-level quality course.

Data Availability
The data used to support the findings of this study are available from the author upon request.

Conflicts of Interest
The author declares that there are no conflicts of interest regarding the publication of this paper.

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