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A Study of Environmental Education Requirements in Urban Theme Parks from the Perspective of Adolescents

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Abstract: Starting from the perspective of adolescents, this study selects the Maritime Silk Road Art Park in Quanzhou, Fujian Province, as the focal point for investigating environmental education requirements for urban theme parks. It comprehensively reviews existing literature and research findings, establishes evaluation indices for environmental education requirements, and systematically analyzes collected data through questionnaires and interviews. The study employs the Kano model to initiate a survey focusing on requirement types and importance ranking at the Maritime Silk Road Art Park. It aims to identify improvement factors and key factors, subsequently conducting a detailed analysis, summary, and explanation of the environmental education requirements for the youth. The results indicate that 11 out of the 25 requirement factors, categorized into five groups, significantly impact youth satisfaction. Based on the sensitivity ranking of improvement factors, these include the following: environmental education game, landscape facility, leisure and recreation facility, plant landscape planning, "five senses experience" activity, trail route design, guided signage facility, public sanitation facility, facility maintenance management, park functional zoning, and consultancy services platform. Through an in-depth analysis of the five prevalent factors influencing environmental education requirements in urban theme parks for adolescents, this study establishes a scientific evaluation system centered on the construction of urban theme parks. It integrates with the development and construction of the parks, proposing innovative and constructive suggestions based on a summary of the analysis results. The aim is to provide references and insights for similar requirements in other theme parks.

Keywords: environmental education; adolescents; urban theme park; Kano model; factor analysis

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1. Introduction and Literature Review

With the onset of the 21st century, rapid socio-economic development has coincided with diverse levels of harm inflicted upon the global ecological environment. The earth's system is experiencing unparalleled and substantial pressure stemming from biological, chemical, and geological cycles. Consequently, the quality of the ecological environment emerges as a pivotal factor influencing the well-being of humanity [1,2]. Environmental education constitutes a crucial conservation strategy [3], playing a pivotal role in fostering sustainable development and safeguarding biodiversity [4,5]. It develops awareness and understanding of the environment, as well as a sense of responsibility and action for environmental protection. Environmental education can help people gain a deeper understanding of the causes and effects of environmental problems. Through environmental education, people can learn how to make better use of resources to protect natural ecosystems and reduce damage to the environment. As early as the 18th and 19th centuries, the roots of "environmental education" began to emerge in Europe and the U.S. In 1762, the French educator Rousseau, within his work "*Emile: Or on Education*", championed nature education and endorsed the acquisition of knowledge through practical experience [6]. The German educator Froebel furthered the ideas of Rousseau and others

by promoting education adapted to nature [7]. The term of environmental education was initially coined by Thomas Pritchard during a meeting of the International Union for the Conservation of Nature and Natural Resources (IUCN) in Paris in 1948 [8]. In 1962, the book "*Silent Spring*" by American marine biologist Rachel Carson, serving as a cautionary tale against attempting to control nature, garnered significant attention upon its release [9]. It was not until 1970 that the International Union for Conservation of Nature (IUCN) organized an "International Conference on Environmental Education in the School Curriculum" in Nevada, United States of America, where the definition of environmental education became widely recognized. On 5 June 1972, during the "United Nations Conference on the Human Environment" in Stockholm, Sweden, the "Stockholm Declaration" was adopted, formally establishing the name "Environmental Education" (EE). In October 1975, the United Nations issued the "Belgrade Charter" at the International Symposium on Environmental Education held in Belgrade, finalizing guiding principles, basic concepts, and other elements of environmental education. In 1977, UNESCO and the United Nations Environment Programme convened the Tbilisi Governmental Conference on Environmental Education in Tbilisi, former Soviet Union. This conference issued the "Tbilisi Declaration", defining and further emphasizing its objectives as awareness, knowledge, attitude, skills, and participation. In the 1980s, international environmental education gradually shifted towards the direction of education for sustainable development. In June 1992, the United Nations organized the Conference on Environment and Development in Rio de Janeiro, Brazil, with the participation of heads of government. During this conference, "Agenda 21" was adopted, introducing the concept of sustainable development as a new connotation and goal for environmental education. "The Declaration of Thessaloniki", issued at the International Conference on Environment and Society held in Thessaloniki, Greece, in 1997, specifically defined environmental education as "education for the environment and sustainable development". In recent years, scientific and technological innovations have injected more ideas into sustainable development. With the introduction of the carbon peak carbon neutral concept and the continued convening of international conferences such as the United Nations Environment Assembly, it can be seen that environmental education and sustainable development have long been a global topic. Despite the term "environmental education" lacking a universally recognized definition, after an extended period of development and refinement (Table 1), it has evolved into a systematic and expansive theoretical framework.

Table 1. Milestones in the development of environmental education.

Time	Organization	File	Content
1970	IUCN	International Conference on Environmental Education in the school curriculum	Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision making and self-formulating of a code of behavior about issues concerning environmental quality [10].
1972	UN	Stockholm Declaration	Take the necessary steps to establish an international programme in environmental education, interdisciplinary in approach, in school and out of school, encompassing all levels of education and directed towards the general public, in particular, the ordinary citizen living in rural and urban areas, youth and adult alike, with a view to educating him as to the simple steps he might take, within his means, to manage and control his environment [11].

Table 1. *Cont.*

Time	Organization	File	Content
1975	UNESCO & UNEP	The Belgrade Charter	The goal of environmental education is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones [12].
1977	UNESCO & UNEP	Intergovernmental Conference on Environmental Education	Environmental education, properly understood, should constitute a comprehensive lifelong education, one responsive to changes in a rapidly changing world. It should prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attributes required to play a productive role towards improving life and protecting the environment, with due regard given to ethical values [13].
1992	UN	Agenda 21	To be effective, environment and development education should deal with the dynamics of both the physical/biological and socio-economic environment and human (which may include spiritual development), should be integrated in all disciplines, and should employ formal and non-formal methods and effective means of communication [14].
1997	UNESCO	Declaration of Thessaloniki	Environmental education, as developed within the framework of the Tbilisi recommendations and as it has evolved since then, addressing the entire range of global issues included in Agenda 21 and the major UN Conferences, has also been dealt with as education for sustainability. This allows it to also be referred to as education for environment and sustainability [15].

Currently, scholars predominantly investigate environmental-education-related aspects from perspectives such as ecotourism, environmental behavior, and environmental perception. The chosen research objects frequently include parks, nature reserves, and schools. Decker and Morrison employed an in-depth interview methodology to engage with 20 environmental educators across six countries. Their focus was on exploring perceptions of gender when working with children in nature. The study emphasizes an understanding of how children's gender dynamics exist in outdoor settings and shape students' experiences of gender in natural environments [16]. Tauro, Ojeda, et al. introduced a novel educational methodology, FEP, from a sustainability perspective. Developed in the Omora Ethnobotanical Park, FEP aims to enhance the integration of dimensions into ecotourism design and broaden human perception to understand biodiversity more comprehensively [17]. Pearce, Huang, Dowling, and Smith conducted visitor data collection in three protected areas in Western Australia. Through structural equation modeling, they discovered that personal norms and connection to nature positively impact pro-environmental behaviors, whereas social norms do not. The study utilized a structural equation modeling approach to analyze the influence of personal norms, social norms, and connection to nature on pro-environmental behavior [18]. Zorrilla-Pujana and Rossi, utilizing the Colombian National Parks Service as an example, employed both quantitative and qualitative methods, including questionnaires and interviews. They aimed to construct a new system of indicators for environmental education in national parks, intending to assess the effectiveness of protected areas [19]. Liu, Zhao and et al. conducted a systematic review of biodiversity on university campuses, revealing that over 300 universities have engaged in

biodiversity research. The analysis suggests that university campuses play a significant role in biodiversity research and protection [20].

Dewey, an American educator, advocated "education as growth", believing that education should begin in childhood to promote the growth of children [21]. Therefore, education during adolescence, as a unique stage of life transitioning from childhood to adulthood, is particularly important. The World Health Organization defines the age range of adolescents as 10–19 years old [22]. Globally, there are approximately 1.3 billion adolescents, constituting one-sixth of the world's total population—more than ever before. Faced with such a substantial demographic, several scholars have investigated issues related to the environment from the perspective of adolescents [23,24]. For instance, Cincera, Kroufek and Bogner confirmed the relevance of sustainable development strategies in shaping the environmental literacy of adolescent students through their research [25]. Additionally, Baierl, Kaiser, and Bogner observed that the characterization of environmental attitudes in adolescents peaks at the age of 11 or 12 years, troughs around the age of 16 years, and returns to the mean thereafter [26].

Urban green space serves multiple functions, providing residents not only with rest and recreation but also playing a crucial role in education [27,28]. In the mid-1950s, with the completion of Disneyland in Anaheim, California, modern theme parks began to emerge [29]. According to NAPHA, an amusement park is one in which the rides, attractions, shows, and buildings revolve around a central theme or group of themes. IAAPA defines a theme park as an amusement park that has themed attractions, including food, costumes, entertainment, retail stores, and/or rides. The emergence of theme parks in China is a result of the eastward trend of Western learning. Ocean Park in Hong Kong, built in the 1970s, was the first modern theme park in China, and Fairview Park in Shenzhen, built in the 1980s, was the first real theme park in mainland China [30]. Liang and Li comprehensively review the literature and research on theme parks, defining a theme park as a specialized space with five main characteristics. They integrate multiple disciplines and propose a framework for future research on theme park tourism [31]. Li, Zhang, Hua, and Jahromi critically reviewed previous publications in theme-park-related disciplines, ultimately proposing a conceptual framework describing the concepts, theoretical underpinnings, and multiple relationships among key stakeholders in the theme park field, enriching the research in this area [32]. Other scholars have considered the emotions and perceptions of visitors [33,34]. For example, Park, Kim, Lee, and Ok visualized the emotions of visitors to Disney theme parks using social media analytics and GIS analytics. The results of the study supported the awakening of pleasurable emotions of visitors to the amusement parks and provided practitioners with references to develop reasonable tour routes to optimize the visitors' visit experience [35].

In current research, the Kano model is typically applied in fields such as product design and management, focusing primarily on improving product function and service quality [36,37]. In recent years, numerous experts and scholars have attempted to integrate the Kano model with other research methods to address various issues. For example, Cui, Ma, Li, and Wang used the Kano model to adjust the structure of the AHP method to explore the problems existing in the main streets of Pingshan Village and Nantou Ancient City in Shenzhen, and to improve the use value of public space [38]. In the realm of improving service quality, Pai, Yeh, and Tang combined the Kano model with IPA to research tourists who had visited the restaurants of Taiwan Wowprime Company. The study aimed to investigate the impact of different service elements on customer satisfaction as a means of enhancing service quality [39]. The Kano model avoids directly querying users about their requirements, preventing the acquisition of incorrect judgments that could lead to unclear data. It accurately identifies users' requirements, compensating for the shortcomings in the factor analysis method, which lacks clear hierarchical identification of requirements. Moreover, it addresses the inability to explicitly evaluate the urgency of factor optimization in the analytic hierarchy process.

