



The Design Consideration of Outdoor Playground: From Elementary School Student's Perceived Attraction and Satisfaction

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ABSTRACT Since outdoor playground is important for elementary school students (ESS), the facilities set in playground can play an important role in triggering children's learning and socialization. This study used importance performance analysis to explore elementary school students' expected perceived attraction and actual experienced satisfaction perceptions towards school outdoor sports playground. ESS in Taiwan from 3rd to 6th grades were targeted as the main research objects. The findings are: (1) in the 1st quadrant students feel satisfied and attracted that "playground has equipment with swinging and vibration features" and "have climbing drill equipment with balance functions", (2) six items in the 2nd quadrant was with highly perceived attraction but low satisfaction, (3) the 3rd quadrant with seven items were with low degrees in both perceived attraction and satisfaction, and (4) the 4th quadrant containing seven items were with low perceived attraction and high satisfaction effectively. Based on this, recommendations were proposed.

INTRODUCTION

Children's participation in games and activities are considered very important in early age. (Kao and Chen 2011). In children's growing stages and perceptions, games mean education. They live and learn through game activities. In other words, throughout these living and learning processes, games are their world. Through games, they learn to cooperate with others, and also they can learn useful skills and gain knowledge. Therefore, it is important to accompany and encourage children to join game learning activities to develop their autonomy and creativity. Hence it is crucial to stress the importance of comprehensive development of children games (Miller and Almon 2009).

Especially, for children's socialization, outdoor activities are considered as an extension of indoor learning activities (Yang and Tsai 2012). As indicated by Marino et al. (2012), 37.5 percent of children prefer playing outdoors and spend an average of 36 minutes per day getting engaged in outdoor games. On elaborating preschool children, Baranowski et al. (1993) found out that preschool children spend more time playing or conducting more physical activities indoors. Therefore, in order for children to make full use of the outdoor playground equipment and game playing time for achieving proper mental and physical development, it is extremely important to provide children with high-quality outdoor playground games, playground equipment with good quality, playground attraction in accordance with their preferences, and games that are able to create fun and enjoyment.

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Concerning the planning and design of campus outdoor sports playground, Tsai (2002) indicated that the vast majority of school principals, general directors, playground equipment manufacturing companies, and agents views are often based on children or adults' self-perspectives to design what they believe to be children's needs towards sports playground and to set up fun-filled games with "attraction effects". In fact, if these games are unable to attract children for recreation use, not only it will cause a great loss to the design meaning but also children will not achieve their real game needs. Therefore, this study hopes that by investigating students' perceived high attraction and high satisfaction towards school sports playground and taking children's demands towards playground as the main goals for planning, it will provide schools with useful references for designing campus outdoor sports playground.

However, despite having a wide range of studies on children's game-related discussions, the main research topics are on exploring preschool children's game inquiries, game therapy, children's game development, children's playing game behavior (Li 2006; Lin and Lin 2008; Tsai 2010; Kao and Chen 2011; Ripat and Becker 2012), there have been only few studies discussing outdoor playground situations. In addition, the main focus of studies in kindergarten or elementary school outdoor playground planning are on playground environmental safety, children's park, and community outdoor playground (Chang et al. 2005; Lin and Hung 2008; Ting et al. 2008; Rhea and Nigaglioni 2016); hence it has been observed that there are relatively few studies exploring the relationship between children's perceived attraction and satisfaction. In order to fill the research gap, this study through investigating children's actual preferences and satisfaction hopes to fully explore the physical and psychological needs of students with different backgrounds in order to provide sufficient references for playground planning. As such, ensuring that schools have attractive playground and children after using the playground achieve satisfaction and pleasant feelings have become the two main motivations of this study.

