

A study on resource allocation of table tennis facility

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Abstract: this research was designed to discuss the differences of students' perceptions before and after they use table tennis facilities and service quality. These students were taking the physical class at the time. The study was also aimed to investigate the pros and cons of the present table tennis facilities. Furthermore, it was hoped to detect the possible flaw in terms of resource allocation and explore the possible improvements. A questionnaire with a total number of 20 questions which included several attributes, such as sports facilities, courts planning, and service was utilized in the research. 249 students who took the course participated in the data collection. A paired t-test analysis was used to find the difference of perception before and after they experience the facilities. Additionally, an Importance-Performance Analysis (IPA) grid was used to investigate the key factors of the possible resource allocation problems. The IPA was divided into four categories, "Keep up the good work", "Possible overkill", "Low priority" and "Concentrate here". The results indicate that there were eight items at "Keep up the good work" grid ; four items fell at "Possible overkill" grid ; three items located at "Low priority" grid, and five items fell at "Concentrate here" grid. Especially, the items in "Concentrate here" grid included, "the length of time for repairing failure facilities", "the accessibility for the disabled, and "the air quality of table tennis courts". The results may show the priority issues that need to be addressed to improve the sports facilities. The outcomes of research may serve as guidelines in sports facilities management and policy making. The application of the results was hoped to increase the satisfaction of the table tennis facilities effectively and students' motivation to participate in table tennis, in turn, to develop students' sporting habit for life.

Keywords: Importance-Performance Analysis, resources allocation, sports facilities.

1. INTRODUCTION

Due to the manpower, financial resources and lack of effective management, the sports facilities do not function as properly as expected in Taiwan. Additionally, inadequate management and maintenance is also likely to cause serious safety concern [2, 5, 6, 9]. As a result, the issue of building a positive and safe environment becomes crucial when promoting sports [3, 10-11]. The gym in a university is used as primary teaching space for physical course and internal events. Therefore, the gym might be the most frequently used facilities by students besides the regular teaching classrooms. The excellence teaching quality relies on knowledge transfer and upgrade of appropriate hardware and software teaching facilities. Recently, due to the drastic change on policies, society, and economy, the funding has decreased. It has affected universities' budget for maintenance and repairing facilities. As the result, the facilities were not managed effectively. Every university faces the challenge on how to effectively manage the facilities with the limited resources to match the needs of teachers and students. Adequate facility is an important factor for the promotion of sports. Additionally, it is a waste of resource, if the resource is not utilized effectively with adequate facilities [7]. A well-managed school facility is the key for building a sports-friendly environment.

In recent years, the emphasis on quality and performance has been important in society. Also, in many universities, the strategies and actions are actively promoted to ensure the quality and performance in order to keep up the competitiveness. The provision adequate

facility is the foundation of excellent physical education. Additionally, design and planning of facilities also influence users' behaviors [1, 4, 8].

In order to understand students' need for table tennis facilities, this research was designed to discuss the differences in students' perceptions before and after using table tennis facilities and service quality. The participants were the students of a university of technology. The study also aimed at investigating the pros and cons of the present table tennis facilities. Furthermore, it was hoped to detect the possible flaw in terms of resource allocation and explore the possible improvements.

2. METHODS

2.1 Participants

They were 249 students who were taking the physical education class in the university. 155 (62.2 %) were females. They were 15-20 years old and most of them (43.4 %) were 20 years old. The disposable income of the majority of participants (93.6 %) was under NTD 20,000. 41.0 % of the participants studied in management school and their frequency of exercise was 2-6 times a week (56.2%).

2.2 Measurements

This empirical research was specifically conducted in table tennis facilities. Additionally, a questionnaire with 20 questions which included several attributes, such as sports facilities, courts planning, and service, was also used. The participants were asked to rate on a 7-point Likert based scale their perception of the importance and their satisfaction of the performance of each

attribute, “1” being “very unimportant” / “very unsatisfied”, and “7” being “very important” / “very satisfied”.

Sports facilities

The dimension of sports facilities includes seven questions which are the number of table tennis courts, the size of table tennis courts, the subordinate facilities of table tennis courts, the quality of facilities in the table tennis courts, the number of facilities in the table tennis courts, the color matching of the table tennis court and the accessibility for the disabled in the table tennis courts. This dimension was designed to measure users' recognition of the importance and satisfaction of sports facilities provision.

Courts planning

Five questions were included to measure this attribute: the signs and instructions of table tennis courts, the design of table tennis courts, the lighting of table tennis courts, the air quality of table tennis courts and the safety of table tennis courts facilities. It was designed to measure users' perception of the importance and satisfaction of court planning.