In summary, while there exists a wealth of research results about adolescents, environmental education, and theme parks individually, there is a noticeable absence of studies that integrate all three elements and employ the Kano model to investigate the satisfaction of environmental education requirements within theme parks from the perspective of adolescents. Consequently, this study is the pioneer in applying the Kano model of the user requirement theory. Its objective is to delve into the satisfaction levels of this demographic regarding the requirement for environmental education in theme parks, as perceived by adolescents. The aim is to gain a better understanding of their sentiments and to provide effective coping strategies for parks to plan and execute environmental education initiatives. Furthermore, this study also is anticipated to offer valuable insights into the progress of environmental education in other theme parks. By taking into account the specific requirements of teenage tourists and aligning them with the park's unique circumstances, it is possible to make targeted and rational investments in resources. This approach allows for a more systematic and accurate development of urban theme parks. This paper seeks to effectively bridge the existing gap in the current research within environmental education. By enriching related research and furnishing a more robust theoretical basis for subsequent studies, it aspires to contribute significantly to the field.

2. Materials and Methods

2.1. Research Area

Quanzhou, the originating point of the ancient Maritime Silk Road in China, served as a significant world trade port during the Middle Ages and continues to be a pioneering region for the "21st Century Chinese Maritime Silk Road". The city seamlessly integrates the cultural, commercial, and architectural legacies of various countries, fostering the unique and diverse culture of the Maritime Silk Road. The cultural spirit of "harmony", "mutual trust", "sharing", and "win–win" has been deeply ingrained in the region. The research area is situated in Quanzhou City, Fujian Province, specifically within the "Maritime Silk Road Art Park—Asia Park". Aligned with the national "One Belt, One Road" policy, this park serves as an open cultural and artistic theme park centered around the theme of the "Maritime Silk Road". Encompassing more than 1000 acres, the park features three main thematic elements: "marine culture, regional culture, exotic culture". The park officially opened on 8 November 2015, and is designed to showcase and celebrate the cultural richness associated with the "Maritime Silk Road". Its thematic elements aim to highlight aspects such as marine culture, regional diversity, and exotic influences. This expansive park provides a space for cultural exploration and artistic appreciation, contributing to the promotion and understanding of the historical and cultural significance of the Maritime Silk Road. The primary landscape design follows the concept of "a vein, two lakes, four districts, five bays, eight scenic". "A vein" symbolizes the park's ecological landscape vein. "Two lakes" refer to the Wave Lake and Haiyue Lake. "Four districts" encompass the "East Asian Art Expression Zone", "Southeast Asian Art Expression Area", "South Asian Art Expression Area", and "West Asian Art Expression Area". "Five bays" include Blue Moon Bay, Mission Hills Bay, Wind Chase Bay, Fisherman's Bay, and Liuxia Bay. "Eight scenes" feature the Island of the Moon, the Harbor of Lights, the Sail of the Coast, the Direction of the Rudder, the Source of Thoughts, the Son of the Wind, the Flowers of the Waves, and the Forest of Greenery. The park boasts a robust public foundation, comprehensive hardware facilities, a vibrant cultural atmosphere, high social awareness, and recognition. With these attributes, the park offers ideal conditions for research purposes (Figure 1).

Figure 1. Geographical location map of Quanzhou Maritime Silk Road Art Park.

2.2. Research Method

2.2.1. Kano Model

The Kano model, proposed in 1979 by Japanese professor Noriaki Kano, was influenced by American scientist Frederick Herzberg's two-factor theory, and his colleague Fumio Takahashi. It aims to categorize product and service attributes based on the degree of customer requirement. The formal publication of the article "Attractive Quality and Must-be Quality" by Noriaki Kano in the Japanese JSQC journal Quality in 1984 marked the establishment and maturation of the Kano model and the theory of charismatic quality [40]. Scholars, including Noriaki Kano, introduced a nonlinear two-dimensional model to replace the prevailing one-dimensional identification model at the time. They argued that quality should be categorized as subjective and objective, exploring the correspondence between the two. In the subjective quality evaluation, quality factors are classified into five categories: essential requirements, one-dimensional requirements, charismatic requirements, undifferentiated requirements, and reverse requirements. Figure 2 illustrates the Kano model advocated by Lee Y.C. and Huang S.Y. [41].

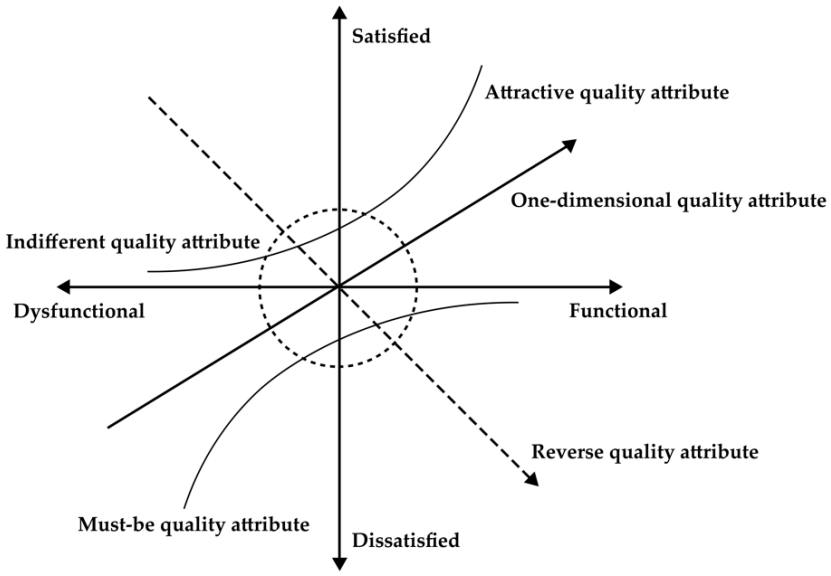

Figure 2. Kano two-dimensional cognitive model.

The horizontal co-ordinate of the Kano model indicates the degree of product functionality, increasing from left to right, while the vertical co-ordinate indicates the degree of user satisfaction, increasing from bottom to top. The Kano model approach designs a question in both forward and backward forms, allowing users to answer with five different options: "Like", "Must be", "Neutral", "Live with", and "Dislike". The specific user requirement questionnaire is shown in Table 2. Through the distribution of the questionnaire to obtain the user's choice for comprehensive analysis, the final product characteristics can be divided into six categories, namely: attractive quality attribute (A), one-dimensional quality attribute (O), must-be quality attribute (M), indifferent quality attribute (I), reverse quality attribute (R), and questionable result (Q). The specific Kano model evaluation table is shown in Table 3.

Table 2. Kano model questionnaire format.

1. Inviting Experts to the Park to Give Lectures on Topics Related to Environmental Education.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are:					
If the park doesn't offer this activity your thoughts are:					

Table 3. Kano model requirement categorization comparison table.

		Dysfunctional				
		Like	Must Be	Neutral	Live With	Dislike
Functional	Like	Q	A	A	A	O
	Must be	R	I	I	I	M
	Neutral	R	I	I	I	M
	Live with	R	I	I	I	M
	Dislike	R	R	R	R	Q

Note: M: Must-be quality attribute, O: One-dimensional quality attribute, A: Attractive quality attribute, I: Indifferent quality attribute, R: Reverse quality attribute, Q: Questionable result.

"Must-be quality attribute" is a requirement that, when provided to tourists, does not result in a significant increase in satisfaction; however, when absent, the level of satisfaction decreases dramatically. Tourists take this requirement for granted, so its sudden absence leads to significant dissatisfaction. This feature or service should be a fundamental requirement that must be available and satisfied.

"One-dimensional quality attribute" means that, when this requirement factor is provided to tourists, their satisfaction increases significantly; when absent, their satisfaction decreases. Tourist satisfaction is linearly related to the qualitative characteristics of the park, and this type of requirement is an indication of competitiveness. Thus, increasing this type of requirement will inevitably increase tourist satisfaction.

"Attractive quality attribute" means that, when this requirement is provided to visitors, their satisfaction increases significantly, and, when lacking, their satisfaction does not decrease significantly. Visitors are pleasantly surprised when the park provides services that exceed their original plans and expectations. The availability of charismatic attribute services is theoretically positively related to satisfaction but does not have a significant negative impact on satisfaction when lacking.

"Indifferent quality attribute" means that the satisfaction of tourists remains unchanged regardless of whether this requirement factor is provided or not. Tourists do not mind whether this service is available or not, and it belongs to the category of optional requirements, having little impact on tourists' satisfaction.

"Reverse quality attribute" refers to the fact that users do not have a requirement for this feature or service, and, if provided, user satisfaction decreases significantly. This feature can create negative emotions in tourists; thus, this type of requirement item is negatively related to tourist satisfaction.

"Questionable result" stands for questionable results; generally, no answers fall into this category, usually because the question is incorrectly worded or the respondent has misunderstood the question.

2.2.2. Better–Worse Coefficient Method

According to the improvement of the Kano model by Berger, Matzler et al. [42,43], the Better–Worse customer satisfaction coefficient was proposed to quantitatively calculate the magnitude of the influence of the requirement factors. In this context, "Better" expresses the extent to which the user's satisfaction increases when a requirement factor is provided, and "Worse" indicates the extent to which user satisfaction decreases when a requirement factor is not provided. The formula is as follows:

$$\text{Better} = \frac{A + O}{A + O + M + I} \quad \text{Worse} = -\frac{O + M}{A + O + M + I} \tag{1}$$

Using this method, the values of Better–Worse customer satisfaction coefficients for all requirement factors are calculated, and a four-quadrant scatter plot corresponding to all factor coefficients is constructed (Figure 3). According to the Better–Worse coefficient, the Better value is used as the horizontal co-ordinate, and the absolute value of the Worse value is used as the vertical co-ordinate. The scatterplot is divided equally between the horizontal and vertical co-ordinates, with the co-ordinates (0.5, 0.5) serving as the separating axes for the four-quadrant attributes [42]. Factors that fall completely in the first quadrant are one-dimensional quality attributes, where the absolute values of Better and Worse are above 0.5. Factors that fall entirely in the second quadrant are must-be quality attributes, where the value of Better is below 0.5, and the absolute value of Worse is above 0.5. Factors that fall entirely in the third quadrant are indifferent quality attributes, where the values of Better and the absolute value of Worse are below 0.5. Factors falling entirely in quadrant 4 are attractive quality attributes, where the better value is above 0.5, and the absolute Worse value is below 0.5. The remaining reverse requirements and dubious results can be identified in the traditional way. If these two types of requirements occur, they can be eliminated before the remaining factors undergo Better–Worse coefficient calculation and classification. The importance of general requirement items is ranked according to must-be quality attribute (M) > one-dimensional quality attribute (O) > attractive quality attribute (A) > indifferent quality attribute (I).