In the extant literature, the Important-Performance Analysis (IPA) methodology was mentioned as an approach for measuring customers' "importance" and "satisfaction" perceptions towards product or service features (Martilla and James 1977; Feng et al. 2014; Shia et al. 2016). As

such, the index of each examined feature would be calculated and classified into two-dimensional graphics. For these benefits, in recent years the IPA approach has been widely applied in tourism and leisure industry to investigate the relationship between customers' expectation (importance degree) and actual experience (performance degree). In accordance with the research purposes, this study aims to utilize the adjusted IPA in which playground attraction degree is set as the emphasis (importance) while total satisfaction degree is viewed as the performance (performance standards). From their mean values, the coordinate center of the matrix is established, which in turn divides the two-dimensional matrix into four distinguished quadrants of (I) "maintain – keep up the good work", (II) "focuses of improvement – concentrate here", (III) "low priority", and (IV) "over-supplied" (Fig. 1). Regarding the planning of the school sports playground, the executives are proposed to sufficiently understand elementary school students' needs and satisfaction as well as the degree of their perceived attraction towards the playground. Taking this point, this study aims through elementary school students' viewpoints (customers' perceptions) and the IPA methodology to understand and evaluate children's perceived attraction and actual experienced satisfaction towards the use and performance of school outdoor sports playground.

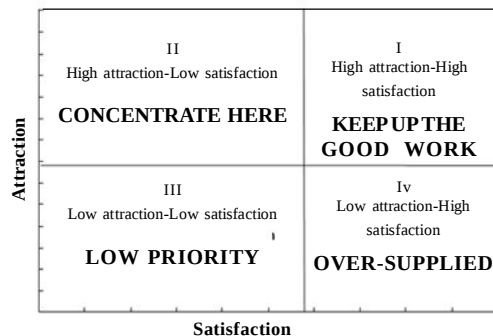


Fig. 1. Important - performance coordinate
Source: Author

Purposes of the Study

In sum, the main purposes of this study are (1) to explore the actual factors influencing children's preferences through understanding elementary school children's current attraction and satisfaction perceptions towards campus outdoor sports playground and (2) to analyze the rela-

tionship between degrees of attraction and satisfaction dimensions through the application of the IPA methodology with four distinguished quadrants. The findings hope to provide educational administrators and school managers with useful references for better planning and designing campus outdoor sports playground.

MATERIAL AND METHODS

Participants

The study is based on a survey of 600 elementary school students in Taiwan. Using clustering sampling, students from nine elementary school in Taiwan from grade Three to Six were chosen as participants. All participating students obtained parental consent. With the assistance of school homeroom teachers in collecting data, 553 valid questionnaires were obtained with a highly effective response rate of 92.1 percent.

Research Instruments and Measures

The survey questionnaires were composed of four main parts of "personal background investigation" (that is, basic personal background of elementary school children such as gender, grade), "usage survey" (that is use time, frequency of use, people to use together, staying time, equipment quantity availability, and playground facilities), "playground attraction scales", and "playground satisfaction scales".

Concerning playground attraction scales, this study was based on Hou et al. (2001) and Yang and Tsai (2012) and other related literature to develop the satisfaction scales. As such, the proposed satisfaction scales used in this study included five main dimensions which were playground sports functions (4 questionnaire items), playground facility exterior (4 items), children's psychological experience (5 items), playground environmental planning (4 items), and playground administration (5 items). Then, the cumulative mean was calculated to find out degree of perceived attraction of children towards the sports playground.

The scale was evaluated using Likert's 5-point scales which ranged from 1 to 5 points, they were respectively, "very unattractive", "unattractive", "neutral", "attractive", and "very attractive". Consequently, the items with higher scores would indicate children's higher degree of perceived attraction. Concerning the reliability

test, the results showed that the internal consistency coefficients for the scales respectively were .73 (playground sports functions), .76 (playground facility exterior), .85 (children's psychological experience), .83 (playground environmental planning), and .83 (playground administration). In sum, the achieved Cronbach's α coefficient for the total scale was .93, implying high internal consistency, thus high reliability for the attraction scales.