Service

The dimension included eight questions: the management of table tennis courts, the cleanness of table tennis courts, the procedure and the effectiveness of reserving facilities, the equipment for preventing sport injuries, the maintenance of table tennis courts facilities, the length of time for repairing failure facilities, the open time for using table tennis courts facilities and the convenience of table tennis courts facilities. This dimension was designed to measure users' recognition of the importance and satisfaction of the service provided by the table tennis venue.

3. RESULTS

As shown in Table 1, 5 attributes were believed to be the most important before the participants experience the facilities and equipment: the air quality, the quality of equipment in the courts, the safety of the courts facilities, their maintenance, and their cleanness. The attribute, color matching, has the lowest average score, 4.87. Overall, the participants had a positive expectance before experiencing the equipment and facilities.

As for the satisfaction after the participants utilized the table tennis facilities, five items scored the highest: the cleanness, the safety, the size, the number of facilities, and the maintenance of table tennis courts facilities. Among all the items, the air quality of table tennis courts had the lowest score (4.22). As the result, the users were satisfied with cleanness, safety, size,

number of equipment, and maintenance of the facilities. On the other hand, the participants were not satisfied with the air quality.

A paired t-test comparing the users' perception before and after experiencing the table tennis facilities was conducted and the result is shown in Table 1. This test was found to be significant ($p < 0.05$). An Importance-Performance Analysis (IPA) grid was further used to investigate the key factors of the possible resource allocation problems. As shown in Fig. 1, the two dimensional IPS model is divided into four quadrants with importance on x-axis and satisfactions on y-axis. The IPA was divided into four categories, “Keep up the good work”, “Possible overkill”, “Low Priority”, and “Concentrate here”.

Quadrant 1 (Top right: High Importance / High Satisfaction): there were eight items at “Keep up the good work” grid: the design of table tennis courts, the lighting, the cleanness, the subordinate facilities, the quality of facilities, the number of facilities, the maintenance, and the safety of table tennis courts facilities.

Quadrant 2 (Top left: Low Importance / High Satisfaction): four items fell at “Possible overkill” grid: the number of table tennis courts, their size, their management, and the procedure and the effectiveness of reserving facilities.

Quadrant 3 (Bottom left: Low Importance / Low Satisfaction): three items located at “Low priority” grid: the signs and instructions of table tennis courts, their color matching, and the open time for using table tennis courts facilities.

Quadrant 4 (Bottom right: High Importance / Low Satisfaction): five items fell at “Concentrate here” grid: the air quality, the equipment for sport injuries, the length of time for repairing failure facilities, the accessibility for the disabled, and the convenience of table tennis courts facilities.

The results indicate that the items in “Concentrate here” grid included the length of time for repairing failure facilities, the accessibility for the disabled, and the air quality of table tennis courts. They may show the priority issues that need to be addressed to improve the sports facilities. The outcomes of research may serve as guidelines in sports facilities management and policy making. The application of the results was hoped to increase the satisfaction of the table tennis facilities effectively and students' motivation for participating in table tennis, in turn, to develop students' sporting habit for life.

Table 1 The Importance – Performance of table tennis resources

items	Importance	Performance	gap	t value
1. The number of table tennis courts	5.18	4.66	0.52	4.484**
2. The size of table tennis courts	5.33	4.73	0.60	5.261**
3. The signs and instructions of table tennis courts	5.15	4.36	0.79	6.638**
4. The design of table tennis courts	5.49	4.69	0.80	7.624**
5. The lighting of table tennis courts	5.47	4.61	0.86	7.945**

6. The air quality of table tennis courts	5.69	4.22	1.47	11.907* *
7. The management of table tennis courts	5.33	4.65	0.68	6.729**
8. The cleanness of table tennis courts	5.54	4.86	0.68	6.604**
9. The subordinate facilities of table tennis courts	5.45	4.64	0.81	7.312**
10. The quality of facilities in the table tennis courts	5.63	4.63	0.99	8.704**
11. The number of facilities in the table tennis courts	5.49	4.71	0.78	7.483**
12. The procedure and the effectiveness of reserving facilities	5.31	4.69	0.62	5.988**
13. The equipment for sport injuries	5.51	4.50	1.02	9.397**
14. The color matching of the table tennis court	4.87	4.55	0.33	3.103*
15. The maintenance of table tennis courts facilities	5.56	4.70	0.86	8.313**
16. The length of time for repairing failure facilities	5.53	4.56	0.96	9.630**
17. The accessibility for the disabled in the table tennis courts	5.44	4.52	0.92	8.835**
18. The safety of table tennis courts facilities	5.63	4.75	0.88	8.818**
19. The open time for using table tennis courts facilities	5.21	4.32	0.89	7.727**
20. The convenience of table tennis courts facilities	5.41	4.41	1.00	8.583**
Average	5.41	4.59		