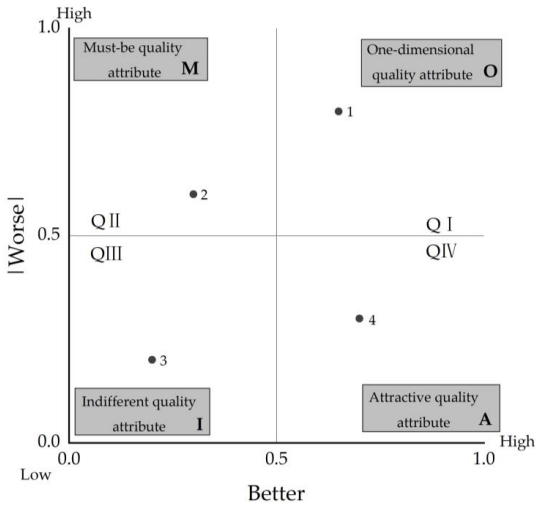

Figure 3. An example of four-quadrant plot.

2.2.3. Analysis of Improvement Factors

Referring to the screening method outlined in the book "*China Customer Satisfaction Index Guide*", the improvement factor sensitivity comparison matrix involves establishing a four-quadrant matrix diagram. This is achieved by using the Better value as the horizontal co-ordinate and the absolute Worse value as the vertical co-ordinate. The purpose is to create the improvement factor selection line, allowing for the segmentation of different improvement factors. The factor selection line is a 1/4 circular arc centered at the origin of the co-ordinate axis, with the distance from the origin to the four-quadrant segmentation point as the radius. The sensitivity "R" is defined as the size of the distance between the factor points on the right side of the factor selection line, calculated as follows [44]:

$$R = \sqrt{Better^2 + Worse^2} - \sqrt{2}\,0.5 \quad (2)$$

Through the calculation, it is evident that the maximum sensitivity, represented by $\sqrt{2}\,0.5$ (approximately 0.707), is about 0.707. The smallest sensitivity corresponds to the factor coinciding with the arc of the circle, with a size of 0. Therefore, the range of values for the factor sensitivity "R" is [0, 0.707] (Figure 4). The requirement factors located on the right side of the factor selection line are the ones requiring improvement. The farther away from the dots, the greater the sensitivity of these factors. In other words, the greater the distance from the improvement factor selection line is, the more attention these factors need for improvement. On the contrary, factors situated on the left side of the factor selection line indicate lower customer sensitivity, suggesting that these factors may not require immediate consideration.

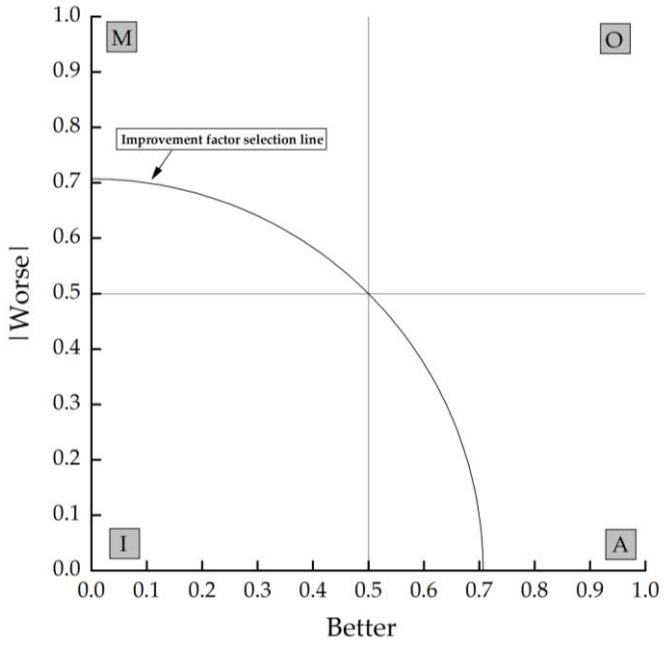

Figure 4. Schematic comparison matrix of sensitivity of improvement factors.

2.2.4. Analysis of Key Factors

Key factor selection involves drawing the key factor selection line on the improvement factor sensitivity comparison matrix graph to segment the improvement factors (Figure 5). Following the approach of previous scholars [45], the key factor selection line is identical to the improvement factor selection line. It constitutes a 1/4 arc with the origin of the co-ordinate axis (0, 0) as the center. Specifically, it is a 1/4 arc with a radius of 1.061 (3/4 of the distance from the circle point to the top right vertex of the matrix, i.e., the sensitivity $R = 0.707/2 \approx 0.354$).

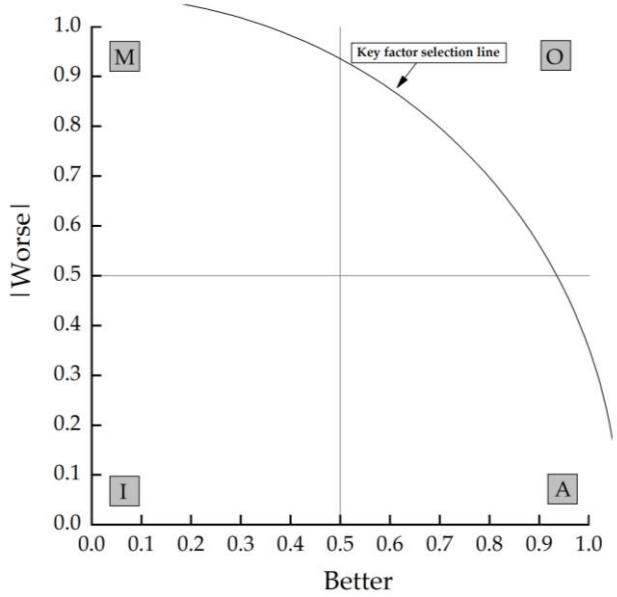

Figure 5. Schematic comparison matrix of sensitivity of key factors.

2.3. Determining the Requirement Indicators

The requirements for environmental education in urban theme parks have not yet formed a unified standard. Therefore, this paper is based on the "Implementation Guidelines for Environmental Education in Primary and Secondary Schools (Trial)", the "Specification for services on theme park" [46] the "Standard for classification of urban green space" [47], and other relevant regulations. Additionally, it combines the characteristics of the Maritime Silk Road Art Park's environmental education landscape (Appendix B), field surveys conducted in the park, and interviews with teenagers. The statistical analysis focuses on indicators of environmental education requirements that appear frequently. The requirement indicators are further planned and organized based on different dimensions, mainly differentiated according to the focus and requirement orientation of young visitors to the park. This approach avoids the intersection of classification and requirement types. A preliminary analysis of environmental education requirements in this theme park divides indicators into five first-level requirements: activity types, interpretation media, park facilities, space planning, and management services. Based on the content of environmental education in urban theme parks, a preliminary refinement of the environmental education requirements is carried out at the second level, addressing specific content, screening, and integration to determine the initial indicator system scale (Table 4). The study employs the Delphi method to further screen the requirement factors. This involves conducting an expert questionnaire with 10 experts in relevant research areas and modifying the indicators based on their opinions. Notable adjustments include merging "A1 Popular science lecture hall activity" with "A2 Environmental education program" and "A5 Outdoor learning classrooms" into "A1 Popular science lecture course". Additionally, "A6 Reading exchange activities" and "A9 Cultural theme activities" are combined into "A4 Festival theme activity", and "A8 Role-playing activity" is incorporated into "A7 Environmental education game". Further, "A6 Visiting themed exhibition" is added to the "Activity type" category. Several indicator items, such as "C2 Science popularization guide sign", "C3 Barrier-free facility", "C4 Catering hygiene facility", "C8 Thematic exhibition facility", "E3 Security protection system", and "E6 Environmental monitoring system", are excluded. The descriptions of questions corresponding to the requirement indicators have been consolidated and modified accordingly. In conclusion, the number of requirements in the broad category of "Activity type" is reduced from 10 to 7, the number of requirements in the broad category of "Park facility" is reduced from 8 to 4, and the number of requirements in the broad category of "Management service" is reduced from 7 to 5. The requirement

items in the categories of "Explanation service" and "Spatial planning" remain unchanged. Indicators related to environmental education are retained, and the final systematic scale is established (Table 5). The reasonableness of the categorization of requirements in the dimensions will be tested through subsequent analysis of the Kano model.

Table 4. Preliminary conception of environmental education requirement evaluation indicators.

Level 1 Requirement	Number	Level 2 Requirement	Title Description
Activity type	A1	Popular science lecture hall activity	Inviting experts in environmental education to give lectures on environmental ecology in the park.
	A2	Environmental education program	Designing one-on-one, large- and small-group type of courses to develop trainees' environmental awareness, behaviors, attitudes, etc.
	A3	Handicraft creation activity	DIY taxidermy, embossing, and other activities that inspire students' creativity.
	A4	Parent–child interactive activities	Parents and children participate in fun activities such as plant and animal identification and gardening.
	A5	Outdoor learning classroom	Teachers take students outdoors to experience nature first-hand and teach them about the environment.
	A6	Reading exchange activity	Organize regular thematic reading and sharing activities related to the environment.
	A7	Environmental education game	Play and discuss games related to environmental education in a fun and educational way.
	A8	Role-playing activity	Role-playing on the theme of environmental protection and experiencing the different stances of people from different walks of life in relation to the incident.
	A9	Cultural theme activity	Thematic activities on specific holidays such as Arbor Day and Environmental Day.
	A10	"Five senses experience" activity	Sense and experience nature through touch, smell, hearing, taste, and sight.
Explanation service	B1	Sign explanation system	Material carriers for popularizing and introducing science, such as environmental education explanation boards and public facility service boards.
	B2	Personnel explanation system	Professional interpreters explain the environment and current situation in the area.
	B3	Multimedia explanation	Audio-visual interpretation in the form of electronic maps, WeChat, radio, etc.
	B4	Explanatory publication	Brochures, explanatory folders, explanatory books, and other paper prints.
Park facility	C1	Guided signage facility	Guide signs for tourists to visit the park.
	C2	Science popularization guide sign	Signs that provide a scientific introduction to the flora and fauna of the park.
	C3	Barrier-free facility	Supporting service facilities that facilitate the safe passage and convenient use of elderly, children, disabled, and other members of society.
	C4	Catering hygiene facility	Use of non-disposable tableware, sewage, and waste disposal facilities.