Concerning playground satisfaction scales, similar calculation was conducted with cumulative mean in order to understand the degree of actual experienced satisfaction of children towards the sports playground. The scale was measured using Likert's 5-point scales which ranged from 1 to 5 points, they were respectively, "very dissatisfied", "dissatisfied", "neutral", "satisfactory", and "very satisfied". Accordingly, the items with higher scores would indicate children's higher degree of actual experienced satisfaction and vice versa. Concerning the reliability test, the achieved Cronbach's α coefficient for the items respectively were .79 (playground sports functions), .85 (playground facility exterior), .89 (children's psychological experience), .86 (playground environmental planning), .85 (playground administration). In general, the achieved Cronbach's α coefficient for the total scale was .95, implying high internal consistency, thus high reliability for the satisfaction scales.

Data Processing

This study utilized SPSS version 20.0 for questionnaire data statistical analysis. As such, descriptive analysis was first carried out. In the next step, Importance-performance analysis (IPA) was employed as the main instrument in order to explore the relationship between the degrees of children's expected perceived attraction and actual experienced satisfaction towards campus outdoor sports playground. Accordingly, attraction degree was set as the vertical (X) axis while degree of experienced satisfaction was set as the horizontal (Y) axis, subsequently dividing the graph into four quadrants. Specifically, the first quadrant of high attraction and satisfaction represented the included items which should be continuously maintained and treated as opportunities. Noteworthy, the second quadrant with items of high attraction but low satisfaction strongly indicated considerable threats which should be paid more attention to or improved.

Meanwhile, once being located in the third quadrant with low degrees in both attraction and satisfaction, the items would be perceived as weaknesses with low priorities. Finally, the fourth quadrant of high degrees in both attraction and satisfaction on the contrary represented over-supplied considerations, which in turn implies they were not necessary to be too emphasized.

RESULTS

Characteristics of the Respondents

Elementary school students' demographic analysis (see Table 1) showed that out of 553 surveyed students, 263 were male (47.6%) and 290 were female (52.4%). Most of the partici-

pants were in the fifth grade (142 students - 25.7%) and used the playground mainly in recess (265 students - 47.9%) with major daily average staying time from 11 to 30 minutes (239 students - 43.2%) and major weekly average playing game frequency from once to twice (195 students - 35.3%). As for playmates, most of them chose classmates to play together (344 students - 62.2%). Seventy percent were willing to participate in outdoor activities. As for equipment availability, fifty percent considered accessible while the other half disagreed.

Attitude of Attraction and Satisfaction Perceptions towards School Outdoor Sports Playground

Table 2 presents the descriptive analysis of respondents' attraction and satisfaction towards school outdoor sports playground. The first three attractive items are "playground with swinging and vibration features" (mean=3.52), "playground has climbing drill equipment with balance functions" (mean=3.34), and "playground with colorful combinations" (mean=3.24) while three lowest items were "playground helps promote affections among classmates and friends" (mean=2.17), "playground helps relax and relieve stress" (mean=2.19), and "playground helps stay healthy and enhance physical health" (mean=2.20). In sum, playground attraction dimensions ranging from high to low respectively were "playground sports functions" (mean=3.24), "playground facility exterior" (mean=2.82), "playground environmental planning" (mean=2.67), "playground administration" (mean=2.57), and "children's psychological experience" (mean=2.26). The details of the analysis were presented in Table 2.