* p < 0.01; ** p < 0.001

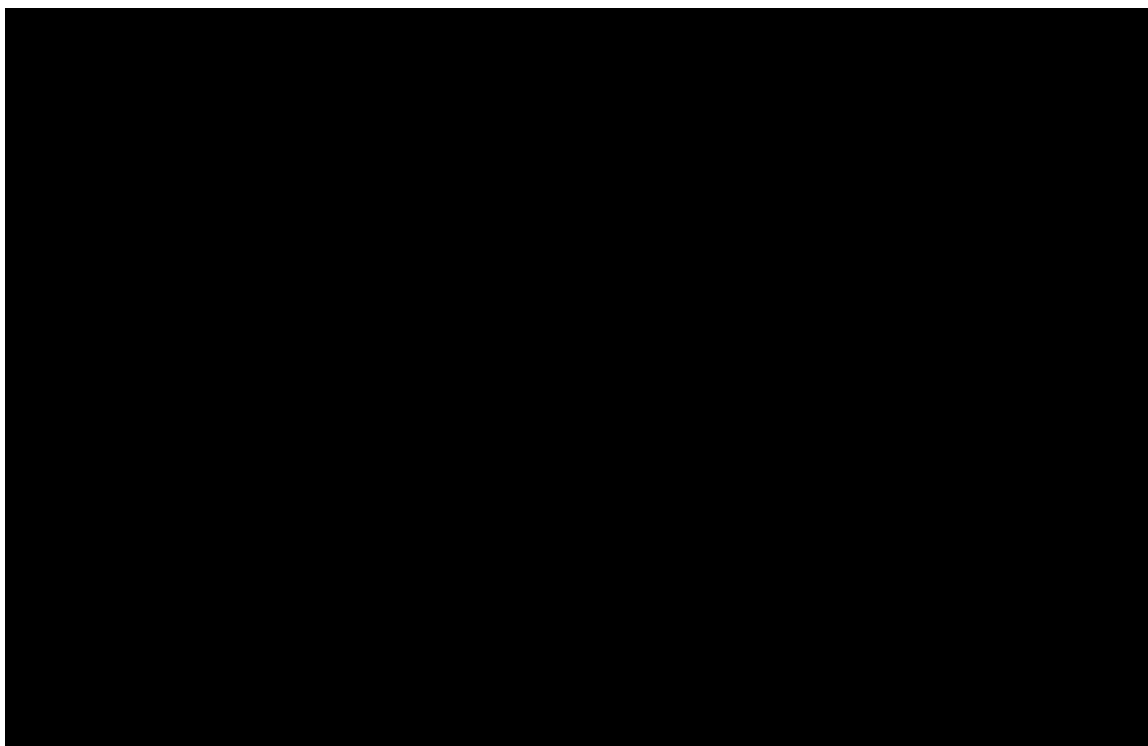


Fig. 1 The Importance-Performance analysis grid

4. DISCUSSION

This research was designed to discuss the differences of students' perceptions before and after they used table tennis facilities and service quality. A questionnaire with 20 questions which included several attributes, such as sports facilities, courts planning, and service was utilized. As the results shown, the organization's efforts on planning, subordinate facilities, lighting, cleanness, quality of equipment, quantity of equipment,

maintenance, and safety were recognized and are the strengths of the organization. Additionally, since the location of the table tennis courts was at the basement of the building, the air quality, the accessibility of the facilities need to be improved with top priority, as well as the equipment for sport injuries and the length of time for repairing failure facilities. The participants were highly satisfied with number, size, and management of table tennis courts, and the effectiveness of reserving facilities. As for the signs and instructions,

the color matching, and the open time for using table tennis courts facilities, they were overly emphasized and there is no need to put more resources.

5. CONCLUSION

Accessibility is considered as essential in public infrastructure. Although there are a small number of handicapped students using table tennis facilities, it is still important to increase the accessibility for handicapped people. It is not only increasing the opportunities for handicapped students to use the facilities, but also advocating a life-long sports habit [8]. The table tennis courts were located in the basement of the building for space management efficiency. The air conditioning was installed in the facilities; however, there was a poor air circulation. It was recommended the air quality be improved by installing air filters or indoor design.

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