Table 4. *Cont.*

Level 1 Requirement	Number	Level 2 Requirement	Title Description
Park facility	C5	Safety and security facility	Guardrails, warning signs, cameras, and other facilities to ensure the safety of tourists.
	C6	Leisure and recreation facility	Facilities for relaxation, such as seating and sitting structures made from local materials.
	C7	Public sanitation facility	Sanitation facilities such as dustbins and public toilets in the park.
	C8	Thematic exhibition facility	Thematic venues displaying the theme culture of the park, types of flora and fauna, etc.
Spatial planning	D1	Plant landscape planning	Plant species, levels, richness, color seasonal color variations, color matching, and stylistic ornamentation.
	D2	Landscape facility	Sculptures, water features, and other structures that high-light the theme of the park and raise awareness of environmental protection.
	D3	Park functional zoning	The overall layout of the park is clear, with a clear distinction between the distribution of park functions and spatial forms.
	D4	Trail route design	The tour line makes full use of the educational resources in the park to provide environmental education and sensory experience.
	D5	Pavement of road	Design the paving of the site in relation to the surrounding environment, showing the environmental education function in terms of materials, patterns, and other factors.
Management service	E1	Plant conservation management	Fertilizing, pruning, deworming, and other conservation measures for plants in the park.
	E2	facility maintenance management	Daily maintenance and management of facilities for recreation, science popularization, interpretation, entertainment, etc.
	E3	Security protection system	Park safety patrols, security measures, and distribution of security services.
	E4	Park management norms	The park's regulation and implementation of environmental education rules and regulations.
	E5	Consultancy services platform	Provide a platform for convenient consultation for the park.
	E6	Environmental monitoring system	Facilities for rapid and effective monitoring of environmental pollution and water quality.
	E7	Environmental education assessment	Evaluation of the effectiveness of environmental education in terms of awareness, knowledge, skills, attitudes, and participation.

Table 5. Environmental education requirement evaluation indicators.

Level 1 Requirement	Number	Level 2 Requirement	Title Description
Activity type	A1	Popular science lecture course	Inviting experts to the park to give lectures on topics related to environmental education.
	A2	Handicraft creation activity	DIY taxidermy, embossing, and other activities that inspire students' creativity.
	A3	Parent–child interactive activity	Parents and children participate in fun activities such as plant and animal identification and gardening.
	A4	Festival theme activity	Thematic reading activities on Book Day and thematic environmental activities on Arbor Day and Environmental Protection Day.
	A5	Environmental education game	Play and discuss games related to environmental education in a fun and educational way.
	A6	Visiting themed exhibition	Visit the theme culture of the park, flora and fauna theme, and other science popularization and interesting exhibition halls.
	A7	"Five senses experience" activity	Sense and experience nature through touch, smell, hearing, taste, and sight.
Explanation service	B1	Sign explanation system	Material carriers for popularizing and introducing science, such as environmental education explanation boards and public facility service boards.
	B2	Personnel explanation system	Professional interpreters explain the environment and current situation in the area.
	B3	Multimedia explanation	Audio-visual interpretation in the form of electronic maps, WeChat, radio, etc.
	B4	Explanatory publication	Brochures, explanatory folders, explanatory books, and other paper prints.
Park facility	C1	Guided signage facility	Guide signs for tourists to visit the park.
	C2	Safety and security facility	Guardrails, warning signs, cameras, and other facilities to ensure the safety of tourists.
	C3	Leisure and recreation facility	Facilities for relaxation, such as seating and sitting structures made from local materials.
	C4	Public sanitation facility	Sanitation facilities such as dustbins and public toilets in the park.
Spatial planning	D1	Plant landscape planning	Plant species, levels, richness, color seasonal color variations, color matching, and stylistic ornamentation.
	D2	Landscape facility	Sculptures, water features, and other structures that highlight the theme of the park and raise awareness of environmental protection.
	D3	Park functional zoning	The overall layout of the park is clear, with a clear distinction between the distribution of park functions and spatial forms.
	D4	Trail route design	The tour line makes full use of the educational resources in the park to provide environmental education and sensory experience.
	D5	Pavement of road	Design the paving of the site in relation to the surrounding environment, showing the environmental education function in terms of materials, patterns, and other factors.

Table 5. *Cont.*

Level 1 Requirement	Number	Level 2 Requirement	Title Description
Management service	E1	Plant conservation management	Fertilizing, pruning, deworming, and other conservation measures for plants in the park.
	E2	facility maintenance management	Daily maintenance and management of facilities for recreation, science popularization, interpretation, entertainment, etc.
	E3	Park management norms	The park's regulation and implementation of environmental education rules and regulations.
	E4	Consultancy services platform	Provide a platform for convenient consultation for the park.
	E5	Environmental education assessment	Evaluation of the effectiveness of environmental education in terms of awareness, knowledge, skills, attitudes, and participation.

The scale for environmental education requirements in this urban theme park is divided into five first-level requirement indicators, including activity type, explanation service, park facility, spatial planning, and management service. Each first-level requirement indicator includes several second-level requirement indicators along with the specific content of each indicator, totaling 25 in all.

2.4. Questionnaire Design

The questionnaire was designed with reference to relevant documents and literature, ensuring the objectivity and accuracy of the questions. Before inviting participants to complete the questionnaire, a brief introduction was provided regarding the essence and purpose of environmental education in theme parks. The questionnaire comprised two parts: basic personal information and the Kano questionnaire on the demand for environmental education in urban theme parks.

Basic personal information included age, gender, and education. The Kano questionnaire encompassed specific content corresponding to the five Level 1 indicators in the aforementioned scale, totaling 25 items. The questionnaire utilized the question pattern of the Kano questionnaire, with two functional and dysfunctional forms for each item. It featured a Likert scale with five levels of options for each question: "Like", "Must be", "Neutral", "Live with", and "Dislike". The corresponding rating scale was as follows: "Like" = 5, "Must be" = 4, "Neutral" = 3, "Live with" = 2, and "Dislike" = 1. Respondents expressed their evaluation of the requirement factors by selecting from these five options (Appendix A).

2.5. Questionnaire Distribution

The research questionnaire was distributed in both offline and online formats. The online questionnaire was disseminated through online channels to school-age youth who had visited the Maritime Silk Road Art Park. The offline questionnaire was randomly distributed to school-age youth within the park, with on-site recovery facilitated during the research period. Field visits revealed that teenagers had more time available during holidays and weekends, coinciding with the park's peak visitor flow. Therefore, paper questionnaires were distributed in the park on holidays and weekends from 1 May 2023 to 11 June 2023, while online questionnaires were concurrently distributed during this period (Table 6).

Table 6. Record of questionnaire distribution.

Place	Attractions	Date	Week	Weather	Time	Number of Questionnaires
The Group Carvings of East Asia		1 May 2023	Monday	Cloudy	9:00–11:00 15:00–17:00	43
		2 May 2023	Tuesday	Cloudy	9:00–11:30 15:00–17:30	45
The Group Carvings of West Asia		3 May 2023	Wednesday	Cloudy	9:00–11:00 15:00–18:00	48
		13 May 2023	Saturday	Cloudy	10:00–11:30 15:30–18:00	35
The Group Carvings of South Asia		14 May 2023	Sunday	Cloudy	10:00–11:00 15:00–17:00	30
		27 May 2023	Saturday	Sunny	10:00–11:00 16:00–18:00	32
The Group Carvings of Southeast Asia		28 May 2023	Sunday	Sunny	9:30–11:00 15:00–17:00	34
		11 June 2023	Sunday	Cloudy	10:00–11:00 15:00–17:00	33

During the formal distribution of the questionnaire, the author provided an explanation of the research content and purpose to the respondents. The questionnaire was distributed with the consent of the respondents and their parents. The researcher filled out the questionnaires, explained the rules for answering questions, addressed any issues encountered during the process, and ensured a smooth completion of the questionnaires. Respondents were assured that the questionnaires would be used solely for academic research and that their personal privacy would not be disclosed after completion. Adhering to the principle that the number of Kano questionnaires issued should exceed 200 and be ten times greater than the number of questions in the questionnaire [48], this research questionnaire, consisting of 25 questions, saw a total of 360 questionnaires issued—60 online and 300 paper questionnaires. After excluding 56 invalid questionnaires, 304 valid questionnaires were retrieved, resulting in an effective recovery rate of approximately 84.44%, aligning with the questionnaire distribution principle. The effective recovery rate of the questionnaire was about 84.44%, in accordance with the distribution principle.

3. Data Analysis and Interpretation

3.1. Description of Sample Characteristics

The questionnaires were first counted in terms of gender, age, and social attribute characteristics of the samples before they were formally filled out. According to the results of the survey, among the 304 valid samples, the proportion of men and women is relatively balanced, of which 155 are male, accounting for 51 percent, and 149 are female, accounting for 49 percent, which shows that the proportion of males is slightly higher than that of females in the research, thus indicating that the number of male and female adolescents who go to the park for fun is similar. The age distribution encompasses the youth age group of 10–19 years old, divided into three categories: 10–14 years old, 15–17 years old,

and 18–19 years old. Among the samples, the predominant age group is 10–14 years old, comprising 145 teenagers (47.7%), followed by 101 teenagers aged 15–17 years (33.2%), and 58 teenagers aged 18–19 years (19.1%). The number of younger, middle, and senior teenagers visiting the parks decreases sequentially. It is evident that individuals aged 10–14 prefer visiting the park for recreational activities. Participants are categorized as elementary school students, middle school students, high school students, and college students. The educational level distribution is fairly balanced, with a majority being primary and junior high school students. Specifically, there are 117 primary school students (38.5%), 106 middle school students (34.9%), 30 high school or secondary school students (9.9%), and 51 college or junior college students (16.8%). It is notable that elementary and middle school students have more time and energy and express a preference for park visits compared to adolescents in other categories. The specific sample characteristics are detailed in Table 7.

Table 7. Summary statistics on the characteristics of the sample population.

Project	Option	Number	Proportion
Gender	Male	155	51%
	Female	149	49%
Age	Aged 10 to 14	145	47.7%
	Aged 15 to 17	101	33.2%
	Aged 18 to 19	58	19.1%
Identity	Primary school student	117	38.5%
	Middle school student	106	34.9%
	High school student	30	9.9%
	Undergraduate	51	16.8%

3.2. Reliability Analysis of the Questionnaire

The reliability test aims to assess the dependability, stability, and credibility of the questionnaire results, typically employing the Cronbach's alpha coefficient for reliability testing. A higher Cronbach's alpha coefficient value indicates greater reliability, with values between 0.7–0.8 suggesting a certain degree of credibility. Values greater than 0.8 indicate a high level of credibility, while values exceeding 0.9 suggest very high credibility. Conversely, values below 0.7 indicate a lack of credibility.

The valid data were imported into SPSS 26.0, and the Cronbach's alpha reliability test was conducted for both functional and dysfunctional questions of the Kano questionnaire to analyze reliability. The results show that the Cronbach's alpha coefficients for all questions are greater than 0.8, indicating that the questionnaire's reliability is better, the internal consistency is good, and the test results are reliable. The specific results are shown in the table below (Table 8).

Table 8. Reliability statistical analysis.