Similarly, as presented in Table 2, the cognitive analysis results of elementary school students' satisfaction perceptions towards school outdoor sports playground showed three highest items which respectively were "playground helps relax and relieve stress" (mean =3.86), "playground helps stay healthy and enhance physical health" (mean =3.81), and "playground helps promote affections among classmates and friends" (mean =3.80) while three lowest items were "playground has equipment with slippery features" (mean =3.30), "playground modeling

Table 1: Elementary school student demographic analysis

<i>Variables</i>	<i>n</i>	<i>%</i>
<i>Gender</i>		
Male	263	47.6
Female	290	52.4
<i>Grade</i>		
3 rd grade	140	25.3
4 th grade	145	26.2
5 th grade	142	25.7
6 th grade	126	22.8
<i>Use Time</i>		
Morning- before school	9	1.6
Period breaks	265	47.9
During PE or extracurricular activities	166	30.0
After class	21	3.8
Sat./ Sun.	38	6.9
Summer / winter vacation	54	9.8
<i>Choose Whether to Participate</i>		
Yes	387	70.0
No	166	30.0
<i>Daily Average Staying Time</i>		
< 10 minutes	171	30.9
11-30 minutes	239	43.2
31-50 minutes	83	15.0
> 51minutes	60	10.8
<i>Weekly Average Playing Game Frequency</i>		
< once per week	160	28.9
1-2 times per week	195	35.3
3-4 times per week	98	17.7
> 5 times per week	100	18.1
<i>People to Use Together</i>		
Alone	26	4.7
Family member	49	8.9
Classmates	344	62.2
Friends	127	23.0
Neighbors	7	1.3
<i>Equipment Quantity Availability</i>		
Enough	278	50.3
Not enough	275	49.7

Table 2: Descriptive statistical analysis of elementary school students' attraction and satisfaction perceptions towards school outdoor sports playground

Dimensions and items	Attraction			Satisfaction		
	Mean	Standard deviation	Ranking	Mean	Standard deviation	Ranking
<i>Playground Sports Functions</i>	3.2	0.9		3.5	0.9	
X1	3.5	1.2	01	3.7	1.1	05
X2	2.9	1.1	06	3.3	1.1	22
X3	3.3	1.2	02	3.7	1.2	06
X4	3.2	1.3	04	3.4	1.2	17
<i>Playground Facility Exterior</i>	2.8	0.5		3.4	0.9	
X5	3.1	1.4	05	3.3	1.2	21
X6	3.2	1.1	03	3.4	1.1	20
X7	2.5	1.1	16	3.5	1.1	10
X8	2.5	1.1	17	3.5	1.1	11
<i>Children's Psychological Experience</i>	2.3	0.9		3.8	0.9	
X9	2.2	1.1	22	3.8	1.1	03
X10	2.2	1.1	21	3.9	1.1	01
X11	2.2	1.1	20	3.8	1.1	02
X12	2.4	1.2	18	3.7	1.1	04
X13	2.4	1.2	19	3.7	1.1	07
<i>Playground Environmental Planning</i>	2.7	0.9		3.4	0.9	
X14	2.5	1.1	14	3.6	1.1	08
X15	2.8	1.1	07	3.4	1.1	18
X16	2.7	1.1	10	3.4	1.1	16
X17	2.7	1.1	08	3.4	1.1	19
X18	2.7	1.2	09	3.4	1.1	15
<i>Playground Administration</i>	2.6	1.0		3.5	1.0	
X19	2.6	1.1	12	3.5	1.2	13
X20	2.6	1.2	11	3.5	1.2	14
X21	2.5	1.2	15	3.6	1.1	09
X22	2.6	1.3	13	3.5	1.2	12
Total scale	2.7	0.5		3.5	0.8	

styles" (mean =3.31), and "playground color combinations" (mean=3.37). In sum, playground satisfaction dimensions ranging from high to low respectively were "children's psychological experience" (mean=3.77), "playground sports functions" (mean=3.52), "playground administration" (mean= 3.50), "playground environmental planning" (mean=3.44), and finally "playground facility exterior" (mean=3.43).

Attraction - Satisfaction Important Performance Analysis

Table 2 indicated the mean of students' perceived attraction and satisfaction degrees after being surveyed with 22 questionnaire items. Then, through Important-Performance Analysis (IPA), based on the achieved overall means, the coordinate axes (2.69, 3.54) were chosen as the origin point for evaluating attraction and satisfaction degrees. The IPA distribution of the items for each dimension was as follows:

Playground Sports Functions

Figure 2 shows the playground sports functions dimension. The items "playground has equipment with swinging and vibration features" (1) and "playground has equipment with slippery features" (3) were located in the first quadrant while the items "playground has climbing drill equipment with balance functions" (2) and "playground has equipment with rotation functions" (4) belonged to the second quadrant.

Playground Facility Exterior

Figure 3 shows the playground facility exterior dimension. The items "playground modeling styles" (5) and "playground color combinations" (6) were located in the second quadrant while the items "playground equipment and facility diversity" (7) and "multi-functional playground facilities" (8) were distributed into the third quadrant.

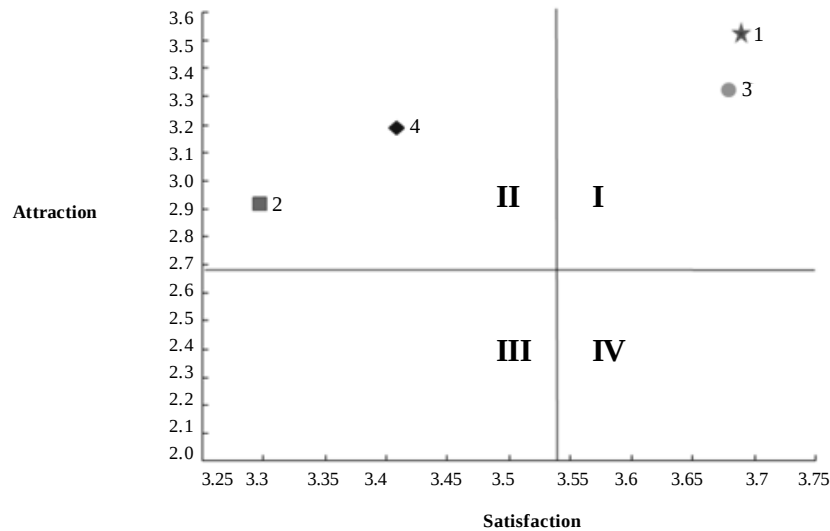


Fig. 2. Playground sports functions: Attraction – Satisfaction important performance analysis

Source: Author

Children's Psychological Experience

Figure 4 shows the children's psychological experience dimension. The items of "playground helps promote feelings among classmates and friends" (9), "playground helps relax and relieve stress" (10), "playground helps stay healthy and enhance physical health", "playground helps

improve interpersonal relations", and "using the sports playground is interesting" (13) gathered in the fourth quadrant.

Playground Environmental Planning

Figure 5 shows the playground environmental planning dimension. Those two items "play-

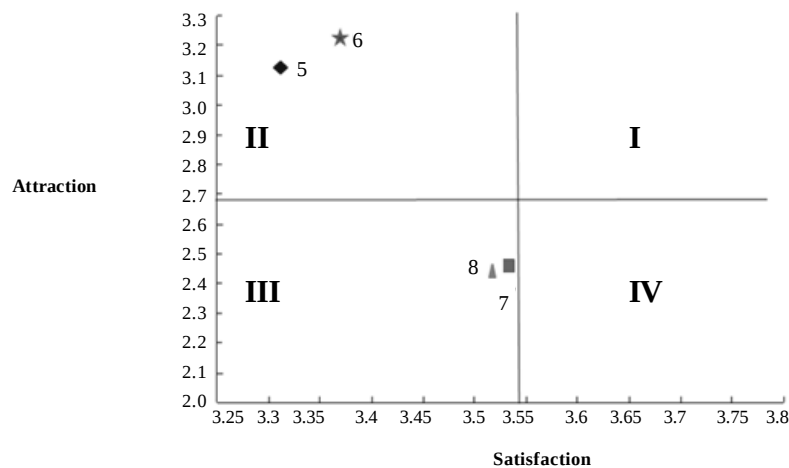


Fig. 3. Playground facility exterior: Attraction – Satisfaction important performance analysis

Source: Author

ground field line planning" (15) and "playground space planning" (17) were located in the second quadrant, followed by the items "playground location ease of use" (16) and "playground facility public use planning" (18) in the third quadrant. The item "feeling towards overall atmosphere of the sports playground" (14) was found to be in the fourth quadrant.