Level 1 Requirement	Level 2 Requirement	Cronbach's Alpha for Question's Functional Form	Cronbach's Alpha for Question's Dysfunctional Form
Activity type	Popular science lecture course Handicraft creation activity Parent–child interactive activity Festival theme activity Environmental education game Visiting themed exhibition "Five senses experience" activity	0.938	0.926

Table 8. *Cont.*

Level 1 Requirement	Level 2 Requirement	Cronbach's Alpha for Question's Functional Form	Cronbach's Alpha for Question's Dysfunctional Form
Explanation service	Sign explanation system Personnel explanation system Multimedia explanation Explanatory publication	0.855	0.919
Park facility	Guided signage facility Safety and security facility Leisure and recreation facility Public sanitation facility	0.859	0.941
Spatial planning	Plant landscape planning Landscape facility Park functional zoning Trail route design Pavement of road	0.920	0.882
Management service	Plant conservation management facility maintenance management Park management norms Consultancy services platforms Environmental education assessment	0.885	0.890

3.3. Validity Analysis of the Questionnaire

Validity analysis is employed to scrutinize the validity of questionnaires and scales, assessing the reasonableness of item design and the appropriateness of variables represented by the items. The validity analysis necessitates testing through factor analysis. Before conducting factor analysis, it is imperative to establish a robust correlation between the items. This is often evaluated using the Kaiser–Meyer–Olkin (KMO) measure value and Bartlett's test of sphericity. The KMO test measure serves as an indicator for comparing the correlation coefficients of simple and partial correlations between variables. A larger KMO value signifies stronger correlations between variables, with a value exceeding 0.7 indicating suitability for factor analysis, while a value below 0.5 suggests unsuitability. Bartlett's test of sphericity assesses whether the questionnaire's options possess structural validity. A smaller significance level indicates better structural validity, with a significance (Sig) of less than 0.001 suggesting good structural validity. In this study, exploratory factor analysis was employed to assess the validity of the questionnaire. Various aspects, such as the KMO measure value, Bartlett's test of sphericity, rotated component matrix, communalities, and total variance explanation, were examined for each of the five dimensions, both functional and dysfunctional, and across all 25 questions. The data were imported into SPSS 26.0 software, and a correlation test was conducted, yielding the results presented in the table below (Table 9). The KMO value for the positive 25 questions of the questionnaire is 0.942, surpassing the 0.8 threshold, and the Sig significance of Bartlett's sphericity is 0.000, falling below 0.001. These results indicate that the questionnaire data are reliable, valid, and well-suited for factor analysis.

Table 9. KMO and Bartlett's test of question's functional forms.

Kaiser–Meyer–Olkin Measure of Sampling Adequacy		0.942
Bartlett's test of sphericity	Approx. chi-square	5177.34
	df	300
	Sig.	0.000

The table below analyzes the factor extraction scenario and the amount of information extracted from the factors. It can be observed that the factor analysis of the positive 25 questions in the questionnaire yielded a total of five factors with eigenvalues greater than 1. The rotated variance explained for these factors is 20.784%, 15.364%, 13.198%, 11.754%, and 11.261%, contributing to a rotated cumulative variance explained of 72.361%, surpassing the 60% threshold (Table 10). Consequently, most of the information pertaining to the 25 indicators can be explained using these five metrics.

Table 10. Total variance explanation of question's functional forms.

	Initial Eigenvalues			**Extraction Sums of Squared Loadings**			**Rotation Sums of Squared Loadings**		
Component	Total	% of Variance	Cumulative%	Total	% of Variance	Cumulative%	Total	% of Variance	Cumulative%
1	10.767	43.069	43.069	10.767	43.069	43.069	5.196	20.784	20.784
2	2.695	10.778	53.847	2.695	10.778	53.847	3.841	15.364	36.148
3	1.810	7.239	61.086	1.810	7.239	61.086	3.299	13.198	49.346
4	1.483	5.931	67.017	1.483	5.931	67.017	2.938	11.754	61.100
5	1.336	5.344	72.361	1.336	5.344	72.361	2.815	11.261	72.361
6	0.577	2.306	74.667						
7	0.524	2.096	76.763						
8	0.486	1.943	78.706						
9	0.452	1.809	80.516						
10	0.438	1.752	82.267						
11	0.404	1.616	83.883						
12	0.377	1.509	85.393						
13	0.367	1.467	86.860						
14	0.354	1.416	88.276						
15	0.350	1.398	89.674						
16	0.333	1.332	91.007						
17	0.315	1.259	92.266						
18	0.305	1.220	93.485						
19	0.287	1.149	94.635						
20	0.281	1.122	95.757						
21	0.251	1.003	96.760						
22	0.231	0.922	97.683						
23	0.211	0.844	98.527						
24	0.193	0.771	99.298						
25	0.175	0.702	100.000						

Extraction method: principal component analysis.

Table 11 indicates that the variance of the common factor corresponding to the positive 25 questions in the questionnaire exceeds 0.6, meeting the criterion of being higher than 0.4. This demonstrates the efficient extraction of research-oriented information and validates that the question design aligns with the criterion (Table 11). The exclusion of factor-loading coefficients less than 0.4 enhances clarity, affirming the reasonability of the categorization between dimensions and question items, and underscoring the significance of their relationship.

Table 11. Rotated component matrix of question's functional forms.

Name	Component					Communalities
	1	2	3	4	5	
Popular science lecture course	0.819					0.769
Parent–child interactive activity	0.814					0.749
Environmental education game	0.809					0.736
Festival theme activity	0.801					0.731
Handicraft creation activity	0.801					0.746
"Five senses experience" activity	0.790					0.740
Visiting themed exhibition	0.775					0.694
Pavement of road		0.805				0.768
Park functional zoning		0.787				0.769
Landscape facility		0.784				0.766
Trail route design		0.774				0.743
Plant landscape planning		0.765				0.739
Plant conservation management			0.731			0.690
Facility maintenance management			0.727			0.692
Environmental education assessment			0.722			0.698
Consultancy services platform			0.716			0.690
Park management norms			0.689			0.679
Personnel explanation system				0.803		0.720
Explanatory publication				0.798		0.722
Multimedia explanation				0.773		0.702
Sign explanation system				0.767		0.666
Guided signage facility					0.790	0.736
Public sanitation facility					0.789	0.756
Safety and security facility					0.780	0.716
Leisure and recreation facility					0.683	0.673

Extraction method: principal analysis. Rotation method: varimax with Kaiser normalization. Rotation converged in 6 iterations.

Table 12 presents the KMO value for the reverse 25 questions of the questionnaire as 0.832, surpassing the threshold of 0.8. Additionally, the significance level (Sig) of Bartlett's sphericity is 0.000, falling below 0.001. These results signify that the data in the questionnaire are reliable and valid, rendering it highly suitable for factor analysis (Table 12).

Table 12. KMO and Bartlett's test of question's dysfunctional forms.

Kaiser–Meyer–Olkin Measure of Sampling Adequacy		0.832
Bartlett's test of sphericity	Approx. chi-square	5769.599
	df	300
	Sig.	0.000

Table 13 provides an analysis of the factor extraction situation, including information on factor extraction. It is evident that the factor analysis of the reverse 25 questions of the questionnaire extracted a total of five factors with eigenvalues greater than 1. The rotated variance explained for these factors is 19.488%, 14.230%, 13.792%, 13.662%, and 12.963%, respectively. Furthermore, the rotated cumulative variance explained is 74.135%, surpassing the threshold of 60% (Table 13). Consequently, these five factors effectively explain the majority of the information contained in the 25 indicators.

Table 13. Total variance explanation of question's dysfunctional forms.

	Initial Eigenvalues			**Extraction Sums of Squared Loadings**			**Rotation Sums of Squared Loadings**		
Component	Total	% of Variance	Cumulative%	Total	% of Variance	Cumulative%	Total	% of Variance	Cumula-tive%
1	4.895	19.582	19.582	4.895	19.582	19.582	4.872	19.488	19.488
2	4.053	16.213	35.795	4.053	16.213	35.795	3.557	14.230	33.718
3	3.579	14.316	50.110	3.579	14.316	50.110	3.448	13.792	47.509
4	3.168	12.673	62.784	3.168	12.673	62.784	3.416	13.662	61.172
5	2.838	11.351	74.135	2.838	11.351	74.135	3.241	12.963	74.135
6	0.916	3.665	77.800						
7	0.814	3.256	81.055						
8	0.766	3.063	84.118						
9	0.371	1.483	85.601						
10	0.346	1.384	86.984						
11	0.335	1.341	88.325						
12	0.311	1.244	89.569						
13	0.272	1.090	90.659						
14	0.259	1.036	91.695						
15	0.243	0.970	92.666						
16	0.230	0.920	93.585						
17	0.220	0.880	94.466						
18	0.213	0.852	95.317						
19	0.208	0.833	96.150						
20	0.189	0.756	96.907						
21	0.179	0.717	97.624						
22	0.173	0.692	98.315						
23	0.158	0.632	98.948						
24	0.146	0.583	99.530						
25	0.117	0.470	100.000						

Extraction method: principal component analysis.

Table 14 illustrates that the variance of the common factors corresponding to the reverse 25 questions of the questionnaire is higher than 0.5, meeting the criterion of being higher than 0.4. This result confirms that research-oriented information can be efficiently extracted, and the design of the questions aligns with the criterion. The removal of factor loading coefficients less than 0.4 provides a clearer understanding of the rational categorization between dimensions and question items, highlighting the significance of their relationship (Table 14).

Table 14. Rotated component matrix of question's dysfunctional forms.

Name	Component					Communalities
	1	2	3	4	5	
Handicraft creation activity	0.880					0.782
Popular science lecture course	0.874					0.766
Festival theme activity	0.866					0.752
Parent–child interactive activity	0.853					0.731
Visiting themed exhibition	0.845					0.717
"Five senses experience" activity	0.771					0.602
Environmental education game	0.723					0.533
Plant conservation management		0.893				0.803
Consultancy services platform		0.871				0.766
Facility maintenance management		0.858				0.754
Park management norms		0.794				0.942
Environmental education assessment		0.774				0.606
Trail route design			0.871			0.768
Landscape facility			0.871			0.765
Plant landscape planning			0.858			0.745
Pavement of road			0.772			0.601
Park functional zoning			0.749			0.572
Leisure and recreation facility				0.935		0.880
Guided signage facility				0.929		0.865
Public sanitation facility				0.927		0.870
Safety and security facility				0.887		0.788
Multimedia explanation					0.901	0.816
Explanatory publication					0.898	0.813
Sign explanation system					0.888	0.793
Personnel explanation system					0.885	0.803

Extraction method: principal analysis. Rotation method: varimax with Kaiser normalization. Rotation converged in 6 iterations.