Playground Administration

The playground administration dimension was composed of four items. As shown in Figure 6, three items of "playground management and maintenance" (19), "playground hygienic environment" (20), and "playground open use methods" (22) were distributed into the third quadrant while the item "security condition of the sports playground" (21) belonged to the fourth quadrant.

DISCUSSION

Play should be at the hearth of children's daily lives. A play space needs to be of high quality and shall attract children's attention while improving their physical and psycho-social development. For this reason, a well-designed

physical environment is important to support children's needs (Manav and Erkan 2012).

The descriptive analysis showed that the factor "playground has equipment with swinging and vibration features" in attracting children to play ranks first, which is consistent with the findings of Li (2008) and Lin and Lin (2008). It is the love of children for swinging and vibration feelings in physical activities that act as one of the reasons for their choices of game devices and playground equipment. Since swinging and vibration features can provide children opportunities to create a sense of balance and reaction capabilities, simultaneously these kinds of playground equipment are more adventurous, interesting, and challenging, they are perceived more attractive and consequently are more favored by children. Noteworthy, ranking after "playground has equipment with swinging and vibration features" is "playground color combinations", implying that the diversity in colors of playground equipment is often more likely to attract children's attention. This result is in line with the ideas of Kao (2002) and Wang (2009) that in order to attract children to the playground to play, it is of great importance to design the school playground facility exterior with diverse

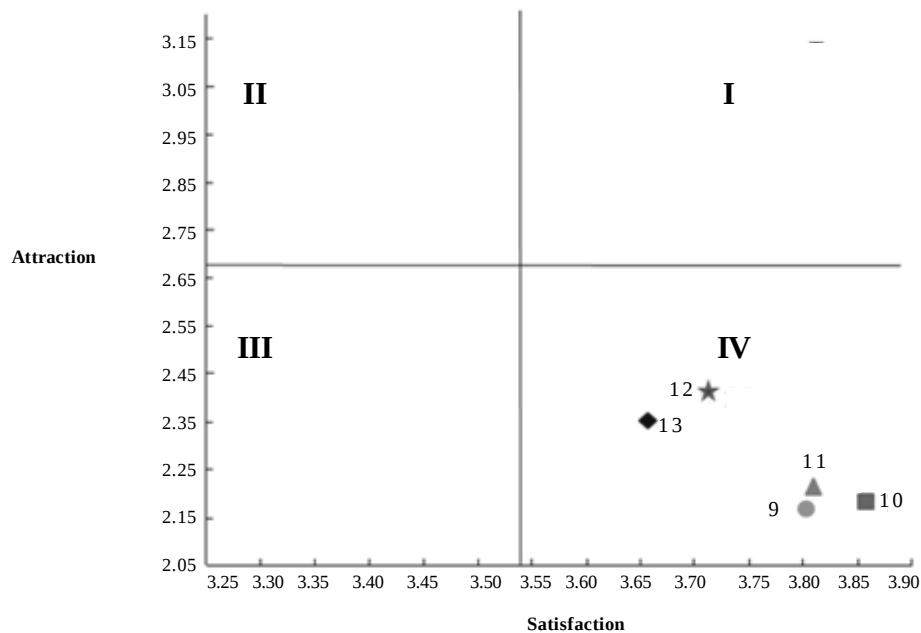


Fig. 4. Children's psychological experience: Attraction – Satisfaction Important Performance analysis
Source: Author