3.4. Traditional Kano Model Attribute Categorization Analysis

The traditional Kano model attribute categorization involves counting the frequency of positive and negative responses to requirement attitudes for each requirement type. This is carried out against a two-dimensional attribute categorization table, where the frequency distribution values and proportions of attractive quality attribute (A), one-dimensional quality attribute (O), must-be quality attribute (M), indifferent quality attribute (I), and reverse quality attribute (R) corresponding to each requirement type are tallied. The questionable result (Q) has already been eliminated during the questionnaire-screening process, so it is not considered. The category with the highest frequency of attributes is then identified as Kano attributes for the requirement item, forming the data foundation for subsequent Better–Worse analyses related to the attribute categorization of environmental education requirements. As depicted in Table 15, for instance, in the case of "A1 Popular science lecture courses", the attributes are distributed as follows: Attribute A = 118; Attribute O = 27; Attribute M = 11; Attribute R = 38; Attribute I = 59; and Attribute Q = 51. Attribute A has the highest frequency. Applying this methodology to the attitudes of 304 adolescents toward the 25 urban theme park environmental requirements results in a summary of the

attribute categorization of the factors of environmental education requirements (Table 16). The distribution shows that attributes A, O, M, and I are more evenly spread without reverse quality attributes.

Table 15. Example table of traditional Kano model attribute categorization (A1 as an example).

		If the Park Does Not Provide This Type of Requirement, Your Thoughts Are				
		Like	Must be	Neutral	Live with	Dislike
If the park offers this type of requirement, your thoughts are	Like	Q (47)	A (46)	A (28)	A (44)	O (27)
	Must be	R (10)	I (12)	I (8)	I (4)	M (4)
	Neutral	R (7)	I (14)	I (9)	I (6)	M (2)
	Live with	R (7)	I (0)	I (4)	I (2)	M (5)
	Dislike	R (8)	R (1)	R (3)	R (2)	Q (4)

Table 16. Traditional Kano attribute categorization.

Number	Type of Requirements	M	O	A	I	R	Q	Total	Attribute Categorization
A1	Popular science lecture course	11	27	118	59	38	51	304	A
A2	Handicraft creation activity	17	26	107	67	38	49	304	A
A3	Parent–child interactive activity	5	19	131	63	39	47	304	A
A4	Festival theme activity	10	23	116	58	47	50	304	A
A5	Environmental education game	70	114	57	32	19	12	304	O
A6	Visiting themed exhibition	10	13	110	72	51	48	304	A
A7	“Five senses experience” activity	58	100	74	46	11	15	304	O
B1	Sign explanation system	17	7	50	103	95	32	304	I
B2	Personnel explanation system	26	10	51	104	87	26	304	I
B3	Multimedia explanation	31	14	51	96	86	26	304	I
B4	Explanatory publication	24	8	57	99	82	34	304	I
C1	Guided signage facility	111	62	29	57	21	24	304	M
C2	Safety and security facility	102	41	43	63	29	26	304	M
C3	Leisure and recreation facility	87	103	49	36	13	16	304	O
C4	Public sanitation facility	114	50	24	54	25	37	304	M
D1	Plant landscape planning	68	103	56	38	12	27	304	O
D2	Landscape facility	50	113	71	43	11	16	304	O
D3	Park functional zoning	6	18	130	52	50	48	304	A
D4	Trail route design	58	92	60	52	18	24	304	O
D5	Pavement of road	9	27	91	78	49	50	304	A
E1	Plant conservation management	104	43	32	66	27	32	304	M
E2	facility maintenance management	111	58	30	60	20	25	304	M
E3	Park management norms	40	18	44	91	73	38	304	I
E4	Consultancy services platform	109	42	35	51	28	39	304	M
E5	Environmental education assessment	12	6	54	126	78	28	304	I

3.5. Better–Worse Coefficient Analysis

While the traditional Kano model effectively distinguishes attribute categorization among requirement factors, it falls short in considering the influence of requirement items on other attributes beyond the one with the largest proportion. This limitation prevents a comprehensive reflection of user satisfaction regarding the provision or absence of specific requirements. In response to this, the paper introduces Better–Worse coefficient analysis to address the deficiencies of the traditional Kano method, building upon the insights gained from the two-dimensional requirement attribute categorization data mentioned earlier.

The Better–Worse coefficient values for each factor are determined using the Better–Worse formula, exemplified by A1 Popular science lecture courses:

$$\text{Better} = \frac{118 + 27}{118 + 27 + 11 + 59} = 0.6744 \quad \text{Worse} = -\frac{27 + 11}{118 + 27 + 11 + 59} = -0.1767$$

Utilizing the Better–Worse coefficient, the Better value serves as the horizontal co-ordinate, while the absolute value of the Worse value serves as the vertical co-ordinate, generating a scatter plot. The four-quadrant scatter plot, which integrates the values of Better and Worse coefficients, quantitatively determines the ultimate attribute categorization for each requirement type. The specific final attribute categorization and scatter plot are computed and graphed using Origin 2018 (Table 17 and Figure 6).

Table 17. Better and Worse coefficient values and attribute categorization.

Number	Type of Requirements	Better Value	Worse Value	Attribute Categorization
A1	Popular science lecture course	0.6744	−0.1767	A
A2	Handicraft creation activity	0.6129	−0.1982	A
A3	Parent–child interactive activity	0.6881	−0.1101	A
A4	Festival theme activity	0.6715	−0.1594	A
A5	Environmental education game	0.6264	−0.6740	O
A6	Visiting themed exhibition	0.6000	−0.1122	A
A7	"Five senses experience" activity	0.6259	−0.5684	O
B1	Sign explanation system	0.3220	−0.1356	I
B2	Personnel explanation system	0.3194	−0.1885	I
B3	Multimedia explanation	0.3385	−0.2344	I
B4	Explanatory publication	0.3457	−0.1702	I
C1	Guided signage facility	0.3514	−0.6680	M
C2	Safety and security facility	0.3374	−0.5743	M
C3	Leisure and recreation facility	0.5527	−0.6909	O
C4	Public sanitation facility	0.3058	−0.6777	M
D1	Plant landscape planning	0.6000	−0.6453	O
D2	Landscape facility	0.6643	−0.5885	O
D3	Park functional zoning	0.7185	−0.1165	A
D4	Trail route design	0.5802	−0.5725	O
D5	Pavement of road	0.5756	−0.1756	A
E1	Plant conservation management	0.3061	−0.6000	M
E2	facility maintenance management	0.3398	−0.6525	M
E3	Park management norms	0.3212	−0.3005	I
E4	Consultancy services platform	0.3249	−0.6371	M
E5	Environmental education assessment	0.3030	−0.0909	I

According to the chart above, there are six factors in the first quadrant classified as "One-dimensional quality attribute (O)". If the park is equipped with these factors, adolescents' satisfaction will significantly increase. Conversely, if the park lacks these factors, adolescents' dissatisfaction will notably rise. Therefore, these factors should be prioritized after addressing essential requirements. In Quadrant II, labeled "Must-be quality attribute (M)", there are six factors. Since these represent the most fundamental requirements, they should be prioritized as the primary considerations. The third quadrant, denoted as "Indifferent quality attribute (I)", encompasses six factors. The provision or absence of these factors has no impact on youth satisfaction, indicating that undifferentiated requirements should be assigned the lowest priority. The fourth quadrant, representing "Attractive quality attribute (A)", includes seven factors. If the park incorporates these factors, youth satisfaction will significantly increase. However, if the park lacks these factors, youth satisfaction will not decrease. Therefore, the second-highest priority should be given to these expectations, which represent the second most crucial set of requirements.

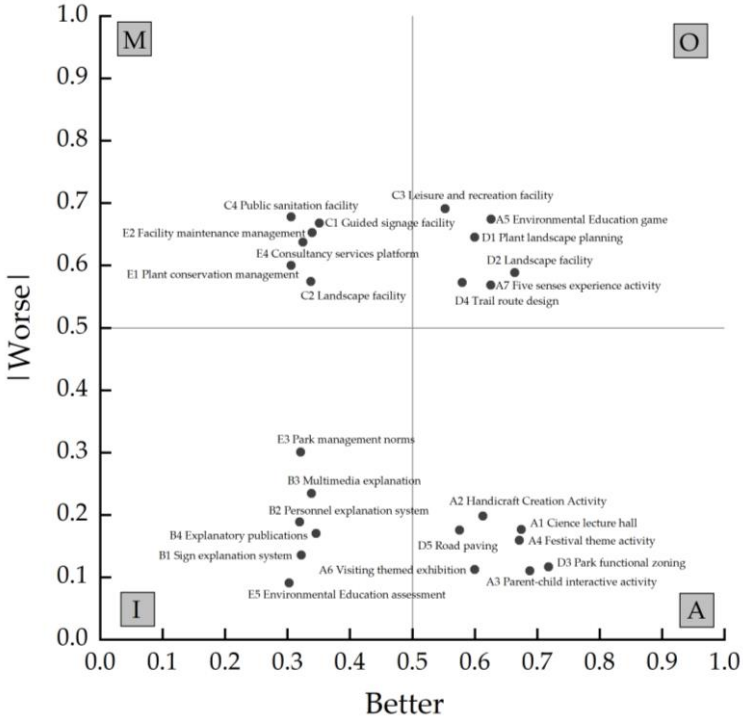

Figure 6. Better–Worse coefficient attribute scatter plot.

Combined with the scatter diagram and the priority ranking of the Kano model, must-be quality attribute (M) > one-dimensional quality attribute (O) > attractive quality attribute (A) > indifferent quality attribute (I) can be initially divided into four levels: must-be quality attribute (C1 Guided signage facility, C2 Safety and security facility, C4 Public sanitation facility, E1 Plant conservation management, E2 facility maintenance management, and E4 Consultancy services platform) > one-dimensional quality attribute (A5 Environmental education games, A7 "Five senses experience" activities, C3 Leisure and recreation facility, D1 Plant landscape planning, D2 Landscape facility, D4 Trail route design) > attractive quality attribute (A1 Popular science lecture course, A2 Handicraft creation activity, A3 Parent–child interactive activity, A4 Festival theme activity, A6 Visiting themed exhibition, D3 Leisure and recreation facility, D5 Pavement of road) > indifferent quality attribute (B1 Sign explanation system, B2 Personnel explanation system, B3 Multimedia explanation, B4 Explanatory publication, E3 Park management norms, E5 Environmental education assessment).

3.6. Requirements Importance Ranking

Since the traditional Kano model can only initially rank demand types according to the order of M > O > A > I and cannot carefully determine the priority order of each factor and its degree of influence on the youth, the concept of demand importance is introduced to rank the importance of each factor in a more detailed manner. According to the principles and formulas for screening improvement factors and key factors, it is observed that factors farther away from the origin of the co-ordinates exhibit greater customer satisfaction and require focused improvement. Therefore, the distance between the co-ordinate point of each factor and the origin can be calculated to rank its importance (Table 18), and the specific formula for distance (St) can be derived as follows:

$$\mathrm{St} = \sqrt{\mathrm{Better}^2 + \mathrm{Worse}^2} \quad (3)$$

Table 18. Satisfaction level and ranking of requirement indicators (in descending order).