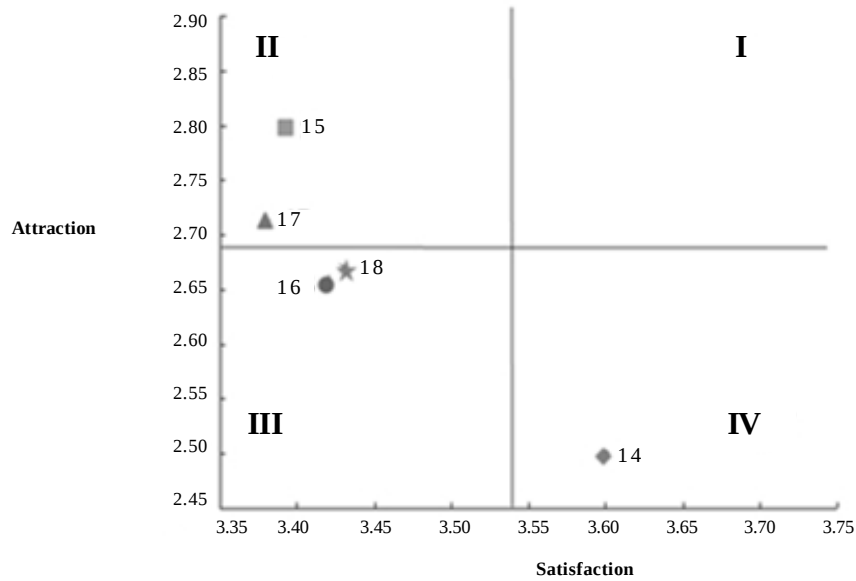


Fig. 5. Perceived playground environmental planning: Attraction – Satisfaction Important Performance analysis

Source: Author

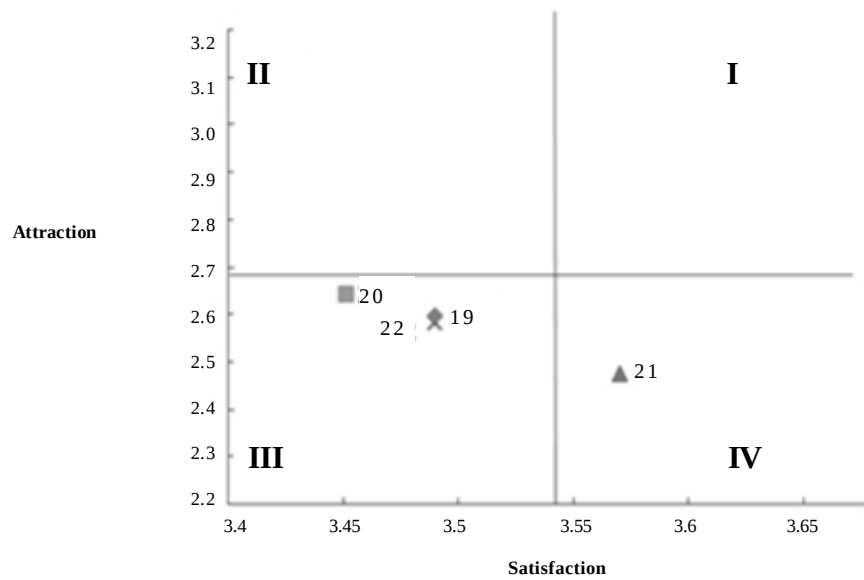


Fig. 6. Perceived administration: Attraction – Satisfaction Important Performance analysis

Source: Author

colors and add various ideas for games since these endeavors will definitely make children more happy to play and learn during the games.