Number	Type of Requirements	B–W Classification	St	Arrange in Order
A5	Environmental education game	A	0.9201	1
D2	Landscape facility	O	0.8874	2
C3	Leisure and recreation facility	O	0.8848	3
D1	Plant landscape planning	O	0.8811	4
A7	"Five senses experience" activity	O	0.8454	5
D4	Trail route design	O	0.8151	6
C1	Guided signage facility	M	0.7547	7
C4	Public sanitation facility	M	0.7435	8
E2	facility maintenance management	M	0.7357	9
D3	Park functional zoning	A	0.7278	10
E4	Consultancy services platform	M	0.7152	11
A1	Popular science lecture course	A	0.6972	12
A3	Parent–child interactive activity	A	0.6968	13
A4	Festival theme activity	A	0.6902	14
E1	Plant conservation management	M	0.6736	15
C2	Safety and security facility	M	0.6661	16
A2	Handicraft creation activity	A	0.6441	17
A6	Visiting themed exhibition	A	0.6104	18
D5	Pavement of road	A	0.6018	19
E3	Park management norms	I	0.4399	20
B3	Multimedia explanation	I	0.4118	21
B4	Explanatory publication	I	0.3854	22
B2	Personnel explanation system	I	0.3708	23
B1	Sign explanation system	I	0.3494	24
E5	Environmental education assessment	I	0.3164	25

From the perspective of requirement dimensions, the most crucial factor in the first level of must-be quality attribute (M) is C1 Guided signage facility, followed by C4 Public sanitation facility, with C2 Safety and security facility being the least significant. In the second level of one-dimensional quality attribute (O), the most important factor is D2 Landscape facility, followed by C3 Leisure and recreation facility, and the least important is D4 Trail route design. The most significant factor in the third level of attractive quality attribute (A) is A5 Environmental educational game, followed by D3 Park functional zoning, and lastly, D5 Pavement of road. In the last level of indifferent quality attribute (I), E3 Park management norms take precedence, and E5 Environmental education assessment is considered the least important. The specific ranking results are shown in Table 19.

Table 19. Sort by importance of attribute categories.

Attribute Category	Importance Ranking
Must-be quality attribute	C1 Guided signage facility > C4 Public sanitation facility > E2 facility maintenance management > E4 Consultancy services platform > E1 Plant conservation management > C2 Safety and security facility
One-dimensional quality attribute	D2 Landscape facility > C3 Leisure and recreation facility > D1 Plant landscape planning > A7 "Five senses experience" activity > D4 Trail route design
Attractive quality attribute	A5 Environmental education game > D3 Park functional zoning > A1 Popular science lecture course> A3 Parent–child interactive activity > A4 Festival theme activity > A2 Handicraft creation activity > A6 Visiting themed exhibition > D5 Pavement of road
Indifferent quality attribute	E3 Park management norms > B3 Multimedia explanation > B4 Explanatory publication > B2 Personnel explanation system > B1 Sign explanation system > E5 Environmental education assessment

From the perspective of requirement types, at the activity type level, A5 Environmental education game was the most important, followed by A7 "Five senses experience" activity, and A6 Visiting themed exhibition was the least important. In the explanation service category, the most crucial factor was B3 Multimedia explanation, followed by B4 Explanatory publication, and the least important factor was B1 Sign explanation system. In the park facility dimension, C3 Leisure and recreation facility was the most important, and C2 Safety and security facility was the least important. At the spatial planning level, D2 Landscape facility was the most important factor, followed by D1 Plant landscape planning, while D5 Pavement of road was the least important factor. In the management service category, E2 facility maintenance management ranked first in importance, with E5 Environmental education assessment at the bottom. The specific ranking results are shown in Table 20.

Table 20. Sort by importance of requirement categories.

Type of Requirements	Importance Ranking
Activity type	A5 Environmental education game > A7 "Five senses experience" activity > A1 Popular science lecture course > A3 Parent–child interactive activity > A4 Festival theme activity > A2 Handicraft creation activity > A6 Visiting themed exhibition
Explanation service	B3 Multimedia explanation > B4 Explanatory publication > B2 Personnel explanation system > B1 Sign explanation system
Park facility	C3 Leisure and recreation facility > C1 Guided signage facility > C4 Public sanitation facility > C2 Safety and security facility
Spatial planning	D2 Landscape facility > D1 Plant landscape planning > D4 Trail route design > D3 Park functional zoning > D5 Pavement of road
Management service	E2 facility maintenance management > E4 Consultancy services platform > E1 Plant conservation management > E3 Park management norms > E5 Environmental education assessment

3.7. Screening of Improvement Factors

The sensitivity "R" of the improvement factors for the environmental education requirements of this urban theme park was calculated using the improvement factor screening method (Table 21). The sensitivity comparison matrix of improvement factors was then generated through direct graphing (Figure 7). It can be concluded that there are 11 factors that need improvement, with the highest sensitivity observed in A5 Environmental education game, followed by D2 Landscape facility, and the smallest sensitivity found in E4 Consultancy services platform. Among the 11 improvement factors, 5 are classified as

one-dimensional quality attribute (O), accounting for approximately 45%; there are only 4 must-be quality attribute (M) factors, making up about 36%; only 1 attractive quality attribute (A) factors is included, representing approximately 9%; and there are 0 indifferent quality attribute (I), also accounting for 0%.

Table 21. Sensitivity ranking of improvement factors (in descending order).

Number	Type of Improvement Factors	B–W Classification	Sensitivity (R)	Arrange in Order
A5	Environmental education game	A	0.2131	1
D2	Landscape facility	O	0.1804	2
C3	Leisure and recreation facility	O	0.1778	3
D1	Plant landscape planning	O	0.1741	4
A7	"Five senses experience" activity	O	0.1384	5
D4	Trail route design	O	0.1081	6
C1	Guided signage facility	M	0.0477	7
C4	Public sanitation facility	M	0.0365	8
E2	facility maintenance management	M	0.0287	9
D3	Park functional zoning	A	0.0208	10
E4	Consultancy services platform	M	0.0082	11

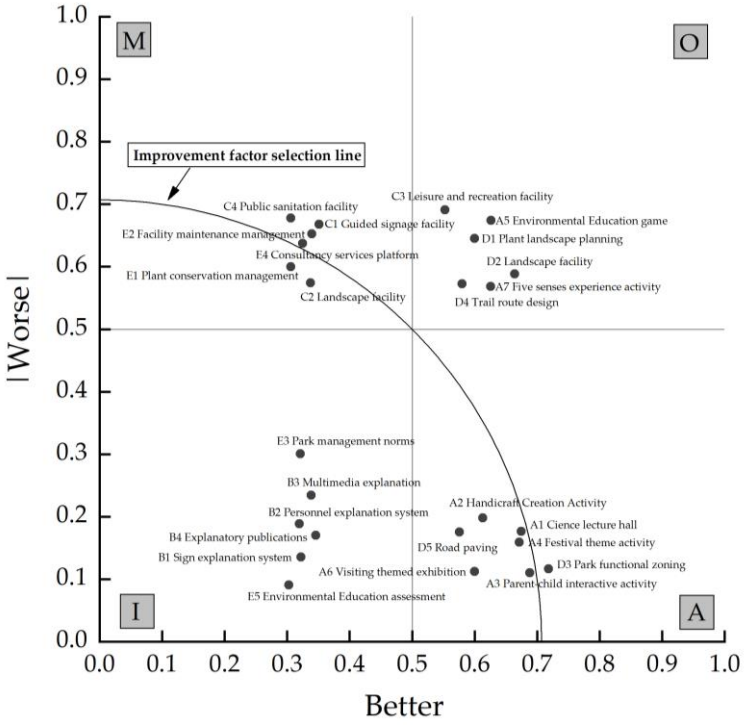

Figure 7. Sensitivity comparison matrix of improvement factors.

3.8. Screening of the Key Factors

After screening the improvement factors, further identification of key factors that require focused attention among these improvement factors is necessary. Referring to Figure 8, it is evident that the sensitivity of all improvement factors in the requirement factors studied in this paper falls between the improvement factor selection line and the key factor selection line. Consequently, all of them are classified as ordinary improvement

factors, indicating the absence of key factors in this study. Thus, all factors are prioritized at the same level.

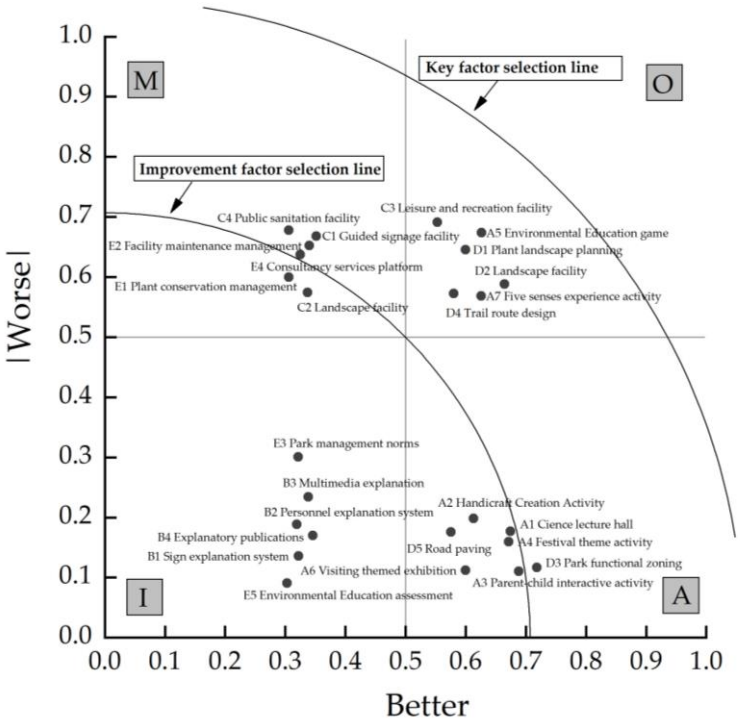

Figure 8. Key factor screening matrix.

3.9. Results and Discussion

Building upon the prior data analysis of the 25 categories of requirement factors, the conclusive results of Kano attribute categorization, element screening, etc. are summarized in Tables 22 and 23.

Table 22. KANO attribute category summary table.

Traditional KANO Model Attribute Categorization Better–Worse Coefficient Method	
Activity type	Factors
M	C1, C2, C4, E1, E2, E4
O	D2, C3, D1, A7, D4
A	A1, A2, A3, A4, A6, D3, D5
I	B1, B2, B3, B4, E3, E5
R	none
Q	none

Table 23. Summary of improvement factors and key factors.

Improvement Factors, Key Factor Screening (Sensitivity Classification)		
Activity type	Improvement factors	Key factors
M	C1, C4, E2, E4	none
O	D2, C3, D1, A7, D4	
A	A5, D3	

The specific analysis indicates that this study did not identify key factors, suggesting that there is no urgent requirement for adolescents. Consequently, there is no immediate need for improvement in these factors. Upon further examination of the improvement factor screening, the following observations were made:

In the activity type dimension, the environmental education game and the "five senses experience" activity are one-dimensional quality attributes with high sensitivity, classifying them as improvement factors. These factors strongly influence the satisfaction of teenage visitors, revealing that teenagers prefer engaging in lively game activities and free socialization. On the other hand, the popular science lecture course, handicraft creation activity, parent–child interactive activity, festival theme activity, and visiting themed exhibition are attractive quality attributes. While not identified as improvement factors, they exhibit a high degree of importance. This is attributed to adolescents' inclination to accompany friends and family members to the park and their preference for interaction with elements such as shapes, materials, and smells. It is evident that these types of requirements should not be overlooked.

The majority of requirements within the park facility category are considered must-be quality attributes, signifying the high importance of this category. Notably, the consultancy services platform, guided signage facility, public sanitation facility, and facility maintenance management, irrespective of their sensitivity levels, fall under the essential facilities that a park must possess. The construction of park infrastructure significantly influences the visitor experience and warrants strong emphasis.

Leisure and recreation facilities, classified as one-dimensional quality attributes with high sensitivity, constitute 11 factors for improvement. This underscores the preference of young people for recreational amenities, indicating a need to reinforce and enhance such facilities to cater to this requirement.

In the spatial planning dimension, landscape facility, plant landscape planning, park functional zoning, and trail route design are identified as improvement factors. Among these, landscape facility, plant landscape planning, and trail route design are categorized as one-dimensional quality attributes with high sensitivity. This implies that these requirements significantly influence the satisfaction of adolescent users. Some studies indicate that adolescents exhibit a heightened preference for water elements. Consequently, for the environmental space planning of parks, incorporating more landscapes and sculptures with water elements and integrating plant landscapes and tour routes with water features, may enhance adolescents' interest to a greater extent.

Among the types of management services, facility maintenance management, consultancy services platform, and plant conservation management are classified as must-be quality attributes, belonging to the improvement factors that require focused implementation. Conversely, park management norms and environmental education assessment are identified as indifferent quality attributes with lower importance ranking. It is evident that, for the youth group, owing to their young age, immaturity, and limited understanding of the rules and regulations governing park construction and management, these requirements are not particularly salient to them.

The significance of the explanation service dimension was not prominent, suggesting that adolescents' attention is not focused on this service when visiting parks. Since the purpose of adolescents visiting parks is more for socializing and experiencing, their attention is more focused on visually stimulating objects, and they may not be sensitive to this type of service. Therefore, the provision of park explanation services for the youth group may not be considered at the moment. However, as a medium to convey site-specific information to the public, the interpretation system is a type of service that requires extra attention in park construction.

4. Conclusions

With the acceleration of social industrialization, city builders and developers are increasingly focusing on low-carbon and green concepts in people's daily lives. Based on

the principle of "human-centeredness" and a user perspective, this study aims to explore the preferences of the youth group for environmental education in urban theme parks at this stage, taking public requirements as a guide. Building upon previous research and expert evaluations, the demand for environmental education is divided into five dimensions, encompassing 25 factors. The study introduces the Kano model of user requirements, proposing an analytical method for categorizing user demand for environmental education in urban theme parks, determining the degree of importance, and screening improvement indicators. This paper employs the questionnaire survey method to distribute surveys to young people of different ages and identities, aiming to intuitively understand the needs of the target demographic and consider their emotional responses. Through statistical analysis, the study draws more specific and scientific conclusions, enhancing the realism and reliability of the findings. The goal is to comprehensively explore the preferences of the youth population regarding environmental education requirements, addressing the existing gap in quantitative research on the demand for environmental education in youth theme parks. The study aims to provide objective and reasonable theoretical guidance and reference value for understanding the demand for environmental education in youth urban theme parks.

The results of the study confirm that teenage users exhibit a higher inclination towards activities involving direct contact and intuition, potentially enhancing their emotional experiences. Outdoor activities are shown to effectively reduce hostility between students and foster a sense of closeness. Adolescents, being in a unique stage of growth, undergo continuous development and adjustment in psychological and physiological aspects. They tend to be strongly attracted to certain things, making it easier to engage them in environmental education. This also implies that the development of environmental education requires a suitable platform that taps into the subtle influences on young minds, going beyond the mere impartation of knowledge.

Environmental education involves a fusion of various disciplines such as aesthetics, botany, pedagogy, and communication. Its execution is influenced by national policy, economic development, and the quality of the population. The vigorous development of environmental education can contribute significantly to advancements in these areas. For instance, in the long run, environmental education can effectively enhance the quality and environmental awareness of young people. Simultaneously, the improvement of the population's quality will continue to propel the development of environmental education. This illustrates a mutually reinforcing relationship between the two aspects.

In recent years, urban developers have made efforts to create spaces that align with the principles of sustainability, providing conducive environments for environmental education. An example of this is the "Maritime Silk Road Art Park—Asia Park" in Quanzhou City, Fujian Province. However, being positioned as a cultural theme park, its suitability for establishing an environmental education system applicable to all park types is questionable, presenting one of the limitations of this study.

While this study extensively reviewed data and literature and conducted quantitative analyses of environmental education requirements, it has certain limitations. Notably, the study fails to identify factors requiring urgent improvement, indicating room for enhancement in the extraction and screening of factors. Despite specifically selecting samples from a particular age group, variations in characteristics, social status, and age among tourists were not considered, impacting the generalizability of the findings. The random selection of samples also introduced subjective arbitrariness in questionnaire responses, which was challenging to control effectively. Additionally, the environmental education requirement indicator set for theme parks, constructed based on the perspective of adolescents, may have a certain degree of timeliness. As user needs evolve over time, future research should adopt a longitudinal approach to address these shortcomings.

5. Recommendations

(1) Introduce a variety of environmental education activities:

In the design and planning of environmental education initiatives in theme parks, emphasis can be placed on organizing games and experiential activities. Additionally, popular science activities are well-suited for parks with high accessibility. These activities, characterized by both high engagement and educational value, allow young individuals to make independent choices and acquire knowledge in a natural setting, contributing to the widespread dissemination of environmental education.

(2) Enhance and optimize the construction of public facilities within the park:

The facilities provided in urban theme parks are directly utilized by adolescent visitors and significantly impact their satisfaction. Integrating these park facilities with environmental protection concepts promotes a more conducive environment for environmental education.

(3) Thoughtfully plan the public space environment within the park:

Aligning space planning with environmental education, designers can rationally design dynamic pathways, and incorporate environmentally friendly seating, sculptures, and other facilities based on the park's characteristics and available resources. Properly configuring plant species and showcasing the park's environmental resources content help instill ecological and environmental protection concepts, encouraging youth to engage more extensively with their surroundings.

(4) Ensure efficient park management services and facility maintenance:

Offering various services to fulfill the physiological needs of young visitors and conducting regular maintenance of park facilities, plant care, and pest control address their psychological needs. This approach enhances the satisfaction of young visitors and boosts the overall attractiveness of the park.

(5) Develop and diversify interpretation services:

Interpretation services serve as a prerequisite for various functions such as educational attractions and recreational activities, playing a crucial role in environmental protection advocacy. These services guide tourists' perspectives and behaviors, offering a cost-effective and impactful medium for promoting environmental awareness and conservation.

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Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Dear fellow traveler,

Hello!

For young individuals, environmental education holds substantial educational value, playing a crucial role in enhancing our understanding of the ecological environment in our surroundings and fostering environmental awareness. During our daily visits to parks, we

have the opportunity to develop a sense of responsibility for environmental conservation by focusing on small actions within our reach. This questionnaire is specifically designed to explore the demand for environmental education factors during visits to theme parks.

To ensure the confidentiality of your responses, this questionnaire is completed anonymously. The information gathered will be used solely for academic research purposes. The author guarantees strict confidentiality and pledges not to disclose any personal information. Please feel at ease while filling out the questionnaire, and we sincerely appreciate your cooperation!

Thank you!

Part I: Basic Information

1. Your age:
2. Your gender:

☐ Male ☐ Female

3. Your current status:

☐ Elementary School Student
☐ Middle School Student
☐ High School Student
☐ College Student

Part II: Multiple-choice question

Table A1. Questionnaire on environmental education requirements in urban theme parks from the perspective of adolescents.

1. Inviting experts to the park to give lectures on topics related to environmental education.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
2. DIY taxidermy, embossing, and other activities that inspire students' creativity.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
3. Parents and children participate in fun activities such as plant and animal identification and gardening.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
4. Thematic reading activities on Book Day and thematic environmental activities on Arbor Day and Environmental Protection Day.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					

Table A1. *Cont.*

5. Play and discuss games related to environmental education in a fun and educational way.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
6. Visit the theme culture of the park, flora and fauna theme, and other science popularization and interesting exhibition halls.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
7. Sense and experience nature through touch, smell, hearing, taste, and sight.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
8. Material carriers for popularizing and introducing science, such as environmental education explanation boards and public facility service boards.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
9. Professional interpreters explain the environment and current situation in the area.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
10. Audio-visual interpretation in the form of electronic maps, WeChat, radio, etc.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
11. Brochures, explanatory folders, explanatory books, and other paper prints.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
12. Guide signs for tourists to visit the park.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
13. Guardrails, warning signs, cameras, and other facilities to ensure the safety of tourists.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					

Table A1. *Cont.*

14. Facilities for relaxation, such as seating and sitting structures made from local materials.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
15. Sanitation facilities such as dustbins and public toilets in the park.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
16. Plant species, levels, richness, color seasonal color variations, color matching, and stylistic ornamentation.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
17. Sculptures, water features, and other structures that highlight the theme of the park and raise awareness of environmental protection.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
18. The overall layout of the park is clear, with a clear distinction between the distribution of park functions and spatial forms.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
19. The tour line makes full use of the educational resources in the park to provide environmental education and sensory experience.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
20. Design the paving of the site in relation to the surrounding environment, showing the environmental education function in terms of materials, patterns, and other factors.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
21. Fertilizing, pruning, deworming and other conservation measures for plants in the park.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
22. Daily maintenance and management of facilities for recreation, science popularization, interpretation, entertainment, etc.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					

Table A1. *Cont.*

23. The park's regulation and implementation of environmental education rules and regulations.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
24. Provide a platform for convenient consultation for the park.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					
25. Evaluation of the effectiveness of environmental education in terms of awareness, knowledge, skills, attitudes, participation, etc.					
	Like	Must be	Neutral	Live with	Dislike
If the park offers this activity your thoughts are: If the park doesn't offer this activity your thoughts are:					

Appendix B

Table A2. Factors of environmental education requirements in the Maritime Silk Road Art Park.

Type of Requirements	**Attraction**		
Activity type			
			
Explanation service			

Table A2. *Cont.*

Type of Requirements	Attraction		
Explanation service			
Park facility			
			
Spatial planning			
			

Table A2. *Cont.*

Type of Requirements	Attraction		
Management service			
			

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