As for the playground activity satisfaction, the analysis showed that children's perceptions towards "relax and relieve stress" and "stay healthy and enhance health" respectively rank first and second. This finding has pointed out that on facing cumulative pressure at school and daily schoolwork which reduce children's physical health in long term as well as cause excessive decrease on their perceived freedom, in order to relax and relieve stress as well as to stay healthy and enhance health, children will utilize school outdoor sports playground to relax physically and mentally to really feel comfortable, pleasurable, and satisfied. Yao (2015) indicated that correlations exist between play equipment utilization frequencies and satisfaction ratings. It also revealed that rare and occasional playground participants are more likely to be attracted to play equipment with moving parts, higher physical challenges, and creative designs. Therefore, the play equipment should still be carefully selected and installed in consideration of different age groups, and participants' needs and characteristics; and more creative and cutting-edge play equipment should be considered for future playground improvements.

As for the IPA analysis, twenty-two achieved items were distributed into 4 quadrants. The items "playground has equipment with swinging and vibration features" and "playground has climbing drill equipment with balance functions" were located in the first quadrant which was considered as "keep up the good work" area, implying their high degrees in both perceived attraction and experienced satisfaction and indicating that they should be continuously maintained. Since these two variables reflect children's higher demands towards the project, simultaneously it not only strongly affects children's actual feelings due to close relations with their degree of enjoyment and satisfaction but also act as children's concerns when using the playground. School administrators should actively maintain these features and functions in future planning and setting up campus sports playground opportunities in order to create the most perfect sports playground quality for attracting children's participation.

Being distributed into the second quadrant, six items of "playground has equipment with slippery features", "playground has equipment with rotation functions", "modeling styles",

"playground color combinations", "playing field line planning", and "playground space planning" with highly perceived attraction but low satisfaction have strongly posed significant threats to the success of playground once they are not properly paid attention to. These findings show that children really valued these aspects; however, their perceived satisfaction is low, meaning that these six items have not been properly identified, hence indicating a great need for strengthening and emphatically improving.

Concerning the third quadrant, seven items of "playground equipment and facility diversity", "multi-functional playground facilities", "playground location ease of use", "playground facility public use planning", "playground management and maintenance", "playground hygienic environment situation", and "playground open use methods" surprisingly indicate low degrees in both perceived attraction and satisfaction. In other words, these items reflected the attributes with disadvantages and low priorities, implying the low priorities for these aspects in the planning and setting of elementary school outdoor sports playground. Therefore, playground administrators should depend on their status to select the appropriate management projects in this area. As such, it is suggested that "playground management and maintenance" is worth exploring and can become the future focus of both children and school since maintaining superior-performing facilities and equipment and normalized operation not only enhances children's smooth and good feelings when using the playground but also their personal safety. For these reasons, school should emphasize this endeavor as an opportunity for positive improvement.

Finally, seven items in the fourth quadrant which are "playground helps promote feelings among classmates and friends", "playground helps relax and relieve stress", "playground helps stay healthy and enhance health", "playground helps improve interpersonal relations", "using the sports playground is interesting", "feeling towards overall atmosphere of the sports playground", "security condition of the sports playground" represent low perceived attraction and high satisfaction. This situation is considered over-supply, implying little effects towards children's satisfaction when being enhanced of the items in this quadrant. Hence, these items are perceived not necessary to be too emphasized. Nonetheless, since these items reflect children's lack of perceived attraction to-

wards campus sports playground, they could be utilized as school resource references in promoting students' cognition and awareness, which in turn effectively makes these aspects more competitive.

CONCLUSION

The present study contributes to the identifications of key elements of elementary schools students' attraction and satisfaction towards outdoor playground sports equipment and environment. It can be concluded that by providing diverse, multi-functional, colorful and ease of use playground facilities and maintain good conditions of equipment, which can certainly increase students' outdoor activities during recess.

RECOMMENDATIONS

The study shows that students considered the use of sports playground as the way of relaxing and relieving stress, enjoying, happiness, and establishing good peer relationships, therefore, schools should be more aware of the conditions of the sports playground facilities and actively seek appropriate funding from higher management units to improve the playground quality and setup suitable equipment to satisfy children's demands.

As for future research, parents can be included as participants to provide useful references and directions for future planning of school sports playground.

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